Baffinland Iron Mines Corporation

Mary River Project

2019 ENVIRONMENT AND CLIMATE CHANGE CANADA METAL AND DIAMOND MINING EFFLUENT REGULATIONS ANNUAL REPORT

REV 0

2020-03-31	0		
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Date	**Rev.**	**Prepared By**	**Reviewed and Approved By**

TABLE 0: REPORT SUBMISSION SUMMARY

Reporting Period	2019
Annual Report Submission Date:	March 31, 2020
Name and Operator of the Mine:	**Baffinland Iron Mines - Mary River Project** **Baffinland Iron Mines Corporation**
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TABLE OF CONTENTS

LIST OF TABLES

APPENDICES

ABBREVIATIONS

Baffinland	Baffinland Iron Mines Corporation
CF	Crushing Facility
CF Pond	Crushing Facility Surface Water Management Pond
CCME	Canadian Council of Ministers of the Environment
CoA	Certificates of Analyses
HDPR	High-Density Polyethylene
ECCC	Environment and Climate Change Canada
EEM	Environmental Effects Monitoring
FDP	Final Discharge Point
MDMER	Metal and Diamond Mining Effluent Regulations
Mine Site	Mary River Mine Site
MMER	Metal Mining Effluent Regulations
MRFT	Mary River Tributary-F
QA/QC	Quality Assurance / Quality Control
the Project	Mary River Project
Tote Road	Milne Inlet Tote Road
WQG	Water Quality Guideline
WRF	Waste Rock Facility
WTP	Water Treatment Plant

1 INTRODUCTION

In accordance with the Metal and Diamond Mining Effluent Regulations (MDMER), this report has been prepared to summarize the monitoring and controlled discharges that occurred at Baffinland Iron Mines Corporation's (Baffinland) Mary River Project (Project) during 2019 from surface water management ponds regulated under the MDMER at the Project's Mary River Mine Site (Mine Site).

The Project is focused on developing several high grade iron ore deposits in the Qikiqtani Region of Baffin Island, Nunavut. During 2019, Baffinland continued to increase mining operations at the Project's Deposit No. 1, located at the Mine Site, approximately 100 kilometres south of Milne Inlet. Mining at Deposit No. 1 is an open pit operation that involves the blasting, crushing and screening of high grade iron ore. Due to the iron ore's high grade, iron ore generated by crushing and screening operations at the Mine Site is considered market ready and requires no further milling or processing. Throughout the year, ore generated at the Mine Site is transported by ore haul trucks and stockpiled at a port site on Milne Inlet, referred to as Milne Port. Ore is transported to Milne Port from the Mine Site using a 100 kilometre road known as the Milne Inlet Tote Road (Tote Road). Ore stockpiled at Milne Port throughout the year is shipped to international markets from Milne Inlet during the shipping season.

On July 10, 2015, the Project became subject to the Metal Mining Effluent Regulations (MMER) under the Fisheries Act as a result of the discharge of effluent in excess of 50 cubic metres (m^3) from the Project's Waste Rock Facility (WRF) surface water management pond (WRF Pond) located at the Mine Site, referred to as effluent monitoring station MS-08.

On June 18, 2016, Baffinland provided Environment and Climate Change Canada (ECCC) with notification and pertinent information regarding the addition of a second effluent monitoring location under MMER for the Project's Crushing Facility (CF) surface water management pond (CF Pond), referred to as effluent monitoring station MS-06.

On June 2, 2017, Baffinland notified ECCC of changes to the final discharge point (FDP) locations for both MS-08 and MS-06. The new coordinates provided in the notification improved the accuracy of the FDPs for both MS-06 and MS-08 and reflect the locations where Baffinland is no longer in control of the effluent discharged to the receiving environment from the monitoring locations.

On June 1, 2018, the MMER were amended, and became the Metal and Diamond Mining Effluent Regulations (MDMER).

On July 3, 2018, Baffinland notified ECCC of changes to the final discharge point (FDP) location for MS-08. The new coordinates reflect the commissioning of the Facility's water treatment plant (WTP) and the location at which Baffinland is no longer in control of the effluent discharged to the receiving environment.

On July 30, 2018, as per subsection 37(1) of the MDMER referred to in paragraph 8(2)(c), Baffinland provided ECCC with information regarding the design-rated capacity of the mine. The design rated

capacity of the Mine Site is projected to be 6 million tonnes (Mt) of iron ore and 3 Mt of waste rock, annually. Mine capacity is determined from equipment estimation, with loading unit rates matched to specific source destination haulage parameters. Geological reserve models are used for material sequencing and quantities.

On July 1, 2019, Baffinland notified ECCC of a controlled transfer of in pit mine water from Deposit No. 1 and subsequent discharge from the MS-08 FDP (refer to Appendix G).

1.1 WASTE ROCK FACILITY POND (MS-08)

The Waste Rock Facility (WRF) was constructed to support Deposit No. 1 mining operations and is located approximately one kilometer northeast of the Deposit No. 1 open pit (refer to map included in Appendix A). Surface water runoff originating from the WRF is intercepted by the Facility's perimeter collection ditches and directed to the WRF Pond. In pit mine water was also transferred to the WRF Pond in 2019 and subsequently treated with the WTP and discharged to the receiving environment through the MS-08 FDP. The WRF Pond is a high-density polyethylene (HDPE) lined earthen walled basin with an approximate capacity of 52,198 m^3. The WRF Pond was repaired and expanded during late 2019, from an original capacity of 9,200 m^3, to accommodate the planned expansion of the WRF footprint over the coming years as well as to address concerns identified in 2017 and 2018.

A transfer pump (located at Latitude 71° 20' 41.7" Longitude 79° 14' 21.2") pumps effluent from the WRF Pond through approximately 330 metres (m) of 8" layflat hose to the water treatment plant (WTP). The WTP consists of physical-chemical treatment for pH adjustment, chemical precipitation and removal of solids by physical barrier. The water treatment processes include coagulation, pH adjustment and precipitation, flocculation and filtration. The WTP effluent is discharged via a Gorman-Rupp 6" pump and sections of lay-flat hose. The FDP for MS-08 is a sampling port after the discharge pump. Coordinates for the MS-08 FDP and MS-08 Discharge Line Outflow are provided below. Following the FDP, effluent passes through approximately 475 m of layflat hose and is discharged to the tundra of the approved receiving environment, the Mary River watershed.

Final Discharge Point MS-08:	Latitude: 71° 20' 41.6"	Longitude: 79° 13' 44.5"
MS-08 Discharge Line Outflow:	Latitude: 71° 20' 41.7"	Longitude: 79° 13' 00.4"

The WTP was constructed in 2018 and has a design treatment rate of 280 m3/hr capacity, consisting of two 140 m^3/hr treatment trains. For each train, the water flow rate and pH in Reactor Tanks 1 and 2 is continuously monitored. Ferric sulfate and polymer is added based on flow rate, while the lime dosage is based on the pH in Reactor Tank 1. The chemical dose rate is adjusted by the plant operator using the PLC to achieve water quality requirements. Monitoring of the treated effluent at various stages of the treatment system is conducted to monitor the treatment system's performance. The WTP Operating SOP,

which includes the operating instructions as well as an overview of the treatment process, General Arrangement Drawings, and Process and Instruments Diagrams is provided as Appendix B of this report.

In 2019, the WTP was operated from June to October discharging over 117,000 m3 of effluent. Effluent discharge volumes were monitored and recorded during periods of discharge through the use of a Krohne Enviromag 6" Magnetic Flow Meter. The frequency and volume of effluent discharges from the WTP was dictated by the WRF Pond's capacity, weather conditions, air logistics, sample holding times, and treatment requirements. As such, effluent was discharged intermittently on an as-needed basis from approximately early June to October. Consequently, the implementation of MDMER effluent and water quality monitoring is restricted to periods of effluent discharge rather than throughout the year due to Project constraints. Since the Project became subject to MDMER, volume and effluent quality monitoring at the MS-08 FDP is initiated and conducted during periods of effluent discharge.

Effluent from the end of the layflat hose is discharged overland (no defined channel) and flows east-northeast over boulder-cobble till material for approximately 475 m before entering a headwater depression that contains intermittent natural flow. The gradient of the depression continues eastward, eventually forming a clearly defined channel approximately 1,170 m down gradient of the end of the layflat hose line. This defined channel drains southeast approximately 740 m before discharging into a Mary River tributary referred to as Mary River Tributary-F (MRTF). From this confluence, MRTF flows south approximately 3.3 kilometres (km) before discharging into the Mary River. MRTF is non-fish bearing, due to the combination of complete freeze up during winter, relatively high stream gradient and the presence of natural in-stream fish barriers near its confluence with the Mary River. Thus, the Mary River represents the primary fish bearing waters reached by mine effluent, and is the Project's receiving water body for the fish monitoring program required by Environmental Effects Monitoring (EEM) under MDMER.

The Project's Phase 1 EEM field study was completed in the summer of 2017 and focused on two (2) effluent-exposed watercourses, MRTF and the Mary River. The Phase 1 Interpretive Report was subsequently prepared by Minnow Environmental Inc. (Minnow) and submitted to ECCC in January, 2018. A copy of the Project's Phase 1 Interpretive Report was provided in the 2018 ECCC MDMER Annual Report. In summary, parameters were below water quality guidelines and no observed effluent-related influences on benthic invertebrate community endpoints suggested that factors other than effluent accounted for the observed difference in non-YOY Arctic charr condition between the effluent-exposed and reference areas of the Mary River. The Project's Phase 2 EEM Study Design was submitted to ECCC on February 7, 2020 for review and approval, with the Phase 2 EEM field study planned for August 2020.

Two (2) water monitoring stations have been established on the Mary River for the purpose of MDMER water quality monitoring, including an upstream reference station (MS-08-US) and an effluent-exposed downstream station (MS-08-DS). Coordinates for the Mary River water monitoring stations are provided below.

MS-08-US (Reference)	Latitude: 71° 18’ 37.8”	Longitude: 79° 11’ 13.5”
MS-08-DS (Effluent-Exposed)	Latitude: 71° 18’ 38.9”	Longitude: 79° 12’ 09.4”

1.2 CRUSHING FACILITY POND (MS-06)

The Crushing Facility (CF) at the Mine Site consists of a pad that houses three (3) crusher spreads as well as associated run-of-mine, lump and fines ore stockpiles. Ditches along the perimeter of the pad directs surface water runoff from the pad to the CF Pond. The CF Pond is a HDPE lined earthen walled basin with an approximate capacity of 4,500 m^3. Runoff (i.e. effluent) collected in the CF Pond is treated for solids removal via pond-based settling (refer to map included in Appendix A). Effluent from the CF Pond is pumped to the approved Mary River outfall discharge location located approximately 1.3 km southeast of the CF Pond using the Mine Site’s treated sewage effluent pipeline, originating at the Mine Site sewage treatment plant. Coordinates for the MS-06 FDP are provided below.

Final Discharge Point MS-06:	Latitude: 71° 18’ 41.0”	Longitude: 79° 16’ 51.1”
MS-06 Effluent Discharge Line:	Latitude: 71° 18’ 6.6”	Longitude: 79° 15’ 23.0”

When effluent discharges are required at MS-06, effluent is pumped and transferred via the treated sewage effluent pipeline to the outfall location near Mary River. The FDP for MS-06 is a sample port located after the pump and before the connection to the sewage effluent pipeline. Mary River is a fish bearing waterbody at the location that receives effluent discharged from MS-06 and is also the receiving waterbody for monitoring the potential effects from effluent discharged from MS-08. As previously stated, two stations have been established on Mary River for the purpose of MDMER water quality monitoring, the MS-08 reference station (MS-08-US) and the MS-08 effluent-exposed station (MS-08-DS). An additional receiving environment water quality monitoring station has been established on Mary River to monitor influences from MS-06 effluent discharge (MS-06-DS). Coordinates for the Mary River water quality monitoring stations are provided below.

MS-08-US (Reference):	Latitude: 71° 18’ 37.8”	Longitude: 79° 11’ 13.5”
MS-08-DS (Effluent-Exposed):	Latitude: 71° 18’ 38.9”	Longitude: 79° 12’ 09.4”
MS-06-DS (Effluent-Exposed):	Latitude: 71° 18’ 01.5”	Longitude: 79° 15’ 32.8”

A figure showing the location of all sampling points is provided in Appendix A of this report.

2 EFFLUENT AND WATER QUALITY MONITORING

The following section discusses the effluent and water quality monitoring of discharges from MS-08 and MS-06 during 2019. Frequency of sampling was dictated by dates of discharge in addition to sample shipping-related logistical constraints and parameter holding time requirements.

2.1 SUMMARY OF DELETERIOUS SUBSTANCES MONITORING

Deleterious substance monitoring was performed 16 times during the discharge of effluent from MS-08 and two (2) times during the discharge of effluent from MS-06 in 2019. The detection limits, mean monthly averages, and mean monthly limits for MS-08 and MS-06 effluent are presented below in Tables 1 and 2, respectively. Certificates of Analyses (CoA) are provided in Appendix C. The daily and monthly cumulative volumes of effluent discharged from MS-08 and MS-06 during 2019 are presented in Tables 3 and 4, respectively. The last date of discharge in 2019 was October 2, 2019 from MS-08 and September 6, 2019 from MS-06.

Table 1: Effluent Deleterious Substances – MS-08

Month	As (mg/L)	Cu (mg/L)	Pb (mg/L)	Ni (mg/L)	Zn (mg/L)	TSS (mg/L)	Ra 226 (Bq/L)	Lowest pH	Highest pH	Effluent Volume (m^3)
Detection Limits[2,3]	0.0001	0.001	0.00005	0.0005	0.003	2	0.0039[1]	0.1	0.1	-
January	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP
February	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP
March	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP
April	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP
May	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP
June	0.0004	0.0045	0.0004	0.0531	0.0134	15.52	0.0077	6.43	7.81	31,088
July	0.0005	0.0068	0.0003	0.0209	0.015	9.175	0.0390	7.00	8.92	45,870
August	0.0016	0.0163	0.0008	0.025	0.0488	9.975	0.0520	7.46	8.89	29,920
September	0.0005	0.005	0.0012	0.0533	0.015	35.33	0.0135	6.91	8.47	9,618
October	0.0005	0.005	0.0003	0.0071	0.015	6.0	0.018	8.79	8.79	1,234
November	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP
December	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP
Mean Monthly Limit	0.5	0.3	0.2	0.5	0.5	15.0	0.37	--	--	--

[1]Radium Detection Limits vary; 0.0093, 0.0099, 0.0047, 0.0075, 0.0084, 0.0049, 0.0070, 0.0086, 0.0069, 0.0068, 0.0075, 0.0079, 0.0048 from June to September.

[2]August 21 detection limits differ; Arsenic 0.01 mg/L, Copper 0.10 mg/L, Lead 0.005 mg/L, Nickel 0.05 mg/L, Zinc 0.3 mg/L

[3]June 7, June 11, June 24, June 30, July 8, July 15, July 22, July 29, August 5, August12, August 21, August 26, September 2 and September 28 detection limits differ; Arsenic 0.001 mg/L, Copper 0.01 mg/L, Lead 0.0005 mg/L, Nickel 0.005 mg/L, Zinc 0.03 mg/L.

Averages calculated by using half the value of the detection limits.

Mean Monthly Limit outlined in MDMER Schedule 4

Table 2: Effluent Deleterious Substances – MS-06

Month	As (mg/L)	Cu (mg/L)	Pb (mg/L)	Ni (mg/L)	Zn (mg/L)	TSS (mg/L)	Ra 226 (Bq/L)	Lowest pH	Highest pH	Effluent Volume (m^3)
Detection Limits	0.0001	0.001	0.00005	0.0005	0.003	2	0.0057[1]	0.1	0.1	-
January	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP
February	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP
March	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP
April	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP
May	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP
June	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP
July	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP
August	0.0005	0.005	0.0003	0.0969	0.015	4.7	0.013	7.01	7.01	602
September	0.0005	0.005	0.0003	0.0944	0.015	2.7	0.023	7.08	7.08	1,059
October	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP
November	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP
December	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP	NDEP
Mean Monthly Limit	0.5	0.3	0.2	0.5	0.5	15	0.37	-	-	-

[1]Radium Detection Limits differ; 0.0071 Bq/L in September.

Averages calculated by using half the value of the detection limits.

Mean Monthly Limit outlined in MDMER Schedule 4

Table 3: Volumes of Effluent Discharged – MS-08

Date	Volume Discharged (m^3)	Date	Volume Discharged (m^3)	Date	Volume Discharged (m^3)	Date	Volume Discharged (m3)	Date	Volume Discharged (m3)
1-Jun-19	0	1-Jul-19	528	1-Aug-19	1,373	1-Sep-19	503	1-Oct-19	714
2-Jun-19	0	2-Jul-19	779	2-Aug-19	1,931	2-Sep-19	404	2-Oct-19	520
3-Jun-19	0	3-Jul-19	724	3-Aug-19	2,803	3-Sep-19	778	3-Oct-19	0
4-Jun-19	0	4-Jul-19	771	4-Aug-19	981	4-Sep-19	365	4-Oct-19	0
5-Jun-19	0	5-Jul-19	671	5-Aug-19	454	5-Sep-19	491	5-Oct-19	0
6-Jun-19	0	6-Jul-19	0	6-Aug-19	1,079	6-Sep-19	480	6-Oct-19	0
7-Jun-19	328	7-Jul-19	0	7-Aug-19	1,171	7-Sep-19	383	7-Oct-19	0
8-Jun-19	2,998	8-Jul-19	255	8-Aug-19	1,235	8-Sep-19	0	8-Oct-19	0
9-Jun-19	0	9-Jul-19	0	9-Aug-19	1,759	9-Sep-19	0	9-Oct-19	0
10-Jun-19	1,889	10-Jul-19	0	10-Aug-19	2,114	10-Sep-19	0	10-Oct-19	0
11-Jun-19	2,155	11-Jul-19	407	11-Aug-19	864	11-Sep-19	0	11-Oct-19	0
12-Jun-19	1,124	12-Jul-19	1,614	12-Aug-19	1,325	12-Sep-19	0	12-Oct-19	0
13-Jun-19	468	13-Jul-19	3,045	13-Aug-19	1,485	13-Sep-19	0	13-Oct-19	0
14-Jun-19	0	14-Jul-19	3,851	14-Aug-19	1,583	14-Sep-19	0	14-Oct-19	0
15-Jun-19	1,640	15-Jul-19	2,336	15-Aug-19	0	15-Sep-19	0	15-Oct-19	0
16-Jun-19	1,499	16-Jul-19	2,179	16-Aug-19	0	16-Sep-19	0	16-Oct-19	0
17-Jun-19	1,795	17-Jul-19	3,394	17-Aug-19	110	17-Sep-19	0	17-Oct-19	0
18-Jun-19	2,222	18-Jul-19	2,579	18-Aug-19	597	18-Sep-19	0	18-Oct-19	0
19-Jun-19	2,628	19-Jul-19	2,421	19-Aug-19	0	19-Sep-19	0	19-Oct-19	0
20-Jun-19	2,140	20-Jul-19	2,417	20-Aug-19	0	20-Sep-19	0	20-Oct-19	0
21-Jun-19	2,228	21-Jul-19	2,338	21-Aug-19	391	21-Sep-19	0	21-Oct-19	0
22-Jun-19	787	22-Jul-19	1,950	22-Aug-19	844	22-Sep-19	0	22-Oct-19	0
23-Jun-19	538	23-Jul-19	2,699	23-Aug-19	531	23-Sep-19	0	23-Oct-19	0
24-Jun-19	776	24-Jul-19	1,412	24-Aug-19	624	24-Sep-19	0	24-Oct-19	0
25-Jun-19	1,049	25-Jul-19	1,663	25-Aug-19	703	25-Sep-19	0	25-Oct-19	0
26-Jun-19	1,026	26-Jul-19	1,567	26-Aug-19	1,253	26-Sep-19	0	26-Oct-19	0
27-Jun-19	1,228	27-Jul-19	1,156	27-Aug-19	1,217	27-Sep-19	0	27-Oct-19	0
28-Jun-19	1,495	28-Jul-19	917	28-Aug-19	452	28-Sep-19	939	28-Oct-19	0
29-Jun-19	474	29-Jul-19	1,213	29-Aug-19	421	29-Sep-19	1,824	29-Oct-19	0
30-Jun-19	603	30-Jul-19	785	30-Aug-19	1,452	30-Sep-19	3,452	30-Oct-19	0
		31-Jul-19	2,200	31-Aug-19	1,169			31-Oct-19	0
June	**31,088**	**July**	**45,870**	**August**	**29,920**	**September**	**9,618**	**October**	**1,234**

Table 4: Volumes of Effluent Discharged – MS-06

Date	Volume Discharged (m^3)	Date	Volume Discharged (m^3)
1-Aug-19	0	1-Sep-19	201
2-Aug-19	0	2-Sep-19	204
3-Aug-19	0	3-Sep-19	177
4-Aug-19	0	4-Sep-19	160
5-Aug-19	0	5-Sep-19	189
6-Aug-19	0	6-Sep-19	128
7-Aug-19	0	7-Sep-19	0
8-Aug-19	0	8-Sep-19	0
9-Aug-19	0	9-Sep-19	0
10-Aug-19	0	10-Sep-19	0
11-Aug-19	0	11-Sep-19	0
12-Aug-19	0	12-Sep-19	0
13-Aug-19	0	13-Sep-19	0
14-Aug-19	0	14-Sep-19	0
15-Aug-19	0	15-Sep-19	0
16-Aug-19	0	16-Sep-19	0
17-Aug-19	0	17-Sep-19	0
18-Aug-19	0	18-Sep-19	0
19-Aug-19	0	19-Sep-19	0
20-Aug-19	0	20-Sep-19	0
21-Aug-19	0	21-Sep-19	0
22-Aug-19	0	22-Sep-19	0
23-Aug-19	0	23-Sep-19	0
24-Aug-19	0	24-Sep-19	0
25-Aug-19	0	25-Sep-19	0
26-Aug-19	0	26-Sep-19	0
27-Aug-19	0	27-Sep-19	0
28-Aug-19	0	28-Sep-19	0
29-Aug-19	13	29-Sep-19	0
30-Aug-19	132	30-Sep-19	0
31-Aug-19	208		
August	**353**	**September**	**1,059**

2.2 ACUTE TOXICITY

Acute toxicity samples were collected and analyzed for MS-08 effluent on June 17, July 8, August 5, September 2 and October 1, 2019. All samples collected from MS-08 were confirmed to be acutely non-lethal for both Rainbow Trout and Daphnia magna.

Acute toxicity samples were collected and analyzed for MS-06 effluent on August 29 and September 2, 2019. Both samples collected from MS-06 were confirmed to be acutely non-lethal for both Rainbow Trout and Daphnia magna. Results of these acute toxicity samples are summarized in Tables 5 and 6. Refer to Appendix C for copies of Certificates of Analyses.

Table 5: Effluent Acute Lethality – MS-08

Sample Number	Sample ID	Date Sample Collected	Results for Rainbow Trout Acute Lethality Tests (mean percentage mortality in 100% effluent test concentration)	Results for *Daphnia magna* Monitoring Tests (mean percentage mortality in 100% effluent test concentration)	Results for Threespine Stickleback Acute Lethality Tests (mean percentage mortality in 100% effluent test concentration)
59519	**MS-08**	**17-Jun-19**	0	0	N/A
59519	**MS-08**	**8-Jul-19**	0	0	N/A
60171	**MS-08**	**5-Aug-19**	10	0	N/A
60495	**MS-08**	**2-Sep-19**	0	0	N/A
60925	**MS-08**	**1-Oct-19**	0	0	N/A

Table 6: Effluent Acute Lethality – MS-06

Sample Number	Sample ID	Date Sample Collected	Results for Rainbow Trout Acute Lethality Tests (mean percentage mortality in 100% effluent test concentration)	Results for *Daphnia magna* Monitoring Tests (mean percentage mortality in 100% effluent test concentration)	Results for Threespine Stickleback Acute Lethality Tests (mean percentage mortality in 100% effluent test concentration)
60486	**MS-06**	**29-Aug-19**	0	0	N/A
60492	**MS-06**	**2-Sep-19**	0	0	N/A

2.3 EFFLUENT CHARACTERIZATION

Effluent characterization sampling was conducted at MS-08 FDP and MS-06 FDP and at the Mary River water quality monitoring stations MS-08-DS, MS-06-DS and MS-08-US during effluent discharges. Parameters required to be reported under MDMER are presented in Tables 7 through 12 below. More details of these results and the optional site-specific parameters measured can be found in the Certificates

of Analyses in Appendix C of this report. The Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines for the Protection of Aquatic Life for long term exposure (CCME LT WQG) are included as supplementary information in Tables 7 through 12.

Table 7: Effluent Characterization – MS-08

Date	Hardness (mg/L)	Alkalinity (mg/L)	Electrical Conductivity (µmhos/cm)	Temperature °C	Dissolved Oxygen %	Dissolved Oxygen (mg/L)	Aluminum (mg/L)	Cadmium (mg/L)	Iron (mg/L)	Mercury (mg/L)	Molybdenum (mg/L)	Selenium (mg/L)	Nitrate (as N) (mg/L)	Chloride (mg/L)	Chromium (mg/L)	Cobalt (mg/L)	Sulphate (mg/L)	Thallium (mg/L)	Uranium (mg/L)	Phosphorus (mg/L)	Manganese (mg/L)	Ammonia (as N) (mg/L)
Detection Limits - June	0.5	10	3	--	--	--	0.005	0.000005	0.00005	0.00001	0.00005	0.00005	0.02	0.5	0.0005	0.0001	0.3	0.00001	0.00001	0.003	0.005	0.01
Detection Limits - July	1.3	10	3	--	--	--	0.05	0.00005	0.1	0.000005	0.0005	0.0005	0.1	2.5	0.005	0.001	1.5	0.0001	0.0001	0.003	0.005	0.2
Detection Limits - October	1.3	10	3	--	--	--	0.05	0.00005	0.1	0.000005	0.0005	0.0005	0.2	5	0.005	0.001	3	0.0001	0.0001	0.003	0.005	0.1
17-Jun-19	375	<10	712	8.6	107.1	11.5	0.531	0.000059	2.65	<0.000010	0.000536	0.00113	1.76	1.38	0.0013	0.0405	375	0.000026	0.000407	0.0096	2.79	0.425
22-Jul-19	3,260	15	4,180	15.4	69	6.8	<0.050	<0.000050	1.56	<0.0000050	<0.00050	0.00674	21.2	14.0	<0.0050	0.0097	3,070	0.00026	0.00019	<0.0030	8.57	6.98
1-Oct-19	3,990	39	5,040	1.3	79.5	10.3	0.082	<0.000050	0.42	<0.0000050	0.00141	0.00642	16.7	17.2	<0.0050	0.005	4,070	<0.00010	0.0019	<0.0030	1.12	3.79

Table 8: Effluent Characterization – MS-06

Date	Hardness (mg/L)	Alkalinity (mg/L)	Electrical Conductivity (µmhos/cm)	Temperature °C	Dissolved Oxygen %	Dissolved Oxygen (mg/L)	Aluminum (mg/L)	Cadmium (mg/L)	Iron (mg/L)	Mercury (mg/L)	Molybdenum (mg/L)	Selenium (mg/L)	Nitrate (as N) (mg/L)	Chloride (mg/L)	Chromium (mg/L)	Cobalt (mg/L)	Sulphate (mg/L)	Thallium (mg/L)	Uranium (mg/L)	Phosphorus (mg/L)	Manganese (mg/L)	Ammonia (as N) (mg/L)
Detection Limits - August	1.3	10	3	--	--	--	0.05	0.00005	0.1	0.000005	0.0005	0.0005	0.1	2.5	0.005	0.001	1.5	0.0001	0.0001	0.003	0.005	0.1
29-Aug-19	1,430	<10	2,220	11.9	101.1	10.8	<0.050	0.000339	0.14	<0.0000050	<0.00050	0.00223	10.2	26.9	<0.0050	0.0895	1,390	0.00015	0.00012	<0.0030	14.1	2.72

Table 9: Effluent Exposure Area – MS-08

Date	Hardness (mg/L)	Alkalinity (mg/L)	Electrical Conductivity (µmhos/cm)	Temperature °C	Dissolved Oxygen %	Dissolved Oxygen (mg/L)	Aluminum (mg/L)	Cadmium (mg/L)	Iron (mg/L)	Mercury (mg/L)	Molybdenum (mg/L)	Selenium (mg/L)	Nitrate (as N) (mg/L)	Chloride (mg/L)	Chromium (mg/L)	Cobalt (mg/L)	Sulphate (mg/L)	Thallium (mg/L)	Uranium (mg/L)	Phosphorus (mg/L)	Manganese (mg/L)	Ammonia (as N) (mg/L)
Detection Limits - June	0.5	10	3	--	--	--	0.005	0.000005	0.01	0.00001	0.00005	0.00005	0.02	0.5	0.0005	0.0001	0.9	0.00001	0.00001	0.05	0.0005	0.01
Detection Limits - July	0.5	10	3	--	--	--	0.005	0.000005	0.01	0.000005	0.00005	0.00005	0.02	0.5	0.0005	0.0001	0.3	0.00001	0.00001	0.003	0.0005	0.01
Detection Limits - August	0.5	10	3	--	--	--	0.005	0.000005	0.01	0.000005	0.00005	0.00005	0.02	0.5	0.0005	0.0001	0.3	0.00001	0.00001	0.05	0.0005	0.01
Detection Limits - October	0.5	10	3	--	--	--	0.005	0.000005	0.01	0.000005	0.00005	0.00005	0.02	0.5	0.0005	0.0001	0.3	0.00001	0.00001	0.003	0.0005	0.01
WQG (mg/L)	1	2	1	--	--	--	0.005	0.000045	0.15	0.00001	0.0365	0.0005	1.46835	60	0.00445	0.00125	0.6	0.0004	0.0075	0.05	0.005	0.05
17-Jun-19	16	13	28.3	6.4	100.3	12.56	0.665	<0.0000050	0.912	<0.000010	0.000056	<0.000050	<0.020	0.5	0.00159	0.00046	0.9	0.000012	0.000183	0.0295	0.0189	<0.010
22-Jul-19	65.7	58	134	12.3	98.6	12.24	0.662	<0.0000050	0.591	<0.0000050	0.000301	<0.000050	0.048	3.67	0.00138	0.00027	9.04	0.000017	0.00192	0.0128	0.00691	<0.010
26-Aug-19	109	91	271	5.0	98.3	12.5	0.333	<0.0000050	0.274	<0.0000050	0.000473	<0.000050	0.082	14.2	0.00064	0.00014	18.8	<0.000010	0.00608	0.0178	0.00377	<0.010
1-Oct-19	83	85	199	1.7	97.3	13.4	0.118	<0.0000050	0.117	<0.0000050	0.000321	<0.000050	0.082	8.2	<0.00050	<0.00010	7.65	<0.000010	0.00415	0.005	0.00247	<0.010

Canadian Environment Water Quality Guideline for the long term protection of aquatic life (CCME1999, 2017) was selected where a CCME guideline exists. Where no CCME guideline exists, the selected criteria are the lowest of either the Ontario Provincial Water Quality Objective (PWQO; OMOE 1994 indicated by a *) or the British Columbia Water Quality Guideline (BCWQG; BCMOE 2013 indicated by a **), as available.

Sulphate guideline is hardness (mg/L CaCO3) dependent as follows: 128 mg/L at 0 - 30 hardness, 218 mg/L at 31 - 75 hardness, 309 mg/L at 76 - 180 hardness, and 429 mg/L at 181 - 250 hardness.

Manganese guideline is hardness (mg/L CaCO3) dependent, and calculated using the equation Mn (ug/L) = 0.0044 * (hardness) + 0.605.

Table 10: Effluent Exposure Area – MS-06

Date	Hardness (mg/L)	Alkalinity (mg/L)	Electrical Conductivity (µmhos/cm)	Temperature ∘C	Dissolved Oxygen %	Dissolved Oxygen (mg/L)	Aluminum (mg/L)	Cadmium (mg/L)	Iron (mg/L)	Mercury (mg/L)	Molybdenum (mg/L)	Selenium (mg/L)	Nitrate (as N) (mg/L)	Chloride (mg/L)	Chromium (mg/L)	Cobalt (mg/L)	Sulphate (mg/L)	Thallium (mg/L)	Uranium (mg/L)	Phosphorus (mg/L)	Manganese (mg/L)	Ammonia (as N) (mg/L)
Detection Limits	0.5	10	3	--	--	--	0.005	0.000005	0.01	0.000005	0.00005	0.00005	0.02	0.5	0.0005	0.0001	0.3	0.00001	0.00001	0.05	0.0005	0.01
WQG (mg/L)	1	2	1	--	--	--	0.005	0.000045	0.15	0.00001	0.0365	0.0005	1.46835	60	0.00445	0.00125	0.6	0.0004	0.0075	0.05	0.005	0.05
29-Aug-19	111	93	240	7.1	96.4	11.7	0.289	<0.0000050	0.248	<0.0000050	0.000602	<0.000050	0.03	13.3	0.0006	0.00013	12.4	0.000011	0.00599	0.0046	0.00379	<0.010

Canadian Environment Water Quality Guideline for the long term protection of aquatic life (CCME1999, 2017) was selected where a CCME guideline exists. Where no CCME guideline exists, the selected criteria are the lowest of either the Ontario Provincial Water Quality Objective (PWQO; OMOE 1994 indicated by a *) or the British Columbia Water Quality Guideline (BCWQG; BCMOE 2013 indicated by a **), as available.
Sulphate guideline is hardness (mg/L CaCO3) dependent as follows: 128 mg/L at 0 - 30 hardness, 218 mg/L at 31 - 75 hardness, 309 mg/L at 76 - 180 hardness, and 429 mg/L at 181 – 250 hardness.
Manganese guideline is hardness (mg/L CaCO3) dependent, and calculated using the equation Mn (ug/L) = 0.0044 * (hardness) + 0.605.

Table 11: Effluent Reference Area – MS-08

Date	Hardness (mg/L)	Alkalinity (mg/L)	Electrical Conductivity (µmhos/cm)	Temperature ∘C	Dissolved Oxygen %	Dissolved Oxygen (mg/L)	Aluminum (mg/L)	Cadmium (mg/L)	Iron (mg/L)	Mercury (mg/L)	Molybdenum (mg/L)	Selenium (mg/L)	Nitrate (as N) (mg/L)	Chloride (mg/L)	Chromium (mg/L)	Cobalt (mg/L)	Sulphate (mg/L)	Thallium (mg/L)	Uranium (mg/L)	Phosphorus (mg/L)	Manganese (mg/L)	Ammonia (as N) (mg/L)
Detection Limits - June	0.5	0.01	3	--	--	--	0.005	0.000005	0.01	0.00001	0.00005	0.00005	0.02	0.5	0.0005	0.0001	0.3	0.00001	0.00001	0.05	0.0005	0.01
Detection Limits - July	0.5	10	3	--	--	--	0.005	0.000005	0.01	0.000005	0.00005	0.00005	0.02	0.5	0.0005	0.0001	0.3	0.00001	0.00001	0.05	0.0005	0.01
Detection Limits - August	0.5	10	3	--	--	--	0.005	0.000005	0.01	0.000005	0.00005	0.00005	0.02	0.5	0.0005	0.0001	0.3	0.00001	0.00001	0.05	0.0005	0.01
Detection Limits - October	0.5	10	3	--	--	--	0.005	0.000005	0.01	0.000005	0.00005	0.00005	0.02	0.5	0.0005	0.0001	0.3	0.00001	0.00001	0.05	0.0005	0.01
WQG (mg/L)	1	2	1	--	--	--	0.005	0.000045	0.15	0.00001	0.0365	0.0005	1.46835	60	0.00445	0.00125	0.6	0.0004	0.0075	0.05	0.005	0.05
17-Jun-19	12.1	11	23.3	6.1	97.4	12.12	0.295	0.000008	0.295	<0.000010	0.000054	<0.000050	<0.020	<0.50	0.00061	0.00015	<0.30	<0.000010	0.000162	0.02	0.00581	<0.010
22-Jul-19	55.7	57	114	13.1	99.8	10.37	0.697	<0.0000050	0.567	<0.0000050	0.000324	<0.000050	<0.020	2.92	0.00127	0.00025	1.42	0.000017	0.00187	0.0112	0.00641	<0.010
26-Aug-19	94.8	88	240	4.8	96.9	12.4	0.36	<0.0000050	0.298	<0.0000050	0.000497	<0.000050	0.176	13.6	0.00065	0.00014	9.07	<0.000010	0.00624	0.0096	0.00405	<0.010
1-Oct-19	81.1	85	192	1.7	95.7	13.4	0.0844	<0.0000050	0.066	<0.0000050	0.000364	<0.000050	0.074	8.41	<0.00050	<0.00010	5.26	<0.000010	0.0045	0.0042	0.00121	<0.010

Canadian Environment Water Quality Guideline for the long term protection of aquatic life (CCME1999, 2017) was selected where a CCME guideline exists. Where no CCME guideline exists, the selected criteria are the lowest of either the Ontario Provincial Water Quality Objective (PWQO; OMOE 1994 indicated by a *) or the British Columbia Water Quality Guideline (BCWQG; BCMOE 2013 indicated by a **), as available.
Sulphate guideline is hardness (mg/L CaCO3) dependent as follows: 128 mg/L at 0 - 30 hardness, 218 mg/L at 31 - 75 hardness, 309 mg/L at 76 - 180 hardness, and 429 mg/L at 181 - 250 hardness.
Manganese guideline is hardness (mg/L CaCO3) dependent, and calculated using the equation Mn (ug/L) = 0.0044 * (hardness) + 0.605.

Table 12: Effluent Reference Area – MS-06

Date	Hardness (mg/L)	Alkalinity (mg/L)	Electrical Conductivity (µmhos/cm)	Temperature ∘C	Dissolved Oxygen %	Dissolved Oxygen (mg/L)	Aluminum (mg/L)	Cadmium (mg/L)	Iron (mg/L)	Mercury (mg/L)	Molybdenum (mg/L)	Selenium (mg/L)	Nitrate (as N) (mg/L)	Chloride (mg/L)	Chromium (mg/L)	Cobalt (mg/L)	Sulphate (mg/L)	Thallium (mg/L)	Uranium (mg/L)	Phosphorus (mg/L)	Manganese (mg/L)	Ammonia (as N) (mg/L)
Detection Limits - August	**0.5**	**10**	**3**	--	--	--	**0.005**	**0.000005**	**0.01**	**0.000005**	**0.00005**	**0.00005**	**0.02**	**0.5**	**0.0005**	**0.0001**	**0.3**	**0.00001**	**0.00001**	**0.05**	**0.0005**	**0.01**
WQG (mg/L)	1	2	1	--	--	--	0.005	0.000045	0.15	0.00001	0.0365	0.0005	1.46835	60	0.00445	0.00125	0.6	0.0004	0.0075	0.05	0.005	0.05
29-Aug-19	103	92	226	7.2	95.6	11.41	0.301	<0.0000050	0.23	<0.0000050	0.000513	<0.000050	<0.020	12.7	0.00055	0.00011	6.78	0.00001	0.0062	0.0045	0.00294	<0.010

Canadian Environment Water Quality Guideline for the long term protection of aquatic life (CCME1999, 2017) was selected where a CCME guideline exists. Where no CCME guideline exists, the selected criteria are the lowest of either the Ontario Provincial Water Quality Objective (PWQO; OMOE 1994 indicated by a *) or the British Columbia Water Quality Guideline (BCWQG; BCMOE 2013 indicated by a **), as available.
Sulphate guideline is hardness (mg/L CaCO3) dependent as follows: 128 mg/L at 0 - 30 hardness, 218 mg/L at 31 - 75 hardness, 309 mg/L at 76 - 180 hardness, and 429 mg/L at 181 - 250 hardness.
Manganese guideline is hardness (mg/L CaCO3) dependent, and calculated using the equation Mn (ug/L) = 0.0044 * (hardness) + 0.605.

2.4 SUB-LETHAL TOXICITY TESTING

Sub-lethal toxicity testing as per MDMER Schedule 5, Part 1, Section 5 was performed twice during 2019 at MS-08, June 17 and July 22, 2019. Sub-lethal toxicity results for 2019 effluent discharges from MS-08 are provided in Tables 13 and 14 below. The Certificates of Analyses for the sub-lethal toxicity results are provided in Appendix C.

Table 13: Effluent Sub-Lethal Toxicity – IC_{25} – MS-08

Date	Species Tested	Sub-lethal Test Type	Sample Method	Lab	Value	Lower 95% C.L	Upper 95% C.L	Notes
17-Jun-19	*Pimephales promelas*	Growth	Grab	Aquatox	>100.00%	-	-	-
17-Jun-19	*Ceriodaphnia dubia*	Reproduction	Grab	Aquatox	37.40%	9.92%	72.20%	-
17-Jun-19	*Lemna minor*	Growth (fond weight)	Grab	Aquatox	66.20%	44.30%	88.20%	-
17-Jun-19	*Lemna minor*	Growth (fond number)	Grab	Aquatox	35.80%	27.20%	48.20%	-
17-Jun-19	*Pseudokirchneriella subcapitata*	Cell yield	Grab	Aquatox	>90.91%	-	-	-
22-Jul-19	*Pimephales promelas*	Growth	Grab	Aquatox	>100.00%	-	-	-
22-Jul-19	*Ceriodaphnia dubia*	Reproduction	Grab	Aquatox	26.80%	13.80%	30.20%	-
22-Jul-19	*Lemna minor*	Growth (frond weight)	Grab	Aquatox	70.20%	45.50%	97.60%	In the case of effluents, an upper 95% confidence limit of 97% is inferred, since a concentration greater than 97% is not possible. Statistically, however, a confidence limit which is greater than 97% effluent is valid.
22-Jul-19	*Lemna minor*	Growth (frond number)	Grab	Aquatox	30.80%	22.10%	40.20%	-
22-Jul-19	*Pseudokirchneriella subcapitata*	Cell yield	Grab	Aquatox	>90.91%	-	-	-

IC_{25} represents the concentration that demonstrates a 25 percent reduction in growth, reproduction, or yield, depending on the sub-lethal test type.

Table 14: Effluent Sub-Lethal Toxicity – LC_{50} – MS-08

Date	Species Tested	Sub-lethal Test Type	Sample Method	Lab	LC_{50}	Lower 95% C.L.	Upper 95% C.L.
17-Jun-19	*Pimephales promelas*	Growth	Grab	Aquatox	>100.00%	-	-
17-Jun-19	*Ceriodaphnia dubia*	Reproduction	Grab	Aquatox	>100.00%	-	-
22-Jul-19	*Pimephales promelas*	Growth	Grab	Aquatox	>100.00%	-	-
22-Jul-19	*Ceriodaphnia dubia*	Reproduction	Grab	Aquatox	>100.00%	-	-
LC_{50} represents the concentration that would cause 50% lethality of test species.							

3 SAMPLING METHODOLOGY

3.1 SAMPLING PROGRAM – QUALITY ASSURANCE AND QUALITY CONTROL PLAN

Baffinland has developed a Sampling Program – Quality Assurance and Quality Control Plan (BAF-PH1-830-P16-0001) as a requirement of Part I, Item 16 of Water Licence No. 2AM-MRY1325. This Sampling Program (QA/QC) has been prepared following the general recommendations presented in the *Quality Assurance (QA) and Quality Control (QC) Guidelines for use by Class "A" Licences in Meeting SNP Requirements and for Submission of a QA/QC Plan* (INAC, 1996) and the *Guidance Document for the Sampling and Analysis of Metal Mining Effluents* (ECCC, 2001). This Plan is included in Appendix D.

The QA/QC objectives of this Plan are designed to provide guidance to field staff and analytical laboratories in order to maintain a high level of confidence in the water quality data generated by the Project.

QA/QC samples taken in 2019 included blind field duplicates. QA/QC analyses of the duplicate samples taken at MS-08 and MS-06 in 2019 are provided in Tables 15 and 16, respectively. Certificates of Analyses for the QA/QC samples are provided in Appendix C.

Table 15: QA/QC Analysis – MS-08

		Date	17-Jun-19	17-Jun-19	RPD (%)	24-Jun-19	24-Jun-19	RPD (%)	30-Jun-19	30-Jun-19	RPD (%)	29-Jul-19	29-Jul-19	RPD (%)	5-Aug-19	5-Aug-19	RPD (%)
		Sample ID	MS-08	MS-0801		MS-08	MS-0801		MS-08	MS-0801		MS-08	MS-0801		MS-08	MS-0801	
Parameter	Units	Detection Limits[3,4]															
Conductivity	µmhos/cm	3	712	714	0.28%	930	940	1.08%	1060	1060	0.00%	3690	3700	0.27%	6620	6610	0.15%
Hardness	mg/L	0.5[1]	375	378	0.80%	-	-	-	-	-	-	-	-	-	5570	5530	0.72%
pH	pH units	0.1	6.7	6.71	0.15%	7.2	7.23	0.42%	7.81	7.75	0.77%	8.92	8.92	0.00%	8.07	8.13	0.74%
TSS	mg/L	2	10.8	9.6	11.11%	15.6	15.6	0.00%	3.2	4	25.00%	7.6	8	5.26%	6.8	6.4	5.88%
Alkalinity	mg/L	10	<10	<10	-	-	-	-	-	-	-	-	-	-	10	10	0.00%
Ammonia (as N)	mg/L	0.01[5]	0.425	0.428	0.71%	0.537	0.541	0.74%	0.86	0.76	11.63%	5.7	5.3	7.02%	8.65	9.14	5.66%
Chloride	mg/L	0.5	1.38	1.39	0.72%	-	-	-	-	-	-	-	-	-	20.1	20	0.50%
Nitrate (as N)	mg/L	0.02	1.76	1.77	0.57%	-	-	-	-	-	-	-	-	-	27.9	27.6	1.08%
Phosphorus	mg/L	0.003	0.0096	0.0055	42.71%	-	-	-	-	-	-	-	-	-	<0.0030	<0.0030	-
Sulphate	mg/L	0.3	375	377	0.53%	-	-	-	-	-	-	-	-	-	5470	5400	1.28%
Aluminum	mg/L	0.005	0.531	0.479	9.79%	0.712	0.597	16.15%	<0.050	<0.050	-	<0.050	<0.050	-	<0.050	0.193	-
Arsenic	mg/L	0.0001	0.00011	<0.00010	-	<0.0010	<0.0010	-	<0.0010	<0.0010	-	<0.0010	<0.0010	-	<0.0010	<0.0010	-
Cadmium	mg/L	0.000005	0.0000588	0.0000605	2.89%	0.000063	0.000062	1.59%	<0.000050	<0.000050	-	<0.000050	<0.000050	-	<0.000050	<0.000050	-
Chromium	mg/L	0.0001	0.0013	0.00114	12.31%	<0.0050	<0.0050	-	<0.0050	<0.0050	-	<0.0050	<0.0050	-	<0.0050	<0.0050	-
Cobalt	mg/L	0.0001	0.0405	0.0403	0.49%	0.0375	0.0378	0.80%	0.037	0.0376	1.62%	0.0105	0.0107	1.90%	0.0157	0.0129	17.83%
Copper	mg/L	0.001	0.0024	0.0021	12.50%	<0.010	<0.010	-	<0.010	<0.010	-	<0.010	<0.010	-	<0.010	<0.010	-
Iron	mg/L	0.01	2.65	2.31	12.83%	1.76	1.62	7.95%	0.6	0.58	3.33%	1.19	1.18	0.84%	1.98	1.68	15.15%
Lead	mg/L	0.00005[6]	0.000453	0.000403	11.04%	0.00051	0.00056	9.80%	<0.00050	<0.00050	-	<0.00050	<0.00050	-	<0.00050	0.00068	-
Manganese	mg/L	0.0001	2.79	2.61	6.45%	2.8	2.8	0.00%	3.35	3.26	2.69%	6.33	6.38	0.79%	16.3	12.6	22.70%
Mercury	mg/L	0.00005	<0.000010	<0.000010	-	-	-	-	-	-	-	-	-	-	<0.0000050	<0.0000050	-
Molybdenum	mg/L	0.0005	0.000536	0.000533	0.56%	0.00075	0.00091	21.33%	0.00076	0.00076	0.00%	<0.00050	<0.00050	-	0.00059	0.00056	5.08%
Nickel	mg/L	0.00005	0.0419	0.0421	0.48%	0.0399	0.0407	2.01%	0.0389	0.0382	1.80%	0.0091	0.0095	4.40%	0.0139	0.0131	5.76%
Selenium	mg/L	0.00001	0.00113	0.00114	0.88%	0.00152	0.00149	1.97%	0.00194	0.00191	1.55%	0.00548	0.00594	8.39%	0.00852	0.00613	28.05%
Thallium	mg/L	0.00001	0.000026	0.000025	3.85%	<0.00010	<0.00010	-	<0.00010	<0.00010	-	0.00018	0.00018	0.00%	0.00012	<0.00010	-
Uranium	mg/L	0.00001	0.000407	0.000351	13.76%	0.00066	0.00065	1.52%	0.00023	0.00022	4.35%	0.00033	0.00032	3.03%	0.00037	0.00047	27.03%
Zinc	mg/L	0.003	0.007	0.0062	11.43%	<0.030	<0.030	-	<0.030	<0.030	-	<0.030	<0.030	-	<0.030	0.06	-
Ra-226	Bq/L	0.0046[2]	0.0097	0.011	13.40%	-	-	-	<0.0071	<0.0084	-	0.019	0.05	163.16%	0.091	0.076	16.48%

[1]Hardness limit differ; 1.3 and 0.5 from June through August

[2]Radium detection limits differ; 0.0047, 0.0077, 0.0075, 0.0071, 0.0084, 0.0069, 0.0068, 0.0060 from June to August

[3]On June 24, June 30, and July 29 detection limits differ: Aluminum 0.05 mg/L, Arsenic 0.001 mg/L, Cadmium 0.00005 mg/L, Cobalt 0.001 mg/L, Copper 0.001 mg/L, Iron 0.1 mg/L, Molybdenum 0.0005 mg/L, Nickel 0.005 mg/L, Selenium 0.0005 mg/L, Thallium 0.0001 mg/L, Uranium 0.001 mg/L, Zinc 0.03 mg/L.

[4]On August 5, detection limits differ; Chloride 2.5 mg/L, Nitrate 0.1 mg/L, Sulfate 1.5 mg/L, Mercury 0.000005 mg/L.

[5]Ammonia detection limits differ; 0.01 mg/L, 0.1 mg/L, 1.0 mg/L, 0.2 mg/L from June to August.

[6]On June 24, June 30, July 29 and August 5 the lead detection limit was 0.0005 mg/L.

RPD is the absolute relative percent difference and is calculated by dividing the duplicate value by the sample value and subtracting 1.

Table 16: QA/QC Analysis – MS-06

		Date	02-Sep-19	02-Sep-19	RPD (%)
		Sample ID	MS-08	MS-0801	
Parameter	Units	Detection Limits			
Conductivity	µmhos/cm	3	2210	2210	0.00%
Hardness	mg/L	1.3	1410	1420	0.71%
pH	pH units	0.1	7.08	7.03	0.71%
TSS	mg/L	2	2.7	<2.0	-
Alkalinity	mg/L	10	<10	<10	-
Ammonia (as N)	mg/L	0.1	2.61	2.55	2.30%
Chloride	mg/L	5	28.1	28.2	0.36%
Nitrate (as N)	mg/L	0.2	10.5	10.3	1.90%
Phosphorus	mg/L	0.003	<0.0030	<0.0030	-
Sulphate	mg/L	3	1500	1440	4.00%
Aluminum	mg/L	0.05	<0.050	<0.050	-
Arsenic	mg/L	0.001	<0.0010	<0.0010	-
Cadmium	mg/L	0.00005	0.000337	0.000289	14.24%
Chromium	mg/L	0.005	<0.0050	<0.0050	-
Cobalt	mg/L	0.001	0.0842	0.0833	1.07%
Copper	mg/L	0.01	<0.010	<0.010	-
Iron	mg/L	0.1	0.15	0.15	0.00%
Lead	mg/L	0.0005	<0.00050	<0.00050	-
Manganese	mg/L	0.005	13.8	14	1.45%
Mercury	mg/L	0.000005	<0.0000050	<0.0000050	-
Molybdenum	mg/L	0.0005	<0.00050	<0.00050	-
Nickel	mg/L	0.005	0.0944	0.0936	0.85%
Selenium	mg/L	0.0005	0.00219	0.00201	8.22%
Thallium	mg/L	0.0001	0.00013	0.00013	0.00%
Uranium	mg/L	0.0001	<0.00010	<0.00010	-
Zinc	mg/L	0.03	<0.030	<0.030	-
Ra-226	Bq/L	0.0071[1]	0.023	0.021	8.70%

[1]Radium detection limits differ: 0.0071, 0.0084
RPD is the absolute relative percent difference and is calculated by dividing the duplicate value by the sample value and subtracting 1.

4 NON-COMPLIANCE INFORMATION

During 2019, there were two (2) incidents involving the release of non-compliant effluent from the Waste Rock Facility (MS-08) during controlled discharges:

- June 2019 – During June 2019, effluent discharged from the WRF Pond (MS-08) had a TSS monthly average (15.52 mg/L) that exceeded the MDMER maximum authorized monthly average concentration for TSS of 15.00 mg/L. TSS concentrations in effluent on June 7 (20 mg/L) and June 11 (28 mg/L) are believed to have contributed to the slightly elevated TSS monthly average in June 2019. The exceedance was documented in a report submitted to ECCC on August 4, 2019. A copy of the report is provided in Appendix E.
- September 2019 – Following an unseasonal rain event and increase in ambient temperatures, effluent discharge from the WRF Pond (MS-08) was restarted in late September to address the influx of surface water runoff. Effluent samples taken on September 28 and September 30, 2019 during discharge showed elevated levels of TSS (40.5 and 55.5 mg/L, respectively), exceeding the grab sample MDMER criterion for TSS of 30.00 mg/L. In response, mitigation measures were implemented, including the installation of bag filters on the discharge line, to reduce TSS concentrations to compliant levels. A subsequent sample collected on October 1, 2019 indicated TSS concentrations had returned to levels below the 30 mg/L criterion. The release was reported by Baffinland to relevant regulators and is documented in the NT-NU Spill Report 19-409, provided in Appendix E of this report.

Since the commissioning and operation of the Facility's WTP in 2018, Baffinland has increased the frequency and rigor of testing and sampling of WRF Pond effluent to optimize dosing requirements and reduce variances in TSS and pH. No other incidents of non-compliance were observed during the controlled effluent discharges from the WRF Pond (MS-08) in 2019.

During 2019, there were two (2) incidents involving the release of non-compliant runoff from the east perimeter ditch of the Crushing Facility (CF):

- July 10, 2019 - During an inspection of the CF on July 10, 2019, runoff was discovered flowing out of the east collection ditch at the toe, resulting in a release of non-compliant effluent. The source of the water was determined to be ice and water entrained in the ore stockpiles, which melted as the stockpile was reclaimed. Upon discovery, surface runoff was promptly redirected to the CF Pond (MS-06) via active pumping. Following the implementation of active pumping, the release of runoff was observed to be arrested. Field sampling at the release location indicated elevated TSS concentrations that exceeded the grab sample MDMER criterion for TSS of 30.00 mg/L. The incident was reported to relevant regulators and is documented in NT-NU Spill Report 19-279, provided in Appendix E of this report.
- August 31, 2019 - During a routine inspection at the CF, runoff was discovered flowing out of the east collection ditch at the toe. Similar to the non-compliant event of July 10, the source was

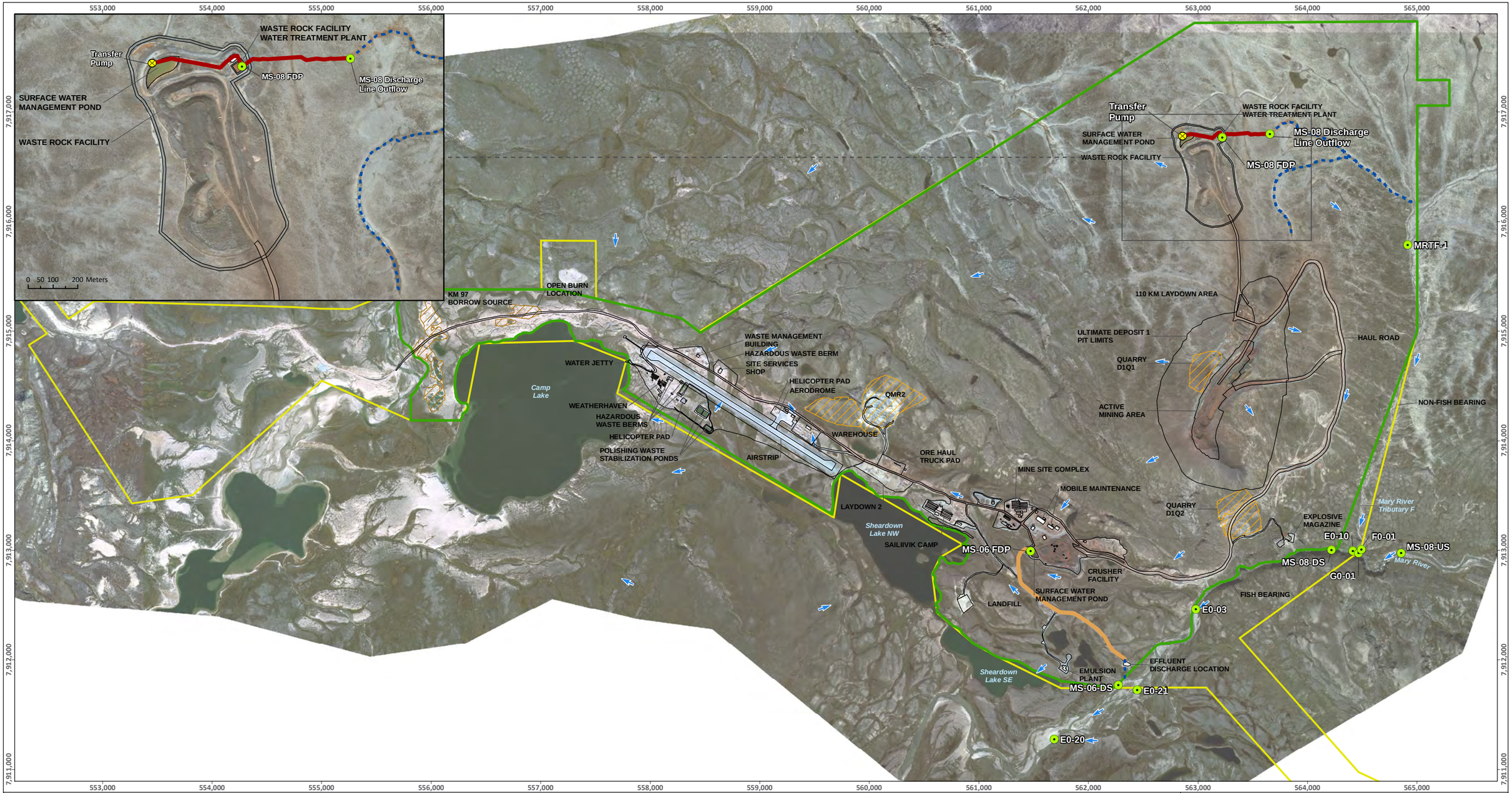
determined to be ice and water entrained in the ore stockpile which melted as the stockpile was being reclaimed. In this instance, pooled water on the crusher pad was being disturbed from increased equipment/vehicle traffic through the area, which was present due to the initiation of remedial earthworks in response to the non-compliant runoff event on July 10, 2019. On discovering the release, runoff was immediately diverted to the CF Pond (MS-06) via active pumping. Following the implementation of active pumping, the release of runoff was observed to be arrested. Field sampling at the release location indicated pH (5.85) that was outside of the permitted pH range of 6.0 to 9.5, stipulated by the MDMER. The incident was reported to relevant regulators and is documented in NT-NU Spill Report 19-279 Update No. 1, provided in Appendix E of this report.

Both releases were contained to the adjacent tundra of the Crushing Facility, which is located approximately one (1) kilometre away from Sheardown Lake tributary; the nearest fish bearing waters. To address deficiencies associated with the east perimeter ditch, a third party engineering firm was retained by Baffinland to investigate and propose corrective actions. Initial work involving the regrading of the ditch was completed in early September 2019, with additional works planned for Freshet 2020.

No incidents of non-compliance were observed during the controlled effluent discharges from the CF Pond (MS-06) in 2019.

APPENDIX A

MONITORING LOCATION MAPS



LEGEND

- Borrow Area
- Quarry Area
- Project Development Area
- Commercial Lease Boundary
- Current Infrastructure
- Lay Flat Hose
- HDPE Pipe
- Overland Surface Water Flow
- Drainage Direction
- Monitoring
- Pump

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Mine Site Layout and MDMER Water Licence Monitoring Locations

Projection: NAD 1983 UTM ZONE 17N.
Base Map: © 2019 Digital Global, Inc.
Imagery and Infrastructure are representative as of August 2019.

0 115 230 460 690 920 Meters
Scale 1:34,000

N

Baffinland

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SAVED: C:\Users\katie.mcguire\Documents\4 - Maps\Reporting\1_AnnualMDMER\BIM_Fig 1 MineSite MDMER.mxd; 29-Mar-20

APPENDIX B

WASTE POND WATER TREATMENT PLANT OPERATIONS

Baffinland Iron Mines Corporation

Waste Pond Water Treatment Plant Operations

Rev 1.0

Prepared By: Chet Fong
Department: Mine Operations
Title: Senior Mining Engineer
Date: 17/08/2018
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Approved By: Simon Fleury
Department: Mine Operations
Title: Mine Manager
Date: 17/08/2018
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DOCUMENT REVISION RECORD

Issue Date MM/DD/YY	Revision	Prepared By	Approved By	Issue Purpose
08/17/18	V1.0	CF		Initial

TABLE OF CONTENTS

1 PURPOSE

This document outlines the basic procedure to safely operate the Water Treatment Plant

2 SCOPE

This document will cover the basic operations of the plant, including start up and shut down, monitoring, treatment, and emergency protocols and procedures for at risk activities at the Water Treatment Plant.

2.1 EXEMPTIONS

This document does not include instructions related to water treatment, which can be found in the plant Operations and Maintenance Manual.

3 RESPONSIBILITES

Any visitor shall request permission to the plant operator prior to entering the work area. In the absence of an operator, permission shall be requested to the mine supervisor.

The Plant operator shall ensure that everyone working in the plant wears the requisite PPE according to the activities being performed (e.g. chemical handling).

4 PROCEDURES

The information in this section is intended as a summary of plant operations. In the case of a discrepancy between this document and the Operations and Maintenance Manual, the latter will take precedence.

For full details on design and plant operation, refer to the operator's manual. In standard operations, the WTP is intended to draw water from the Waste Dump Pond and treat the intake water in 3 steps inside the WTP structure. The water is then discharged to a Geotube Settling Pond, where a fourth treatment step of settlement will occur, before water is either discharged into the environment or, if not compliant, recirculated back to the Waste Dump Pond.

The three steps of treatment involve the injection of chemical into temporary storage tanks.

- Step 1 – Iron Precipitation
- Step 2 – Hydroxide Precipitation and pH Adjustment

- Step 3 – Flocculation
- Step 4 - Filtration

Steps 1-3 occur inside the WTP structure, with the 4th step taking place in the Geotube Settling Pond.

4.1 PLANT OPERATIONS

Plant operations consists primarily of managing flow, dosage and water levels across the pond, sump, and tanks. Flow is managed with a combination of control panel adjustments and manual valve manipulations.

The plant consists of the following components:

1. Intake Pump – pulls water from the Waste Dump Pond into the WTP
2. Onion tanks – water is stored for treatment prior to discharge. There are two trains, which can be run independently or concurrently.
3. Control panel – use to remotely manage pumps – can be set for automatic and manual operations
4. Dosing pumps – use to inject chemical into onion tanks at a fixed rate
5. Dosing tanks – mixing tanks from which chemicals (Lime, Polymer) is depleted at a configurable rate
6. Transfer pumps – used to take treated water from the plant out to the Geotube Pond
7. Geotube Pond – discharge from the plant is deposited here for particulate settlement prior to final discharge.
8. Discharge pump – used to pull treated water from the Geotube Pond to either be discharged into the environment or recirculated back to the Waste Dump Pond.
9. Blower motors – used to agitate water in onion tanks during treatment to ensure more even dispersion of chemicals.

Once the Plant is operational, the operator will commence with monitoring the measured levels of pH and suspended solids with built in instrumentations and gauges. These readings may be corroborated with manual instrumentations such as a YSI meter.

When readings indicate pH readings at the desired values, the operator shall then initiate discharging of water into the Geotube Pond. This water is allowed to percolate through the Geotube, which catches particulates as a filter. Once in the Sump, where any remaining particulates are then captured and settle into the bottom of the pond.

Water is discharged from this Geotube Pond, either directly into the environment or back into the Waste Dump Pond. The maximum flow rate for these discharging is 1200 gal/min, this limit imposed by the flowmeter installed.

At design capacity, the intake pump(s) should be able to pull water into the WTP for treatment at an equal rate to the discharge pump. The plant effectively runs continuously with dosing in-stream.

4.2 Plant Start up

The following steps should be undertaken when starting up the WTP.

1. Ensure blower motors are activated.
2. Ensure all the Valves to the Geotube Sump are open.
3. Ensure the transfer pumps are switched to automatic
4. Check that all the intake valves are open
5. Keep valves open between tanks on each train
6. Start up intake pump and adjust pressure accordingly. To do this, adjust the following:
    a. Rpm of the pump
    b. Valve openings
7. Start Ferric Sulphate Dosing system. Ensure intake is in the Ferric Sulphate barrels, and there are no leaks present. Pumps should be activated.
8. Start Lime Dosing system. Dosing pumps should be activated.
9. Start up Polymer Dosing System. Dosing pumps should be activated

Plant operations can now commence.

4.3 Plant Shut Down

Plant shut down can be undertaken when it is to be unmanned for a longer period of time (eg. More than 2 shifts) within the same system (for winter decommissioning, procedure XXX). To run a plant shut down

1. Shut all intake valves
2. Shut all Ferric Sulphate dosing equipment
3. Shut all Lime dosing equipment
4. shut all Polymer dosing equipment
5. Rinse Lime lines (reference other procedure)

Plant can now be shut down. This procedure can be utilized with the onion tanks full. This should also be done before any interruptions in power due to generator maintenance or other causes.

4.4 Discharging

Discharging be undertaken whenever the plant is running. It is most efficient to run the discharge when there is moderate to high water levels in the Geotube Sump. The intake hose for the Geotube Sump should utilize the ring to ensure that drawn water is from the top of the water surface.

Discharging requires the manual operation of the valves to discharge the water either to the environment or back to the Waste Dump Pond. Readings should also be checked and logged on the flowmeter when discharge begins using the totalizer values.

NOTE: discharge flow rate should be kept below 1200 gal/min, as flow greater than this will not be measureable.

To discharge, the following steps should be undertaken:

1. Ensure enough water to discharge. Water levels should be at least 50 centimetres from the bottom of the sump prior to beginning discharge.
2. Ensure valve on re-circulation line is closed. This will enable the water to discharge into the environment. Where re-circulation is required, close the valve on the discharge line and open the valve on the re-circulation line.
3. If discharging to the environment, check the totalizer reading on the flowmeter prior to discharge. This is not required if re-circulating.
4. On the control panel, Set discharge to "on"
5. While discharging, check discharge pH and Turbidity with sampling tap periodically. Samples can be collected and tested using YSI instrument.
6. When discharging is complete or to be disabled, go to control panel and set discharge to "off"

4.5 CHEMICAL DOSING

Chemical dosing is performed as part of the treatment process. The primary drivers for chemical dosing is:

1. Reduce the pH
2. Reduce the suspended solids

Prior to discharging water back into the environment.

As dosing quantities will vary depending on flow rate and water qualities, refer to user manual for dosing quantities.

Dosing procedures will vary slightly between the stages of treatment. The three stages that require chemical intervention are Ferric Sulphate, Lime, and Polymer.

4.5.1 FERRIC SULPHATE – LIQUID

PPE Required: long chemical resistant gloves, apron, face shield, standard PPE

- Prepare a barrel for dosing by placing the barrel into the duck pond by the ferric sulphate dosing area and removing the top seal.
- Put 2 dosing pumps into 1 barrel (1 per train)
- Switch on dosing pump on the control panel
- On the pump, check frequency and stroke length to ensure dosage is as expected.
- To change barrels, switch off on the dosing pump and change barrel

4.5.2 LIME – BAGS

PPE Required: long chemical resistant gloves, respirator, face shield, respirator, standard PPE

- Fill mixing tank with intake water.
- Check filter on accessory intake water line (dedicated line for filling lime and polymer mixing tanks)
- Open valve on AI water line (fill tank). Fill to required water levels
- Ensure mixer is operating
- Add lime to water

4.5.3 POLYMER – BAGS

PPE Required: standard PPE

- Fill mixing tank with intake water.
- Check filter on accessory intake water line (dedicated line for filling lime and polymer mixing tanks)
- Open valve on AI water line (fill tank). Fill to required water levels
- Ensure mixer is operating
- Add polymer to water

4.6 SYSTEM AUTOMATION

For instruction on System Automation, please refer to the Operations and Maintenance Manual.

4.7 TROUBLE SHOOTING

For issue identification, please refer to the checklists in the Operations and Maintenance Manual.

4.8 ACCIDENT RESPONSE

As the WTP involves the handling of a number of chemicals that may be harmful, precautions must be taken to ensure all personnel who are in the work area are informed of the hazards and the preventative and treatment measures.

4.8.1 RESPONSE EQUIPMENT AVAILABLE

The WTP is equipped with a stationary emergency shower, 2 portable emergency shower stations and eyewash stations (dual purpose), 2 fire extinguishers, and 1 stationary eyewash station.

Additionally, the WTP is equipped with spare PPE, face shields, respirators, chemical resistant gloves, hearing protection, and spill kits.

There are also patch kits for the onion tanks, hose and fitting replacements, tools, and a base station radio available at the WTP.

In the event that an incident occurs that requires emergency response, same basic steps should be immediately undertaken. The following lists some of the possible situations and a brief of the response steps.

4.8.2 SPILLS ON THE GROUND

- Retrieve spill pad kit
- use gloves to handle
- dispose in drum
- Label and dispose.

4.8.3 SPILLS ON PERSON

- Proceed to stationary emergency shower
- Notify secondary operator
- Secondary operator activates pump switch
- Pull handle and rinse for 10 mins
- If unable to proceed to stationary emergency shower, refer to “emergency response procedure”

4.8.4 LIME IN EYES

- If possible, proceed immediately to emergency eyewash station
- Activate emergency eyewash and rinse for 10 mins.
- Repeat if required
- Notify secondary operator
- If unable to proceed to emergency eyewash station, refer to “emergency response procedure”

4.8.5 LIME SPILL

- Retrieve spill pad kit
- use gloves to handle
- dispose in drum
- Label and dispose.

4.9 APPENDICIES

Appendix A – Operations and Maintenance Manual for Mary River Mine Waste Rock Pile Water Treatment Plant

APPENDIX A – OPERATIONS & MAINTENANCE MANUAL FOR MARY RIVER MINE WASTE ROCK PILE WATER TREATMENT PLANT
20180817_v02

OPERATIONS & MAINTENANCE MANUAL FOR MARY RIVER MINE WASTE ROCK PILE WATER TREATMENT PLANT 20180817_v02

Baffinland Iron Mines Corporation

Prepared by:

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Project No. 137-0001

TABLE OF CONTENTS

Page

1.0 INTRODUCTION

This documents outlines the Operations Manual for Baffinland Iron Mine Corporation's (BIM) Mary River Mine Waste Rock Pile water treatment plant (WTP).

2.0 PLANT OVERVIEW

2.1 General Process Description

The WTP employs a process of coagulation, pH adjustment, flocculation, and filtration to treat acid rock surface runoff collected in the pond at the base of the waste rock pile. The objective of the system operation is to treat water to within the parameters outlined in the Metal Mining Effluent Regulations (MMER), as specified to McCue by BIM, and summarized in Table 1.

Table 1: MMER Effluent Limits

Parameter	Unit	Maximum Authorized Monthly Mean Concentration	Maximum Authorized Concentrations in a Composite Sample	Maximum Authorized Concentration in a Grab Sample
Arsenic	mg/L	0.5	0.75	1.00
Copper	mg/L	0.3	0.45	0.60
Cyanide	NTU	1.00	1.50	2.00
Lead	mg/L	0.20	0.30	0.40
Nickel	mg/L	0.50	0.75	1.00
Zinc	mg/L	0.50	0.75	1.00
Total Suspended Solids	mg/L	15.00	22.50	30.00
Radium 226	Bq/L	0.37	0.74	1.11
pH	SU	6-9.5	6-9.5	6-9.5

The treatment steps are described in Section 2.2. Refer to drawings in Appendix A:

2.2 Brief Process Overview

2.2.1 *System Inlet*

Water is collected at an inlet storage pond (P-001) where it is held for treatment. Two diesel powered centrifugal trash pumps (PU-100A/B) are used to transfer water from the storage pond to an equipment enclosure where the WTP is housed.

At the WTP, the flow can be divided into two separate treatment trains (1 and 2), with each train having a flow meter on the inlet line to monitor flow.

Water is directed into two reactor tanks (TA-110 and TA-210) for processing.

2.2.2 *Step 1 – Iron Precipitation*

Ferric sulphate solution is injected into TA-110 and TA-210 to promote coagulation and precipitation of some heavy metals.

As of system commissioning in June 2018, ferric sulphate liquid solution (12% Fe) is used and injected directly into the process. Each process train utilizes an independent chemical pump to introduce chemical into the system.

The WTS also includes a ferric sulphate make down system, including a holding tank and mixer to allow for makeup of solution using dry ferric sulphate.

Each reactor tank includes a pH sensor to provide continuous monitoring of pH.

Each reactor tank is equipped with four air diffusers which supply air to the process and provide continuous mixing so that solids are kept suspended. Each train is supplied air by a dedicated blower.

2.2.3 *Step 2 – Hydroxide Precipitation and pH Adjustment*

Water flows by gravity from TA-110 and TA-210 to TA-120 and TA-220 respectively. Here, hydrated lime is injected into the process to increase pH and aid in further precipitation of some metals through hydroxide precipitation.

Hydrated lime solution is made manually by adding dry hydrated lime and raw influent water to a mixing tank (TA-020). A mixer is run continuously to ensure the hydrated lime slurry does not solidify.

One hydrated lime chemical pump is utilized to dose each reactor tank with chemical. Two motorized valves (MV-120 and MV-220) are used to control the flow of lime to each reactor tank. Each reactor tank includes a pH sensor to provide continuous monitoring of pH.

Each reactor tank is equipped with four air diffusers which supply air to the process and provide continuous mixing so that solids are kept suspended. Each train is supplied air by a dedicated blower.

2.2.4 *Step 3 – Flocculation*

Water flows by gravity from TA-120 and TA-220 to TA-130 and TA-230 respectively. Here, polymer is injected into the process to aid in flocculation of suspended solids prior to filtration.
Polymer solution is made manually by adding dry polymer and raw influent water to a mixing tank (TA-030). A mixer is run continuously to ensure uniformity of the polymer solution.

Two polymer chemical pumps are utilized to provide polymer dosing to each train. Polymer can be dosed directly into each reactor tank, or inline through a static mixer located directly downstream of the reactor tank.

2.2.5 *Step 4 – Filtration*

Water from TA-130 and TA-230 is pumped to a geotube pond via two diesel powered centrifugal trash pumps (PU-200A/B).

Water is directed to a manifold where it can be distributed to two geotube bags for solids filtration. Two additional geotube bags can be deployed in the pond once the currently operating geotube bags have reached capacity. These spare geotubes are currently stored in a warehouse for future use.

Filtered water leaves the geotube bags and is directed to a collection point at the North West corner of the pond. From here, water is pumped via one diesel trash pump (PU-300) to the Mary River discharge point, or recycled back to the inlet pond. A flow meter is installed on the discharge line to Mary River to allow for data logging of flow.

2.3 Major Equipment List

The WTP layout is provided in appendix A. A list of major equipment is provided in Table 2.

Table 2: Major WTP Equipment

Equipment	Description	Qty	Drawing Reference (If Available)
Pond Transfer Pump	Model: Prime Aire PA4A60-404ST Power: Diesel Driven Capacity: 140m3/hr	2	PU-100 A / PU-100 B
Inlet Flow Meter	Model: GF Signet 3-2551-P1-42	2	FT-100 / FT-200
Ferric Reaction Tank	Material: Polyurethane Size: 5.9m W x 1.5 H Capacity: 24,820 Liters	2	TA-110 / TA-210
Lime Reaction Tank	Material: Polyurethane Size: 5.9m W x 1.5 H Capacity: 24,820 Liters	2	TA-120 / TA-220
Polymer Reaction Tank	Material: Polyurethane Size: 5.9m W x 1.5 H Capacity: 24,820 Liters	2	TA-130 / TA-230
Aeration Blowers	Gast R7100A-3 Blower • 208 V / 3 HP / 60 Hz	2	BL-100A / BL-100B
pH Controller and Sensors	Model: Walchem W900 (Controller) Model: Walchem WEL-PHF-NN (Sensors)	1	pH-110/120/210/220
Motorized Ball Valve	Hayward 1” Ball Valve Model: HRSN2	2	MV-120 and MV-220
Level Transmitter	Model: Echosonic 11 LU27	2	LT-130 / LT-230
Bag Filter	Model: FTI830-2P-150-CS-BS-P13-DP Bag Size: 5 Micron	1	FIL-100
Ferric Chemical Pump	Model: Walchem EHE31E1-VC Power: 115 VAC/1hp/60Hz Capacity: 1 LPM @ 105m TDH	2	PU-010A / PU-010B
Lime Chemical Pump	Model: Flowmotion FR25-HR30HR Power: 230V/3hp/60Hz Capacity: 9.5 LPM @ 105 m TDH	1	PU-020
Polymer Chemical Pump	Model: Flowmotion FR25-HR30HR Power: 230V/3hp/60Hz Capacity: 16.5 LPM @ 105 m TDH	2	PU-030A / PU-030B
Ferric Mixing Tank	Material: Polyurethane Size: Ø 1.2m x 1.3m Height	1	TA-010
Lime Mixing Tank	Material: Polyurethane Size: Ø 1.8m x 1.7m Height	1	TA-020
Polymer Mixing Tank	Material: Polyurethane Size: Ø 1.6m x 1.6m Height	1	TA-030
Coarse Bubble Diffusers	Model: Maxair 24” SS	24	-

2.4 System Automation

The system is automated through a main control panel located in the system enclosure. The system P&ID is provided in Appendix A. Operation is outlined in Table 3.

Table 3: Control Panel Automation

Equipment ID	Equipment Description	Control Logic	PID Control Reference	Controls	Panel Indication
PU – 100 A/B	Inlet Pond Pump	Units can be controlled in Hand or in Auto. Pump will turn on in Hand in Auto or in Hand.	-	-	Pump icon will indicate run status
		Pump will turn off if high level is measured in TA-110 or TA-210	LSH-110 / LSH-210	Auto	High level alarm at panel
		Pump will turn off if high level measured in TA-130 or TA-230	LIT-130 / LIT-230	Auto - High level settable at panel	High level alarm at panel
BL-100 A/B	Blower	Units can be controlled in Hand or in Auto Blower will turn on in Auto or in Hand	-	-	Blower icon will indicate run status
		BL-100 A will turn off if low level is measured by LIT-130	LIT-130	Auto – Low level settable at panel	Low level alarm
		BL-100 B will turn off if low level is measured by LIT-230	LIT-230	Auto – Low level settable at panel	Low level alarm
pH-110	pH Sensor	Continuous monitoring of pH	-	-	Display pH on PLC
pH-210	pH Sensor	Continuous monitoring of pH	-	-	Display pH on PLC

pH-210	pH Sensor	If pH>9.5, close MV-120 - Alarm	MV-120	Auto – pH set point settable at panel	Display pH on PLC
pH-220	pH Dosage	If pH>9, close MV-220 - Alarm	MV-220	Auto – pH set point settable at panel	Display pH on PLC
PU-010A	Ferric Pump	Units can be controlled in Hand or in Auto	-	-	Pump icon will indicate run status
		If FIT-100 measures flow, PU-010A energizes.	FIT-100	Auto	Display run status on PLC
PU-010B	Ferric Pump	Units can be controlled in Hand or in Auto	-	-	Pump icon will indicate run status
		If FIT-200 measures flow, PU-010B energizes.	FIT-100	Auto	Display run status on PLC
PU-020	Lime Pump	Units can be controlled in Hand or in Auto	-	-	Pump icon will indicate run status
		Speed Control (1 train only) If pH-120> 8.5, PU-020 will reduce speed. If pH < 8, pump will increase pump speed. If pH is between 8 to 8.5, pump will maintain pump speed.	pH-110 / pH-120	Auto – pH set point adjustable at panel	Display run status on PLC
		Speed Control Disabled If flow is detected by both trains, speed control is disabled.	FIT-100 / FIT-200	Auto	Display run status on PLC
PU-030 A	Polymer Pump	Units can be controlled in Hand or in Auto	-	-	Pump icon will indicate run status

		Polymer pump energizes if PU-200 A is on	PU-200A	-	Display run status on PLC
PU-030 B	Polymer Pump	Units can be controlled in Hand or in Auto	-	-	Pump icon will indicate run status
		Polymer pump energizes if PU-200 B is on	PU-200B	-	Display run status on PLC
PU-200 A	Transfer Pump	Units can be controlled in Hand or in Auto	-	-	Pump icon will indicate run status
		If LT-130 measures < 3', PU-200A off. If LT-130 measures >3', PU-200A on.	LT-130	Auto – Set points adjustable at panel	Pump icon will indicate run status
		If LT-130 measures >4.5', PU-200A off. If LT-130<4.5', PU-200A on.	LT-130	Auto – Set points adjustable at panel	Pump icon will indicate run status
PU-200 B	Transfer Pump	Units can be controlled in Hand or in Auto	-	-	Pump icon will indicate run status
		If LT-230 measures < 3', PU-200B off. If LT-230 measures >3', PU-200B on.	LT-130	Auto – Set points adjustable at panel	Pump icon will indicate run status
		If LT-230 measures >4.5', PU-200B off. If LT-230<4.5', PU-200B on.	LT-130	Auto – Set points adjustable at panel	Pump icon will indicate run status
PU-300	Discharge Pump	Units can be controlled in Hand or in Auto	-	-	Pump icon will indicate run status
		Pump off at LSL-200	LSL-200	-	Level indicator on panel

		Pump on at LSH-200	LSH-200	-	Level indicator on panel
		High Level Alarm at LSHH-200	LSHH-200	-	High Level Alarm
MX-010 /020/030	Mixer	Units can be controlled on/off manually	-	-	-

3.0 GENERAL STARTUP PROCEDURE

3.1 After Dormancy Pre-start-up Procedures

The following steps shall be taken after extended periods of dormancy, prior to general startup of the WTP.

Task	Check
Perform a visual inspection of the system enclosure for signs of water/snow ingress.	.
Inspect hose and pipe for signs of leaks, abrasion, or other physical damage.	☐
Inspect Reactor tanks as follows: • Signs of leaks, abrasion, or other physical damage. • Tank connections for signs of strain or stress. • Make sure that valves at the inlet and outlet are opened.	☐
Inspect Blowers as follows: • Signs of abrasion, or other physical damage on all external accessories such as relief valves, gauges and filters. • Make sure that valves at the inlet and outlet are opened.	☐
Inspect Diesel Pumps as follows: • Signs of leaks, abrasion, or other physical damage. • Check for and tighten loose attaching hardware. • Make sure that valves at the inlet and outlet are opened. • Check oil levels and lubricate as necessary.	☐
Inspect Ferric Sulphate pump as follows • Signs of leaks, abrasion, or other physical damage. • Make sure that valves at the inlet and outlet are opened.	☐
Inspect Hydrated Lime pumps as follows • Signs of leaks, abrasion, or other physical damage. • Inspect condition of internal pump hose. • Make sure that valves at the inlet and outlet are opened.	☐
Inspect Polymer pump as follows: • Signs of leaks, abrasion, or other physical damage. • Inspect condition of internal pump hose. • Make sure that valves at the inlet and outlet are opened.	☐
Inspect Level Transmitter as follows: • Monitor debris and ensure the sensor is level and mounted perpendicular to water level. • Check and roughly compare measurement on the PLC with the real on the field.	☐
Inspect pH sensors as follows: • Monitor debris and deposition of scaling on the transmitter. Perform a cleaning of the sensors as necessary.	☐

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Insect Bag Filter vessel as follows: • Signs of leaks, abrasion, or other physical damage. • Inspect filter bag and replace as necessary	☐
Inspect Inlet Flow Meter as follows: • Signs of leaks, abrasion, or other physical damage. • Inspect flow sensor for scaling. Clean as necessary.	☐
Inspect Geotube Bag as follows: • Ensure inlet connection points are securely attached. • Ensure height of bag does not exceed recommended limits. If so, decommission geotube bag. • Clean geotube surface of sediment and scaling to prevent fouling using a push broom, or gentle pressure washing.	☐

3.2 Commissioning

After pre-start-up procedures are completed, the system can be energized. The following procedure reflects a high level overview of equipment checks to be performed. Detailed instructions can be found in the product specific manuals. Before any mechanical intervention, disconnect the electrical supply.

3.2.1 *Hydrated Lime Pump / Polymer Pump*

Task	Check
Ensure that all protections (cover, cover window, ventilator hood, coupling protection) are in place before operating the pump.	☐
Check the direction of rotation of the pump.	☐
Make sure that valves at the inlet and outlet are opened.	☐
Start the pump by checking its direction of rotation through the cover window.	☐
Check the flow and discharge pressure and adjust rollers if these figures don't match the pump specifications.	☐

IMPORTANT: Ensure lime pump valves remains open during operation. Should valves be left in the closed position, the process line can over pressurize, leading to a rupture of the chemical hose.

3.2.2 *Blowers*

Task	Check
Ensure impeller rotation is correct.	☐
Check filters and inspect for signs of fouling. Replace if necessary.	☐

-

Ambient temperature – Check room and discharge air temperatures. Exhaust air should not exceed 135ºC.	☐
Working pressure and vacuum values – Adjust relief valve pressure or vacuum setting, if needed.	☐
Motor current – Check that the supply current matches recommended current rating on product nameplate.	☐
Electrical overload cutout – Check that the current matches the rating on product nameplate.	☐

3.2.3 *Ferric Pump*

Task	Check
Ensure pump is energized.	☐
Make sure that valves at the inlet and outlet are opened.	☐
Start the pump manually, in order to prime and adjust dosing rates.	☐
Prime the pump. See manual for details.	☐
Adjust dosing according to inlet water flow rate. See below.	☐
Check dosing rate with calibration cylinder.	☐

3.2.4 *Motorized Valve*

Task	Check
Ensure valve is energized.	☐
Ensure valve opens/closes reliably in manual mode:	☐

3.2.5 *Diesel Pumps*

Task	Check
Check fuel level and oil levels in the engine, air compressor, pump bearings and seal housing.	☐
Consult engine operations manual before attempting to start the unit.	☐
Allow pump to prime.	☐
Adjust engine speed to desired output.	☐

3.2.6 *pH Sensors*

Task	Check
Ensure sensor is calibrated.	☐
Ensure the pH reading displayed locally at the Walchem panel is transmitted correctly to PLC.	☐

3.2.7 *Geotube*

Task	Check
Ensure surface is clean of sediment and debris.	☐
Ensure all inlet valve are open.	☐
Ensure height of geotube does not exceed manufacturer recommended limit.	☐

4.0 OPERATION

4.1 General Operating Instructions

Operation of the WTP will consist of ensuring major equipment (blowers, dosing pumps, motorized valves, level transmitters) is running correctly, and ensuring influent/effluent monitoring and sampling are conducted on schedule.

The drivers for pH adjustment and TSS treatment are operation of the Ferric Sulfate, Hydrated Lime and Polymer Pump, along with the proper performance of the aeration blowers and diffusers equipment.

The unit will run manually. During short term dormancy, the unit can be operated in a “Sleep Mode” where the system is run in a re-cycle status using two submersible pumps inside TA-130 and TA-230 to recirculate water from the end of each train to the beginning of each train. Chemical injection is disabled during dormancy, however, the lime mixer should remain on to maintain suspension of the hydrated lime slurry. Blowers will also remain on to ensure suspension of solids within the reactor tanks.

Parameters to be measured and recorded daily include temperature, pH (typical values are between 6.5 and 9), and TSS. The system must be monitored regularly to ensure pH does not drop below the low level set point or raise above the level set point.

The pH reading should be recorded daily. The pH should be cross referenced regularly with a hand held device. Should the pH differ from the hand held reading, the operator should clean the pH electrodes using a 2-5% solution of hydrochloric acid.

System data can be recorded in the spreadsheet provided in Appendix B. Regular daily monitoring of parameters such as pH, temperature, TSS, and Geotube height must be recorded to ensure proper operation.

4.2 Operating Procedure

The following section will outline the step-by-step procedures for operating the treatment system.

4.2.1 *Standard Operation*

Inlet

The inlet pond level should be checked and recorded prior to start up. Two pond pumps can be utilized to transfer raw water to the treatment system. Usage will depend on the volume of treatment required. At low pond levels, one pond pump and one process train can be utilized. At high levels, both pumps can be utilized to increase the treatment volume.

All pump discharge valves must be opened. The pumps (PU-100 A/B) shall be placed in “Hand” at the PLC. This will energize the pumps and begin transfer of water to the treatment system. The pumps will only turn on if a high level is measured by LSH-110/210 or LT-130/230.

Operators must ensure the inlet pond level is monitored, as the pumps do not include a low level shut off.

Ferric Pumps (PU-010 A/B)

Water is transferred from the inlet pond to two reactor tanks (TA-110 and TA-210) where ferric sulphate is injected. The dosage rate of the ferric pumps is determined by the inlet quality of the raw water and can range from 0 to 20 mg/l. The dosage rate is to be determined by the operator.

The dosage rate must be set manually at the pump. Once set, the pump can be set to “Auto” at the control panel. The ferric pumps, PU-010 A and PU-010 B, will energize when flow is detected by FIT-100 and FIT-200 respectively.

Before starting the pumps, all discharge valves must be opened.

Lime Pump (PU-020)

After coagulant addition, water flows by gravity to TA-120 and TA-220 where hydrated lime is injected into the process. The dosage rate of the Lime pump is determined by the inlet quality of raw water and the pH required, and can range from 0 to 300 mg/l. The dosage rate is to be determined by the operator.

In manual mode, the speed of the pump can be set at the pump VFD, located on the lime pump stand.

Pump speed will be dependent on the pH measured by pH-120, and the pH set point entered into the panel (adjustable by an operator). At a setpoint of 8.5, the pump will increase speed if pH-120 measures a pH below 8. If pH-120 measures a pH above 9, pump speed will decrease. If pH is measured between 8 to 8.5, the dosage rate will remain the same.

-

At a pH above 9.5, MV-120 and MV-220 will close.

The lime pump will operate continuously, with chemical consistently recirculated to the lime mixing tank (TA-020). This is done to ensure the lime slurry does not settle and solidify in the piping system. At the end of every shift, clean water must be flushed through the piping in order to prevent fouling. Flushing may be required more frequently depending on operational conditions.

Due to the possibility of fouling, the lime pump system must be monitored for pressure consistently.

Lime Solution Make Up

Hydrated lime solution is made manually, with the solution concentration ranging from 5-10% depending on volume of raw water to be treated. A concentration of 5% is recommended to minimize line fouling caused by the lime slurry. Higher concentrations can be made, but more frequent line flushing will be required.

The lime tank mixer is operated from the panel, and should be operated continuously to prevent the slurry from solidifying.

Polymer Pumps (PU-030 A/B)

The dosage rate of the ferric pumps is determined by the inlet quality and can range from 0 to 3 mg/l.

The dosage rate must be set manually at the pump. Once set, the pump can be set to “Auto” at the control panel. The polymer pumps, PU-020 A and PU-020 B, will energize when the transfer pumps, PU-200 A and PU-200 B are energized.

Before starting the pumps, all discharge valves must be opened.

Polymer Solution Make Up

Polymer solution is made manually, with concentration ranging from 0.1 to 0.25% depending on volume to be treated.

The polymer tank mixer is operated from the panel, and should be kept on at all times to maintain uniformity of the solution.

Blowers

The blowers are operated from the panel, and should be energized at all times when raw water is being processed in the reactor tanks.

Both blowers (BL-100A and BL-100B) can be set in “Auto” at the panel, at which point they will run continuously until the water level in TA-130 and TA-230 is measured to be less than 6”. This level is settable at the panel.

Raw Water Bag Filter

The bag filter provides filtration of water required for chemical makeup. The filter bags should be replaced periodically when differential pressure across the filter exceeds approximately 20 psi.

Geotube Bags

Water is transferred from the final reactor tanks (TA-130 and TA-230) by diesel generated trash pumps (PU-200 A and PU-200 B) to the geotube pond. The transfer pumps, PU-200A and PU-200B are operated based on the level measured by the reactor tank level transmitters, LT-130 and LT-230 respectively. These set points are adjustable at the panel.

The height of the geotube bags must be monitored regularly.

4.3 Daily Operator Checklist

The following steps outline day-to-day operational procedures for the WTS.

Standard Operation

Task	Check
Check inlet pond and record water level	☐
Check lime and polymer solutions, make up additional solution as required.	☐
Place PU-100 A (and PU-100 B if necessary) in Hand mode at the control panel.	☐
Set Ferric Sulphate pump (PU-010 A / B) dose rate and place pump in Auto at control panel. Ensure pump energizes when flow is detected by FIT-100 or FIT-200.	☐
Turn on hydrated lime pump (PU-020 A) manually. Adjust dose rate based on flow measured by inlet flow meters.	☐
Monitor hydrated lime pump pressure gauge. If pressure gauge is showing a pressure greater than 15 psi, flush line with water.	☐
Set polymer pump dose rate at panel. Set in “remote” mode. Set pump to auto at panel. Pump will turn on when PU-200A/B energize.	☐
Set Blowers (BL-100 A / BL-100B) to Hand.	☐
Once onion tanks are full, set PU-200A/B to Auto (if using both trains). Ensure downstream valves to geotube bags are open.	☐

Observe reactor tank water levels to ensure inlet and outlet flows are balanced.	☐
Observe and record height of geotube bags. Height must not exceed 6 feet.	☐
Set PU-300 to auto in the panel. Once the water in the pond reaches the operating float switch, the pump will be energized.	☐
Discharge vales must be set manually to allow for discharge to the creek, or recycle back to the inlet pond. Set valves in correct position.	☐

Daily Shutdown

Task	**Check**
Set inlet pump to Off position	
Allow reactor tanks to be pumped down to ¼ volume.	☐
Turn off chemical pumps.	☐
Flush lime line with water	☐
Keep lime mixer (Mix-020) on to ensure hydrated lime slurry remains in liquid form.	☐
If tanks are lowered, blowers can be turned off. If tanks are kept full, energize recirculation pumps.	☐
Check lime and polymer solutions, make up additional solution if required.	☐
Turn transfer pumps (PU-200 A/B) and discharge diesel pump (PU-300) off.	☐

APPENDIX A –DRAWINGS

NOTES:

PU-200A/B- Transfer Pump
PU-300- Discharge Pump
FT-300- Flow Meter
LS- Level Switch
-LSHH 200
-LSH 200
-LSL 200

Process lines
Instrumentation lines

Process based on conceptual desgin by Golder Associates

REVISION TABLE

No.	DESCRIPTION	DATE
0	Original Issue	2018/04/30
1	Record Drawing	2018/07/31

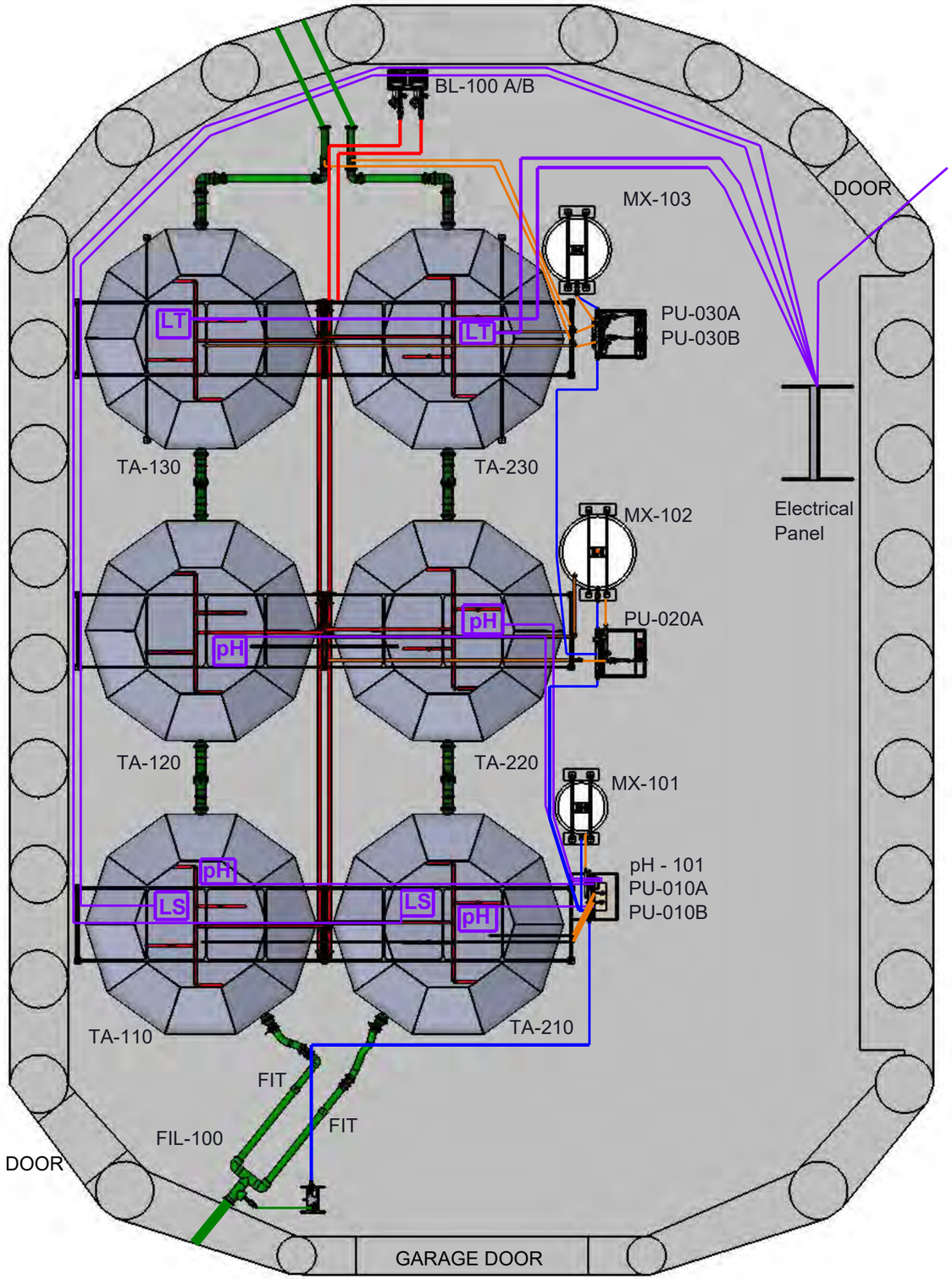
McCUE ENGINEERING CONTRACTORS

CLIENT:

BAFFINLAND IRON MINES CORPORATION

FULL SITE LAYOUT
GENERAL ARRANGEMENT DRAWING
Waste Rock Pile Water Treatment Plant

DATE: July 31, 2018	SCALE: NTS
DATA BY: R.B.	MCCUE JOB NO: 137-0001
DRAWN BY: L.S	FIG: GA-001



LEGEND

BL-100 A/B - Blower
FIL-100 - Bag Filter
MX-101 - Ferric Mixing Station
MX-102 - Lime Mixing Station
MX-103 - Polymer Mixing Station
PU-010 A/B - Ferric Pump
PU-020 - Lime Pump
PU-030 A/B - Polymer Pump
TA-110 - Ferric Process Tank (Train 1)
TA-210 - Ferric Process Tank (Train 2)
TA-120 - Lime Process Tank (Train 1)
TA-220 - Lime Process Tank (Train 2)
TA-130 - Polymer Process Tank (Train 1)
TA-230 - Polymer Process Tank (Train 2)
pH-101 - pH Controller
FIT - Flow Meter
pH - pH Sensor
LS - Level Switch
LT - Level Transmiter

Notes:

- Process Lines
- Water Make-up Lines
- Chemical Lines
- Air Lines
- Instrumentation Line

Process based on conceptual design by Golder Associates

REVISION TABLE		
No.	DESCRIPTION	DATE
0	Original Issue	2018/05/01
1	Record Drawing	2018/08/17

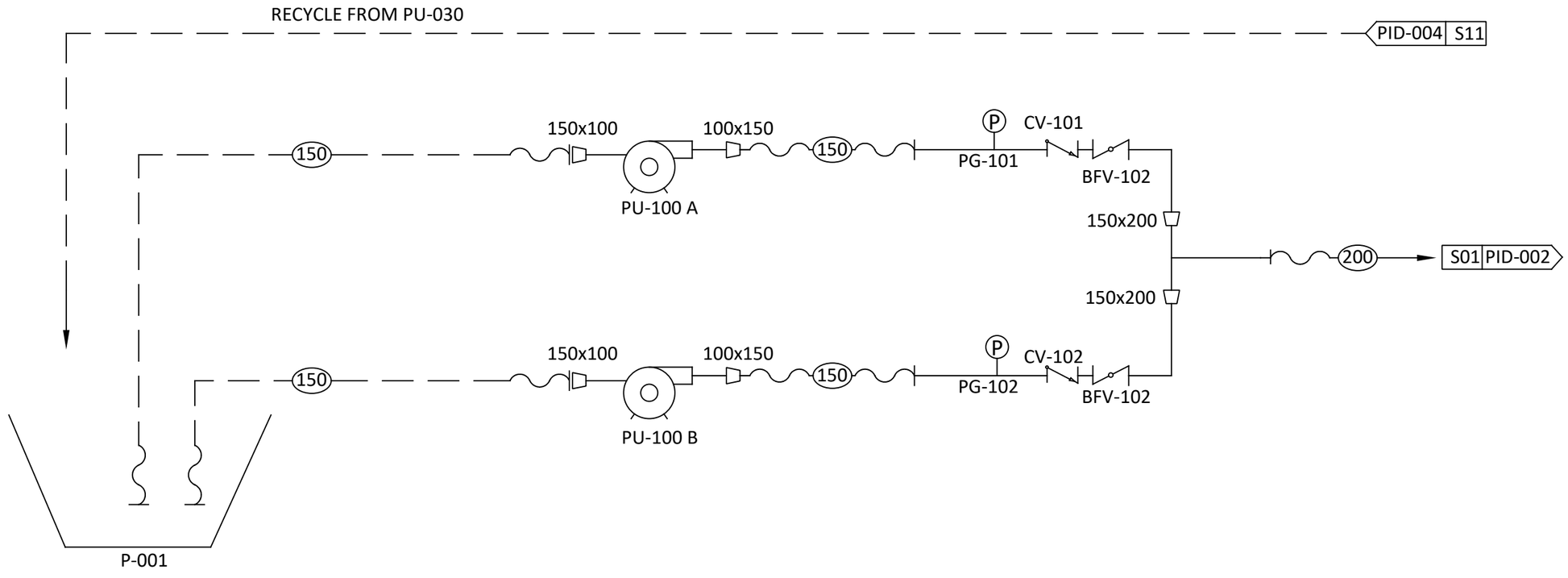
McCUE ENGINEERING CONTRATORS

CLIENT:

BAFFINLAND IRON MINES CORPORATION

BUILDING LAYOUT
GENERAL ARRANGEMENT DRAWING
Waste Rock Pile Water Treatment Plant

DATE: August 17, 2018	SCALE: AS SHOWN
DATA BY: R.B	JOB NO: 137-0001
DRAWN BY: L.S	FIG: GA-002



P-001
Inlet Storage Pond

PU-100 A/B
Pond Transfer Pump
Model: Prime Aire PA4A60-404ST
Power: Diesel Driven
Capacity: 140m³/hr

LEGEND :

- Hose
- Sch. 80 PVC Pipe
- Butterfly Valve
- Check Valve
- Reducer
- Pressure Gauge

Process based on conceptual design by Golder Associates

NO.	REVISION TABLE	DATE
0	Original Issue	April 30, 2018
1	Record Drawing	July 31, 2018

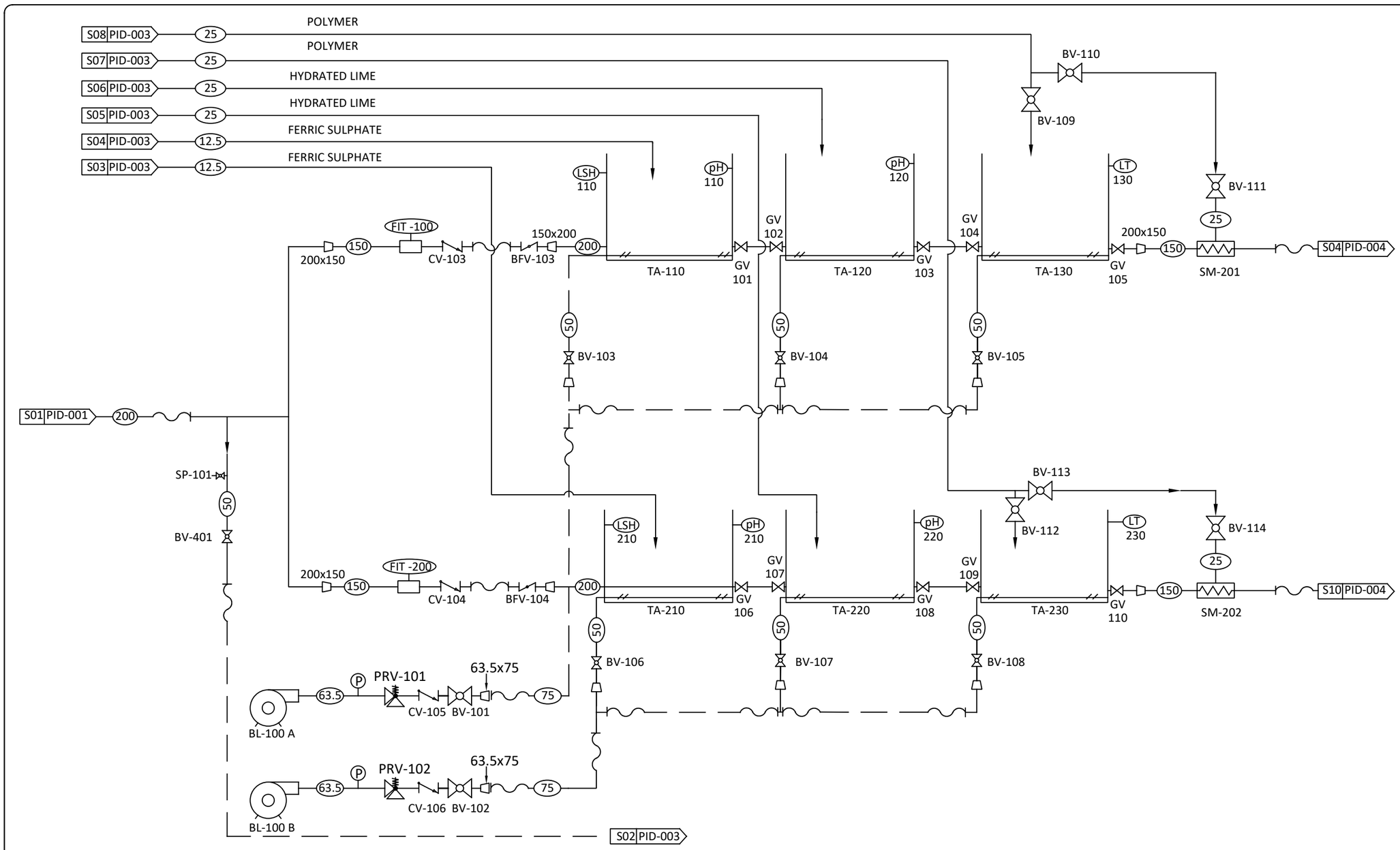
McCUE ENGINEERING CONTRACTORS

CLIENT:

BAFFINLAND IRON MINES CORPORATION

Waste Rock Water Storage Pond
PROCESS & INSTRUMENTATION DIAGRAM
Waste Rock Pile Treatment Plant

DATE: July 31, 2018	SCALE: NTS
DATA BY: R.B.	MCCUE JOB NO: 137-0001
DRAWN BY: M.T.	FIG: PID-0001



BL-100 A/B
Blower
Model: Gast R7100A-3
Power: 208V/3hp/60Hz
Capacity: 500m³/hr @ 1.9m TDH

TA-110/210
Ferric Reaction Tank
Material: Polyurethane
Size: 5.9m W x 1.5 H
Capacity: 24,820 Liters

TA-120/220
Lime Reaction Tank
Material: Polyurethane
Size: 5.9m W x 1.5 H
Capacity: 24,820 Liters

TA-130/230
Polymer Reaction Tank
Material: Polyurethane
Size: 5.9m W x 1.5 H
Capacity: 24,820 Liters

FT-100/200
Influent Flow Meter
Model: GF Signet 3-2551-P1-41

LT-130/230
Level Transmitter
Model: Echosonic 11 LU27

pH-110/120/210/220
pH Meter
Model: Walchem WEL-PHF-NN

LEGEND:

- Hose
- Sch. 80 PVC Pipe
- Butterfly Valve
- Check Valve
- Reducer
- Pressure Gauge
- Static Mixer
- Gate Valve
- Pressure Relief Valve
- Ball Valve
- Sample Port
- Flow Meter
- Level Switch
- pH Sensor
- Level Transmitter

Process based on conceptual design by Golder Associates

NO.	REVISION TABLE	DATE
0	Original Issue	April 30, 2018
1	Record Drawing	July 31, 2018

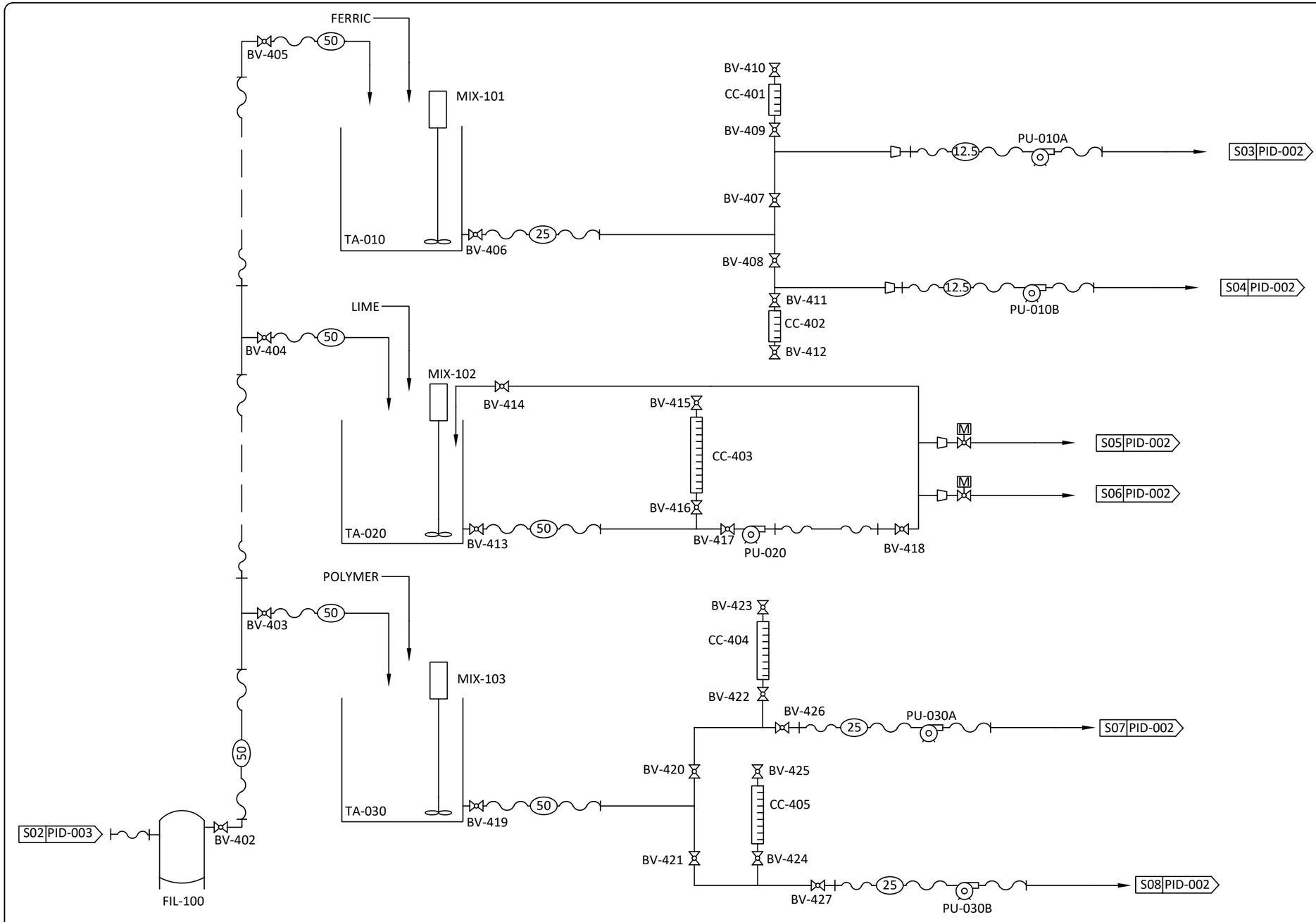
McCUE ENGINEERING CONTRACTORS

CLIENT:

BAFFINLAND IRON MINES CORPORATION

REACTION TANKS
PROCESS & INSTRUMENTATION DIAGRAM
Waste Rock Pile Water Treatment Plant

DATE: July 31, 2018	SCALE: NTS
DATA BY: R.B.	MCCUE JOB NO: 137-0001
DRAWN BY: M.T.	FIG: PID-0002



FIL-100
Bag Filter
Model: FTI 830-2P-150-CS-BS-P13-DP
Bag Size: 5 Micron

PU-010A/B
Ferric Chemical Pump
Model: Welchmen EHE31E1-VC
Power: 115 VAC/1hp/60Hz
Capacity: 21 LPM @ 106m TDH

PU-020
Lime Chemical Pump
Model: Flowmotion FR25-HR30HR
Power: 230V/3hp/60Hz
Capacity: 570 LPM @ 42m TDH

PU-030
Polymer Chemical Pump
Model: Flowmotion FR25-HR30HR
Power: 230V/3hp/60Hz
Capacity: 990 LPM @ 42m TDH

MIX-101
Ferric Mixer
Model: Dynamix DMX-5505K-1
Power: 0.5 HP, 230V/1Ph/60Hz
Shaft: 1" Diameter x 41" Long

MIX-102
Lime Mixer
Model: Dynamix DMX-5505K-2
Power: 0.5 HP, 230V/1Ph/60Hz
Shaft: 1" Diameter x 52" Long

MIX-103
Polymer Mixer
Model: Dynamix DMX-5505K-1
Power: 0.5 HP, 230V/1Ph/60Hz
Shaft: 1" Diameter x 49" Long

TA-010
Ferric Mixing Tank
Material: Polyurethane
Size: Ø 1.2m x 1.3m Height

TA-020
Lime Mixing Tank
Material: Polyurethane
Size: Ø 1.8m x 1.7m Height

TA-030
Polymer Mixing Tank
Material: Polyurethane
Size: Ø 1.6m x 1.6m Height

CC-401/402/403/404/405
Calibration Column

LEGEND:

- Hose
- Sch. 80 PVC Pipe
- Ball Valve
- Reducer
- Motorized Ball Valve

Process based on conceptual design by Golder Associates

NO.	REVISION TABLE	DATE
0	Original Issue	April 30, 2018
1	Record Drawing	July 31, 2018

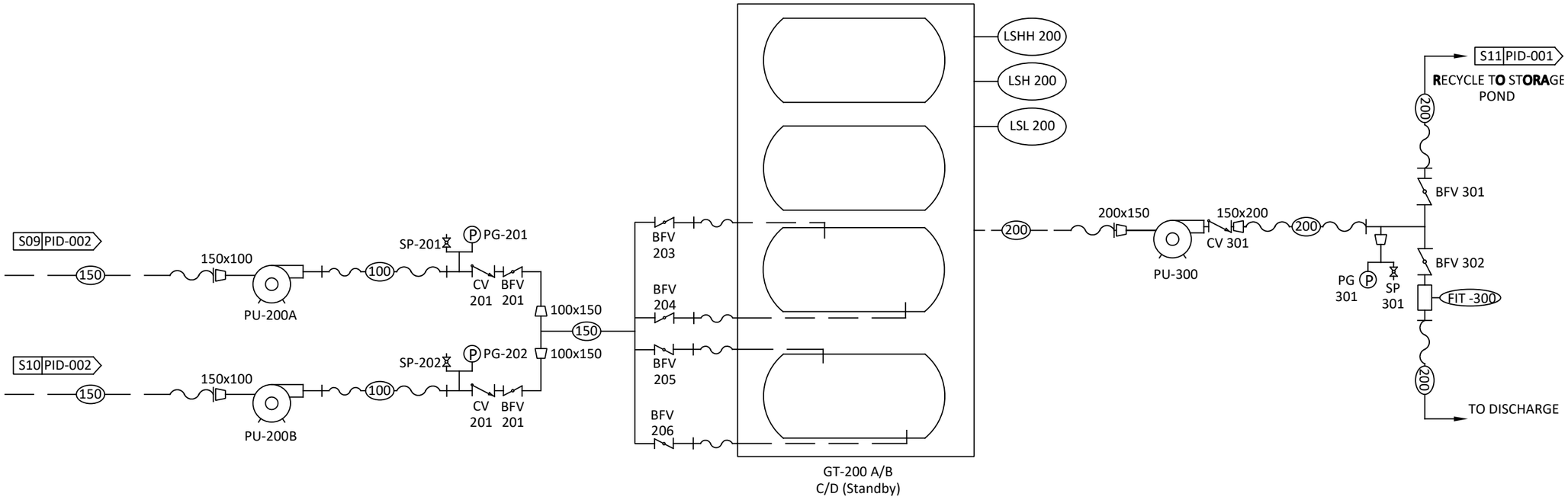
McCUE ENGINEERING CONTRACTORS

CLIENT:

BAFFINLAND IRON MINES CORPORATION

CHEMICAL MAKEUP
PROCESS & INSTRUMENTATION DIAGRAM
Waste Rock Pile Water Treatment Plant

DATE: July 31, 2018	SCALE: NTS
DATA BY: R.B.	MCCUE JOB NO: 137-0001
DRAWN BY: M.T.	FIG: PID-003



LEGEND:

- Hose
- Sch. 80 PVC Pipe
- Butterfly Valve
- Check Valve
- Reducer
- (P) Pressure Gauge
- SP Sample Port
- (LS) Level Switch

Process based on conceptual design by Golder Associates

NO.	REVISION TABLE	DATE
0	Original Issue	April 30, 2018
1	Record Drawing	July 31, 2018

McCUE ENGINEERING CONTRACTORS

CLIENT:

BAFFINLAND IRON MINES CORPORATION

GEOTUBE FIELD PROCESS & INSTRUMENTATION DIAGRAM

Waste Rock Pile Water Treatment Plant

DATE: July 31, 2018	SCALE: NTS
DATA BY: R.B.	MCCUE JOB NO: 137-0001
DRAWN BY: M.T.	FIG: PID-004

PU-200A/B
Transfer Pump
Model: Prime Aire PA4A60-404ST
Power: Diesel Driven
Capacity: 140m³/hr

GT-200 A/B/C/D
Geotube
Model: Tencare GT500
Dimensions: 60' Circumference x 100' Long

PU-300
Discharge Pump
Model: Prime Aire PA4A60-404ST
Power: Diesel Driven
Capacity: 280m³/hr

FT-300
Flow Meter
Model: Toshiba GFG32

APPENDIX B - MONITORING

BROWNFIELDS TO GOLD MINES

Monitoring Spreadsheet

Project Name: BaffinLand Iron Mine
Waste Pile Water Treatment

Date	Time	OP	Inlet Quality			Train 1						Train 2						Discharge							
			Temp	Inlet pH	Inlet TSS	FIT-100	pH-110	pH-120	Ferric Dosage	Lime Dosage	Polymer Dosage	FIT-200	pH-210	pH-220	Ferric Dosage	Lime Dosage	Polymer Dosage	FIT-300	FIT-300 Totalizer	Geotube Pond pH	Geobag 1 Height	Geobag 2 Height	Discharge pH	Discharge Turbidity	Discharge TSS
			ºC		mg/L	(L/s)			Stroke/Speed	Hz	Hz	(L/s)			Stroke/Speed	Hz	Hz	(gpm)	(gpm)		(m)	(m)		NTU	(mg/L)

Observations

Chemical Availability	Week #1 Date:	Week #2 Date:	Week #3 Date:	Week #4 Date:
Ferric Sulphate				
Hydrated Lime				
Polymer				

APPENDIX C

CERTIFICATES OF ANALYSES

Baffinland Iron Mine's Corporation (Oakville)
ATTN: William Bowden/Connor Devereaux
2275 Upper Middle Rd. E.
Suite #300
Oakville ON L6H 0C3

Date Received: 29-AUG-19
Report Date: 24-SEP-19 11:37 (MT)
Version: FINAL

Client Phone: 647-253-0596

Certificate of Analysis

Lab Work Order #: L2338795

Project P.O. #: 4500057496
Job Reference: MS-06 WT TOX
C of C Numbers:
Legal Site Desc:

Rick Hawthorne
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2338795-1 MS-06 Sampled By: KB/BM on 29-AUG-19 @ 17:30 Matrix: WATER							
Physical Tests							
Conductivity	2220		3.0	umhos/cm		31-AUG-19	R4780508
Hardness (as CaCO3)	1430		1.3	mg/L		03-SEP-19	
pH	7.01		0.10	pH units		30-AUG-19	R4778183
Total Suspended Solids	4.7		2.0	mg/L		30-AUG-19	R4778163
Total Dissolved Solids	1960		20	mg/L		31-AUG-19	R4778969
Turbidity	6.43		0.10	NTU		31-AUG-19	R4778962
Anions and Nutrients							
Acidity (as CaCO3)	35.1		5.0	mg/L		05-SEP-19	R4784118
Alkalinity, Total (as CaCO3)	<10		10	mg/L		31-AUG-19	R4780508
Ammonia, Total (as N)	2.72	DLHC	0.10	mg/L		03-SEP-19	R4781881
Chloride (Cl)	26.9	DLDS	2.5	mg/L		30-AUG-19	R4782042
Fluoride (F)	<0.10	DLDS	0.10	mg/L		30-AUG-19	R4782042
Nitrate (as N)	10.2	DLDS	0.10	mg/L		30-AUG-19	R4782042
Total Kjeldahl Nitrogen	3.06		0.15	mg/L	04-SEP-19	04-SEP-19	R4782891
Phosphorus, Total	<0.0030		0.0030	mg/L	30-AUG-19	03-SEP-19	R4781670
Sulfate (SO4)	1390	DLDS	1.5	mg/L		30-AUG-19	R4782042
Cyanides							
Cyanide, Total	<20	DLM	20	mg/L		03-SEP-19	R4781895
Organic / Inorganic Carbon							
Dissolved Carbon Filtration Location	LAB					30-AUG-19	R4778762
Dissolved Organic Carbon	0.59		0.50	mg/L	30-AUG-19	03-SEP-19	R4781177
Total Organic Carbon	1.65		0.50	mg/L		03-SEP-19	R4781533
Total Metals							
Aluminum (Al)-Total	<0.050	DLHC	0.050	mg/L	30-AUG-19	02-SEP-19	R4779931
Antimony (Sb)-Total	<0.0010	DLHC	0.0010	mg/L	30-AUG-19	02-SEP-19	R4779931
Arsenic (As)-Total	<0.0010	DLHC	0.0010	mg/L	30-AUG-19	02-SEP-19	R4779931
Barium (Ba)-Total	0.0213	DLHC	0.0010	mg/L	30-AUG-19	02-SEP-19	R4779931
Beryllium (Be)-Total	<0.0010	DLHC	0.0010	mg/L	30-AUG-19	02-SEP-19	R4779931
Bismuth (Bi)-Total	<0.00050	DLHC	0.00050	mg/L	30-AUG-19	02-SEP-19	R4779931
Boron (B)-Total	<0.10	DLHC	0.10	mg/L	30-AUG-19	02-SEP-19	R4779931
Cadmium (Cd)-Total	0.000339	DLHC	0.000050	mg/L	30-AUG-19	02-SEP-19	R4779931
Calcium (Ca)-Total	106	DLHC	0.50	mg/L	30-AUG-19	02-SEP-19	R4779931
Cesium (Cs)-Total	<0.00010	DLHC	0.00010	mg/L	30-AUG-19	02-SEP-19	R4779931
Chromium (Cr)-Total	<0.0050	DLHC	0.0050	mg/L	30-AUG-19	02-SEP-19	R4779931
Cobalt (Co)-Total	0.0895	DLHC	0.0010	mg/L	30-AUG-19	02-SEP-19	R4779931
Copper (Cu)-Total	<0.010	DLHC	0.010	mg/L	30-AUG-19	02-SEP-19	R4779931
Iron (Fe)-Total	0.14	DLHC	0.10	mg/L	30-AUG-19	02-SEP-19	R4779931
Lead (Pb)-Total	<0.00050	DLHC	0.00050	mg/L	30-AUG-19	02-SEP-19	R4779931
Lithium (Li)-Total	0.057	DLHC	0.010	mg/L	30-AUG-19	02-SEP-19	R4779931
Magnesium (Mg)-Total	280	DLHC	0.050	mg/L	30-AUG-19	02-SEP-19	R4779931
Manganese (Mn)-Total	14.1	DLHC	0.0050	mg/L	30-AUG-19	02-SEP-19	R4779931
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		03-SEP-19	R4781423

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2338795-1 MS-06 Sampled By: KB/BM on 29-AUG-19 @ 17:30 Matrix: WATER							
Total Metals							
Molybdenum (Mo)-Total	<0.00050	DLHC	0.00050	mg/L	30-AUG-19	02-SEP-19	R4779931
Nickel (Ni)-Total	0.0969	DLHC	0.0050	mg/L	30-AUG-19	02-SEP-19	R4779931
Phosphorus (P)-Total	<0.50	DLHC	0.50	mg/L	30-AUG-19	02-SEP-19	R4779931
Potassium (K)-Total	11.7	DLHC	0.50	mg/L	30-AUG-19	02-SEP-19	R4779931
Rubidium (Rb)-Total	0.0155	DLHC	0.0020	mg/L	30-AUG-19	02-SEP-19	R4779931
Selenium (Se)-Total	0.00223	DLHC	0.00050	mg/L	30-AUG-19	02-SEP-19	R4779931
Silicon (Si)-Total	2.2	DLHC	1.0	mg/L	30-AUG-19	02-SEP-19	R4779931
Silver (Ag)-Total	<0.00050	DLHC	0.00050	mg/L	30-AUG-19	02-SEP-19	R4779931
Sodium (Na)-Total	6.91	DLHC	0.50	mg/L	30-AUG-19	02-SEP-19	R4779931
Strontium (Sr)-Total	0.198	DLHC	0.010	mg/L	30-AUG-19	02-SEP-19	R4779931
Sulfur (S)-Total	471	DLHC	5.0	mg/L	30-AUG-19	02-SEP-19	R4779931
Tellurium (Te)-Total	<0.0020	DLHC	0.0020	mg/L	30-AUG-19	02-SEP-19	R4779931
Thallium (Tl)-Total	0.00015	DLHC	0.00010	mg/L	30-AUG-19	02-SEP-19	R4779931
Thorium (Th)-Total	<0.0010	DLHC	0.0010	mg/L	30-AUG-19	02-SEP-19	R4779931
Tin (Sn)-Total	<0.0010	DLHC	0.0010	mg/L	30-AUG-19	02-SEP-19	R4779931
Titanium (Ti)-Total	<0.0030	DLHC	0.0030	mg/L	30-AUG-19	02-SEP-19	R4779931
Tungsten (W)-Total	<0.0010	DLHC	0.0010	mg/L	30-AUG-19	02-SEP-19	R4779931
Uranium (U)-Total	0.00012	DLHC	0.00010	mg/L	30-AUG-19	02-SEP-19	R4779931
Vanadium (V)-Total	<0.0050	DLHC	0.0050	mg/L	30-AUG-19	02-SEP-19	R4779931
Zinc (Zn)-Total	<0.030	DLHC	0.030	mg/L	30-AUG-19	02-SEP-19	R4779931
Zirconium (Zr)-Total	<0.0020	DLHC	0.0020	mg/L	30-AUG-19	02-SEP-19	R4779931
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					02-SEP-19	R4780008
Dissolved Metals Filtration Location	FIELD					30-AUG-19	R4778671
Aluminum (Al)-Dissolved	<0.050	DLHC	0.050	mg/L	30-AUG-19	30-AUG-19	R4779908
Antimony (Sb)-Dissolved	<0.0010	DLHC	0.0010	mg/L	30-AUG-19	30-AUG-19	R4779908
Arsenic (As)-Dissolved	<0.0010	DLHC	0.0010	mg/L	30-AUG-19	30-AUG-19	R4779908
Barium (Ba)-Dissolved	0.0245	DLHC	0.0010	mg/L	30-AUG-19	02-SEP-19	R4779908
Beryllium (Be)-Dissolved	<0.0010	DLHC	0.0010	mg/L	30-AUG-19	30-AUG-19	R4779908
Bismuth (Bi)-Dissolved	<0.00050	DLHC	0.00050	mg/L	30-AUG-19	30-AUG-19	R4779908
Boron (B)-Dissolved	<0.10	DLHC	0.10	mg/L	30-AUG-19	30-AUG-19	R4779908
Cadmium (Cd)-Dissolved	0.000367	DLHC	0.000050	mg/L	30-AUG-19	02-SEP-19	R4779908
Calcium (Ca)-Dissolved	105	DLHC	0.50	mg/L	30-AUG-19	30-AUG-19	R4779908
Cesium (Cs)-Dissolved	<0.00010	DLHC	0.00010	mg/L	30-AUG-19	02-SEP-19	R4779908
Chromium (Cr)-Dissolved	<0.0050	DLHC	0.0050	mg/L	30-AUG-19	30-AUG-19	R4779908
Cobalt (Co)-Dissolved	0.0881	DLHC	0.0010	mg/L	30-AUG-19	30-AUG-19	R4779908
Copper (Cu)-Dissolved	<0.0020	DLHC	0.0020	mg/L	30-AUG-19	30-AUG-19	R4779908
Iron (Fe)-Dissolved	<0.10	DLHC	0.10	mg/L	30-AUG-19	30-AUG-19	R4779908
Lead (Pb)-Dissolved	<0.00050	DLHC	0.00050	mg/L	30-AUG-19	30-AUG-19	R4779908
Lithium (Li)-Dissolved	0.061	DLHC	0.010	mg/L	30-AUG-19	30-AUG-19	R4779908
Magnesium (Mg)-Dissolved	283	DLHC	0.050	mg/L	30-AUG-19	30-AUG-19	R4779908

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2338795-1 MS-06 Sampled By: KB/BM on 29-AUG-19 @ 17:30 Matrix: WATER							
Dissolved Metals							
Manganese (Mn)-Dissolved	14.1	DLHC	0.0050	mg/L	30-AUG-19	30-AUG-19	R4779908
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	02-SEP-19	03-SEP-19	R4781421
Molybdenum (Mo)-Dissolved	<0.00050	DLHC	0.00050	mg/L	30-AUG-19	30-AUG-19	R4779908
Nickel (Ni)-Dissolved	0.0965	DLHC	0.0050	mg/L	30-AUG-19	30-AUG-19	R4779908
Phosphorus (P)-Dissolved	<0.50	DLHC	0.50	mg/L	30-AUG-19	30-AUG-19	R4779908
Potassium (K)-Dissolved	11.7	DLHC	0.50	mg/L	30-AUG-19	30-AUG-19	R4779908
Rubidium (Rb)-Dissolved	0.0159	DLHC	0.0020	mg/L	30-AUG-19	30-AUG-19	R4779908
Selenium (Se)-Dissolved	0.00256	DLHC	0.00050	mg/L	30-AUG-19	30-AUG-19	R4779908
Silicon (Si)-Dissolved	2.20	DLHC	0.50	mg/L	30-AUG-19	30-AUG-19	R4779908
Silver (Ag)-Dissolved	<0.00050	DLHC	0.00050	mg/L	30-AUG-19	30-AUG-19	R4779908
Sodium (Na)-Dissolved	7.08	DLHC	0.50	mg/L	30-AUG-19	30-AUG-19	R4779908
Strontium (Sr)-Dissolved	0.201	DLHC	0.010	mg/L	30-AUG-19	30-AUG-19	R4779908
Sulfur (S)-Dissolved	475	DLHC	5.0	mg/L	30-AUG-19	30-AUG-19	R4779908
Tellurium (Te)-Dissolved	<0.0020	DLHC	0.0020	mg/L	30-AUG-19	30-AUG-19	R4779908
Thallium (Tl)-Dissolved	0.00015	DLHC	0.00010	mg/L	30-AUG-19	02-SEP-19	R4779908
Thorium (Th)-Dissolved	<0.0010	DLHC	0.0010	mg/L	30-AUG-19	30-AUG-19	R4779908
Tin (Sn)-Dissolved	<0.0010	DLHC	0.0010	mg/L	30-AUG-19	30-AUG-19	R4779908
Titanium (Ti)-Dissolved	<0.0030	DLHC	0.0030	mg/L	30-AUG-19	30-AUG-19	R4779908
Tungsten (W)-Dissolved	<0.0010	DLHC	0.0010	mg/L	30-AUG-19	30-AUG-19	R4779908
Uranium (U)-Dissolved	0.00013	DLHC	0.00010	mg/L	30-AUG-19	02-SEP-19	R4779908
Vanadium (V)-Dissolved	<0.0050	DLHC	0.0050	mg/L	30-AUG-19	30-AUG-19	R4779908
Zinc (Zn)-Dissolved	0.020	DLHC	0.010	mg/L	30-AUG-19	30-AUG-19	R4779908
Zirconium (Zr)-Dissolved	<0.0020	DLHC	0.0020	mg/L	30-AUG-19	30-AUG-19	R4779908
Radiological Parameters							
Ra-226	0.013		0.0055	Bq/L	09-SEP-19	19-SEP-19	R4780785

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

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Chloride (Cl)	MS-B	L2338795-1
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2338795-1
Matrix Spike	Boron (B)-Dissolved	MS-B	L2338795-1
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2338795-1
Matrix Spike	Cobalt (Co)-Dissolved	MS-B	L2338795-1
Matrix Spike	Lithium (Li)-Dissolved	MS-B	L2338795-1
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2338795-1
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L2338795-1
Matrix Spike	Nickel (Ni)-Dissolved	MS-B	L2338795-1
Matrix Spike	Potassium (K)-Dissolved	MS-B	L2338795-1
Matrix Spike	Rubidium (Rb)-Dissolved	MS-B	L2338795-1
Matrix Spike	Silicon (Si)-Dissolved	MS-B	L2338795-1
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2338795-1
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2338795-1
Matrix Spike	Sulfur (S)-Dissolved	MS-B	L2338795-1
Matrix Spike	Uranium (U)-Dissolved	MS-B	L2338795-1
Matrix Spike	Aluminum (Al)-Total	MS-B	L2338795-1
Matrix Spike	Barium (Ba)-Total	MS-B	L2338795-1
Matrix Spike	Calcium (Ca)-Total	MS-B	L2338795-1
Matrix Spike	Iron (Fe)-Total	MS-B	L2338795-1
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2338795-1
Matrix Spike	Silicon (Si)-Total	MS-B	L2338795-1
Matrix Spike	Sodium (Na)-Total	MS-B	L2338795-1
Matrix Spike	Strontium (Sr)-Total	MS-B	L2338795-1
Matrix Spike	Sulfur (S)-Total	MS-B	L2338795-1
Matrix Spike	Titanium (Ti)-Total	MS-B	L2338795-1
Matrix Spike	Uranium (U)-Total	MS-B	L2338795-1
Matrix Spike	Ammonia, Total (as N)	MS-B	L2338795-1

Sample Parameter Qualifier key listed:

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACY-TITR-TB	Water	Acidity	APHA 2310 B modified

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

ALK-WT	Water	Alkalinity, Total (as CaCO3)	EPA 310.2

This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.

CL-IC-N-WT	Water	Chloride by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

CN-TOT-WT	Water	Cyanide, Total	ISO 14403-2

Total cyanide is determined by the combination of UV digestion and distillation. Cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

When using this method, high levels of thiocyanate in samples can cause false positives at ~1-2% of the thiocyanate concentration. For samples with detectable cyanide analyzed by this method, ALS recommends analysis for thiocyanate to check for this potential interference

DOC-WT	Water	Dissolved Organic Carbon	APHA 5310B

Reference Information

Sample is filtered through a 0.45um filter, then injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic carbon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.

EC-SCREEN-WT	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

EC-WT	Water	Conductivity	APHA 2510 B

Water samples can be measured directly by immersing the conductivity cell into the sample.

F-IC-N-WT	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-WT	Water	Hardness	APHA 2340 B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-WT	Water	Dissolved Mercury in Water by CVAAS	EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

HG-T-CVAA-WT	Water	Total Mercury in Water by CVAAS	EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

MET-D-CCMS-WT	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

MET-T-CCMS-WT	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

NH3-F-WT	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO3-IC-WT	Water	Nitrate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-COL-WT	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is deteremined colourimetrically after persulphate digestion of the sample.

PH-BF	Water	pH	APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

RA226-MMER-FC	Water	Ra226 by Alpha Scint, MDC=0.01 Bq/L	EPA 903.1
SO4-IC-N-WT	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-BF	Water	Total Dissolved Solids	APHA 2540C

A well-mixed sample is filtered though glass fibres filter. A known volume of the filtrate is evaporated and dried at 180 +/- 2C for 1hr.

SOLIDS-TSS-BF	Water	Suspended solids	APHA 2540 D-Gravimetric

Reference Information

A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104 +/- 1C for a minimum of four hours or until a constant weight is achieved.

TKN-WT Water Total Kjeldahl Nitrogen APHA 4500-Norg D

This analysis is carried out using procedures adapted from APHA Method 4500-Norg "Nitrogen (Organic)". Total Kjeldahl Nitrogen is determined by sample digestion at 380 Celsius with analysis using an automated colorimetric method.

TOC-WT Water Total Organic Carbon APHA 5310B

Sample is injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic cabon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.

TURBIDITY-BF Water Turbidity APHA 2130 B

Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.

** 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
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA
FC	ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
TB	ALS ENVIRONMENTAL - THUNDER BAY, ONTARIO, CANADA
BF	ALS ENVIRONMENTAL - BAFFIN ISLAND, NUNAVUT, 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 weight of sample
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

Workorder: L2338795 Report Date: 24-SEP-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACY-TITR-TB	**Water**							
Batch R4784118								
WG3152901-3 DUP		**L2339862-1**						
Acidity (as CaCO3)		4.1	3.7		mg/L	10	20	05-SEP-19
WG3152901-2 LCS								
Acidity (as CaCO3)			94.6		%		85-115	05-SEP-19
WG3152901-1 MB								
Acidity (as CaCO3)			<2.0		mg/L		2	05-SEP-19
ALK-WT	**Water**							
Batch R4780508								
WG3149320-4 DUP		**WG3149320-3**						
Alkalinity, Total (as CaCO3)		92	92		mg/L	0.2	20	31-AUG-19
WG3149320-2 LCS								
Alkalinity, Total (as CaCO3)			101.8		%		85-115	31-AUG-19
WG3149320-1 MB								
Alkalinity, Total (as CaCO3)			<10		mg/L		10	31-AUG-19
CL-IC-N-WT	**Water**							
Batch R4782042								
WG3148597-14 DUP		**WG3148597-13**						
Chloride (Cl)		277	277		mg/L	0.1	20	30-AUG-19
WG3148597-12 LCS								
Chloride (Cl)			101.7		%		90-110	30-AUG-19
WG3148597-11 MB								
Chloride (Cl)			<0.50		mg/L		0.5	30-AUG-19
WG3148597-15 MS		**WG3148597-13**						
Chloride (Cl)			N/A	MS-B	%		-	30-AUG-19
CN-TOT-WT	**Water**							
Batch R4781895								
WG3150491-3 DUP		**L2338795-1**						
Cyanide, Total		<20	<20	RPD-NA	mg/L	N/A	20	03-SEP-19
WG3150491-2 LCS								
Cyanide, Total			85.3		%		80-120	03-SEP-19
WG3150491-1 MB								
Cyanide, Total			<0.0020		mg/L		0.002	03-SEP-19
WG3150491-4 MS		**L2338795-1**						
Cyanide, Total			84.8		%		70-130	03-SEP-19
DOC-WT	**Water**							

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
DOC-WT	**Water**							
Batch R4781177								
WG3149140-3 DUP		**L2337949-1**						
Dissolved Organic Carbon		7.87	7.97		mg/L	1.2	20	03-SEP-19
WG3149140-2 LCS								
Dissolved Organic Carbon			96.8		%		80-120	03-SEP-19
WG3149140-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	03-SEP-19
WG3149140-4 MS		**L2337949-1**						
Dissolved Organic Carbon			94.9		%		70-130	03-SEP-19
EC-WT	**Water**							
Batch R4780508								
WG3149320-4 DUP		**WG3149320-3**						
Conductivity		226	225		umhos/cm	0.4	10	31-AUG-19
WG3149320-2 LCS								
Conductivity			99.9		%		90-110	31-AUG-19
WG3149320-1 MB								
Conductivity			<3.0		umhos/cm		3	31-AUG-19
F-IC-N-WT	**Water**							
Batch R4782042								
WG3148597-14 DUP		**WG3148597-13**						
Fluoride (F)		0.321	0.318		mg/L	1.0	20	30-AUG-19
WG3148597-12 LCS								
Fluoride (F)			101.5		%		90-110	30-AUG-19
WG3148597-11 MB								
Fluoride (F)			<0.020		mg/L		0.02	30-AUG-19
WG3148597-15 MS		**WG3148597-13**						
Fluoride (F)			99.9		%		75-125	30-AUG-19
HG-D-CVAA-WT	**Water**							
Batch R4781421								
WG3149941-4 DUP		**WG3149941-3**						
Mercury (Hg)-Dissolved		<0.0000050	<0.000005(	RPD-NA	mg/L	N/A	20	03-SEP-19
WG3149941-2 LCS								
Mercury (Hg)-Dissolved			95.5		%		80-120	03-SEP-19
WG3149941-1 MB								
Mercury (Hg)-Dissolved			<0.000005(		mg/L		0.000005	03-SEP-19
WG3149941-6 MS		**WG3149941-5**						
Mercury (Hg)-Dissolved			94.1		%		70-130	03-SEP-19
HG-T-CVAA-WT	**Water**							

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-T-CVAA-WT	**Water**							
Batch R4781423								
WG3149940-4 DUP		**WG3149940-3**						
Mercury (Hg)-Total		<0.0000050	<0.000005C	RPD-NA	mg/L	N/A	20	03-SEP-19
WG3149940-2 LCS								
Mercury (Hg)-Total			92.7		%		80-120	03-SEP-19
WG3149940-1 MB								
Mercury (Hg)-Total			<0.000005C		mg/L		0.000005	03-SEP-19
WG3149940-6 MS		**WG3149940-5**						
Mercury (Hg)-Total			91.1		%		70-130	03-SEP-19
MET-D-CCMS-WT	**Water**							
Batch R4779908								
WG3149036-4 DUP		**WG3149036-3**						
Aluminum (Al)-Dissolved		<0.050	<0.050	RPD-NA	mg/L	N/A	20	30-AUG-19
Antimony (Sb)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	30-AUG-19
Arsenic (As)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	30-AUG-19
Barium (Ba)-Dissolved		0.0245	0.0213		mg/L	14	20	02-SEP-19
Beryllium (Be)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	30-AUG-19
Bismuth (Bi)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	30-AUG-19
Boron (B)-Dissolved		<0.10	<0.10	RPD-NA	mg/L	N/A	20	30-AUG-19
Cadmium (Cd)-Dissolved		0.000367	0.000378		mg/L	2.8	20	02-SEP-19
Calcium (Ca)-Dissolved		105	104		mg/L	0.6	20	30-AUG-19
Cesium (Cs)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	02-SEP-19
Chromium (Cr)-Dissolved		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	30-AUG-19
Cobalt (Co)-Dissolved		0.0881	0.0878		mg/L	0.4	20	30-AUG-19
Copper (Cu)-Dissolved		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	30-AUG-19
Iron (Fe)-Dissolved		<0.10	<0.10	RPD-NA	mg/L	N/A	20	30-AUG-19
Lead (Pb)-Dissolved		<0.00050	0.00067	RPD-NA	mg/L	N/A	20	30-AUG-19
Lithium (Li)-Dissolved		0.061	0.060		mg/L	1.6	20	30-AUG-19
Magnesium (Mg)-Dissolved		283	283		mg/L	0.1	20	30-AUG-19
Manganese (Mn)-Dissolved		14.1	14.1		mg/L	0.5	20	30-AUG-19
Molybdenum (Mo)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	30-AUG-19
Nickel (Ni)-Dissolved		0.0965	0.0965		mg/L	0.1	20	30-AUG-19
Phosphorus (P)-Dissolved		<0.50	<0.50	RPD-NA	mg/L	N/A	20	30-AUG-19
Potassium (K)-Dissolved		11.7	11.6		mg/L	0.4	20	30-AUG-19
Rubidium (Rb)-Dissolved		0.0159	0.0162		mg/L	2.3	20	30-AUG-19
Selenium (Se)-Dissolved		0.00256	0.00225		mg/L	13	20	30-AUG-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4779908								
WG3149036-4 DUP		**WG3149036-3**						
Silicon (Si)-Dissolved		2.20	2.19		mg/L	0.7	20	30-AUG-19
Silver (Ag)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	30-AUG-19
Sodium (Na)-Dissolved		7.08	7.30		mg/L	3.0	20	30-AUG-19
Strontium (Sr)-Dissolved		0.201	0.199		mg/L	0.7	20	30-AUG-19
Sulfur (S)-Dissolved		475	476		mg/L	0.2	20	30-AUG-19
Tellurium (Te)-Dissolved		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	30-AUG-19
Thallium (Tl)-Dissolved		0.00015	0.00017		mg/L	6.6	20	02-SEP-19
Thorium (Th)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	30-AUG-19
Tin (Sn)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	30-AUG-19
Titanium (Ti)-Dissolved		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	30-AUG-19
Tungsten (W)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	30-AUG-19
Uranium (U)-Dissolved		0.00013	0.00011		mg/L	11	20	02-SEP-19
Vanadium (V)-Dissolved		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	30-AUG-19
Zinc (Zn)-Dissolved		0.020	0.020		mg/L	3.0	20	30-AUG-19
Zirconium (Zr)-Dissolved		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	30-AUG-19
WG3149036-2 LCS								
Aluminum (Al)-Dissolved			103.6		%		80-120	30-AUG-19
Antimony (Sb)-Dissolved			100.2		%		80-120	30-AUG-19
Arsenic (As)-Dissolved			97.7		%		80-120	30-AUG-19
Barium (Ba)-Dissolved			99.6		%		80-120	30-AUG-19
Beryllium (Be)-Dissolved			98.3		%		80-120	30-AUG-19
Bismuth (Bi)-Dissolved			99.5		%		80-120	30-AUG-19
Boron (B)-Dissolved			95.1		%		80-120	30-AUG-19
Cadmium (Cd)-Dissolved			98.7		%		80-120	30-AUG-19
Calcium (Ca)-Dissolved			101.0		%		80-120	30-AUG-19
Cesium (Cs)-Dissolved			96.5		%		80-120	30-AUG-19
Chromium (Cr)-Dissolved			99.9		%		80-120	30-AUG-19
Cobalt (Co)-Dissolved			99.3		%		80-120	30-AUG-19
Copper (Cu)-Dissolved			98.3		%		80-120	30-AUG-19
Iron (Fe)-Dissolved			102.2		%		80-120	30-AUG-19
Lead (Pb)-Dissolved			99.3		%		80-120	30-AUG-19
Lithium (Li)-Dissolved			96.5		%		80-120	30-AUG-19
Magnesium (Mg)-Dissolved			100.7		%		80-120	30-AUG-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4779908								
WG3149036-2 LCS								
Manganese (Mn)-Dissolved			101.4		%		80-120	30-AUG-19
Molybdenum (Mo)-Dissolved			102.5		%		80-120	30-AUG-19
Nickel (Ni)-Dissolved			99.0		%		80-120	30-AUG-19
Phosphorus (P)-Dissolved			98.2		%		80-120	30-AUG-19
Potassium (K)-Dissolved			100.5		%		80-120	30-AUG-19
Rubidium (Rb)-Dissolved			102.2		%		80-120	30-AUG-19
Selenium (Se)-Dissolved			97.4		%		80-120	30-AUG-19
Silicon (Si)-Dissolved			100.4		%		60-140	30-AUG-19
Silver (Ag)-Dissolved			97.7		%		80-120	30-AUG-19
Sodium (Na)-Dissolved			102.4		%		80-120	30-AUG-19
Strontium (Sr)-Dissolved			101.2		%		80-120	30-AUG-19
Sulfur (S)-Dissolved			100.3		%		80-120	30-AUG-19
Tellurium (Te)-Dissolved			96.2		%		80-120	30-AUG-19
Thallium (Tl)-Dissolved			99.9		%		80-120	30-AUG-19
Thorium (Th)-Dissolved			97.5		%		80-120	30-AUG-19
Tin (Sn)-Dissolved			97.8		%		80-120	30-AUG-19
Titanium (Ti)-Dissolved			100.0		%		80-120	30-AUG-19
Tungsten (W)-Dissolved			98.2		%		80-120	30-AUG-19
Uranium (U)-Dissolved			98.4		%		80-120	30-AUG-19
Vanadium (V)-Dissolved			101.9		%		80-120	30-AUG-19
Zinc (Zn)-Dissolved			97.6		%		80-120	30-AUG-19
Zirconium (Zr)-Dissolved			96.2		%		80-120	30-AUG-19
WG3149036-1 MB								
Aluminum (Al)-Dissolved			<0.0050		mg/L		0.005	30-AUG-19
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	30-AUG-19
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	30-AUG-19
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	30-AUG-19
Beryllium (Be)-Dissolved			<0.00010		mg/L		0.0001	30-AUG-19
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	30-AUG-19
Boron (B)-Dissolved			<0.010		mg/L		0.01	30-AUG-19
Cadmium (Cd)-Dissolved			<0.000005(		mg/L		0.000005	30-AUG-19
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	30-AUG-19
Cesium (Cs)-Dissolved			<0.000010		mg/L		0.00001	30-AUG-19
Chromium (Cr)-Dissolved			<0.00050		mg/L		0.0005	30-AUG-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4779908								
WG3149036-1 MB								
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	30-AUG-19
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	30-AUG-19
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	30-AUG-19
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	30-AUG-19
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	30-AUG-19
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	30-AUG-19
Manganese (Mn)-Dissolved			<0.00050		mg/L		0.0005	30-AUG-19
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	30-AUG-19
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	30-AUG-19
Phosphorus (P)-Dissolved			<0.050		mg/L		0.05	30-AUG-19
Potassium (K)-Dissolved			<0.050		mg/L		0.05	30-AUG-19
Rubidium (Rb)-Dissolved			<0.00020		mg/L		0.0002	30-AUG-19
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	30-AUG-19
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	30-AUG-19
Silver (Ag)-Dissolved			<0.000050		mg/L		0.00005	30-AUG-19
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	30-AUG-19
Strontium (Sr)-Dissolved			<0.0010		mg/L		0.001	30-AUG-19
Sulfur (S)-Dissolved			<0.50		mg/L		0.5	30-AUG-19
Tellurium (Te)-Dissolved			<0.00020		mg/L		0.0002	30-AUG-19
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	30-AUG-19
Thorium (Th)-Dissolved			<0.00010		mg/L		0.0001	30-AUG-19
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	30-AUG-19
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	30-AUG-19
Tungsten (W)-Dissolved			<0.00010		mg/L		0.0001	30-AUG-19
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	30-AUG-19
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	30-AUG-19
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	30-AUG-19
Zirconium (Zr)-Dissolved			<0.00020		mg/L		0.0002	30-AUG-19
WG3149036-5 MS		**WG3149036-3**						
Aluminum (Al)-Dissolved			88.2		%		70-130	30-AUG-19
Antimony (Sb)-Dissolved			97.1		%		70-130	30-AUG-19
Arsenic (As)-Dissolved			97.1		%		70-130	30-AUG-19
Barium (Ba)-Dissolved			N/A	MS-B	%		-	30-AUG-19
Beryllium (Be)-Dissolved			86.0		%		70-130	30-AUG-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4779908								
WG3149036-5 MS		**WG3149036-3**						
Bismuth (Bi)-Dissolved			95.4		%		70-130	30-AUG-19
Boron (B)-Dissolved			N/A	MS-B	%		-	30-AUG-19
Cadmium (Cd)-Dissolved			86.2		%		70-130	30-AUG-19
Calcium (Ca)-Dissolved			N/A	MS-B	%		-	30-AUG-19
Cesium (Cs)-Dissolved			84.8		%		70-130	30-AUG-19
Chromium (Cr)-Dissolved			96.2		%		70-130	30-AUG-19
Cobalt (Co)-Dissolved			N/A	MS-B	%		-	30-AUG-19
Copper (Cu)-Dissolved			90.9		%		70-130	30-AUG-19
Lead (Pb)-Dissolved			94.0		%		70-130	30-AUG-19
Lithium (Li)-Dissolved			N/A	MS-B	%		-	30-AUG-19
Magnesium (Mg)-Dissolved			N/A	MS-B	%		-	30-AUG-19
Manganese (Mn)-Dissolved			N/A	MS-B	%		-	30-AUG-19
Molybdenum (Mo)-Dissolved			96.1		%		70-130	30-AUG-19
Nickel (Ni)-Dissolved			N/A	MS-B	%		-	30-AUG-19
Phosphorus (P)-Dissolved			96.3		%		70-130	30-AUG-19
Potassium (K)-Dissolved			N/A	MS-B	%		-	30-AUG-19
Rubidium (Rb)-Dissolved			N/A	MS-B	%		-	30-AUG-19
Selenium (Se)-Dissolved			93.8		%		70-130	30-AUG-19
Silicon (Si)-Dissolved			N/A	MS-B	%		-	30-AUG-19
Silver (Ag)-Dissolved			89.5		%		70-130	30-AUG-19
Sodium (Na)-Dissolved			N/A	MS-B	%		-	30-AUG-19
Strontium (Sr)-Dissolved			N/A	MS-B	%		-	30-AUG-19
Sulfur (S)-Dissolved			N/A	MS-B	%		-	30-AUG-19
Tellurium (Te)-Dissolved			92.4		%		70-130	30-AUG-19
Thallium (Tl)-Dissolved			94.9		%		70-130	30-AUG-19
Thorium (Th)-Dissolved			91.5		%		70-130	30-AUG-19
Tin (Sn)-Dissolved			93.8		%		70-130	30-AUG-19
Titanium (Ti)-Dissolved			91.9		%		70-130	30-AUG-19
Tungsten (W)-Dissolved			92.3		%		70-130	30-AUG-19
Uranium (U)-Dissolved			N/A	MS-B	%		-	30-AUG-19
Vanadium (V)-Dissolved			99.9		%		70-130	30-AUG-19
Zirconium (Zr)-Dissolved			89.7		%		70-130	30-AUG-19
MET-T-CCMS-WT	**Water**							

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4779931								
WG3148978-4 DUP		**WG3148978-3**						
Aluminum (Al)-Total		<0.050	<0.050	RPD-NA	mg/L	N/A	20	02-SEP-19
Antimony (Sb)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	02-SEP-19
Arsenic (As)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	02-SEP-19
Barium (Ba)-Total		0.0213	0.0216		mg/L	1.4	20	02-SEP-19
Beryllium (Be)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	02-SEP-19
Bismuth (Bi)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	02-SEP-19
Boron (B)-Total		<0.10	<0.10	RPD-NA	mg/L	N/A	20	02-SEP-19
Cadmium (Cd)-Total		0.000339	0.000346		mg/L	1.8	20	02-SEP-19
Calcium (Ca)-Total		106	109		mg/L	2.8	20	02-SEP-19
Chromium (Cr)-Total		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	02-SEP-19
Cesium (Cs)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	02-SEP-19
Cobalt (Co)-Total		0.0895	0.0911		mg/L	1.8	20	02-SEP-19
Copper (Cu)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	02-SEP-19
Iron (Fe)-Total		0.14	0.15		mg/L	4.4	20	02-SEP-19
Lead (Pb)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	02-SEP-19
Lithium (Li)-Total		0.057	0.058		mg/L	1.6	20	02-SEP-19
Magnesium (Mg)-Total		280	286		mg/L	2.3	20	02-SEP-19
Manganese (Mn)-Total		14.1	14.3		mg/L	1.9	20	02-SEP-19
Molybdenum (Mo)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	02-SEP-19
Nickel (Ni)-Total		0.0969	0.0991		mg/L	2.3	20	02-SEP-19
Phosphorus (P)-Total		<0.50	<0.50	RPD-NA	mg/L	N/A	20	02-SEP-19
Potassium (K)-Total		11.7	11.9		mg/L	1.9	20	02-SEP-19
Rubidium (Rb)-Total		0.0155	0.0160		mg/L	2.9	20	02-SEP-19
Selenium (Se)-Total		0.00223	0.00255		mg/L	13	20	02-SEP-19
Silicon (Si)-Total		2.2	2.3		mg/L	2.0	20	02-SEP-19
Silver (Ag)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	02-SEP-19
Sodium (Na)-Total		6.91	7.15		mg/L	3.4	20	02-SEP-19
Strontium (Sr)-Total		0.198	0.207		mg/L	4.6	20	02-SEP-19
Sulfur (S)-Total		471	481		mg/L	2.0	25	02-SEP-19
Thallium (Tl)-Total		0.00015	0.00015		mg/L	1.8	20	02-SEP-19
Tellurium (Te)-Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	02-SEP-19
Thorium (Th)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	25	02-SEP-19
Tin (Sn)-Total		<0.0010	<0.0010		mg/L			02-SEP-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4779931								
WG3148978-4 DUP		**WG3148978-3**						
Tin (Sn)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	02-SEP-19
Titanium (Ti)-Total		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	02-SEP-19
Tungsten (W)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	02-SEP-19
Uranium (U)-Total		0.00012	0.00013		mg/L	7.6	20	02-SEP-19
Vanadium (V)-Total		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	02-SEP-19
Zinc (Zn)-Total		<0.030	<0.030	RPD-NA	mg/L	N/A	20	02-SEP-19
Zirconium (Zr)-Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	02-SEP-19
WG3148978-2 LCS								
Aluminum (Al)-Total			105.7		%		80-120	30-AUG-19
Antimony (Sb)-Total			104.3		%		80-120	30-AUG-19
Arsenic (As)-Total			100.1		%		80-120	30-AUG-19
Barium (Ba)-Total			102.4		%		80-120	30-AUG-19
Beryllium (Be)-Total			99.9		%		80-120	30-AUG-19
Bismuth (Bi)-Total			101.9		%		80-120	30-AUG-19
Boron (B)-Total			97.1		%		80-120	30-AUG-19
Cadmium (Cd)-Total			100.3		%		80-120	30-AUG-19
Calcium (Ca)-Total			101.1		%		80-120	30-AUG-19
Chromium (Cr)-Total			103.0		%		80-120	30-AUG-19
Cesium (Cs)-Total			98.3		%		80-120	30-AUG-19
Cobalt (Co)-Total			101.6		%		80-120	30-AUG-19
Copper (Cu)-Total			101.8		%		80-120	30-AUG-19
Iron (Fe)-Total			106.5		%		80-120	30-AUG-19
Lead (Pb)-Total			101.9		%		80-120	30-AUG-19
Lithium (Li)-Total			97.7		%		80-120	30-AUG-19
Magnesium (Mg)-Total			104.9		%		80-120	30-AUG-19
Manganese (Mn)-Total			101.3		%		80-120	30-AUG-19
Molybdenum (Mo)-Total			103.2		%		80-120	30-AUG-19
Nickel (Ni)-Total			102.9		%		80-120	30-AUG-19
Phosphorus (P)-Total			101.9		%		70-130	30-AUG-19
Potassium (K)-Total			103.1		%		80-120	30-AUG-19
Rubidium (Rb)-Total			101.1		%		80-120	30-AUG-19
Selenium (Se)-Total			101.0		%		80-120	30-AUG-19
Silicon (Si)-Total			105.4		%		60-140	30-AUG-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4779931								
WG3148978-2 LCS								
Silver (Ag)-Total			99.7		%		80-120	30-AUG-19
Sodium (Na)-Total			104.3		%		80-120	30-AUG-19
Strontium (Sr)-Total			101.5		%		80-120	30-AUG-19
Sulfur (S)-Total			105.8		%		80-120	30-AUG-19
Thallium (Tl)-Total			103.1		%		80-120	30-AUG-19
Tellurium (Te)-Total			96.6		%		80-120	30-AUG-19
Thorium (Th)-Total			100.3		%		70-130	30-AUG-19
Tin (Sn)-Total			99.2		%		80-120	30-AUG-19
Titanium (Ti)-Total			99.99		%		80-120	30-AUG-19
Tungsten (W)-Total			101.1		%		80-120	30-AUG-19
Uranium (U)-Total			104.7		%		80-120	30-AUG-19
Vanadium (V)-Total			103.6		%		80-120	30-AUG-19
Zinc (Zn)-Total			97.0		%		80-120	30-AUG-19
Zirconium (Zr)-Total			98.0		%		80-120	30-AUG-19
WG3148978-1 MB								
Aluminum (Al)-Total			<0.0050		mg/L		0.005	30-AUG-19
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	30-AUG-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	30-AUG-19
Barium (Ba)-Total			<0.00010		mg/L		0.0001	30-AUG-19
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	30-AUG-19
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	30-AUG-19
Boron (B)-Total			<0.010		mg/L		0.01	30-AUG-19
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	30-AUG-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	30-AUG-19
Chromium (Cr)-Total			<0.00050		mg/L		0.0005	30-AUG-19
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	30-AUG-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	30-AUG-19
Copper (Cu)-Total			<0.0010		mg/L		0.001	30-AUG-19
Iron (Fe)-Total			<0.010		mg/L		0.01	30-AUG-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	30-AUG-19
Lithium (Li)-Total			<0.0010		mg/L		0.001	30-AUG-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	30-AUG-19
Manganese (Mn)-Total			<0.00050		mg/L		0.0005	30-AUG-19
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	30-AUG-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4779931								
WG3148978-1 MB								
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	30-AUG-19
Phosphorus (P)-Total			<0.050		mg/L		0.05	30-AUG-19
Potassium (K)-Total			<0.050		mg/L		0.05	30-AUG-19
Rubidium (Rb)-Total			<0.00020		mg/L		0.0002	30-AUG-19
Selenium (Se)-Total			<0.000050		mg/L		0.00005	30-AUG-19
Silicon (Si)-Total			<0.10		mg/L		0.1	30-AUG-19
Silver (Ag)-Total			<0.000050		mg/L		0.00005	30-AUG-19
Sodium (Na)-Total			<0.050		mg/L		0.05	30-AUG-19
Strontium (Sr)-Total			<0.0010		mg/L		0.001	30-AUG-19
Sulfur (S)-Total			<0.50		mg/L		0.5	30-AUG-19
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	30-AUG-19
Tellurium (Te)-Total			<0.00020		mg/L		0.0002	30-AUG-19
Thorium (Th)-Total			<0.00010		mg/L		0.0001	30-AUG-19
Tin (Sn)-Total			<0.00010		mg/L		0.0001	30-AUG-19
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	30-AUG-19
Tungsten (W)-Total			<0.00010		mg/L		0.0001	30-AUG-19
Uranium (U)-Total			<0.000010		mg/L		0.00001	30-AUG-19
Vanadium (V)-Total			<0.00050		mg/L		0.0005	30-AUG-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	30-AUG-19
Zirconium (Zr)-Total			<0.00020		mg/L		0.0002	30-AUG-19
WG3148978-5 MS		**WG3148978-6**						
Aluminum (Al)-Total			N/A	MS-B	%		-	30-AUG-19
Antimony (Sb)-Total			105.8		%		70-130	30-AUG-19
Arsenic (As)-Total			101.2		%		70-130	30-AUG-19
Barium (Ba)-Total			N/A	MS-B	%		-	30-AUG-19
Beryllium (Be)-Total			100.3		%		70-130	30-AUG-19
Bismuth (Bi)-Total			97.9		%		70-130	30-AUG-19
Boron (B)-Total			97.1		%		70-130	30-AUG-19
Cadmium (Cd)-Total			101.9		%		70-130	30-AUG-19
Calcium (Ca)-Total			N/A	MS-B	%		-	30-AUG-19
Chromium (Cr)-Total			102.5		%		70-130	30-AUG-19
Cesium (Cs)-Total			100.3		%		70-130	30-AUG-19
Cobalt (Co)-Total			99.0		%		70-130	30-AUG-19
Copper (Cu)-Total			99.0		%		70-130	30-AUG-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4779931								
WG3148978-5 MS		**WG3148978-6**						
Iron (Fe)-Total			N/A	MS-B	%		-	30-AUG-19
Lead (Pb)-Total			98.6		%		70-130	30-AUG-19
Lithium (Li)-Total			97.8		%		70-130	30-AUG-19
Magnesium (Mg)-Total			N/A	MS-B	%		-	30-AUG-19
Manganese (Mn)-Total			101.2		%		70-130	30-AUG-19
Molybdenum (Mo)-Total			106.0		%		70-130	30-AUG-19
Nickel (Ni)-Total			98.8		%		70-130	30-AUG-19
Phosphorus (P)-Total			100.7		%		70-130	30-AUG-19
Potassium (K)-Total			98.7		%		70-130	30-AUG-19
Rubidium (Rb)-Total			99.8		%		70-130	30-AUG-19
Selenium (Se)-Total			102.5		%		70-130	30-AUG-19
Silicon (Si)-Total			N/A	MS-B	%		-	30-AUG-19
Silver (Ag)-Total			99.4		%		70-130	30-AUG-19
Sodium (Na)-Total			N/A	MS-B	%		-	30-AUG-19
Strontium (Sr)-Total			N/A	MS-B	%		-	30-AUG-19
Sulfur (S)-Total			N/A	MS-B	%		-	30-AUG-19
Thallium (Tl)-Total			100.3		%		70-130	30-AUG-19
Tellurium (Te)-Total			96.3		%		70-130	30-AUG-19
Thorium (Th)-Total			98.9		%		70-130	30-AUG-19
Tin (Sn)-Total			100.2		%		70-130	30-AUG-19
Titanium (Ti)-Total			N/A	MS-B	%		-	30-AUG-19
Tungsten (W)-Total			99.4		%		70-130	30-AUG-19
Uranium (U)-Total			N/A	MS-B	%		-	30-AUG-19
Vanadium (V)-Total			103.7		%		70-130	30-AUG-19
Zinc (Zn)-Total			94.7		%		70-130	30-AUG-19
Zirconium (Zr)-Total			101.2		%		70-130	30-AUG-19
NH3-F-WT	**Water**							
Batch R4781881								
WG3150401-3 DUP		**L2338695-1**						
Ammonia, Total (as N)		3.48	3.44		mg/L	1.0	20	03-SEP-19
WG3150401-2 LCS								
Ammonia, Total (as N)			103.0		%		85-115	03-SEP-19
WG3150401-1 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	03-SEP-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NH3-F-WT	**Water**							
Batch R4781881								
WG3150401-4 MS		**L2338695-1**						
Ammonia, Total (as N)			N/A	MS-B	%		-	03-SEP-19
NO3-IC-WT	**Water**							
Batch R4782042								
WG3148597-14 DUP		**WG3148597-13**						
Nitrate (as N)		0.111	0.112		mg/L	1.1	20	30-AUG-19
WG3148597-12 LCS								
Nitrate (as N)			102.2		%		90-110	30-AUG-19
WG3148597-11 MB								
Nitrate (as N)			<0.020		mg/L		0.02	30-AUG-19
WG3148597-15 MS		**WG3148597-13**						
Nitrate (as N)			101.6		%		75-125	30-AUG-19
P-T-COL-WT	**Water**							
Batch R4781670								
WG3148678-3 DUP		**L2335825-1**						
Phosphorus, Total		0.0241	0.0226		mg/L	6.4	20	03-SEP-19
WG3148678-2 LCS								
Phosphorus, Total			95.9		%		80-120	03-SEP-19
WG3148678-1 MB								
Phosphorus, Total			<0.0030		mg/L		0.003	03-SEP-19
WG3148678-4 MS		**L2335825-1**						
Phosphorus, Total			87.5		%		70-130	03-SEP-19
PH-BF	**Water**							
Batch R4778183								
WG3148349-2 DUP		**L2338802-1**						
pH		8.14	8.17	J	pH units	0.03	0.2	30-AUG-19
WG3148349-1 LCS								
pH			7.02		pH units		6.9-7.1	30-AUG-19
SO4-IC-N-WT	**Water**							
Batch R4782042								
WG3148597-14 DUP		**WG3148597-13**						
Sulfate (SO4)		40.5	40.5		mg/L	0.1	20	30-AUG-19
WG3148597-12 LCS								
Sulfate (SO4)			101.2		%		90-110	30-AUG-19
WG3148597-11 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	30-AUG-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SO4-IC-N-WT	**Water**							
Batch R4782042								
WG3148597-15 MS		**WG3148597-13**						
Sulfate (SO4)			98.6		%		75-125	30-AUG-19
SOLIDS-TDS-BF	**Water**							
Batch R4778969								
WG3149192-3 DUP		**L2339506-1**						
Total Dissolved Solids		2020	1940		mg/L	3.9	20	31-AUG-19
WG3149192-2 LCS								
Total Dissolved Solids			99.0		%		85-115	31-AUG-19
WG3149192-1 MB								
Total Dissolved Solids			<20		mg/L		20	31-AUG-19
SOLIDS-TSS-BF	**Water**							
Batch R4778163								
WG3148457-3 DUP		**L2338809-1**						
Total Suspended Solids		8.0	7.1		mg/L	12	25	30-AUG-19
WG3148457-2 LCS								
Total Suspended Solids			100.0		%		85-115	30-AUG-19
WG3148457-1 MB								
Total Suspended Solids			<2.0		mg/L		2	30-AUG-19
TKN-WT	**Water**							
Batch R4782891								
WG3151201-3 DUP		**L2338210-1**						
Total Kjeldahl Nitrogen		0.69	0.67		mg/L	2.8	20	04-SEP-19
WG3151201-2 LCS								
Total Kjeldahl Nitrogen			118.0		%		75-125	04-SEP-19
WG3151201-1 MB								
Total Kjeldahl Nitrogen			<0.15		mg/L		0.15	04-SEP-19
WG3151201-4 MS		**L2338210-1**						
Total Kjeldahl Nitrogen			93.8		%		70-130	04-SEP-19
TOC-WT	**Water**							
Batch R4781533								
WG3150042-7 DUP		**L2338795-1**						
Total Organic Carbon		1.65	1.60		mg/L	2.7	20	03-SEP-19
WG3150042-6 LCS								
Total Organic Carbon			108.3		%		80-120	03-SEP-19
WG3150042-5 MB								
Total Organic Carbon			<0.50		mg/L		0.5	03-SEP-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TOC-WT	**Water**							
Batch R4781533								
WG3150042-8 MS		**L2338795-1**						
Total Organic Carbon			108.5		%		70-130	03-SEP-19
TURBIDITY-BF	**Water**							
Batch R4778962								
WG3148746-3 DUP		**L2338790-1**						
Turbidity		7.71	7.69		NTU	0.3	15	31-AUG-19
WG3148746-2 LCS								
Turbidity			109.0		%		85-115	31-AUG-19
WG3148746-1 MB								
Turbidity			<0.10		NTU		0.1	31-AUG-19

Quality Control Report

Workorder: L2338795 Report Date: 24-SEP-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

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

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

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.

Thursday, September 19, 2019

Rick Hawthorne
ALS Environmental
60 Northland Rd, Unit 1
Waterloo Canada, ON N2V 2B8

Re: ALS Workorder: 1909041
Project Name:
Project Number: L2338795

Dear Mr. Hawthorne:

One water sample was received from ALS Environmental, on 9/4/2019. The sample was scheduled for the following analysis:

Radium-226

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,

ALS Environmental
Katie M. OBrien
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
AIHA	214884
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280

1909041

Radium-226:

The sample was prepared and analyzed according to the current revision of SOP 783.

All acceptance criteria were met.

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1909041
Client Name: ALS Environmental
Client Project Name:
Client Project Number: L2338795
Client PO Number: L2338795

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
L2338795-1	1909041-1		WATER	29-Aug-19	

ALS Environmental

L2338795

1909041 WATERLOO

Subcontract Request Form

Subcontract To:

ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
225 COMMERCE DRIVE
FORT COLLINS,CO 80524

NOTES: Please reference on final report and invoice: PO# *L2338795*
ALS requires QC data to be provided with your final results.

Please see enclosed 1 **sample(s) in** 1 **Container(s)**

SAMPLE NUMBER	ANALYTICAL REQUIRED	DATE SAMPLED / DUE DATE	Priority Flag
L2338795-1 MS-06		8/29/2019	**E**
	Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	9/19/2019	

Subcontract Info Contact: Mary-Lynn Pike (519) 886-6910
Analysis and reporting info contact: Rick Hawthorne
60 NORTHLAND ROAD, UNIT 1
WATERLOO,ON N2V 2B8
Phone: (519) 886-6910 Email: Rick.Hawthorne@alsglobal.com

Please email confirmation of receipt to: **Rick.Hawthorne@alsglobal.com**

Shipped By: _____ Date Shipped: _____

Received By: [signature] Date Received: 9/4/19 1620

Verified By: _____ Date Verified: _____

Temperature: _____

Sample Integrity Issues: _____

ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: ALS Waterloo Workorder No: 1909041

Project Manager: KMO Initials: EE Date: 9/5/19

1.	Are airbills / shipping documents present and/or removable?	DROP OFF	YES	NO
2.	Are custody seals on **shipping** containers intact?	NONE	YES	NO *
3.	Are custody seals on **sample** containers intact?	NONE	YES	NO *
4.	Is there a COC (chain-of-custody) present?		YES	NO *
5.	Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)		YES	NO *
6.	Are short-hold samples present?		YES	NO
7.	Are all samples within holding times for the requested analyses?		YES	NO *
8.	Were all sample containers received intact? (not broken or leaking)		YES	NO *
9.	Is there sufficient sample for the requested analyses?		YES	NO *
10.	Are all samples in the proper containers for the requested analyses?		YES	NO *
11.	Are all aqueous samples preserved correctly, if required? (excluding volatiles)	N/A	YES	NO *
12.	Are all aqueous non-preserved samples pH 4-9?	N/A	YES	NO *
13.	Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm (1/4 inch) diameter? (i.e. size of green pea)	N/A	YES	NO
14.	Were the samples shipped on ice?		YES	NO
15.	Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: #1 #3 #4	RAD ONLY	YES	NO

Cooler #:	1							
Temperature (°C):	7.6							
No. of custody seals on cooler:	3							
DOT Survey/ Acceptance Information — External µR/hr reading:	11							
Background µR/hr reading:	13							

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? YES / NO / NA (If no, see Form 008.)

*** Please provide details here for NO responses to gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.**

All client bottle ID's vs ALS lab ID's double-checked by: EE

If applicable, was the client contacted? YES / NO / NA Contact: _____ Date/Time: _____

Project Manager Signature / Date: 9/6/19

Form 201r27.xls
(02/11/2019)

*IR Gun #1, VWR SN 170560549
*IR Gun #3, VWR SN 170647571
*IR Gun #4, Oakton, SN 2372220101-0002

190941

EXPRESS WORLDWIDE **WPX** DHL

2019-09-03 MYDHL+ 1.0 / *30-0821*

From : ALS Environmental
Ed Hill
60 Northland Rd
Unit 1

N2V 2B8 WATERLOO ON
Canada

11-3

Origin:
YHM

Contact: +15198666910

To : **ALS Environmental Fort Collins**
Sample Login
225 Commerce Drive

7.60

Contact:
Sample Login
+18004431511

80524 FORT COLLINS Colorado
United States of America

US-DEN-DEN

C [redacted] Day Time

Ref:

Pce/Shpt Weight: **39.8 lbs**

Piece: **1/1**

Contents: Water Samples

WAYBILL 53 7295 2104,

(2L)US80524+48000001

Client:	ALS Environmental	**Date:**	*19-Sep-19*
Project:	L2338795	**Work Order:**	1909041
Sample ID:	L2338795-1	**Lab ID:**	1909041-1
Legal Location:		**Matrix:**	WATER
Collection Date:	8/29/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **9/9/2019**		PrepBy: **JXH**
Ra-226	**0.013 (+/- 0.0065)**		**0.0055**	**BQ/l**	NA	9/19/2019 12:00
Carr: BARIUM	*96.4*		*40-110*	*%REC*	DL = NA	9/19/2019 12:00

Client:	ALS Environmental	**Date:**	*19-Sep-19*
Project:	L2338795	**Work Order:**	1909041
Sample ID:	L2338795-1	**Lab ID:**	1909041-1
Legal Location:		**Matrix:**	WATER
Collection Date:	8/29/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed

Explanation of Qualifiers

Radiochemistry:

- "Report Limit" is the MDC

U or ND - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

Y2 - Chemical Yield outside default limits.

W - DER is greater than Warning Limit of 1.42

* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.
# - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.
G - Sample density differs by more than 15% of LCS density.
D - DER is greater than Control Limit

M - Requested MDC not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS, Matrix Spike Recovery within control limits.

N - Matrix Spike Recovery outside control limits

NC - Not Calculated for duplicate results less than 5 times MDC

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

Inorganics:

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).

U or ND - Indicates that the compound was analyzed for but not detected.

E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.

M - Duplicate injection precision was not met.

N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.

Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.

* - Duplicate analysis (relative percent difference) not within control limits.

S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

Organics:

U or ND - Indicates that the compound was analyzed for but not detected.

B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.

E - Analyte concentration exceeds the upper level of the calibration range.

J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).

A - A tentatively identified compound is a suspected aldol-condensation product.

X - The analyte was diluted below an accurate quantitation level.

* - The spike recovery is equal to or outside the control criteria used.

+ - The relative percent difference (RPD) equals or exceeds the control criteria.

G - A pattern resembling gasoline was detected in this sample.

D - A pattern resembling diesel was detected in this sample.

M - A pattern resembling motor oil was detected in this sample.

C - A pattern resembling crude oil was detected in this sample.

4 - A pattern resembling JP-4 was detected in this sample.

5 - A pattern resembling JP-5 was detected in this sample.

H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.

L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.

Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
- gasoline
- JP-8
- diesel
- mineral spirits
- motor oil
- Stoddard solvent
- bunker C

QC BATCH REPORT

Batch ID: **RE190909-1-1** Instrument ID **Alpha Scin** Method: **Radium-226 by Radon Emanation**

LCS Sample ID: **RE190909-1** Units: **BQ/l** Analysis Date: **9/19/2019 12:32**

Client ID: Run ID: **RE190909-1A** Prep Date: **9/9/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.77 (+/- 0.442)	0.0116	1.72		103	67-120					P,M3
Carr: BARIUM	15500		16020		96.7	40-110					

LCSD Sample ID: **RE190909-1** Units: **BQ/l** Analysis Date: **9/19/2019 12:32**

Client ID: Run ID: **RE190909-1A** Prep Date: **9/9/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.83 (+/- 0.457)	0.012	1.72		106	67-120		1.77	0.1	2.1	P,M3
Carr: BARIUM	15700		16020		98.3	40-110		15500			

MB Sample ID: **RE190909-1** Units: **BQ/l** Analysis Date: **9/19/2019 12:00**

Client ID: Run ID: **RE190909-1A** Prep Date: **9/9/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	0.0021 (+/- 0.0039)	0.0068									U
Carr: BARIUM	15400		16020		95.9	40-110					

The following samples were analyzed in this batch: 1909041-1

AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

TOXICITY TEST REPORT

Daphnia magna
EPS 1/RM/14

Work Order : 240159
Sample Number : 60486

SAMPLE IDENTIFICATION

Company :	ALS Laboratory Group, Waterloo	Date Collected :	2019-08-29
Location :	Waterloo ON	Time Collected :	17:30
Job Number :	L2338795	Date Received :	2019-08-30
Substance :	MS-06	Time Received :	11:00
Sampling Method :	Grab	Temperature on Receipt :	8.0 °C
Sampled By :	KB/BM	Date Tested :	2019-08-30
Sample Description :	Cloudy, grey, mild odour		

Test Method : Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*. Environment Canada EPS 1/RM/14 (Second Edition, December 2000, with February 2016 amendments).

48-HOUR TEST RESULTS

Substance	Effect	Value
Control	Mean Immobility	0.0 %
	Mean Mortality	0.0 %
100%	Mean Immobility	0.0 %
	Mean Mortality	0.0 %

The results reported relate only to the sample tested and as received.

TEST ORGANISM

Species :	*Daphnia magna*	Time to First Brood :	8.6 days
Organism Batch :	Dm19-16	Average Brood Size :	39.0 young
Culture Mortality :	0.9% (previous 7 days)		

TEST CONDITIONS

Sample Treatment :	None	Number of Replicates :	3
pH Adjustment :	None	Organisms / Replicate :	10
Pre-aeration Rate :	~30 mL/min/L	Organisms / Test Level :	30
Pre-aeration Time :	30 minutes	Organism Loading Rate :	15.0 mL/organism
Test Aeration :	None	Impaired Control Organisms :	0.0%
Hardness Adjustment :	None	Test Method Deviation(s) :	None

REFERENCE TOXICANT DATA

Toxicant :	Sodium Chloride	Historical Mean LC50 :	6.4 g/L
Date Tested :	2019-08-20	Warning Limits (± 2SD) :	5.7 - 7.2 g/L
LC50 :	6.4 g/L	Organism Batch :	Dm19-16
95% Confidence Limits :	6.2 - 6.6 g/L	Analyst(s) :	RK, AW, NM
Statistical Method :	Spearman-Kärber		

COMMENTS

All test validity criteria as specified in the test method were satisfied.

Date : 2019-09-03
yyyy-mm-dd

Approved By : Nancy Kreger
Project Manager

Work Order : 240159
Sample Number : 60486

TEST DATA

	pH	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	Temperature (°C)	O_2 Saturation (%)*	Hardness (as $CaCO_3$)
Initial Water Chemistry (100%) :	7.2	10.0	2270	20.0	118	>1000 mg/L

0 HOURS

Date & Time 2019-08-30 14:45
Analyst(s) : AW/SV

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O_2	Conductivity	Temperature	O_2 Saturation (%)*	Hardness
100	A	0	0	7.3	9.0	2272	20.0	105	>1000
100	B	0	0	7.3	9.0	2272	20.0	105	>1000
100	C	0	0	7.3	9.0	2272	20.0	105	>1000
Control	A	0	0	8.5	8.7	782	20.0	100	200
Control	B	0	0	8.5	8.7	782	20.0	100	200
Control	C	0	0	8.5	8.7	782	20.0	100	200

Notes:

24 HOURS

Date & Time 2019-08-31 14:45
Analyst(s) : SV

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O_2	Conductivity	Temperature
100	A	–	0	–	–	–	20.0
100	B	–	0	–	–	–	20.0
100	C	–	0	–	–	–	20.0
Control	A	–	0	–	–	–	20.0
Control	B	–	0	–	–	–	20.0
Control	C	–	0	–	–	–	20.0

Notes:

48 HOURS

Date & Time 2019-09-01 14:45
Analyst(s) : SV

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O_2	Conductivity	Temperature
100	A	0	0	7.4	8.3	2278	20.0
100	B	0	0	7.4	8.3	2302	20.0
100	C	0	0	7.5	8.2	2313	20.0
Control	A	0	0	8.5	8.4	775	20.0
Control	B	0	0	8.5	8.5	776	20.0
Control	C	0	0	8.5	8.4	796	20.0

Notes:

Number immobile does not include number dead.

– = not measured/not required
* adjusted for temperature and barometric pressure

Test Data Reviewed By : JL
Date : 2019-09-03

AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

TOXICITY TEST REPORT

Rainbow Trout
EPS 1/RM/13

Work Order : 240159
Sample Number : 60486

SAMPLE IDENTIFICATION

Company :	ALS Laboratory Group, Waterloo	Date Collected :	2019-08-29
Location :	Waterloo ON	Time Collected :	17:30
Job Number :	L2338795	Date Received :	2019-08-30
Substance :	MS-06	Time Received :	11:00
Sampling Method :	Grab	Temperature on Receipt :	8.0 °C
Sampled By :	KB/BM	Date Tested :	2019-08-30
Sample Description :	Cloudy, grey, mild odour		

Test Method(s) : Reference Method for Determining Acute Lethality of Liquid Effluents to Rainbow Trout. Environment Canada, EPS 1/RM/13 (2nd Edition, December 2000, with May 2007 and February 2016 amendments).

96-HOUR TEST RESULTS

Substance	Effect	Value
Control	Mean Impairment	0.0 %
	Mean Mortality	0.0 %
100%	Mean Impairment	0.0 %
	Mean Mortality	0.0 %

The results reported relate only to the sample tested and as received.

TEST ORGANISM

Test Organism :	*Oncorhynchus mykiss*	Average Fork Length (± 2 SD) :	40.7 mm (±6.9)
Organism Batch :	T19-16	Range of Fork Lengths :	35 - 46 mm
Control Sample Size :	10	Average Wet Weight (± 2 SD) :	0.58 g (±0.31)
Cumulative stock tank mortality rate :	0% (previous 7 days)	Range of Wet Weights :	0.35 - 0.83 g
Control organisms showing stress :	0 (at test completion)	Organism Loading Rate :	0.3 g/L

TEST CONDITIONS

Sample Treatment :	None	Volume Tested (L) :	20
pH Adjustment :	None	Number of Replicates :	1
Test Aeration :	Yes	Organisms Per Replicate :	10
Pre-aeration/Aeration Rate :	6.5 ± 1 mL/min/L	Organisms Per Test Level :	10
Total Pre-Aeration Time :	120 minutes	Test Method Deviation(s) :	None

REFERENCE TOXICANT DATA

Toxicant :	Potassium Chloride	Date Tested :	2019-08-21
Organism Batch :	T19-16	Historical Mean LC50 :	3755 mg/L
LC50 :	3975 mg/L	Warning Limits (± 2SD) :	3139 - 4492 mg/L
95% Confidence Limits :	3644 - 4336 mg/L	Analyst(s) :	MJT, TA, TL
Statistical Method :	Spearman-Kärber		

COMMENTS

•All test validity criteria as specified in the test method were satisfied.

Date : 2019-09-03
yyyy-mm-dd

Approved By : Nancy Krueger
Project Manager

Work Order : 240159
Sample Number : 60486

TEST DATA

	pH	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	Temperature (°C)	O_2 Saturation (%)*
Initial Water Chemistry (100%) :	7.1	10.6	2400	14.0	108
After 30 min pre-aeration :	6.8	10.2	2394	14.0	105

0 HOURS

Date & Time 2019-08-30 15:10
Analyst(s) : ALC/MDH

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature	O_2 Saturation*
100%	0	0	6.8	9.8	2388	14.5	103
Control	0	0	8.1	9.5	953	14.5	99

Notes:

24 HOURS

Date & Time 2019-08-31 15:10
Analyst(s) : ALC(MV)

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	6.9	9.1	–	15.0
Control	0	0	–	–	–	15.0

Notes:

48 HOURS

Date & Time 2019-09-01 15:10
Analyst(s) : ALC(MV)

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	6.7	9.7	–	15.0
Control	0	0	–	–	–	15.0

Notes:

72 HOURS

Date & Time 2019-09-02 15:10
Analyst(s) : ALC(MV)

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	6.7	8.9	–	15.0
Control	0	0	–	–	–	15.0

Notes:

96 HOURS

Date & Time 2019-09-03 15:10
Analyst(s) : MDH

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	6.6	9.0	2391	15.0
Control	0	0	8.2	9.2	901	15.0

Notes:

"–" = not measured/not required
Number impaired does not include number dead.
* adjusted for temperature and barometric pressure

Test Data Reviewed By : FS
Date : 2019-09-03

CHAIN OF CUSTODY RECORD

AQUATOX

AquaTox Work Order No: 240159

Shipping Address: AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, Ontario Canada N0B 2J0

Voice: (519) 763-4412 **Fax:** (519) 763-4419

P.O. Number: 4500057496

Field Sampler Name (print): KB/BM

Signature:

Affiliation: Baffinland Iron Mine / ALS Environmental

Sample Storage (prior to shipping):

Custody Relinquished by: Kendra Button

Date/Time Shipped: 29-Aug-19/19:00

Client: ALS Environmental c/o Baffinland Iron Mine

Quote # (2019): 162705399-19

Phone: (519) 886-6910

Fax: (519) 886-9047

Contact: Rick Hawthorne (ALS) / Martina Rendas (Aquatox)

Sample Identification					Analyses Requested									Sample Method and Volume		
Date Collected (yyyy-mm-dd)	Time Collected (e.g. 14:30, 24 hr clock)	Sample Name (L2338795)	AquaTox Sample Number	Temp. on arrival	Rainbow Trout Single Concentration	Rainbow Trout LC50	*Daphnia magna* Single Concentration	*Daphnia magna* LC50	Fathead Minnow Survival & Growth	*Ceriodaphnia dubia* Survival & Reproduction	*Lemna minor* Growth	*Pseudokirchneriella subcapitata* Growth	Other (please specify below)	Grab	Composite	# of Containers and Volume (eg. 2 x 1L, 3 x 10L, etc.)
2019-08-29	17:30	MS-06	60486	8.0	✓		✓							✓		2 x 10LCarboy

For Lab Use Only

Received By: MOH/MST

Date: 2019-08-30

Time: 11:00

Storage Location:

Storage Temp.(°C)

CN

Please list any special requests or instructions:

Rush TAT w/ Daily updates. PH required (62)

Report Distribution: bimcore@alsglobal.com, rick.hawthorne@alsglobal.com

ALS Environmental

L2338795

WATERLOO

Subcontract Request Form

Subcontract To:

AQUATOX TESTING AND CONSULTING
11B NICHOLAS BEAVER ROAD
RR3
GUELPH,ON N1H 6H9

NOTES: Please reference on final report and invoice: PO# *L2338795*
ALS requires QC data to be provided with your final results.

Please see enclosed 1 **sample(s) in** 0 **Container(s)**

SAMPLE NUMBER	ANALYTICAL REQUIRED	DATE SAMPLED / DUE DATE	Priority Flag
L2338795-1 MS-06		8/ 29/ 2019	**E**
	Special Request Aquatox (SPECIAL REQUEST2-AQT 14)	9/6/2019	
	Special Request Aquatox (SPECIAL REQUEST-AQT 14)	9/6/2019	

Subcontract Info Contact: Mary-Lynn Pike (519) 886-6910

Analysis and reporting info contact: Rick Hawthorne
60 NORTHLAND ROAD, UNIT 1
WATERLOO,ON N2V 2B8
Phone: (519) 886-6910 Email: Rick.Hawthorne@alsglobal.com

Please email confirmation of receipt to: **Rick.Hawthorne@alsglobal.com**

Shipped By: _____ Date Shipped: _____

Received By: _____ Date Received: _____

Verified By: _____ Date Verified: _____

Temperature: _____

Sample Integrity Issues: _____

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2338795-COFC

COC Number: 15 -

Page 1 of 1

Report To	Contact and company name below will appear on the final report
Company:	Baffinland Iron Mines Corp.
Contact:	Wiliam Bowden and Connor Devereaux
Phone:	647-253-0596 EXT 6016
	Company address below will appear on the final report
Street:	2275 Upper Middle Rd. E., Suite #300
City/Province:	Oakville, ON
Postal Code:	L6H 0C3
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	
Contact:	

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	bimcore@alsglobal.com
Email 2	bimww@alsglobal.com
Email 3	

Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	ap@baffinland.com
Email 2	commercial@baffinland.com

Project Information	
ALS Account # / Quote #:	23642 /Q42455
Job #:	MS-06 WT TOX
PO / AFE:	4500057496
LSD:	

Oil and Gas Required Fields (client use)	
AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only): L2338795

ALS Contact: Sampler: KB/BM

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☐ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
	4 day [P4] ☐		1 Business day [E1] ☑
	3 day [P3] ☐		Same Day, Weekend or Statutory holiday [E0] ☐
	2 day [P2] ☐		

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	BIM-MMER-WT	Group 3	Number of Containers
1	MS-06	29-Aug-19	17:30	Water	E1	E1	11

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human drinking water use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☑ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C		FINAL COOLER TEMPERATURES °C		
[illegible]		12.2		

SHIPMENT RELEASE (client use)		
Released by: Kendra Button	Release Date: 29-Aug-19	Time: 18:15

INITIAL SHIPMENT RECEPTION (lab use only)		
Received by:	Date:	Time:

FINAL SHIPMENT RECEPTION (lab use only)		
Received by: [illegible]	Date: 30 Aug-19	Time: 1000

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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 specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

Baffinland Iron Mine's Corporation (Oakville)
ATTN: William Bowden/Connor Devereaux
2275 Upper Middle Rd. E.
Suite #300
Oakville ON L6H 0C3

Date Received: 29-AUG-19
Report Date: 03-OCT-19 10:30 (MT)
Version: FINAL REV. 2

Client Phone: 647-253-0596

Certificate of Analysis

Lab Work Order #: L2338802

Project P.O. #: 4500057496
Job Reference: MS-06 EFF CHARACTERIZATION - REF AND EXPOSURE
C of C Numbers:
Legal Site Desc:

Comments:

3-OCT-2019 Amended sample time on sample 2 as per COFC.

Rick Hawthorne
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2338802-1 MS-08-US Sampled By: CP/BC on 29-AUG-19 @ 18:20 Matrix: WATER							
Physical Tests							
Conductivity	226		3.0	umhos/cm		31-AUG-19	R4780508
Hardness (as CaCO3)	103	HTC	0.50	mg/L		02-SEP-19	
pH	8.14		0.10	pH units		30-AUG-19	R4778183
Total Suspended Solids	3.4		2.0	mg/L		30-AUG-19	R4778163
Anions and Nutrients							
Alkalinity, Total (as CaCO3)	92		10	mg/L		31-AUG-19	R4780508
Ammonia, Total (as N)	<0.010		0.010	mg/L		30-AUG-19	R4778487
Chloride (Cl)	12.7		0.50	mg/L		30-AUG-19	R4782042
Fluoride (F)	0.025		0.020	mg/L		30-AUG-19	R4782042
Nitrate (as N)	<0.020		0.020	mg/L		30-AUG-19	R4782042
Total Kjeldahl Nitrogen	<0.15		0.15	mg/L	30-AUG-19	03-SEP-19	R4781609
Phosphorus, Total	0.0045		0.0030	mg/L	30-AUG-19	03-SEP-19	R4781670
Sulfate (SO4)	6.78		0.30	mg/L		30-AUG-19	R4782042
Organic / Inorganic Carbon							
Dissolved Carbon Filtration Location	LAB					30-AUG-19	R4778762
Dissolved Organic Carbon	1.67		0.50	mg/L	30-AUG-19	03-SEP-19	R4781177
Total Organic Carbon	2.42		0.50	mg/L		03-SEP-19	R4781533
Total Metals							
Aluminum (Al)-Total	0.301		0.0050	mg/L	30-AUG-19	30-AUG-19	R4779931
Antimony (Sb)-Total	<0.00010		0.00010	mg/L	30-AUG-19	30-AUG-19	R4779931
Arsenic (As)-Total	<0.00010		0.00010	mg/L	30-AUG-19	30-AUG-19	R4779931
Barium (Ba)-Total	0.0155		0.00010	mg/L	30-AUG-19	30-AUG-19	R4779931
Beryllium (Be)-Total	<0.00010		0.00010	mg/L	30-AUG-19	30-AUG-19	R4779931
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L	30-AUG-19	30-AUG-19	R4779931
Boron (B)-Total	<0.010		0.010	mg/L	30-AUG-19	30-AUG-19	R4779931
Cadmium (Cd)-Total	<0.0000050		0.0000050	mg/L	30-AUG-19	30-AUG-19	R4779931
Calcium (Ca)-Total	21.0		0.050	mg/L	30-AUG-19	30-AUG-19	R4779931
Cesium (Cs)-Total	0.000031		0.000010	mg/L	30-AUG-19	30-AUG-19	R4779931
Chromium (Cr)-Total	0.00055		0.00050	mg/L	30-AUG-19	30-AUG-19	R4779931
Cobalt (Co)-Total	0.00011		0.00010	mg/L	30-AUG-19	30-AUG-19	R4779931
Copper (Cu)-Total	0.0013		0.0010	mg/L	30-AUG-19	30-AUG-19	R4779931
Iron (Fe)-Total	0.230		0.010	mg/L	30-AUG-19	30-AUG-19	R4779931
Lead (Pb)-Total	0.000190		0.000050	mg/L	30-AUG-19	30-AUG-19	R4779931
Lithium (Li)-Total	<0.0010		0.0010	mg/L	30-AUG-19	30-AUG-19	R4779931
Magnesium (Mg)-Total	12.2		0.0050	mg/L	30-AUG-19	30-AUG-19	R4779931
Manganese (Mn)-Total	0.00294		0.00050	mg/L	30-AUG-19	30-AUG-19	R4779931
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		03-SEP-19	R4781423
Molybdenum (Mo)-Total	0.000513		0.000050	mg/L	30-AUG-19	30-AUG-19	R4779931
Nickel (Ni)-Total	0.00076		0.00050	mg/L	30-AUG-19	30-AUG-19	R4779931
Phosphorus (P)-Total	<0.050		0.050	mg/L	30-AUG-19	30-AUG-19	R4779931
Potassium (K)-Total	1.58		0.050	mg/L	30-AUG-19	30-AUG-19	R4779931
Rubidium (Rb)-Total	0.00248		0.00020	mg/L	30-AUG-19	30-AUG-19	R4779931

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2338802-1 MS-08-US Sampled By: CP/BC on 29-AUG-19 @ 18:20 Matrix: WATER							
Total Metals							
Selenium (Se)-Total	<0.000050		0.000050	mg/L	30-AUG-19	30-AUG-19	R4779931
Silicon (Si)-Total	1.50		0.10	mg/L	30-AUG-19	30-AUG-19	R4779931
Silver (Ag)-Total	<0.000050		0.000050	mg/L	30-AUG-19	30-AUG-19	R4779931
Sodium (Na)-Total	5.51		0.050	mg/L	30-AUG-19	30-AUG-19	R4779931
Strontium (Sr)-Total	0.0243		0.0010	mg/L	30-AUG-19	30-AUG-19	R4779931
Sulfur (S)-Total	2.79		0.50	mg/L	30-AUG-19	30-AUG-19	R4779931
Tellurium (Te)-Total	<0.00020		0.00020	mg/L	30-AUG-19	30-AUG-19	R4779931
Thallium (Tl)-Total	0.000010		0.000010	mg/L	30-AUG-19	30-AUG-19	R4779931
Thorium (Th)-Total	0.00029		0.00010	mg/L	30-AUG-19	30-AUG-19	R4779931
Tin (Sn)-Total	<0.00010		0.00010	mg/L	30-AUG-19	30-AUG-19	R4779931
Titanium (Ti)-Total	0.0146		0.00030	mg/L	30-AUG-19	30-AUG-19	R4779931
Tungsten (W)-Total	<0.00010		0.00010	mg/L	30-AUG-19	30-AUG-19	R4779931
Uranium (U)-Total	0.00620		0.000010	mg/L	30-AUG-19	30-AUG-19	R4779931
Vanadium (V)-Total	0.00066		0.00050	mg/L	30-AUG-19	30-AUG-19	R4779931
Zinc (Zn)-Total	<0.0030		0.0030	mg/L	30-AUG-19	30-AUG-19	R4779931
Zirconium (Zr)-Total	0.00064		0.00020	mg/L	30-AUG-19	30-AUG-19	R4779931
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					02-SEP-19	R4780008
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	02-SEP-19	03-SEP-19	R4781421
Radiological Parameters							
Ra-226	<0.0082		0.0082	Bq/L	09-SEP-19	19-SEP-19	R4780785
L2338802-2 MS-06-DS Sampled By: CP/BC on 29-AUG-19 @ 18:45 Matrix: WATER							
Physical Tests							
Conductivity	240		3.0	umhos/cm		31-AUG-19	R4780508
Hardness (as CaCO3)	111	HTC	0.50	mg/L		02-SEP-19	
pH	8.20		0.10	pH units		30-AUG-19	R4778183
Total Suspended Solids	4.7		2.0	mg/L		30-AUG-19	R4778163
Anions and Nutrients							
Alkalinity, Total (as CaCO3)	93		10	mg/L		31-AUG-19	R4780508
Ammonia, Total (as N)	<0.010		0.010	mg/L		30-AUG-19	R4778487
Chloride (Cl)	13.3		0.50	mg/L		30-AUG-19	R4782042
Fluoride (F)	0.024		0.020	mg/L		30-AUG-19	R4782042
Nitrate (as N)	0.030		0.020	mg/L		30-AUG-19	R4782042
Total Kjeldahl Nitrogen	<0.15		0.15	mg/L	30-AUG-19	03-SEP-19	R4781609
Phosphorus, Total	0.0046		0.0030	mg/L	30-AUG-19	03-SEP-19	R4781670
Sulfate (SO4)	12.4		0.30	mg/L		30-AUG-19	R4782042
Organic / Inorganic Carbon							
Dissolved Carbon Filtration Location	LAB					30-AUG-19	R4778762
Dissolved Organic Carbon	1.64		0.50	mg/L	30-AUG-19	03-SEP-19	R4781177
Total Organic Carbon	2.40		0.50	mg/L		03-SEP-19	R4781533

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2338802-2 MS-06-DS Sampled By: CP/BC on 29-AUG-19 @ 18:45 Matrix: WATER							
Organic / Inorganic Carbon							
Total Metals							
Aluminum (Al)-Total	0.289		0.0050	mg/L	30-AUG-19	30-AUG-19	R4779931
Antimony (Sb)-Total	<0.00010		0.00010	mg/L	30-AUG-19	30-AUG-19	R4779931
Arsenic (As)-Total	0.00010		0.00010	mg/L	30-AUG-19	30-AUG-19	R4779931
Barium (Ba)-Total	0.0157		0.00010	mg/L	30-AUG-19	30-AUG-19	R4779931
Beryllium (Be)-Total	<0.00010		0.00010	mg/L	30-AUG-19	30-AUG-19	R4779931
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L	30-AUG-19	30-AUG-19	R4779931
Boron (B)-Total	<0.010		0.010	mg/L	30-AUG-19	30-AUG-19	R4779931
Cadmium (Cd)-Total	<0.0000050		0.0000050	mg/L	30-AUG-19	30-AUG-19	R4779931
Calcium (Ca)-Total	22.1		0.050	mg/L	30-AUG-19	30-AUG-19	R4779931
Cesium (Cs)-Total	0.000034		0.000010	mg/L	30-AUG-19	30-AUG-19	R4779931
Chromium (Cr)-Total	0.00060		0.00050	mg/L	30-AUG-19	30-AUG-19	R4779931
Cobalt (Co)-Total	0.00013		0.00010	mg/L	30-AUG-19	30-AUG-19	R4779931
Copper (Cu)-Total	0.0013		0.0010	mg/L	30-AUG-19	30-AUG-19	R4779931
Iron (Fe)-Total	0.248		0.010	mg/L	30-AUG-19	30-AUG-19	R4779931
Lead (Pb)-Total	0.000201		0.000050	mg/L	30-AUG-19	30-AUG-19	R4779931
Lithium (Li)-Total	0.0011		0.0010	mg/L	30-AUG-19	30-AUG-19	R4779931
Magnesium (Mg)-Total	13.6		0.0050	mg/L	30-AUG-19	30-AUG-19	R4779931
Manganese (Mn)-Total	0.00379		0.00050	mg/L	30-AUG-19	30-AUG-19	R4779931
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		03-SEP-19	R4781423
Molybdenum (Mo)-Total	0.000602		0.000050	mg/L	30-AUG-19	30-AUG-19	R4779931
Nickel (Ni)-Total	0.00083		0.00050	mg/L	30-AUG-19	30-AUG-19	R4779931
Phosphorus (P)-Total	<0.050		0.050	mg/L	30-AUG-19	30-AUG-19	R4779931
Potassium (K)-Total	1.60		0.050	mg/L	30-AUG-19	30-AUG-19	R4779931
Rubidium (Rb)-Total	0.00249		0.00020	mg/L	30-AUG-19	30-AUG-19	R4779931
Selenium (Se)-Total	<0.000050		0.000050	mg/L	30-AUG-19	30-AUG-19	R4779931
Silicon (Si)-Total	1.35		0.10	mg/L	30-AUG-19	30-AUG-19	R4779931
Silver (Ag)-Total	<0.000050		0.000050	mg/L	30-AUG-19	30-AUG-19	R4779931
Sodium (Na)-Total	5.38		0.050	mg/L	30-AUG-19	30-AUG-19	R4779931
Strontium (Sr)-Total	0.0256		0.0010	mg/L	30-AUG-19	30-AUG-19	R4779931
Sulfur (S)-Total	4.74		0.50	mg/L	30-AUG-19	30-AUG-19	R4779931
Tellurium (Te)-Total	<0.00020		0.00020	mg/L	30-AUG-19	30-AUG-19	R4779931
Thallium (Tl)-Total	0.000011		0.000010	mg/L	30-AUG-19	30-AUG-19	R4779931
Thorium (Th)-Total	0.00029		0.00010	mg/L	30-AUG-19	30-AUG-19	R4779931
Tin (Sn)-Total	<0.00010		0.00010	mg/L	30-AUG-19	30-AUG-19	R4779931
Titanium (Ti)-Total	0.0143		0.00030	mg/L	30-AUG-19	30-AUG-19	R4779931
Tungsten (W)-Total	<0.00010		0.00010	mg/L	30-AUG-19	30-AUG-19	R4779931
Uranium (U)-Total	0.00599		0.000010	mg/L	30-AUG-19	30-AUG-19	R4779931
Vanadium (V)-Total	0.00071		0.00050	mg/L	30-AUG-19	30-AUG-19	R4779931
Zinc (Zn)-Total	<0.0030		0.0030	mg/L	30-AUG-19	30-AUG-19	R4779931
Zirconium (Zr)-Total	0.00059		0.00020	mg/L	30-AUG-19	30-AUG-19	R4779931

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2338802-2 MS-06-DS Sampled By: CP/BC on 29-AUG-19 @ 18:45 Matrix: WATER							
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					02-SEP-19	R4780008
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	02-SEP-19	03-SEP-19	R4781421
Radiological Parameters							
Ra-226	<0.0071		0.0071	Bq/L	09-SEP-19	19-SEP-19	R4780785

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

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Chloride (Cl)	MS-B	L2338802-1, -2
Matrix Spike	Aluminum (Al)-Total	MS-B	L2338802-1, -2
Matrix Spike	Barium (Ba)-Total	MS-B	L2338802-1, -2
Matrix Spike	Calcium (Ca)-Total	MS-B	L2338802-1, -2
Matrix Spike	Iron (Fe)-Total	MS-B	L2338802-1, -2
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2338802-1, -2
Matrix Spike	Silicon (Si)-Total	MS-B	L2338802-1, -2
Matrix Spike	Sodium (Na)-Total	MS-B	L2338802-1, -2
Matrix Spike	Strontium (Sr)-Total	MS-B	L2338802-1, -2
Matrix Spike	Sulfur (S)-Total	MS-B	L2338802-1, -2
Matrix Spike	Titanium (Ti)-Total	MS-B	L2338802-1, -2
Matrix Spike	Uranium (U)-Total	MS-B	L2338802-1, -2
Matrix Spike	Ammonia, Total (as N)	MS-B	L2338802-1, -2

Sample Parameter Qualifier key listed:

Qualifier	Description
HTC	Hardness was calculated from Total Ca and/or Mg concentrations and may be biased high (dissolved Ca/Mg results unavailable).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-WT	Water	Alkalinity, Total (as CaCO3)	EPA 310.2

This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.

CL-IC-N-WT	Water	Chloride by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

DOC-WT	Water	Dissolved Organic Carbon	APHA 5310B

Sample is filtered through a 0.45um filter, then injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic carbon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.

EC-SCREEN-WT	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

EC-WT	Water	Conductivity	APHA 2510 B

Water samples can be measured directly by immersing the conductivity cell into the sample.

F-IC-N-WT	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-WT	Water	Hardness	APHA 2340 B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-WT	Water	Dissolved Mercury in Water by CVAAS	EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

HG-T-CVAA-WT	Water	Total Mercury in Water by CVAAS	EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

MET-T-CCMS-WT	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Reference Information

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

NH3-F-WT	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO3-IC-WT	Water	Nitrate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-COL-WT	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is deteremined colourimetrically after persulphate digestion of the sample.

PH-BF	Water	pH	APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

RA226-MMER-FC	Water	Ra226 by Alpha Scint, MDC=0.01 Bq/L	EPA 903.1
SO4-IC-N-WT	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TSS-BF	Water	Suspended solids	APHA 2540 D-Gravimetric

A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104 +/- 1C for a minimum of four hours or until a constant weight is achieved.

TKN-WT	Water	Total Kjeldahl Nitrogen	APHA 4500-Norg D

This analysis is carried out using procedures adapted from APHA Method 4500-Norg "Nitrogen (Organic)". Total Kjeldahl Nitrogen is determined by sample digestion at 380 Celsius with analysis using an automated colorimetric method.

TOC-WT	Water	Total Organic Carbon	APHA 5310B

Sample is injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic cabon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.

** 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
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA
FC	ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
BF	ALS ENVIRONMENTAL - BAFFIN ISLAND, NUNAVUT, 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 weight of sample
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

Workorder: L2338802 Report Date: 03-OCT-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ALK-WT	**Water**							
Batch R4780508								
WG3149320-4 DUP		**WG3149320-3**						
Alkalinity, Total (as CaCO3)		92	92		mg/L	0.2	20	31-AUG-19
WG3149320-2 LCS								
Alkalinity, Total (as CaCO3)			101.8		%		85-115	31-AUG-19
WG3149320-1 MB								
Alkalinity, Total (as CaCO3)			<10		mg/L		10	31-AUG-19
CL-IC-N-WT	**Water**							
Batch R4782042								
WG3148597-14 DUP		**WG3148597-13**						
Chloride (Cl)		277	277		mg/L	0.1	20	30-AUG-19
WG3148597-12 LCS								
Chloride (Cl)			101.7		%		90-110	30-AUG-19
WG3148597-11 MB								
Chloride (Cl)			<0.50		mg/L		0.5	30-AUG-19
WG3148597-15 MS		**WG3148597-13**						
Chloride (Cl)			N/A	MS-B	%		-	30-AUG-19
DOC-WT	**Water**							
Batch R4781177								
WG3149140-3 DUP		**L2337949-1**						
Dissolved Organic Carbon		7.87	7.97		mg/L	1.2	20	03-SEP-19
WG3149140-2 LCS								
Dissolved Organic Carbon			96.8		%		80-120	03-SEP-19
WG3149140-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	03-SEP-19
WG3149140-4 MS		**L2337949-1**						
Dissolved Organic Carbon			94.9		%		70-130	03-SEP-19
EC-WT	**Water**							
Batch R4780508								
WG3149320-4 DUP		**WG3149320-3**						
Conductivity		226	225		umhos/cm	0.4	10	31-AUG-19
WG3149320-2 LCS								
Conductivity			99.9		%		90-110	31-AUG-19
WG3149320-1 MB								
Conductivity			<3.0		umhos/cm		3	31-AUG-19
F-IC-N-WT	**Water**							

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F-IC-N-WT	**Water**							
Batch R4782042								
WG3148597-14 DUP		**WG3148597-13**						
Fluoride (F)		0.321	0.318		mg/L	1.0	20	30-AUG-19
WG3148597-12 LCS								
Fluoride (F)			101.5		%		90-110	30-AUG-19
WG3148597-11 MB								
Fluoride (F)			<0.020		mg/L		0.02	30-AUG-19
WG3148597-15 MS		**WG3148597-13**						
Fluoride (F)			99.9		%		75-125	30-AUG-19
HG-D-CVAA-WT	**Water**							
Batch R4781421								
WG3149941-4 DUP		**WG3149941-3**						
Mercury (Hg)-Dissolved		<0.0000050	<0.000005C	RPD-NA	mg/L	N/A	20	03-SEP-19
WG3149941-2 LCS								
Mercury (Hg)-Dissolved			95.5		%		80-120	03-SEP-19
WG3149941-1 MB								
Mercury (Hg)-Dissolved			<0.000005C		mg/L		0.000005	03-SEP-19
WG3149941-6 MS		**WG3149941-5**						
Mercury (Hg)-Dissolved			94.1		%		70-130	03-SEP-19
HG-T-CVAA-WT	**Water**							
Batch R4781423								
WG3149940-4 DUP		**WG3149940-3**						
Mercury (Hg)-Total		<0.0000050	<0.000005C	RPD-NA	mg/L	N/A	20	03-SEP-19
WG3149940-2 LCS								
Mercury (Hg)-Total			92.7		%		80-120	03-SEP-19
WG3149940-1 MB								
Mercury (Hg)-Total			<0.000005C		mg/L		0.000005	03-SEP-19
WG3149940-6 MS		**WG3149940-5**						
Mercury (Hg)-Total			91.1		%		70-130	03-SEP-19
MET-T-CCMS-WT	**Water**							
Batch R4779931								
WG3148978-4 DUP		**WG3148978-3**						
Aluminum (Al)-Total		<0.050	<0.050	RPD-NA	mg/L	N/A	20	02-SEP-19
Antimony (Sb)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	02-SEP-19
Arsenic (As)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	02-SEP-19
Barium (Ba)-Total		0.0213	0.0216		mg/L	1.4	20	02-SEP-19
Beryllium (Be)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	02-SEP-19
Bismuth (Bi)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	02-SEP-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4779931								
WG3148978-4 DUP		**WG3148978-3**						
Boron (B)-Total		<0.10	<0.10	RPD-NA	mg/L	N/A	20	02-SEP-19
Cadmium (Cd)-Total		0.000339	0.000346		mg/L	1.8	20	02-SEP-19
Calcium (Ca)-Total		106	109		mg/L	2.8	20	02-SEP-19
Chromium (Cr)-Total		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	02-SEP-19
Cesium (Cs)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	02-SEP-19
Cobalt (Co)-Total		0.0895	0.0911		mg/L	1.8	20	02-SEP-19
Copper (Cu)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	02-SEP-19
Iron (Fe)-Total		0.14	0.15		mg/L	4.4	20	02-SEP-19
Lead (Pb)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	02-SEP-19
Lithium (Li)-Total		0.057	0.058		mg/L	1.6	20	02-SEP-19
Magnesium (Mg)-Total		280	286		mg/L	2.3	20	02-SEP-19
Manganese (Mn)-Total		14.1	14.3		mg/L	1.9	20	02-SEP-19
Molybdenum (Mo)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	02-SEP-19
Nickel (Ni)-Total		0.0969	0.0991		mg/L	2.3	20	02-SEP-19
Phosphorus (P)-Total		<0.50	<0.50	RPD-NA	mg/L	N/A	20	02-SEP-19
Potassium (K)-Total		11.7	11.9		mg/L	1.9	20	02-SEP-19
Rubidium (Rb)-Total		0.0155	0.0160		mg/L	2.9	20	02-SEP-19
Selenium (Se)-Total		0.00223	0.00255		mg/L	13	20	02-SEP-19
Silicon (Si)-Total		2.2	2.3		mg/L	2.0	20	02-SEP-19
Silver (Ag)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	02-SEP-19
Sodium (Na)-Total		6.91	7.15		mg/L	3.4	20	02-SEP-19
Strontium (Sr)-Total		0.198	0.207		mg/L	4.6	20	02-SEP-19
Sulfur (S)-Total		471	481		mg/L	2.0	25	02-SEP-19
Thallium (Tl)-Total		0.00015	0.00015		mg/L	1.8	20	02-SEP-19
Tellurium (Te)-Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	02-SEP-19
Thorium (Th)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	25	02-SEP-19
Tin (Sn)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	02-SEP-19
Titanium (Ti)-Total		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	02-SEP-19
Tungsten (W)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	02-SEP-19
Uranium (U)-Total		0.00012	0.00013		mg/L	7.6	20	02-SEP-19
Vanadium (V)-Total		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	02-SEP-19
Zinc (Zn)-Total		<0.030	<0.030	RPD-NA	mg/L	N/A	20	02-SEP-19
Zirconium (Zr)-Total		<0.0020	<0.0020		mg/L			02-SEP-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4779931								
WG3148978-4 DUP		**WG3148978-3**						
Zirconium (Zr)-Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	02-SEP-19
WG3148978-2 LCS								
Aluminum (Al)-Total			105.7		%		80-120	30-AUG-19
Antimony (Sb)-Total			104.3		%		80-120	30-AUG-19
Arsenic (As)-Total			100.1		%		80-120	30-AUG-19
Barium (Ba)-Total			102.4		%		80-120	30-AUG-19
Beryllium (Be)-Total			99.9		%		80-120	30-AUG-19
Bismuth (Bi)-Total			101.9		%		80-120	30-AUG-19
Boron (B)-Total			97.1		%		80-120	30-AUG-19
Cadmium (Cd)-Total			100.3		%		80-120	30-AUG-19
Calcium (Ca)-Total			101.1		%		80-120	30-AUG-19
Chromium (Cr)-Total			103.0		%		80-120	30-AUG-19
Cesium (Cs)-Total			98.3		%		80-120	30-AUG-19
Cobalt (Co)-Total			101.6		%		80-120	30-AUG-19
Copper (Cu)-Total			101.8		%		80-120	30-AUG-19
Iron (Fe)-Total			106.5		%		80-120	30-AUG-19
Lead (Pb)-Total			101.9		%		80-120	30-AUG-19
Lithium (Li)-Total			97.7		%		80-120	30-AUG-19
Magnesium (Mg)-Total			104.9		%		80-120	30-AUG-19
Manganese (Mn)-Total			101.3		%		80-120	30-AUG-19
Molybdenum (Mo)-Total			103.2		%		80-120	30-AUG-19
Nickel (Ni)-Total			102.9		%		80-120	30-AUG-19
Phosphorus (P)-Total			101.9		%		70-130	30-AUG-19
Potassium (K)-Total			103.1		%		80-120	30-AUG-19
Rubidium (Rb)-Total			101.1		%		80-120	30-AUG-19
Selenium (Se)-Total			101.0		%		80-120	30-AUG-19
Silicon (Si)-Total			105.4		%		60-140	30-AUG-19
Silver (Ag)-Total			99.7		%		80-120	30-AUG-19
Sodium (Na)-Total			104.3		%		80-120	30-AUG-19
Strontium (Sr)-Total			101.5		%		80-120	30-AUG-19
Sulfur (S)-Total			105.8		%		80-120	30-AUG-19
Thallium (Tl)-Total			103.1		%		80-120	30-AUG-19
Tellurium (Te)-Total			96.6		%		80-120	30-AUG-19
Thorium (Th)-Total			100.3		%		70-130	30-AUG-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4779931								
WG3148978-2 LCS								
Tin (Sn)-Total			99.2		%		80-120	30-AUG-19
Titanium (Ti)-Total			99.99		%		80-120	30-AUG-19
Tungsten (W)-Total			101.1		%		80-120	30-AUG-19
Uranium (U)-Total			104.7		%		80-120	30-AUG-19
Vanadium (V)-Total			103.6		%		80-120	30-AUG-19
Zinc (Zn)-Total			97.0		%		80-120	30-AUG-19
Zirconium (Zr)-Total			98.0		%		80-120	30-AUG-19
WG3148978-1 MB								
Aluminum (Al)-Total			<0.0050		mg/L		0.005	30-AUG-19
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	30-AUG-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	30-AUG-19
Barium (Ba)-Total			<0.00010		mg/L		0.0001	30-AUG-19
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	30-AUG-19
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	30-AUG-19
Boron (B)-Total			<0.010		mg/L		0.01	30-AUG-19
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	30-AUG-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	30-AUG-19
Chromium (Cr)-Total			<0.00050		mg/L		0.0005	30-AUG-19
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	30-AUG-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	30-AUG-19
Copper (Cu)-Total			<0.0010		mg/L		0.001	30-AUG-19
Iron (Fe)-Total			<0.010		mg/L		0.01	30-AUG-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	30-AUG-19
Lithium (Li)-Total			<0.0010		mg/L		0.001	30-AUG-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	30-AUG-19
Manganese (Mn)-Total			<0.00050		mg/L		0.0005	30-AUG-19
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	30-AUG-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	30-AUG-19
Phosphorus (P)-Total			<0.050		mg/L		0.05	30-AUG-19
Potassium (K)-Total			<0.050		mg/L		0.05	30-AUG-19
Rubidium (Rb)-Total			<0.00020		mg/L		0.0002	30-AUG-19
Selenium (Se)-Total			<0.000050		mg/L		0.00005	30-AUG-19
Silicon (Si)-Total			<0.10		mg/L		0.1	30-AUG-19
Silver (Ag)-Total			<0.000050		mg/L		0.00005	30-AUG-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4779931								
WG3148978-1 MB								
Sodium (Na)-Total			<0.050		mg/L		0.05	30-AUG-19
Strontium (Sr)-Total			<0.0010		mg/L		0.001	30-AUG-19
Sulfur (S)-Total			<0.50		mg/L		0.5	30-AUG-19
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	30-AUG-19
Tellurium (Te)-Total			<0.00020		mg/L		0.0002	30-AUG-19
Thorium (Th)-Total			<0.00010		mg/L		0.0001	30-AUG-19
Tin (Sn)-Total			<0.00010		mg/L		0.0001	30-AUG-19
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	30-AUG-19
Tungsten (W)-Total			<0.00010		mg/L		0.0001	30-AUG-19
Uranium (U)-Total			<0.000010		mg/L		0.00001	30-AUG-19
Vanadium (V)-Total			<0.00050		mg/L		0.0005	30-AUG-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	30-AUG-19
Zirconium (Zr)-Total			<0.00020		mg/L		0.0002	30-AUG-19
WG3148978-5 MS		**WG3148978-6**						
Aluminum (Al)-Total			N/A	MS-B	%		-	30-AUG-19
Antimony (Sb)-Total			105.8		%		70-130	30-AUG-19
Arsenic (As)-Total			101.2		%		70-130	30-AUG-19
Barium (Ba)-Total			N/A	MS-B	%		-	30-AUG-19
Beryllium (Be)-Total			100.3		%		70-130	30-AUG-19
Bismuth (Bi)-Total			97.9		%		70-130	30-AUG-19
Boron (B)-Total			97.1		%		70-130	30-AUG-19
Cadmium (Cd)-Total			101.9		%		70-130	30-AUG-19
Calcium (Ca)-Total			N/A	MS-B	%		-	30-AUG-19
Chromium (Cr)-Total			102.5		%		70-130	30-AUG-19
Cesium (Cs)-Total			100.3		%		70-130	30-AUG-19
Cobalt (Co)-Total			99.0		%		70-130	30-AUG-19
Copper (Cu)-Total			99.0		%		70-130	30-AUG-19
Iron (Fe)-Total			N/A	MS-B	%		-	30-AUG-19
Lead (Pb)-Total			98.6		%		70-130	30-AUG-19
Lithium (Li)-Total			97.8		%		70-130	30-AUG-19
Magnesium (Mg)-Total			N/A	MS-B	%		-	30-AUG-19
Manganese (Mn)-Total			101.2		%		70-130	30-AUG-19
Molybdenum (Mo)-Total			106.0		%		70-130	30-AUG-19
Nickel (Ni)-Total			98.8		%		70-130	30-AUG-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4779931								
WG3148978-5 MS		**WG3148978-6**						
Phosphorus (P)-Total			100.7		%		70-130	30-AUG-19
Potassium (K)-Total			98.7		%		70-130	30-AUG-19
Rubidium (Rb)-Total			99.8		%		70-130	30-AUG-19
Selenium (Se)-Total			102.5		%		70-130	30-AUG-19
Silicon (Si)-Total			N/A	MS-B	%		-	30-AUG-19
Silver (Ag)-Total			99.4		%		70-130	30-AUG-19
Sodium (Na)-Total			N/A	MS-B	%		-	30-AUG-19
Strontium (Sr)-Total			N/A	MS-B	%		-	30-AUG-19
Sulfur (S)-Total			N/A	MS-B	%		-	30-AUG-19
Thallium (Tl)-Total			100.3		%		70-130	30-AUG-19
Tellurium (Te)-Total			96.3		%		70-130	30-AUG-19
Thorium (Th)-Total			98.9		%		70-130	30-AUG-19
Tin (Sn)-Total			100.2		%		70-130	30-AUG-19
Titanium (Ti)-Total			N/A	MS-B	%		-	30-AUG-19
Tungsten (W)-Total			99.4		%		70-130	30-AUG-19
Uranium (U)-Total			N/A	MS-B	%		-	30-AUG-19
Vanadium (V)-Total			103.7		%		70-130	30-AUG-19
Zinc (Zn)-Total			94.7		%		70-130	30-AUG-19
Zirconium (Zr)-Total			101.2		%		70-130	30-AUG-19
NH3-F-WT	**Water**							
Batch R4778487								
WG3148447-19 DUP		**L2337949-1**						
Ammonia, Total (as N)		0.116	0.119		mg/L	2.6	20	30-AUG-19
WG3148447-18 LCS								
Ammonia, Total (as N)			107.9		%		85-115	30-AUG-19
WG3148447-17 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	30-AUG-19
WG3148447-20 MS		**L2337949-1**						
Ammonia, Total (as N)			N/A	MS-B	%		-	30-AUG-19
NO3-IC-WT	**Water**							
Batch R4782042								
WG3148597-14 DUP		**WG3148597-13**						
Nitrate (as N)		0.111	0.112		mg/L	1.1	20	30-AUG-19
WG3148597-12 LCS								
Nitrate (as N)			102.2				90-110	

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO3-IC-WT	**Water**							
Batch R4782042								
WG3148597-12 LCS								
Nitrate (as N)			102.2		%		90-110	30-AUG-19
WG3148597-11 MB								
Nitrate (as N)			<0.020		mg/L		0.02	30-AUG-19
WG3148597-15 MS		**WG3148597-13**						
Nitrate (as N)			101.6		%		75-125	30-AUG-19
P-T-COL-WT	**Water**							
Batch R4781670								
WG3148678-3 DUP		**L2335825-1**						
Phosphorus, Total		0.0241	0.0226		mg/L	6.4	20	03-SEP-19
WG3148678-2 LCS								
Phosphorus, Total			95.9		%		80-120	03-SEP-19
WG3148678-1 MB								
Phosphorus, Total			<0.0030		mg/L		0.003	03-SEP-19
WG3148678-4 MS		**L2335825-1**						
Phosphorus, Total			87.5		%		70-130	03-SEP-19
PH-BF	**Water**							
Batch R4778183								
WG3148349-2 DUP		**L2338802-1**						
pH		8.14	8.17	J	pH units	0.03	0.2	30-AUG-19
WG3148349-1 LCS								
pH			7.02		pH units		6.9-7.1	30-AUG-19
SO4-IC-N-WT	**Water**							
Batch R4782042								
WG3148597-14 DUP		**WG3148597-13**						
Sulfate (SO4)		40.5	40.5		mg/L	0.1	20	30-AUG-19
WG3148597-12 LCS								
Sulfate (SO4)			101.2		%		90-110	30-AUG-19
WG3148597-11 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	30-AUG-19
WG3148597-15 MS		**WG3148597-13**						
Sulfate (SO4)			98.6		%		75-125	30-AUG-19
SOLIDS-TSS-BF	**Water**							
Batch R4778163								
WG3148457-3 DUP		**L2338809-1**						
Total Suspended Solids		8.0	7.1		mg/L	12	25	30-AUG-19
WG3148457-2 LCS								

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SOLIDS-TSS-BF	**Water**							
Batch R4778163								
WG3148457-2 LCS								
Total Suspended Solids			100.0		%		85-115	30-AUG-19
WG3148457-1 MB								
Total Suspended Solids			<2.0		mg/L		2	30-AUG-19
TKN-WT	**Water**							
Batch R4781609								
WG3148730-3 DUP		**L2338488-1**						
Total Kjeldahl Nitrogen		<0.15	<0.15	RPD-NA	mg/L	N/A	20	03-SEP-19
WG3148730-2 LCS								
Total Kjeldahl Nitrogen			93.1		%		75-125	03-SEP-19
WG3148730-1 MB								
Total Kjeldahl Nitrogen			<0.15		mg/L		0.15	03-SEP-19
WG3148730-4 MS		**L2338488-1**						
Total Kjeldahl Nitrogen			88.7		%		70-130	03-SEP-19
TOC-WT	**Water**							
Batch R4781533								
WG3150042-7 DUP		**L2338795-1**						
Total Organic Carbon		1.65	1.60		mg/L	2.7	20	03-SEP-19
WG3150042-6 LCS								
Total Organic Carbon			108.3		%		80-120	03-SEP-19
WG3150042-5 MB								
Total Organic Carbon			<0.50		mg/L		0.5	03-SEP-19
WG3150042-8 MS		**L2338795-1**						
Total Organic Carbon			108.5		%		70-130	03-SEP-19

Quality Control Report

Workorder: L2338802 Report Date: 03-OCT-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

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

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

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.

Thursday, September 19, 2019

Rick Hawthorne
ALS Environmental
60 Northland Rd, Unit 1
Waterloo Canada, ON N2V 2B8

Re: ALS Workorder: 1909042
Project Name:
Project Number: L2338802

Dear Mr. Hawthorne:

Two water samples were received from ALS Environmental, on 9/4/2019. The samples were scheduled for the following analysis:

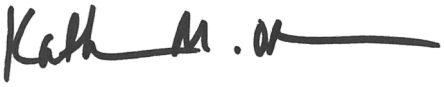
Radium-226

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,



ALS Environmental
Katie M. OBrien
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
AIHA	214884
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280

1909042

Radium-226:

The sample was prepared and analyzed according to the current revision of SOP 783.

All acceptance criteria were met.

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1909042
Client Name: ALS Environmental
Client Project Name:
Client Project Number: L2338802
Client PO Number: L2338802

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
L2338802-1	1909042-1		WATER	29-Aug-19	
L2338802-2	1909042-2		WATER	29-Aug-19	

ALS Environmental

L2338802

1909042 WATERLOO

Subcontract Request Form

Subcontract To:

ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
225 COMMERCE DRIVE
FORT COLLINS,CO 80524

NOTES: Please reference on final report and invoice: PO# *L2338802*
ALS requires QC data to be provided with your final results.

Please see enclosed 2 sample(s) in 2 Container(s)

	SAMPLE NUMBER	ANALYTICAL REQUIRED	DATE SAMPLED / DUE DATE	Priority Flag
1	**L2338802-1 MS-06-US**		8/29/2019	E
		Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	9/19/2019	
2	**L2338802-2 MS-06-DS**		8/29/2019	E
		Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	9/19/2019	

Subcontract Info Contact: Mary-Lynn Pike (519) 886-6910
Analysis and reporting info contact: Rick Hawthorne
60 NORTHLAND ROAD, UNIT 1
WATERLOO,ON N2V 2B8
Phone: (519) 886-6910 Email: Rick.Hawthorne@alsglobal.com

Please email confirmation of receipt to: Rick.Hawthorne@alsglobal.com

Shipped By: _____ Date Shipped: _____

Received By: EMC2 Date Received: 9/4/19 1620

Verified By: _____ Date Verified: _____

Temperature: _____

Sample Integrity Issues: _____

ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: ALS Waterloo Workorder No: R109042

Project Manager: KMO Initials: EE Date: 9/5/19

1. Are airbills / shipping documents present and/or removable?		DROP OFF	YES	NO
2. Are custody seals on **shipping** containers intact?		NONE	YES	NO *
3. Are custody seals on **sample** containers intact?		NONE	YES	NO *
4. Is there a COC (chain-of-custody) present?			YES	NO *
5. Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)			YES	NO *
6. Are short-hold samples present?			YES	NO
7. Are all samples within holding times for the requested analyses?			YES	NO *
8. Were all sample containers received intact? (not broken or leaking)			YES	NO *
9. Is there sufficient sample for the requested analyses?			YES	NO *
10. Are all samples in the proper containers for the requested analyses?			YES	NO *
11. Are all aqueous samples preserved correctly, if required? (excluding volatiles)		N/A	YES	NO *
12. Are all aqueous non-preserved samples pH 4-9?		N/A	YES	NO *
13. Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm (1/4 inch) diameter? (i.e. size of green pea)		N/A	YES	NO
14. Were the samples shipped on ice?			YES	NO
15. Were cooler temperatures measured at 0.1-6.0°C?	IR gun used*: #1 #3 #4	RAD ONLY	YES	NO

Cooler #:	1							
Temperature (°C):	7.6							
No. of custody seals on cooler:	3							
DOT Survey/ Acceptance Information — External µR/hr reading:	11							
Background µR/hr reading:	13							

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? YES / NO / NA (If no, see Form 008.)

*** Please provide details here for NO responses to gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.**

All client bottle ID's vs ALS lab ID's double-checked by: EE

If applicable, was the client contacted? YES / NO / NA Contact: _____ Date/Time: _____

Project Manager Signature / Date: 9/6/19

Form 201r27.xls
(02/11/2019)

*IR Gun #1, VWR SN 170560549
*IR Gun #3, VWR SN 170647571
*IR Gun #4, Oakton, SN 2372220101-0002

1909042

EXPRESS WORLDWIDE **WPX** DHL

2019-09-03 MYDHL+ 1.0/*30-0621*

From : ALS Environmental
Ed Hill
60 Northland Rd
Unit 1

N2V 2B8 WATERLOO ON
Canada

11-3

Origin:
YHM

Contact: +15198866910

To : ALS Environmental Fort Collins
Sample Login
225 Commerce Drive

7.6°

Contact:
Sample Login
+18004431511

80524 FORT COLLINS Colorado
United States of America

US-DEN-DEN

C [redacted] Day Time

Ref:

Pce/Shpt Weight: 39.8 lbs
Piece: 1/1

Contents: Water Samples

WAYBILL 53 7295 2104,

(2L)US80524+48000001

Client:	ALS Environmental	**Date:**	*19-Sep-19*
Project:	L2338802	**Work Order:**	1909042
Sample ID:	L2338802-1	**Lab ID:**	1909042-1
Legal Location:		**Matrix:**	WATER
Collection Date:	8/29/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1			**SOP 783**		Prep Date: **9/9/2019**	PrepBy: **JXH**
Ra-226	0.0049 (+/- 0.0054)	U	0.0082	BQ/l	NA	9/19/2019 12:00
Carr: BARIUM	*90.1*		*40-110*	*%REC*	DL = NA	9/19/2019 12:00

Client:	ALS Environmental	**Date:**	*19-Sep-19*
Project:	L2338802	**Work Order:**	1909042
Sample ID:	L2338802-2	**Lab ID:**	1909042-2
Legal Location:		**Matrix:**	WATER
Collection Date:	8/29/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1			**SOP 783**		Prep Date: **9/9/2019**	PrepBy: **JXH**
Ra-226	0.0043 (+/- 0.0047)	U	0.0071	BQ/l	NA	9/19/2019 12:00
Carr: BARIUM	*96.9*		*40-110*	*%REC*	DL = NA	9/19/2019 12:00

Client:	ALS Environmental	**Date:**	*19-Sep-19*
Project:	L2338802	**Work Order:**	1909042
Sample ID:	L2338802-2	**Lab ID:**	1909042-2
Legal Location:		**Matrix:**	WATER
Collection Date:	8/29/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed

Explanation of Qualifiers

Radiochemistry:

- "Report Limit" is the MDC

U or ND - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

Y2 - Chemical Yield outside default limits.

W - DER is greater than Warning Limit of 1.42

* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.
# - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.
G - Sample density differs by more than 15% of LCS density.
D - DER is greater than Control Limit

M - Requested MDC not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS, Matrix Spike Recovery within control limits.

N - Matrix Spike Recovery outside control limits

NC - Not Calculated for duplicate results less than 5 times MDC

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

Inorganics:

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).

U or ND - Indicates that the compound was analyzed for but not detected.

E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.

M - Duplicate injection precision was not met.

N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.

Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.

* - Duplicate analysis (relative percent difference) not within control limits.

S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

Organics:

U or ND - Indicates that the compound was analyzed for but not detected.

B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.

E - Analyte concentration exceeds the upper level of the calibration range.

J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).

A - A tentatively identified compound is a suspected aldol-condensation product.

X - The analyte was diluted below an accurate quantitation level.

* - The spike recovery is equal to or outside the control criteria used.

+ - The relative percent difference (RPD) equals or exceeds the control criteria.

G - A pattern resembling gasoline was detected in this sample.

D - A pattern resembling diesel was detected in this sample.

M - A pattern resembling motor oil was detected in this sample.

C - A pattern resembling crude oil was detected in this sample.

4 - A pattern resembling JP-4 was detected in this sample.

5 - A pattern resembling JP-5 was detected in this sample.

H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.

L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.

Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
- gasoline
- JP-8
- diesel
- mineral spirits
- motor oil
- Stoddard solvent
- bunker C

QC BATCH REPORT

Batch ID: **RE190909-1-1** Instrument ID **Alpha Scin** Method: **Radium-226 by Radon Emanation**

LCS Sample ID: **RE190909-1** Units: **BQ/l** Analysis Date: **9/19/2019 12:32**

Client ID: Run ID: **RE190909-1A** Prep Date: **9/9/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.77 (+/- 0.442)	0.0116	1.72		103	67-120					P,M3
Carr: BARIUM	15500		16020		96.7	40-110					

LCSD Sample ID: **RE190909-1** Units: **BQ/l** Analysis Date: **9/19/2019 12:32**

Client ID: Run ID: **RE190909-1A** Prep Date: **9/9/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.83 (+/- 0.457)	0.012	1.72		106	67-120		1.77	0.1	2.1	P,M3
Carr: BARIUM	15700		16020		98.3	40-110		15500			

MB Sample ID: **RE190909-1** Units: **BQ/l** Analysis Date: **9/19/2019 12:00**

Client ID: Run ID: **RE190909-1A** Prep Date: **9/9/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	0.0021 (+/- 0.0039)	0.0068									U
Carr: BARIUM	15400		16020		95.9	40-110					

The following samples were analyzed in this batch: 1909042-1 1909042-2

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2338802-COFC

COC Number: 15 -

Page 1 of 1

Report To	Contact and company name below will appear on the final report
Company:	Baffinland Iron Mines Corp.
Contact:	Wiliam Bowden and Connor Devereaux
Phone:	647-253-0596 EXT 6016
	Company address below will appear on the final report
Street:	2275 Upper Middle Rd. E., Suite #300
City/Province:	Oakville, ON
Postal Code:	L6H 0C3
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report ☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax bimcore@alsglobal.com
Email 2 bimww@alsglobal.com
Email 3

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax ap@baffinland.com
Email 2 commercial@baffinland.com

Project Information

ALS Account # / Quote #:	23642 /Q42455
Job #:	MS-06 Eff Characterization - Ref and Exposure
PO / AFE:	4500057496
LSD:	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only) L2338802

ALS Contact: **Sampler:** CP/BC

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☐ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
4 day [P4]	☐	1 Business day [E1]	☑
3 day [P3]	☐	Same Day, Weekend or Statutory holiday [E0]	☐
2 day [P2]	☐		

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	BIM-MMER-EFF	Number of Containers
1	MS-08-US	29-Aug-19	18:20	Water	E1	7
2	MS-06-DS	29-Aug-19	18:45	Water	E1	7

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human drinking water use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			12.2		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Kendra Button	Release Date: 29-Aug-19	Time: 18:45	Received by:	Date:	Time:	Received by: AP	Date: 30-8-19	Time: 10:15

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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 specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Baffinland Iron Mine's Corporation (Oakville)
ATTN: William Bowden/Connor Devereaux
2275 Upper Middle Rd. E.
Suite #300
Oakville ON L6H 0C3

Date Received: 03-SEP-19
Report Date: 24-SEP-19 11:45 (MT)
Version: FINAL

Client Phone: 647-253-0596

Certificate of Analysis

Lab Work Order #: L2339844

Project P.O. #: 4500057496
Job Reference: MS-06 WT TOX
C of C Numbers:
Legal Site Desc:

Rick Hawthorne
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2339844-1 MS-06 Sampled By: KB/CP on 02-SEP-19 @ 15:15 Matrix: WATER							
Physical Tests							
Conductivity	2210		3.0	umhos/cm		04-SEP-19	R4782545
Hardness (as CaCO3)	1410		1.3	mg/L		03-SEP-19	
pH	7.08		0.10	pH units		03-SEP-19	R4781669
Total Suspended Solids	2.7		2.0	mg/L		03-SEP-19	R4781869
Total Dissolved Solids	2010		20	mg/L		03-SEP-19	R4782348
Turbidity	7.92		0.10	NTU		03-SEP-19	R4782165
Anions and Nutrients							
Acidity (as CaCO3)	<5.0		5.0	mg/L		05-SEP-19	R4784118
Alkalinity, Total (as CaCO3)	<10		10	mg/L		04-SEP-19	R4782545
Ammonia, Total (as N)	2.61	DLHC	0.10	mg/L		03-SEP-19	R4781881
Chloride (Cl)	28.1	DLDS	5.0	mg/L		03-SEP-19	R4782656
Fluoride (F)	<0.20		0.20	mg/L		03-SEP-19	R4782656
Nitrate (as N)	10.5	DLDS	0.20	mg/L		03-SEP-19	R4782656
Total Kjeldahl Nitrogen	2.18		0.15	mg/L	04-SEP-19	05-SEP-19	R4783676
Phosphorus, Total	<0.0030		0.0030	mg/L	03-SEP-19	04-SEP-19	R4782483
Sulfate (SO4)	1500	DLDS	3.0	mg/L		03-SEP-19	R4782656
Cyanides							
Cyanide, Total	<0.0020	SP	0.0020	mg/L		04-SEP-19	R4783059
Organic / Inorganic Carbon							
Dissolved Carbon Filtration Location	LAB					03-SEP-19	R4782235
Dissolved Organic Carbon	0.63		0.50	mg/L	03-SEP-19	04-SEP-19	R4782677
Total Organic Carbon	0.92		0.50	mg/L		04-SEP-19	R4782674
Total Metals							
Aluminum (Al)-Total	<0.050	DLHC	0.050	mg/L	03-SEP-19	03-SEP-19	R4782041
Antimony (Sb)-Total	<0.0010	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782041
Arsenic (As)-Total	<0.0010	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782041
Barium (Ba)-Total	0.0196	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782041
Beryllium (Be)-Total	<0.0010	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782041
Bismuth (Bi)-Total	<0.00050	DLHC	0.00050	mg/L	03-SEP-19	03-SEP-19	R4782041
Boron (B)-Total	<0.10	DLHC	0.10	mg/L	03-SEP-19	03-SEP-19	R4782041
Cadmium (Cd)-Total	0.000337	DLHC	0.000050	mg/L	03-SEP-19	03-SEP-19	R4782041
Calcium (Ca)-Total	107	DLHC	0.50	mg/L	03-SEP-19	03-SEP-19	R4782041
Cesium (Cs)-Total	<0.00010	DLHC	0.00010	mg/L	03-SEP-19	03-SEP-19	R4782041
Chromium (Cr)-Total	<0.0050	DLHC	0.0050	mg/L	03-SEP-19	03-SEP-19	R4782041
Cobalt (Co)-Total	0.0842	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782041
Copper (Cu)-Total	<0.010	DLHC	0.010	mg/L	03-SEP-19	03-SEP-19	R4782041
Iron (Fe)-Total	0.15	DLHC	0.10	mg/L	03-SEP-19	03-SEP-19	R4782041
Lead (Pb)-Total	<0.00050	DLHC	0.00050	mg/L	03-SEP-19	03-SEP-19	R4782041
Lithium (Li)-Total	0.061	DLHC	0.010	mg/L	03-SEP-19	03-SEP-19	R4782041
Magnesium (Mg)-Total	280	DLHC	0.050	mg/L	03-SEP-19	03-SEP-19	R4782041
Manganese (Mn)-Total	13.8	DLHC	0.0050	mg/L	03-SEP-19	03-SEP-19	R4782041
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		04-SEP-19	R4782727

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2339844-1 MS-06 Sampled By: KB/CP on 02-SEP-19 @ 15:15 Matrix: WATER							
Total Metals							
Molybdenum (Mo)-Total	<0.00050	DLHC	0.00050	mg/L	03-SEP-19	03-SEP-19	R4782041
Nickel (Ni)-Total	0.0944	DLHC	0.0050	mg/L	03-SEP-19	03-SEP-19	R4782041
Phosphorus (P)-Total	<0.50	DLHC	0.50	mg/L	03-SEP-19	03-SEP-19	R4782041
Potassium (K)-Total	11.7	DLHC	0.50	mg/L	03-SEP-19	03-SEP-19	R4782041
Rubidium (Rb)-Total	0.0157	DLHC	0.0020	mg/L	03-SEP-19	03-SEP-19	R4782041
Selenium (Se)-Total	0.00219	DLHC	0.00050	mg/L	03-SEP-19	03-SEP-19	R4782041
Silicon (Si)-Total	2.2	DLHC	1.0	mg/L	03-SEP-19	03-SEP-19	R4782041
Silver (Ag)-Total	<0.00050	DLHC	0.00050	mg/L	03-SEP-19	03-SEP-19	R4782041
Sodium (Na)-Total	6.83	DLHC	0.50	mg/L	03-SEP-19	03-SEP-19	R4782041
Strontium (Sr)-Total	0.203	DLHC	0.010	mg/L	03-SEP-19	03-SEP-19	R4782041
Sulfur (S)-Total	465	DLHC	5.0	mg/L	03-SEP-19	03-SEP-19	R4782041
Tellurium (Te)-Total	<0.0020	DLHC	0.0020	mg/L	03-SEP-19	03-SEP-19	R4782041
Thallium (Tl)-Total	0.00013	DLHC	0.00010	mg/L	03-SEP-19	03-SEP-19	R4782041
Thorium (Th)-Total	<0.0010	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782041
Tin (Sn)-Total	<0.0010	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782041
Titanium (Ti)-Total	<0.0030	DLHC	0.0030	mg/L	03-SEP-19	03-SEP-19	R4782041
Tungsten (W)-Total	<0.0010	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782041
Uranium (U)-Total	<0.00010	DLHC	0.00010	mg/L	03-SEP-19	03-SEP-19	R4782041
Vanadium (V)-Total	<0.0050	DLHC	0.0050	mg/L	03-SEP-19	03-SEP-19	R4782041
Zinc (Zn)-Total	<0.030	DLHC	0.030	mg/L	03-SEP-19	03-SEP-19	R4782041
Zirconium (Zr)-Total	<0.0020	DLHC	0.0020	mg/L	03-SEP-19	03-SEP-19	R4782041
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					03-SEP-19	R4781089
Dissolved Metals Filtration Location	FIELD					03-SEP-19	R4781204
Aluminum (Al)-Dissolved	<0.050	DLHC	0.050	mg/L	03-SEP-19	03-SEP-19	R4782250
Antimony (Sb)-Dissolved	<0.0010	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782250
Arsenic (As)-Dissolved	<0.0010	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782250
Barium (Ba)-Dissolved	0.0199	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782250
Beryllium (Be)-Dissolved	<0.0010	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782250
Bismuth (Bi)-Dissolved	<0.00050	DLHC	0.00050	mg/L	03-SEP-19	03-SEP-19	R4782250
Boron (B)-Dissolved	<0.10	DLHC	0.10	mg/L	03-SEP-19	03-SEP-19	R4782250
Cadmium (Cd)-Dissolved	0.000338	DLHC	0.000050	mg/L	03-SEP-19	03-SEP-19	R4782250
Calcium (Ca)-Dissolved	107	DLHC	0.50	mg/L	03-SEP-19	03-SEP-19	R4782250
Cesium (Cs)-Dissolved	<0.00010	DLHC	0.00010	mg/L	03-SEP-19	03-SEP-19	R4782250
Chromium (Cr)-Dissolved	<0.0050	DLHC	0.0050	mg/L	03-SEP-19	03-SEP-19	R4782250
Cobalt (Co)-Dissolved	0.0816	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782250
Copper (Cu)-Dissolved	<0.0020	DLHC	0.0020	mg/L	03-SEP-19	03-SEP-19	R4782250
Iron (Fe)-Dissolved	<0.10	DLHC	0.10	mg/L	03-SEP-19	03-SEP-19	R4782250
Lead (Pb)-Dissolved	<0.00050	DLHC	0.00050	mg/L	03-SEP-19	03-SEP-19	R4782250
Lithium (Li)-Dissolved	0.063	DLHC	0.010	mg/L	03-SEP-19	03-SEP-19	R4782250
Magnesium (Mg)-Dissolved	277	DLHC	0.050	mg/L	03-SEP-19	03-SEP-19	R4782250

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2339844-1 MS-06 Sampled By: KB/CP on 02-SEP-19 @ 15:15 Matrix: WATER							
Dissolved Metals							
Manganese (Mn)-Dissolved	14.1	DLHC	0.0050	mg/L	03-SEP-19	03-SEP-19	R4782250
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	03-SEP-19	04-SEP-19	R4782733
Molybdenum (Mo)-Dissolved	<0.00050	DLHC	0.00050	mg/L	03-SEP-19	03-SEP-19	R4782250
Nickel (Ni)-Dissolved	0.0918	DLHC	0.0050	mg/L	03-SEP-19	03-SEP-19	R4782250
Phosphorus (P)-Dissolved	<0.50	DLHC	0.50	mg/L	03-SEP-19	03-SEP-19	R4782250
Potassium (K)-Dissolved	11.4	DLHC	0.50	mg/L	03-SEP-19	03-SEP-19	R4782250
Rubidium (Rb)-Dissolved	0.0153	DLHC	0.0020	mg/L	03-SEP-19	03-SEP-19	R4782250
Selenium (Se)-Dissolved	0.00232	DLHC	0.00050	mg/L	03-SEP-19	03-SEP-19	R4782250
Silicon (Si)-Dissolved	2.11	DLHC	0.50	mg/L	03-SEP-19	03-SEP-19	R4782250
Silver (Ag)-Dissolved	<0.00050	DLHC	0.00050	mg/L	03-SEP-19	03-SEP-19	R4782250
Sodium (Na)-Dissolved	6.81	DLHC	0.50	mg/L	03-SEP-19	03-SEP-19	R4782250
Strontium (Sr)-Dissolved	0.200	DLHC	0.010	mg/L	03-SEP-19	03-SEP-19	R4782250
Sulfur (S)-Dissolved	480	DLHC	5.0	mg/L	03-SEP-19	03-SEP-19	R4782250
Tellurium (Te)-Dissolved	<0.0020	DLHC	0.0020	mg/L	03-SEP-19	03-SEP-19	R4782250
Thallium (Tl)-Dissolved	0.00013	DLHC	0.00010	mg/L	03-SEP-19	03-SEP-19	R4782250
Thorium (Th)-Dissolved	<0.0010	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782250
Tin (Sn)-Dissolved	<0.0010	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782250
Titanium (Ti)-Dissolved	<0.0030	DLHC	0.0030	mg/L	03-SEP-19	03-SEP-19	R4782250
Tungsten (W)-Dissolved	<0.0010	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782250
Uranium (U)-Dissolved	<0.00010	DLHC	0.00010	mg/L	03-SEP-19	03-SEP-19	R4782250
Vanadium (V)-Dissolved	<0.0050	DLHC	0.0050	mg/L	03-SEP-19	03-SEP-19	R4782250
Zinc (Zn)-Dissolved	0.013	DLHC	0.010	mg/L	03-SEP-19	03-SEP-19	R4782250
Zirconium (Zr)-Dissolved	<0.0020	DLHC	0.0020	mg/L	03-SEP-19	03-SEP-19	R4782250
Radiological Parameters							
Ra-226	0.023		0.0071	Bq/L	09-SEP-19	19-SEP-19	R4780785
L2339844-2 MS-0601 Sampled By: KB/CP on 02-SEP-19 @ 15:15 Matrix: WATER							
Physical Tests							
Conductivity	2210		3.0	umhos/cm		04-SEP-19	R4782545
Hardness (as CaCO3)	1420		1.3	mg/L		03-SEP-19	
pH	7.03		0.10	pH units		03-SEP-19	R4781669
Total Suspended Solids	<2.0		2.0	mg/L		03-SEP-19	R4781869
Total Dissolved Solids	2020		20	mg/L		03-SEP-19	R4782348
Turbidity	7.72		0.10	NTU		03-SEP-19	R4782165
Anions and Nutrients							
Acidity (as CaCO3)	<5.0		5.0	mg/L		05-SEP-19	R4784118
Alkalinity, Total (as CaCO3)	<10		10	mg/L		04-SEP-19	R4782545
Ammonia, Total (as N)	2.55	DLHC	0.10	mg/L		03-SEP-19	R4781881
Chloride (Cl)	28.2	DLDS	5.0	mg/L		03-SEP-19	R4782900
Fluoride (F)	<0.20	DLDS	0.20	mg/L		03-SEP-19	R4782900
Nitrate (as N)	10.3	DLDS	0.20	mg/L		03-SEP-19	R4782900

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2339844-2 MS-0601 Sampled By: KB/CP on 02-SEP-19 @ 15:15 Matrix: WATER							
Anions and Nutrients							
Total Kjeldahl Nitrogen	2.32		0.15	mg/L	04-SEP-19	05-SEP-19	R4783676
Phosphorus, Total	<0.0030		0.0030	mg/L	03-SEP-19	04-SEP-19	R4782483
Sulfate (SO4)	1440	DLDS	3.0	mg/L		03-SEP-19	R4782900
Cyanides							
Cyanide, Total	<2.0	RRR	2.0	mg/L		04-SEP-19	R4783059
Organic / Inorganic Carbon							
Dissolved Carbon Filtration Location	LAB					03-SEP-19	R4782235
Dissolved Organic Carbon	<0.50		0.50	mg/L	03-SEP-19	04-SEP-19	R4782677
Total Organic Carbon	0.79		0.50	mg/L		04-SEP-19	R4782674
Total Metals							
Aluminum (Al)-Total	<0.050	DLHC	0.050	mg/L	03-SEP-19	03-SEP-19	R4782041
Antimony (Sb)-Total	<0.0010	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782041
Arsenic (As)-Total	<0.0010	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782041
Barium (Ba)-Total	0.0199	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782041
Beryllium (Be)-Total	<0.0010	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782041
Bismuth (Bi)-Total	<0.00050	DLHC	0.00050	mg/L	03-SEP-19	03-SEP-19	R4782041
Boron (B)-Total	<0.10	DLHC	0.10	mg/L	03-SEP-19	03-SEP-19	R4782041
Cadmium (Cd)-Total	0.000289	DLHC	0.000050	mg/L	03-SEP-19	03-SEP-19	R4782041
Calcium (Ca)-Total	107	DLHC	0.50	mg/L	03-SEP-19	03-SEP-19	R4782041
Cesium (Cs)-Total	<0.00010	DLHC	0.00010	mg/L	03-SEP-19	03-SEP-19	R4782041
Chromium (Cr)-Total	<0.0050	DLHC	0.0050	mg/L	03-SEP-19	03-SEP-19	R4782041
Cobalt (Co)-Total	0.0833	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782041
Copper (Cu)-Total	<0.010	DLHC	0.010	mg/L	03-SEP-19	03-SEP-19	R4782041
Iron (Fe)-Total	0.15	DLHC	0.10	mg/L	03-SEP-19	03-SEP-19	R4782041
Lead (Pb)-Total	<0.00050	DLHC	0.00050	mg/L	03-SEP-19	03-SEP-19	R4782041
Lithium (Li)-Total	0.060	DLHC	0.010	mg/L	03-SEP-19	03-SEP-19	R4782041
Magnesium (Mg)-Total	279	DLHC	0.050	mg/L	03-SEP-19	03-SEP-19	R4782041
Manganese (Mn)-Total	14.0	DLHC	0.0050	mg/L	03-SEP-19	03-SEP-19	R4782041
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		04-SEP-19	R4782727
Molybdenum (Mo)-Total	<0.00050	DLHC	0.00050	mg/L	03-SEP-19	03-SEP-19	R4782041
Nickel (Ni)-Total	0.0936	DLHC	0.0050	mg/L	03-SEP-19	03-SEP-19	R4782041
Phosphorus (P)-Total	<0.50	DLHC	0.50	mg/L	03-SEP-19	03-SEP-19	R4782041
Potassium (K)-Total	11.5	DLHC	0.50	mg/L	03-SEP-19	03-SEP-19	R4782041
Rubidium (Rb)-Total	0.0153	DLHC	0.0020	mg/L	03-SEP-19	03-SEP-19	R4782041
Selenium (Se)-Total	0.00201	DLHC	0.00050	mg/L	03-SEP-19	03-SEP-19	R4782041
Silicon (Si)-Total	2.2	DLHC	1.0	mg/L	03-SEP-19	03-SEP-19	R4782041
Silver (Ag)-Total	<0.00050	DLHC	0.00050	mg/L	03-SEP-19	03-SEP-19	R4782041
Sodium (Na)-Total	6.84	DLHC	0.50	mg/L	03-SEP-19	03-SEP-19	R4782041
Strontium (Sr)-Total	0.197	DLHC	0.010	mg/L	03-SEP-19	03-SEP-19	R4782041
Sulfur (S)-Total	468	DLHC	5.0	mg/L	03-SEP-19	03-SEP-19	R4782041
Tellurium (Te)-Total	<0.0020	DLHC	0.0020	mg/L	03-SEP-19	03-SEP-19	R4782041
Thallium (Tl)-Total	0.00013	DLHC	0.00010	mg/L	03-SEP-19	03-SEP-19	R4782041

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2339844-2 MS-0601 Sampled By: KB/CP on 02-SEP-19 @ 15:15 Matrix: WATER							
Total Metals							
Thorium (Th)-Total	<0.0010	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782041
Tin (Sn)-Total	<0.0010	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782041
Titanium (Ti)-Total	<0.0030	DLHC	0.0030	mg/L	03-SEP-19	03-SEP-19	R4782041
Tungsten (W)-Total	<0.0010	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782041
Uranium (U)-Total	<0.00010	DLHC	0.00010	mg/L	03-SEP-19	03-SEP-19	R4782041
Vanadium (V)-Total	<0.0050	DLHC	0.0050	mg/L	03-SEP-19	03-SEP-19	R4782041
Zinc (Zn)-Total	<0.030	DLHC	0.030	mg/L	03-SEP-19	03-SEP-19	R4782041
Zirconium (Zr)-Total	<0.0020	DLHC	0.0020	mg/L	03-SEP-19	03-SEP-19	R4782041
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					03-SEP-19	R4781089
Dissolved Metals Filtration Location	FIELD					03-SEP-19	R4781204
Aluminum (Al)-Dissolved	<0.050	DLHC	0.050	mg/L	03-SEP-19	03-SEP-19	R4782250
Antimony (Sb)-Dissolved	<0.0010	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782250
Arsenic (As)-Dissolved	<0.0010	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782250
Barium (Ba)-Dissolved	0.0210	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782250
Beryllium (Be)-Dissolved	<0.0010	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782250
Bismuth (Bi)-Dissolved	<0.00050	DLHC	0.00050	mg/L	03-SEP-19	03-SEP-19	R4782250
Boron (B)-Dissolved	<0.10	DLHC	0.10	mg/L	03-SEP-19	03-SEP-19	R4782250
Cadmium (Cd)-Dissolved	0.000375	DLHC	0.000050	mg/L	03-SEP-19	03-SEP-19	R4782250
Calcium (Ca)-Dissolved	107	DLHC	0.50	mg/L	03-SEP-19	03-SEP-19	R4782250
Cesium (Cs)-Dissolved	<0.00010	DLHC	0.00010	mg/L	03-SEP-19	03-SEP-19	R4782250
Chromium (Cr)-Dissolved	<0.0050	DLHC	0.0050	mg/L	03-SEP-19	03-SEP-19	R4782250
Cobalt (Co)-Dissolved	0.0836	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782250
Copper (Cu)-Dissolved	<0.0020	DLHC	0.0020	mg/L	03-SEP-19	03-SEP-19	R4782250
Iron (Fe)-Dissolved	<0.10	DLHC	0.10	mg/L	03-SEP-19	03-SEP-19	R4782250
Lead (Pb)-Dissolved	<0.00050	DLHC	0.00050	mg/L	03-SEP-19	03-SEP-19	R4782250
Lithium (Li)-Dissolved	0.060	DLHC	0.010	mg/L	03-SEP-19	03-SEP-19	R4782250
Magnesium (Mg)-Dissolved	281	DLHC	0.050	mg/L	03-SEP-19	03-SEP-19	R4782250
Manganese (Mn)-Dissolved	14.1	DLHC	0.0050	mg/L	03-SEP-19	03-SEP-19	R4782250
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	03-SEP-19	04-SEP-19	R4782733
Molybdenum (Mo)-Dissolved	<0.00050	DLHC	0.00050	mg/L	03-SEP-19	03-SEP-19	R4782250
Nickel (Ni)-Dissolved	0.0942	DLHC	0.0050	mg/L	03-SEP-19	03-SEP-19	R4782250
Phosphorus (P)-Dissolved	<0.50	DLHC	0.50	mg/L	03-SEP-19	03-SEP-19	R4782250
Potassium (K)-Dissolved	11.6	DLHC	0.50	mg/L	03-SEP-19	03-SEP-19	R4782250
Rubidium (Rb)-Dissolved	0.0148	DLHC	0.0020	mg/L	03-SEP-19	03-SEP-19	R4782250
Selenium (Se)-Dissolved	0.00200	DLHC	0.00050	mg/L	03-SEP-19	03-SEP-19	R4782250
Silicon (Si)-Dissolved	2.19	DLHC	0.50	mg/L	03-SEP-19	03-SEP-19	R4782250
Silver (Ag)-Dissolved	<0.00050	DLHC	0.00050	mg/L	03-SEP-19	03-SEP-19	R4782250
Sodium (Na)-Dissolved	6.90	DLHC	0.50	mg/L	03-SEP-19	03-SEP-19	R4782250
Strontium (Sr)-Dissolved	0.196	DLHC	0.010	mg/L	03-SEP-19	03-SEP-19	R4782250
Sulfur (S)-Dissolved	471	DLHC	5.0	mg/L	03-SEP-19	03-SEP-19	R4782250

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2339844-2 MS-0601 Sampled By: KB/CP on 02-SEP-19 @ 15:15 Matrix: WATER							
Dissolved Metals							
Tellurium (Te)-Dissolved	<0.0020	DLHC	0.0020	mg/L	03-SEP-19	03-SEP-19	R4782250
Thallium (Tl)-Dissolved	0.00013	DLHC	0.00010	mg/L	03-SEP-19	03-SEP-19	R4782250
Thorium (Th)-Dissolved	<0.0010	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782250
Tin (Sn)-Dissolved	<0.0010	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782250
Titanium (Ti)-Dissolved	<0.0030	DLHC	0.0030	mg/L	03-SEP-19	03-SEP-19	R4782250
Tungsten (W)-Dissolved	<0.0010	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782250
Uranium (U)-Dissolved	<0.00010	DLHC	0.00010	mg/L	03-SEP-19	03-SEP-19	R4782250
Vanadium (V)-Dissolved	<0.0050	DLHC	0.0050	mg/L	03-SEP-19	03-SEP-19	R4782250
Zinc (Zn)-Dissolved	0.012	DLHC	0.010	mg/L	03-SEP-19	03-SEP-19	R4782250
Zirconium (Zr)-Dissolved	<0.0020	DLHC	0.0020	mg/L	03-SEP-19	03-SEP-19	R4782250
Radiological Parameters							
Ra-226	0.021		0.0084	Bq/L	09-SEP-19	19-SEP-19	R4780785
Report Remarks : RRR: DLM: elevated RL due to sample matrix interference SP: sample was preserved in the lab.							

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

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Chloride (Cl)	MS-B	L2339844-1
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2339844-1, -2
Matrix Spike	Boron (B)-Dissolved	MS-B	L2339844-1, -2
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2339844-1, -2
Matrix Spike	Cobalt (Co)-Dissolved	MS-B	L2339844-1, -2
Matrix Spike	Lithium (Li)-Dissolved	MS-B	L2339844-1, -2
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2339844-1, -2
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L2339844-1, -2
Matrix Spike	Nickel (Ni)-Dissolved	MS-B	L2339844-1, -2
Matrix Spike	Potassium (K)-Dissolved	MS-B	L2339844-1, -2
Matrix Spike	Rubidium (Rb)-Dissolved	MS-B	L2339844-1, -2
Matrix Spike	Silicon (Si)-Dissolved	MS-B	L2339844-1, -2
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2339844-1, -2
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2339844-1, -2
Matrix Spike	Sulfur (S)-Dissolved	MS-B	L2339844-1, -2
Matrix Spike	Aluminum (Al)-Total	MS-B	L2339844-1, -2
Matrix Spike	Barium (Ba)-Total	MS-B	L2339844-1, -2
Matrix Spike	Boron (B)-Total	MS-B	L2339844-1, -2
Matrix Spike	Calcium (Ca)-Total	MS-B	L2339844-1, -2
Matrix Spike	Copper (Cu)-Total	MS-B	L2339844-1, -2
Matrix Spike	Iron (Fe)-Total	MS-B	L2339844-1, -2
Matrix Spike	Lithium (Li)-Total	MS-B	L2339844-1, -2
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2339844-1, -2
Matrix Spike	Manganese (Mn)-Total	MS-B	L2339844-1, -2
Matrix Spike	Molybdenum (Mo)-Total	MS-B	L2339844-1, -2
Matrix Spike	Potassium (K)-Total	MS-B	L2339844-1, -2
Matrix Spike	Rubidium (Rb)-Total	MS-B	L2339844-1, -2
Matrix Spike	Silicon (Si)-Total	MS-B	L2339844-1, -2
Matrix Spike	Sodium (Na)-Total	MS-B	L2339844-1, -2
Matrix Spike	Strontium (Sr)-Total	MS-B	L2339844-1, -2
Matrix Spike	Sulfur (S)-Total	MS-B	L2339844-1, -2
Matrix Spike	Titanium (Ti)-Total	MS-B	L2339844-1, -2
Matrix Spike	Uranium (U)-Total	MS-B	L2339844-1, -2
Matrix Spike	Zinc (Zn)-Total	MS-B	L2339844-1, -2
Matrix Spike	Phosphorus, Total	MS-B	L2339844-1, -2

Sample Parameter Qualifier key listed:

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRR	Refer to Report Remarks for issues regarding this analysis
SP	Sample was Preserved at the laboratory

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACY-TITR-TB	Water	Acidity	APHA 2310 B modified

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

ALK-WT	Water	Alkalinity, Total (as CaCO3)	EPA 310.2

This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.

CL-IC-N-WT	Water	Chloride by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental

Reference Information

Protection Act (July 1, 2011).

CN-TOT-WT	Water	Cyanide, Total	ISO 14403-2

Total cyanide is determined by the combination of UV digestion and distillation. Cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

When using this method, high levels of thiocyanate in samples can cause false positives at ~1-2% of the thiocyanate concentration. For samples with detectable cyanide analyzed by this method, ALS recommends analysis for thiocyanate to check for this potential interference

DOC-WT	Water	Dissolved Organic Carbon	APHA 5310B

Sample is filtered through a 0.45um filter, then injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic carbon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.

EC-SCREEN-WT	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

EC-WT	Water	Conductivity	APHA 2510 B

Water samples can be measured directly by immersing the conductivity cell into the sample.

F-IC-N-WT	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-WT	Water	Hardness	APHA 2340 B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-WT	Water	Dissolved Mercury in Water by CVAAS	EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

HG-T-CVAA-WT	Water	Total Mercury in Water by CVAAS	EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

MET-D-CCMS-WT	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

MET-T-CCMS-WT	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

NH3-F-WT	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO3-IC-WT	Water	Nitrate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-COL-WT	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is deteremined colourimetrically after persulphate digestion of the sample.

PH-BF	Water	pH	APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

RA226-MMER-FC	Water	Ra226 by Alpha Scint, MDC=0.01	EPA 903.1

Reference Information

		Bq/L	
SO4-IC-N-WT	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-BF Water Total Dissolved Solids APHA 2540C

A well-mixed sample is filtered though glass fibres filter. A known volume of the filtrate is evaporated and dried at 180 +/- 2C for 1hr.

SOLIDS-TSS-BF Water Suspended solids APHA 2540 D-Gravimetric

A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104 +/- 1C for a minimum of four hours or until a constant weight is achieved.

TKN-WT Water Total Kjeldahl Nitrogen APHA 4500-Norg D

This analysis is carried out using procedures adapted from APHA Method 4500-Norg "Nitrogen (Organic)". Total Kjeldahl Nitrogen is determined by sample digestion at 380 Celsius with analysis using an automated colorimetric method.

TOC-WT Water Total Organic Carbon APHA 5310B

Sample is injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic cabon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.

TURBIDITY-BF Water Turbidity APHA 2130 B

Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.

** 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
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA
FC	ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
TB	ALS ENVIRONMENTAL - THUNDER BAY, ONTARIO, CANADA
BF	ALS ENVIRONMENTAL - BAFFIN ISLAND, NUNAVUT, 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 weight of sample
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

Workorder: L2339844 Report Date: 24-SEP-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACY-TITR-TB	**Water**							
Batch R4784118								
WG3152901-3 DUP		**L2339862-1**						
Acidity (as CaCO3)		4.1	3.7		mg/L	10	20	05-SEP-19
WG3152901-2 LCS								
Acidity (as CaCO3)			94.6		%		85-115	05-SEP-19
WG3152901-1 MB								
Acidity (as CaCO3)			<2.0		mg/L		2	05-SEP-19
ALK-WT	**Water**							
Batch R4782545								
WG3151110-4 DUP		**WG3151110-3**						
Alkalinity, Total (as CaCO3)		150	150		mg/L	0.3	20	04-SEP-19
WG3151110-2 LCS								
Alkalinity, Total (as CaCO3)			103.0		%		85-115	04-SEP-19
WG3151110-1 MB								
Alkalinity, Total (as CaCO3)			<10		mg/L		10	04-SEP-19
CL-IC-N-WT	**Water**							
Batch R4782656								
WG3150765-10 DUP		**WG3150765-8**						
Chloride (Cl)		212	211		mg/L	0.4	20	03-SEP-19
WG3150765-7 LCS								
Chloride (Cl)			100.8		%		90-110	03-SEP-19
WG3150765-6 MB								
Chloride (Cl)			<0.50		mg/L		0.5	03-SEP-19
WG3150765-9 MS		**WG3150765-8**						
Chloride (Cl)			N/A	MS-B	%		-	03-SEP-19
Batch R4782900								
WG3150455-19 DUP		**WG3150455-20**						
Chloride (Cl)		40.6	40.6		mg/L	0.1	20	03-SEP-19
WG3150455-17 LCS								
Chloride (Cl)			101.4		%		90-110	03-SEP-19
WG3150455-16 MB								
Chloride (Cl)			<0.50		mg/L		0.5	03-SEP-19
WG3150455-18 MS		**WG3150455-20**						
Chloride (Cl)			104.1		%		75-125	03-SEP-19
CN-TOT-WT	**Water**							

Quality Control Report

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Oakville ON L6H 0C3
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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CN-TOT-WT	**Water**							
Batch R4783059								
WG3151281-3 DUP		**L2339844-2**						
Cyanide, Total		<2.0	<2.0	RPD-NA	mg/L	N/A	20	04-SEP-19
WG3151281-2 LCS								
Cyanide, Total			86.3		%		80-120	04-SEP-19
WG3151281-1 MB								
Cyanide, Total			<0.0020		mg/L		0.002	04-SEP-19
WG3151281-4 MS		**L2339844-2**						
Cyanide, Total			77		%		70-130	04-SEP-19
DOC-WT	**Water**							
Batch R4782677								
WG3150890-3 DUP		**L2339830-1**						
Dissolved Organic Carbon		2.69	2.84		mg/L	5.7	20	04-SEP-19
WG3150890-2 LCS								
Dissolved Organic Carbon			98.0		%		80-120	04-SEP-19
WG3150890-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	04-SEP-19
WG3150890-4 MS		**L2339830-1**						
Dissolved Organic Carbon			99.8		%		70-130	04-SEP-19
EC-WT	**Water**							
Batch R4782545								
WG3151110-4 DUP		**WG3151110-3**						
Conductivity		1280	1270		umhos/cm	0.5	10	04-SEP-19
WG3151110-2 LCS								
Conductivity			100.8		%		90-110	04-SEP-19
WG3151110-1 MB								
Conductivity			<3.0		umhos/cm		3	04-SEP-19
F-IC-N-WT	**Water**							
Batch R4782656								
WG3150765-10 DUP		**WG3150765-8**						
Fluoride (F)		0.132	0.133		mg/L	1.1	20	03-SEP-19
WG3150765-7 LCS								
Fluoride (F)			101.2		%		90-110	03-SEP-19
WG3150765-6 MB								
Fluoride (F)			<0.020		mg/L		0.02	03-SEP-19
WG3150765-9 MS		**WG3150765-8**						
Fluoride (F)			100.0		%		75-125	03-SEP-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F-IC-N-WT	**Water**							
Batch R4782900								
WG3150455-19 DUP		**WG3150455-20**						
Fluoride (F)		0.064	0.065		mg/L	0.5	20	03-SEP-19
WG3150455-17 LCS								
Fluoride (F)			103.0		%		90-110	03-SEP-19
WG3150455-16 MB								
Fluoride (F)			<0.020		mg/L		0.02	03-SEP-19
WG3150455-18 MS		**WG3150455-20**						
Fluoride (F)			100.2		%		75-125	03-SEP-19
HG-D-CVAA-WT	**Water**							
Batch R4782733								
WG3150261-4 DUP		**WG3150261-3**						
Mercury (Hg)-Dissolved		<0.000050	0.0000360		mg/L	18	20	04-SEP-19
WG3150261-2 LCS								
Mercury (Hg)-Dissolved			98.2		%		80-120	04-SEP-19
WG3150261-1 MB								
Mercury (Hg)-Dissolved			<0.000005C		mg/L		0.000005	04-SEP-19
WG3150261-5 MS		**WG3150261-3**						
Mercury (Hg)-Dissolved			85.1		%		70-130	04-SEP-19
HG-T-CVAA-WT	**Water**							
Batch R4782727								
WG3150240-3 DUP		**L2339830-1**						
Mercury (Hg)-Total		<0.0000050	<0.000005C	RPD-NA	mg/L	N/A	20	04-SEP-19
WG3150240-2 LCS								
Mercury (Hg)-Total			97.6		%		80-120	04-SEP-19
WG3150240-1 MB								
Mercury (Hg)-Total			<0.000005C		mg/L		0.000005	04-SEP-19
WG3150240-4 MS		**L2339839-1**						
Mercury (Hg)-Total			90.9		%		70-130	04-SEP-19
MET-D-CCMS-WT	**Water**							
Batch R4782250								
WG3150303-4 DUP		**WG3150303-3**						
Aluminum (Al)-Dissolved		<0.050	<0.050	RPD-NA	mg/L	N/A	20	03-SEP-19
Antimony (Sb)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	03-SEP-19
Arsenic (As)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	03-SEP-19
Barium (Ba)-Dissolved		0.0199	0.0206		mg/L	3.5	20	03-SEP-19
Beryllium (Be)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	03-SEP-19
Bismuth (Bi)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	03-SEP-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4782250								
WG3150303-4 DUP		**WG3150303-3**						
Boron (B)-Dissolved		<0.10	<0.10	RPD-NA	mg/L	N/A	20	03-SEP-19
Cadmium (Cd)-Dissolved		0.000338	0.000374		mg/L	10	20	03-SEP-19
Calcium (Ca)-Dissolved		107	106		mg/L	1.1	20	03-SEP-19
Cesium (Cs)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	03-SEP-19
Chromium (Cr)-Dissolved		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	03-SEP-19
Cobalt (Co)-Dissolved		0.0816	0.0823		mg/L	0.9	20	03-SEP-19
Copper (Cu)-Dissolved		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	03-SEP-19
Iron (Fe)-Dissolved		<0.10	<0.10	RPD-NA	mg/L	N/A	20	03-SEP-19
Lead (Pb)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	03-SEP-19
Lithium (Li)-Dissolved		0.063	0.059		mg/L	5.4	20	03-SEP-19
Magnesium (Mg)-Dissolved		277	278		mg/L	0.6	20	03-SEP-19
Manganese (Mn)-Dissolved		14.1	14.0		mg/L	0.6	20	03-SEP-19
Molybdenum (Mo)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	03-SEP-19
Nickel (Ni)-Dissolved		0.0918	0.0931		mg/L	1.5	20	03-SEP-19
Phosphorus (P)-Dissolved		<0.50	<0.50	RPD-NA	mg/L	N/A	20	03-SEP-19
Potassium (K)-Dissolved		11.4	11.6		mg/L	1.6	20	03-SEP-19
Rubidium (Rb)-Dissolved		0.0153	0.0156		mg/L	1.9	20	03-SEP-19
Selenium (Se)-Dissolved		0.00232	0.00227		mg/L	2.3	20	03-SEP-19
Silicon (Si)-Dissolved		2.11	2.13		mg/L	1.3	20	03-SEP-19
Silver (Ag)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	03-SEP-19
Sodium (Na)-Dissolved		6.81	6.77		mg/L	0.6	20	03-SEP-19
Strontium (Sr)-Dissolved		0.200	0.200		mg/L	0.1	20	03-SEP-19
Sulfur (S)-Dissolved		480	467		mg/L	2.6	20	03-SEP-19
Tellurium (Te)-Dissolved		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	03-SEP-19
Thallium (Tl)-Dissolved		0.00013	0.00012		mg/L	1.9	20	03-SEP-19
Thorium (Th)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	03-SEP-19
Tin (Sn)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	03-SEP-19
Titanium (Ti)-Dissolved		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	03-SEP-19
Tungsten (W)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	03-SEP-19
Uranium (U)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	03-SEP-19
Vanadium (V)-Dissolved		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	03-SEP-19
Zinc (Zn)-Dissolved		0.013	0.012		mg/L	4.5	20	03-SEP-19
Zirconium (Zr)-Dissolved		<0.0020	<0.0020		mg/L			03-SEP-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4782250								
WG3150303-4 DUP		**WG3150303-3**						
Zirconium (Zr)-Dissolved		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	03-SEP-19
WG3150303-2 LCS								
Aluminum (Al)-Dissolved			104.9		%		80-120	03-SEP-19
Antimony (Sb)-Dissolved			100.8		%		80-120	03-SEP-19
Arsenic (As)-Dissolved			99.0		%		80-120	03-SEP-19
Barium (Ba)-Dissolved			99.9		%		80-120	03-SEP-19
Beryllium (Be)-Dissolved			100.4		%		80-120	03-SEP-19
Bismuth (Bi)-Dissolved			101.0		%		80-120	03-SEP-19
Boron (B)-Dissolved			100.1		%		80-120	03-SEP-19
Cadmium (Cd)-Dissolved			95.7		%		80-120	03-SEP-19
Calcium (Ca)-Dissolved			102.1		%		80-120	03-SEP-19
Cesium (Cs)-Dissolved			100.2		%		80-120	03-SEP-19
Chromium (Cr)-Dissolved			101.2		%		80-120	03-SEP-19
Cobalt (Co)-Dissolved			98.9		%		80-120	03-SEP-19
Copper (Cu)-Dissolved			97.0		%		80-120	03-SEP-19
Iron (Fe)-Dissolved			96.9		%		80-120	03-SEP-19
Lead (Pb)-Dissolved			102.2		%		80-120	03-SEP-19
Lithium (Li)-Dissolved			98.9		%		80-120	03-SEP-19
Magnesium (Mg)-Dissolved			101.5		%		80-120	03-SEP-19
Manganese (Mn)-Dissolved			101.2		%		80-120	03-SEP-19
Molybdenum (Mo)-Dissolved			103.8		%		80-120	03-SEP-19
Nickel (Ni)-Dissolved			97.6		%		80-120	03-SEP-19
Phosphorus (P)-Dissolved			98.1		%		80-120	03-SEP-19
Potassium (K)-Dissolved			101.0		%		80-120	03-SEP-19
Rubidium (Rb)-Dissolved			100.2		%		80-120	03-SEP-19
Selenium (Se)-Dissolved			99.8		%		80-120	03-SEP-19
Silicon (Si)-Dissolved			102.0		%		60-140	03-SEP-19
Silver (Ag)-Dissolved			99.2		%		80-120	03-SEP-19
Sodium (Na)-Dissolved			104.4		%		80-120	03-SEP-19
Strontium (Sr)-Dissolved			99.96		%		80-120	03-SEP-19
Sulfur (S)-Dissolved			105.1		%		80-120	03-SEP-19
Tellurium (Te)-Dissolved			95.8		%		80-120	03-SEP-19
Thallium (Tl)-Dissolved			102.1		%		80-120	03-SEP-19
Thorium (Th)-Dissolved			96.9		%		80-120	03-SEP-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4782250								
WG3150303-2 LCS								
Tin (Sn)-Dissolved			98.1		%		80-120	03-SEP-19
Titanium (Ti)-Dissolved			97.3		%		80-120	03-SEP-19
Tungsten (W)-Dissolved			99.99		%		80-120	03-SEP-19
Uranium (U)-Dissolved			99.0		%		80-120	03-SEP-19
Vanadium (V)-Dissolved			101.0		%		80-120	03-SEP-19
Zinc (Zn)-Dissolved			95.9		%		80-120	03-SEP-19
Zirconium (Zr)-Dissolved			98.1		%		80-120	03-SEP-19
WG3150303-1 MB								
Aluminum (Al)-Dissolved			<0.0050		mg/L		0.005	03-SEP-19
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	03-SEP-19
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	03-SEP-19
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	03-SEP-19
Beryllium (Be)-Dissolved			<0.00010		mg/L		0.0001	03-SEP-19
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	03-SEP-19
Boron (B)-Dissolved			<0.010		mg/L		0.01	03-SEP-19
Cadmium (Cd)-Dissolved			<0.000005(		mg/L		0.000005	03-SEP-19
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	03-SEP-19
Cesium (Cs)-Dissolved			<0.000010		mg/L		0.00001	03-SEP-19
Chromium (Cr)-Dissolved			<0.00050		mg/L		0.0005	03-SEP-19
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	03-SEP-19
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	03-SEP-19
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	03-SEP-19
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	03-SEP-19
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	03-SEP-19
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	03-SEP-19
Manganese (Mn)-Dissolved			<0.00050		mg/L		0.0005	03-SEP-19
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	03-SEP-19
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	03-SEP-19
Phosphorus (P)-Dissolved			<0.050		mg/L		0.05	03-SEP-19
Potassium (K)-Dissolved			<0.050		mg/L		0.05	03-SEP-19
Rubidium (Rb)-Dissolved			<0.00020		mg/L		0.0002	03-SEP-19
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	03-SEP-19
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	03-SEP-19
Silver (Ag)-Dissolved			<0.000050		mg/L		0.00005	03-SEP-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4782250								
WG3150303-1 MB								
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	03-SEP-19
Strontium (Sr)-Dissolved			<0.0010		mg/L		0.001	03-SEP-19
Sulfur (S)-Dissolved			<0.50		mg/L		0.5	03-SEP-19
Tellurium (Te)-Dissolved			<0.00020		mg/L		0.0002	03-SEP-19
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	03-SEP-19
Thorium (Th)-Dissolved			<0.00010		mg/L		0.0001	03-SEP-19
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	03-SEP-19
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	03-SEP-19
Tungsten (W)-Dissolved			<0.00010		mg/L		0.0001	03-SEP-19
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	03-SEP-19
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	03-SEP-19
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	03-SEP-19
Zirconium (Zr)-Dissolved			<0.00020		mg/L		0.0002	03-SEP-19
WG3150303-5 MS		**WG3150303-3**						
Aluminum (Al)-Dissolved			96.0		%		70-130	03-SEP-19
Antimony (Sb)-Dissolved			97.4		%		70-130	03-SEP-19
Arsenic (As)-Dissolved			98.8		%		70-130	03-SEP-19
Barium (Ba)-Dissolved			N/A	MS-B	%		-	03-SEP-19
Beryllium (Be)-Dissolved			96.0		%		70-130	03-SEP-19
Bismuth (Bi)-Dissolved			94.8		%		70-130	03-SEP-19
Boron (B)-Dissolved			N/A	MS-B	%		-	03-SEP-19
Cadmium (Cd)-Dissolved			94.7		%		70-130	03-SEP-19
Calcium (Ca)-Dissolved			N/A	MS-B	%		-	03-SEP-19
Cesium (Cs)-Dissolved			97.2		%		70-130	03-SEP-19
Chromium (Cr)-Dissolved			97.5		%		70-130	03-SEP-19
Cobalt (Co)-Dissolved			N/A	MS-B	%		-	03-SEP-19
Copper (Cu)-Dissolved			93.9		%		70-130	03-SEP-19
Iron (Fe)-Dissolved			85.3		%		70-130	03-SEP-19
Lead (Pb)-Dissolved			95.1		%		70-130	03-SEP-19
Lithium (Li)-Dissolved			N/A	MS-B	%		-	03-SEP-19
Magnesium (Mg)-Dissolved			N/A	MS-B	%		-	03-SEP-19
Manganese (Mn)-Dissolved			N/A	MS-B	%		-	03-SEP-19
Molybdenum (Mo)-Dissolved			99.8		%		70-130	03-SEP-19
Nickel (Ni)-Dissolved			N/A	MS-B	%		-	03-SEP-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4782250								
WG3150303-5 MS		**WG3150303-3**						
Phosphorus (P)-Dissolved			104.8		%		70-130	03-SEP-19
Potassium (K)-Dissolved			N/A	MS-B	%		-	03-SEP-19
Rubidium (Rb)-Dissolved			N/A	MS-B	%		-	03-SEP-19
Selenium (Se)-Dissolved			95.5		%		70-130	03-SEP-19
Silicon (Si)-Dissolved			N/A	MS-B	%		-	03-SEP-19
Silver (Ag)-Dissolved			95.3		%		70-130	03-SEP-19
Sodium (Na)-Dissolved			N/A	MS-B	%		-	03-SEP-19
Strontium (Sr)-Dissolved			N/A	MS-B	%		-	03-SEP-19
Sulfur (S)-Dissolved			N/A	MS-B	%		-	03-SEP-19
Tellurium (Te)-Dissolved			92.1		%		70-130	03-SEP-19
Thallium (Tl)-Dissolved			94.4		%		70-130	03-SEP-19
Thorium (Th)-Dissolved			92.1		%		70-130	03-SEP-19
Tin (Sn)-Dissolved			96.4		%		70-130	03-SEP-19
Titanium (Ti)-Dissolved			94.7		%		70-130	03-SEP-19
Tungsten (W)-Dissolved			94.5		%		70-130	03-SEP-19
Vanadium (V)-Dissolved			99.8		%		70-130	03-SEP-19
Zirconium (Zr)-Dissolved			94.0		%		70-130	03-SEP-19
MET-T-CCMS-WT	**Water**							
Batch R4782041								
WG3150225-4 DUP		**WG3150225-3**						
Aluminum (Al)-Total		1.11	1.15		mg/L	3.7	20	03-SEP-19
Antimony (Sb)-Total		0.0022	0.0022		mg/L	0.0	20	03-SEP-19
Arsenic (As)-Total		0.0034	0.0037		mg/L	8.9	20	03-SEP-19
Barium (Ba)-Total		0.0565	0.0582		mg/L	2.8	20	03-SEP-19
Beryllium (Be)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	03-SEP-19
Bismuth (Bi)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	03-SEP-19
Boron (B)-Total		0.86	0.89		mg/L	3.0	20	03-SEP-19
Cadmium (Cd)-Total		0.000098	0.000099		mg/L	0.8	20	03-SEP-19
Calcium (Ca)-Total		71.6	73.0		mg/L	1.9	20	03-SEP-19
Chromium (Cr)-Total		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	03-SEP-19
Cesium (Cs)-Total		0.00018	0.00018		mg/L	2.9	20	03-SEP-19
Cobalt (Co)-Total		0.0013	0.0013		mg/L	0.2	20	03-SEP-19
Copper (Cu)-Total		0.021	0.022		mg/L	3.3	20	03-SEP-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4782041								
WG3150225-4 DUP		**WG3150225-3**						
Iron (Fe)-Total		1.56	1.56		mg/L	0.0	20	03-SEP-19
Lead (Pb)-Total		0.00317	0.00327		mg/L	3.1	20	03-SEP-19
Lithium (Li)-Total		0.136	0.138		mg/L	1.3	20	03-SEP-19
Magnesium (Mg)-Total		20.7	21.2		mg/L	2.5	20	03-SEP-19
Manganese (Mn)-Total		0.0947	0.0954		mg/L	0.7	20	03-SEP-19
Molybdenum (Mo)-Total		0.325	0.319		mg/L	1.8	20	03-SEP-19
Nickel (Ni)-Total		<0.0050	0.0065	RPD-NA	mg/L	N/A	20	03-SEP-19
Phosphorus (P)-Total		<0.50	<0.50	RPD-NA	mg/L	N/A	20	03-SEP-19
Potassium (K)-Total		32.8	33.1		mg/L	0.9	20	03-SEP-19
Rubidium (Rb)-Total		0.0188	0.0191		mg/L	1.7	20	03-SEP-19
Selenium (Se)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	03-SEP-19
Silicon (Si)-Total		4.1	4.5		mg/L	10	20	03-SEP-19
Silver (Ag)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	03-SEP-19
Sodium (Na)-Total		112	115		mg/L	3.1	20	03-SEP-19
Strontium (Sr)-Total		0.398	0.383		mg/L	3.7	20	03-SEP-19
Sulfur (S)-Total		19.7	19.3		mg/L	1.6	25	03-SEP-19
Thallium (Tl)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	03-SEP-19
Tellurium (Te)-Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	03-SEP-19
Thorium (Th)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	25	03-SEP-19
Tin (Sn)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	03-SEP-19
Titanium (Ti)-Total		0.0476	0.0471		mg/L	1.1	20	03-SEP-19
Tungsten (W)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	03-SEP-19
Uranium (U)-Total		0.0106	0.0106		mg/L	0.3	20	03-SEP-19
Vanadium (V)-Total		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	03-SEP-19
Zinc (Zn)-Total		0.137	0.137		mg/L	0.2	20	03-SEP-19
Zirconium (Zr)-Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	03-SEP-19
WG3150225-2 LCS								
Aluminum (Al)-Total			103.1		%		80-120	03-SEP-19
Antimony (Sb)-Total			98.0		%		80-120	03-SEP-19
Arsenic (As)-Total			100.4		%		80-120	03-SEP-19
Barium (Ba)-Total			98.8		%		80-120	03-SEP-19
Beryllium (Be)-Total			97.2		%		80-120	03-SEP-19
Bismuth (Bi)-Total			96.9		%		80-120	03-SEP-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4782041								
WG3150225-2 LCS								
Boron (B)-Total			96.3		%		80-120	03-SEP-19
Cadmium (Cd)-Total			95.4		%		80-120	03-SEP-19
Calcium (Ca)-Total			96.3		%		80-120	03-SEP-19
Chromium (Cr)-Total			98.2		%		80-120	03-SEP-19
Cesium (Cs)-Total			96.2		%		80-120	03-SEP-19
Cobalt (Co)-Total			97.3		%		80-120	03-SEP-19
Copper (Cu)-Total			97.6		%		80-120	03-SEP-19
Iron (Fe)-Total			95.4		%		80-120	03-SEP-19
Lead (Pb)-Total			98.9		%		80-120	03-SEP-19
Lithium (Li)-Total			92.9		%		80-120	03-SEP-19
Magnesium (Mg)-Total			100.6		%		80-120	03-SEP-19
Manganese (Mn)-Total			102.0		%		80-120	03-SEP-19
Molybdenum (Mo)-Total			98.2		%		80-120	03-SEP-19
Nickel (Ni)-Total			97.5		%		80-120	03-SEP-19
Phosphorus (P)-Total			102.8		%		70-130	03-SEP-19
Potassium (K)-Total			100.3		%		80-120	03-SEP-19
Rubidium (Rb)-Total			93.5		%		80-120	03-SEP-19
Selenium (Se)-Total			100.5		%		80-120	03-SEP-19
Silicon (Si)-Total			102.2		%		60-140	03-SEP-19
Silver (Ag)-Total			95.4		%		80-120	03-SEP-19
Sodium (Na)-Total			106.3		%		80-120	03-SEP-19
Strontium (Sr)-Total			95.3		%		80-120	03-SEP-19
Sulfur (S)-Total			99.1		%		80-120	03-SEP-19
Thallium (Tl)-Total			98.7		%		80-120	03-SEP-19
Tellurium (Te)-Total			92.7		%		80-120	03-SEP-19
Thorium (Th)-Total			93.9		%		70-130	03-SEP-19
Tin (Sn)-Total			94.5		%		80-120	03-SEP-19
Titanium (Ti)-Total			99.1		%		80-120	03-SEP-19
Tungsten (W)-Total			96.0		%		80-120	03-SEP-19
Uranium (U)-Total			96.0		%		80-120	03-SEP-19
Vanadium (V)-Total			99.6		%		80-120	03-SEP-19
Zinc (Zn)-Total			96.3		%		80-120	03-SEP-19
Zirconium (Zr)-Total			94.6		%		80-120	03-SEP-19
WG3150225-1 MB								

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4782041								
WG3150225-1 MB								
Aluminum (Al)-Total			<0.0050		mg/L		0.005	03-SEP-19
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	03-SEP-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	03-SEP-19
Barium (Ba)-Total			<0.00010		mg/L		0.0001	03-SEP-19
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	03-SEP-19
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	03-SEP-19
Boron (B)-Total			<0.010		mg/L		0.01	03-SEP-19
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	03-SEP-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	03-SEP-19
Chromium (Cr)-Total			<0.00050		mg/L		0.0005	03-SEP-19
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	03-SEP-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	03-SEP-19
Copper (Cu)-Total			<0.0010		mg/L		0.001	03-SEP-19
Iron (Fe)-Total			<0.010		mg/L		0.01	03-SEP-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	03-SEP-19
Lithium (Li)-Total			<0.0010		mg/L		0.001	03-SEP-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	03-SEP-19
Manganese (Mn)-Total			<0.00050		mg/L		0.0005	03-SEP-19
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	03-SEP-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	03-SEP-19
Phosphorus (P)-Total			<0.050		mg/L		0.05	03-SEP-19
Potassium (K)-Total			<0.050		mg/L		0.05	03-SEP-19
Rubidium (Rb)-Total			<0.00020		mg/L		0.0002	03-SEP-19
Selenium (Se)-Total			<0.000050		mg/L		0.00005	03-SEP-19
Silicon (Si)-Total			<0.10		mg/L		0.1	03-SEP-19
Silver (Ag)-Total			<0.000050		mg/L		0.00005	03-SEP-19
Sodium (Na)-Total			<0.050		mg/L		0.05	03-SEP-19
Strontium (Sr)-Total			<0.0010		mg/L		0.001	03-SEP-19
Sulfur (S)-Total			<0.50		mg/L		0.5	03-SEP-19
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	03-SEP-19
Tellurium (Te)-Total			<0.00020		mg/L		0.0002	03-SEP-19
Thorium (Th)-Total			<0.00010		mg/L		0.0001	03-SEP-19
Tin (Sn)-Total			<0.00010		mg/L		0.0001	03-SEP-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4782041								
WG3150225-1 MB								
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	03-SEP-19
Tungsten (W)-Total			<0.00010		mg/L		0.0001	03-SEP-19
Uranium (U)-Total			<0.000010		mg/L		0.00001	03-SEP-19
Vanadium (V)-Total			<0.00050		mg/L		0.0005	03-SEP-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	03-SEP-19
Zirconium (Zr)-Total			<0.00020		mg/L		0.0002	03-SEP-19
WG3150225-5 MS		**WG3150225-3**						
Aluminum (Al)-Total			N/A	MS-B	%		-	03-SEP-19
Antimony (Sb)-Total			98.6		%		70-130	03-SEP-19
Arsenic (As)-Total			103.6		%		70-130	03-SEP-19
Barium (Ba)-Total			N/A	MS-B	%		-	03-SEP-19
Beryllium (Be)-Total			109.4		%		70-130	03-SEP-19
Bismuth (Bi)-Total			98.2		%		70-130	03-SEP-19
Boron (B)-Total			N/A	MS-B	%		-	03-SEP-19
Cadmium (Cd)-Total			104.8		%		70-130	03-SEP-19
Calcium (Ca)-Total			N/A	MS-B	%		-	03-SEP-19
Chromium (Cr)-Total			103.3		%		70-130	03-SEP-19
Cesium (Cs)-Total			102.0		%		70-130	03-SEP-19
Cobalt (Co)-Total			102.6		%		70-130	03-SEP-19
Copper (Cu)-Total			N/A	MS-B	%		-	03-SEP-19
Iron (Fe)-Total			N/A	MS-B	%		-	03-SEP-19
Lead (Pb)-Total			99.1		%		70-130	03-SEP-19
Lithium (Li)-Total			N/A	MS-B	%		-	03-SEP-19
Magnesium (Mg)-Total			N/A	MS-B	%		-	03-SEP-19
Manganese (Mn)-Total			N/A	MS-B	%		-	03-SEP-19
Molybdenum (Mo)-Total			N/A	MS-B	%		-	03-SEP-19
Nickel (Ni)-Total			102.8		%		70-130	03-SEP-19
Phosphorus (P)-Total			90.1		%		70-130	03-SEP-19
Potassium (K)-Total			N/A	MS-B	%		-	03-SEP-19
Rubidium (Rb)-Total			N/A	MS-B	%		-	03-SEP-19
Selenium (Se)-Total			100.8		%		70-130	03-SEP-19
Silicon (Si)-Total			N/A	MS-B	%		-	03-SEP-19
Silver (Ag)-Total			94.3		%		70-130	03-SEP-19
Sodium (Na)-Total			N/A	MS-B	%		-	03-SEP-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4782041								
WG3150225-5 MS		**WG3150225-3**						
Strontium (Sr)-Total			N/A	MS-B	%		-	03-SEP-19
Sulfur (S)-Total			N/A	MS-B	%		-	03-SEP-19
Thallium (Tl)-Total			98.3		%		70-130	03-SEP-19
Tellurium (Te)-Total			98.3		%		70-130	03-SEP-19
Tin (Sn)-Total			98.5		%		70-130	03-SEP-19
Titanium (Ti)-Total			N/A	MS-B	%		-	03-SEP-19
Tungsten (W)-Total			98.7		%		70-130	03-SEP-19
Uranium (U)-Total			N/A	MS-B	%		-	03-SEP-19
Vanadium (V)-Total			104.1		%		70-130	03-SEP-19
Zinc (Zn)-Total			N/A	MS-B	%		-	03-SEP-19
NH3-F-WT	**Water**							
Batch R4781881								
WG3150401-7 DUP		**L2339522-6**						
Ammonia, Total (as N)		<0.010	<0.010	RPD-NA	mg/L	N/A	20	03-SEP-19
WG3150401-6 LCS								
Ammonia, Total (as N)			97.3		%		85-115	03-SEP-19
WG3150401-5 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	03-SEP-19
WG3150401-8 MS		**L2339522-6**						
Ammonia, Total (as N)			93.2		%		75-125	03-SEP-19
NO3-IC-WT	**Water**							
Batch R4782656								
WG3150765-10 DUP		**WG3150765-8**						
Nitrate (as N)		2.09	2.08		mg/L	0.1	20	03-SEP-19
WG3150765-7 LCS								
Nitrate (as N)			101.4		%		90-110	03-SEP-19
WG3150765-6 MB								
Nitrate (as N)			<0.020		mg/L		0.02	03-SEP-19
WG3150765-9 MS		**WG3150765-8**						
Nitrate (as N)			96.2		%		75-125	03-SEP-19
Batch R4782900								
WG3150455-19 DUP		**WG3150455-20**						
Nitrate (as N)		0.888	0.888		mg/L	0.0	20	03-SEP-19
WG3150455-17 LCS								
Nitrate (as N)			100.8		%		90-110	03-SEP-19
WG3150455-16 MB								

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO3-IC-WT	**Water**							
Batch R4782900								
WG3150455-16 MB								
Nitrate (as N)			<0.020		mg/L		0.02	03-SEP-19
WG3150455-18 MS		**WG3150455-20**						
Nitrate (as N)			103.1		%		75-125	03-SEP-19
P-T-COL-WT	**Water**							
Batch R4782483								
WG3150772-3 DUP		**L2338742-1**						
Phosphorus, Total		0.106	0.110		mg/L	3.5	20	04-SEP-19
WG3150772-2 LCS								
Phosphorus, Total			97.3		%		80-120	04-SEP-19
WG3150772-1 MB								
Phosphorus, Total			<0.0030		mg/L		0.003	04-SEP-19
WG3150772-4 MS		**L2338742-1**						
Phosphorus, Total			N/A	MS-B	%		-	04-SEP-19
PH-BF	**Water**							
Batch R4781669								
WG3150384-2 DUP		**L2339918-1**						
pH		7.04	7.05	J	pH units	0.01	0.2	03-SEP-19
WG3150384-1 LCS								
pH			7.01		pH units		6.9-7.1	03-SEP-19
SO4-IC-N-WT	**Water**							
Batch R4782656								
WG3150765-10 DUP		**WG3150765-8**						
Sulfate (SO4)		43.7	43.4		mg/L	0.6	20	03-SEP-19
WG3150765-7 LCS								
Sulfate (SO4)			100.8		%		90-110	03-SEP-19
WG3150765-6 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	03-SEP-19
WG3150765-9 MS		**WG3150765-8**						
Sulfate (SO4)			96.8		%		75-125	03-SEP-19
Batch R4782900								
WG3150455-19 DUP		**WG3150455-20**						
Sulfate (SO4)		18.2	18.2		mg/L	0.0	20	03-SEP-19
WG3150455-17 LCS								
Sulfate (SO4)			101.8		%		90-110	03-SEP-19
WG3150455-16 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	03-SEP-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SO4-IC-N-WT	**Water**							
Batch R4782900								
WG3150455-18 MS		**WG3150455-20**						
Sulfate (SO4)			106.3		%		75-125	03-SEP-19
SOLIDS-TDS-BF	**Water**							
Batch R4782348								
WG3151105-3 DUP		**L2339753-2**						
Total Dissolved Solids		3310	3210		mg/L	3.1	20	03-SEP-19
WG3151105-2 LCS								
Total Dissolved Solids			101.9		%		85-115	03-SEP-19
WG3151105-1 MB								
Total Dissolved Solids			<20		mg/L		20	03-SEP-19
SOLIDS-TSS-BF	**Water**							
Batch R4781869								
WG3150478-3 DUP		**L2339918-2**						
Total Suspended Solids		94.0	92.0		mg/L	2.2	25	03-SEP-19
WG3150478-2 LCS								
Total Suspended Solids			100.8		%		85-115	03-SEP-19
WG3150478-1 MB								
Total Suspended Solids			<2.0		mg/L		2	03-SEP-19
TKN-WT	**Water**							
Batch R4783676								
WG3151797-3 DUP		**L2338737-2**						
Total Kjeldahl Nitrogen		0.63	0.61		mg/L	3.7	20	05-SEP-19
WG3151797-2 LCS								
Total Kjeldahl Nitrogen			102.3		%		75-125	05-SEP-19
WG3151797-1 MB								
Total Kjeldahl Nitrogen			<0.15		mg/L		0.15	05-SEP-19
WG3151797-4 MS		**L2338737-2**						
Total Kjeldahl Nitrogen			106.2		%		70-130	05-SEP-19
TOC-WT	**Water**							
Batch R4782674								
WG3151130-3 DUP		**L2339830-1**						
Total Organic Carbon		3.06	3.15		mg/L	2.8	20	04-SEP-19
WG3151130-2 LCS								
Total Organic Carbon			97.0		%		80-120	04-SEP-19
WG3151130-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	04-SEP-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TOC-WT	**Water**							
Batch R4782674								
WG3151130-4 MS		**L2339830-1**						
Total Organic Carbon			95.8		%		70-130	04-SEP-19
TURBIDITY-BF	**Water**							
Batch R4782165								
WG3150783-3 DUP		**L2339918-2**						
Turbidity		146	148		NTU	1.4	15	03-SEP-19
WG3150783-2 LCS								
Turbidity			110.0		%		85-115	03-SEP-19
WG3150783-1 MB								
Turbidity			<0.10		NTU		0.1	03-SEP-19

Quality Control Report

Workorder: L2339844 Report Date: 24-SEP-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

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

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

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.

Thursday, September 19, 2019

Rick Hawthorne
ALS Environmental
60 Northland Rd, Unit 1
Waterloo Canada, ON N2V 2B8

Re: ALS Workorder: 1909037
Project Name:
Project Number: L2339844

Dear Mr. Hawthorne:

Two water samples were received from ALS Environmental, on 9/4/2019. The samples were scheduled for the following analysis:

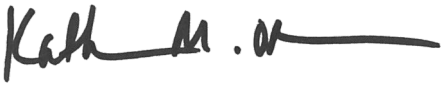
Radium-226

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,



ALS Environmental
Katie M. OBrien
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
AIHA	214884
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280

1909037

Radium-226:

The samples were prepared and analyzed according to the current revision of SOP 783.

All acceptance criteria were met.

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1909037
Client Name: ALS Environmental
Client Project Name:
Client Project Number: L2339844
Client PO Number: L2339844

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
L2339844-1	1909037-1		WATER	02-Sep-19	
L2339844-2	1909037-2		WATER	02-Sep-19	

ALS Environmental

Subcontract Request Form

Subcontract To:

ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
225 COMMERCE DRIVE
FORT COLLINS,CO 80524

2 x ILP

NOTES: Please reference on final report and invoice: PO# *L2339844*
ALS requires QC data to be provided with your final results.

Please see enclosed 2 sample(s) in 2 Container(s)

	SAMPLE NUMBER	ANALYTICAL REQUIRED	DATE SAMPLED / DUE DATE	Priority Flag
1	**L2339844-1 MS-06**		9/ 2/ 2019	E
		Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	9/20/2019	
2	**L2339844-2 MS-0601**		9/ 2/ 2019	E
		Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	9/20/2019	

Subcontract Info Contact: Mary-Lynn Pike (519) 886-6910
Analysis and reporting info contact: Rick Hawthorne
60 NORTHLAND ROAD, UNIT 1
WATERLOO,ON N2V 2B8
Phone: (519) 886-6910 Email: Rick.Hawthorne@alsglobal.com

Please email confirmation of receipt to: Rick.Hawthorne@alsglobal.com

Shipped By: _____ Date Shipped: _____
Received By: EvE Date Received: 9/4/19 1620
Verified By: _____ Date Verified: _____
Temperature: _____
Sample Integrity Issues: _____

ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: ALS Waterloo Workorder No: 1909037

Project Manager: KMO Initials: EE Date: 9/5/19

1.	Are airbills / shipping documents present and/or removable?	DROP OFF	YES	NO
2.	Are custody seals on **shipping** containers intact?	NONE	YES	NO *
3.	Are custody seals on **sample** containers intact?	NONE	YES	NO *
4.	Is there a COC (chain-of-custody) present?		YES	NO *
5.	Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)		YES	NO *
6.	Are short-hold samples present?		YES	NO
7.	Are all samples within holding times for the requested analyses?		YES	NO *
8.	Were all sample containers received intact? (not broken or leaking)		YES	NO *
9.	Is there sufficient sample for the requested analyses?		YES	NO *
10.	Are all samples in the proper containers for the requested analyses?		YES	NO *
11.	Are all aqueous samples preserved correctly, if required? (excluding volatiles)	N/A	YES	NO *
12.	Are all aqueous non-preserved samples pH 4-9?	N/A	YES	NO *
13.	Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm (1/4 inch) diameter? (i.e. size of green pea)	N/A	YES	NO
14.	Were the samples shipped on ice?		YES	NO
15.	Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: #1 #3 #4	RAD ONLY	YES	NO

Cooler #:	1							
Temperature (°C):	7.6							
No. of custody seals on cooler:	3							
DOT Survey/ Acceptance Information — External µR/hr reading:	11							
Background µR/hr reading:	13							

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? YES / NO / NA (If no, see Form 008.)

*** Please provide details here for NO responses to gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.**

All client bottle ID's vs ALS lab ID's double-checked by: EE

If applicable, was the client contacted? YES / NO / NA Contact: _____ Date/Time: _____

Project Manager Signature / Date: 9/6/19

Form 201r27.xls
(02/11/2019)

*IR Gun #1, VWR SN 170560549
*IR Gun #3, VWR SN 170647571
*IR Gun #4, Oakton, SN 2372220101-0002

196081

EXPRESS WORLDWIDE **WPX** DHL

2019-09-03 MYDHL+ 1.0 / *30-0821*

From: ALS Environmental
Ed Hill
60 Northland Rd
Unit 1

N2V 2B8 WATERLOO ON
Canada

11-3

Origin:
YHM

Contact: +15198866910

To: ALS Environmental Fort Collins
Sample Login
225 Commerce Drive

7.60

Contact:
Sample Login
+18004431511

80524 FORT COLLINS Colorado
United States of America

US-DEN-DEN

C [redacted]

Day Time

Ref:

Pce/Shpt Weight: **39.8 lbs**

Piece: **1/1**

Contents: Water Samples

WAYBILL 53 7295 2104,

(2L)US80524+48000001

Client:	ALS Environmental	**Date:**	*19-Sep-19*
Project:	L2339844	**Work Order:**	1909037
Sample ID:	L2339844-1	**Lab ID:**	1909037-1
Legal Location:		**Matrix:**	WATER
Collection Date:	9/2/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **9/9/2019**		PrepBy: **JXH**
Ra-226	**0.023 (+/- 0.0092)**		**0.0071**	**BQ/l**	NA	9/19/2019 12:00
Carr: BARIUM	*95.9*		*40-110*	*%REC*	DL = NA	9/19/2019 12:00

Client:	ALS Environmental	**Date:**	*19-Sep-19*
Project:	L2339844	**Work Order:**	1909037
Sample ID:	L2339844-2	**Lab ID:**	1909037-2
Legal Location:		**Matrix:**	WATER
Collection Date:	9/2/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **9/9/2019**		PrepBy: **JXH**
Ra-226	**0.021 (+/- 0.0093)**		**0.0084**	**BQ/l**	NA	9/19/2019 12:00
Carr: BARIUM	*94.8*		*40-110*	*%REC*	DL = NA	9/19/2019 12:00

Client:	ALS Environmental	**Date:**	*19-Sep-19*
Project:	L2339844	**Work Order:**	1909037
Sample ID:	L2339844-2	**Lab ID:**	1909037-2
Legal Location:		**Matrix:**	WATER
Collection Date:	9/2/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed

Explanation of Qualifiers

Radiochemistry:

- "Report Limit" is the MDC

U or ND - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

Y2 - Chemical Yield outside default limits.

W - DER is greater than Warning Limit of 1.42

* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.
# - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.
G - Sample density differs by more than 15% of LCS density.
D - DER is greater than Control Limit

M - Requested MDC not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS, Matrix Spike Recovery within control limits.

N - Matrix Spike Recovery outside control limits

NC - Not Calculated for duplicate results less than 5 times MDC

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

Inorganics:

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).

U or ND - Indicates that the compound was analyzed for but not detected.

E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.

M - Duplicate injection precision was not met.

N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.

Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.

* - Duplicate analysis (relative percent difference) not within control limits.

S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

Organics:

U or ND - Indicates that the compound was analyzed for but not detected.

B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.

E - Analyte concentration exceeds the upper level of the calibration range.

J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).

A - A tentatively identified compound is a suspected aldol-condensation product.

X - The analyte was diluted below an accurate quantitation level.

* - The spike recovery is equal to or outside the control criteria used.

+ - The relative percent difference (RPD) equals or exceeds the control criteria.

G - A pattern resembling gasoline was detected in this sample.

D - A pattern resembling diesel was detected in this sample.

M - A pattern resembling motor oil was detected in this sample.

C - A pattern resembling crude oil was detected in this sample.

4 - A pattern resembling JP-4 was detected in this sample.

5 - A pattern resembling JP-5 was detected in this sample.

H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.

L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.

Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
- gasoline
- JP-8
- diesel
- mineral spirits
- motor oil
- Stoddard solvent
- bunker C

Batch ID: **RE190909-1-1** Instrument ID **Alpha Scin** Method: **Radium-226 by Radon Emanation**

LCS Sample ID: **RE190909-1** Units: **BQ/l** Analysis Date: **9/19/2019 12:32**

Client ID: Run ID: **RE190909-1A** Prep Date: **9/9/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.77 (+/- 0.442)	0.0116	1.72		103	67-120					P,M3
Carr: BARIUM	15500		16020		96.7	40-110					

LCSD Sample ID: **RE190909-1** Units: **BQ/l** Analysis Date: **9/19/2019 12:32**

Client ID: Run ID: **RE190909-1A** Prep Date: **9/9/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.83 (+/- 0.457)	0.012	1.72		106	67-120		1.77	0.1	2.1	P,M3
Carr: BARIUM	15700		16020		98.3	40-110		15500			

MB Sample ID: **RE190909-1** Units: **BQ/l** Analysis Date: **9/19/2019 12:00**

Client ID: Run ID: **RE190909-1A** Prep Date: **9/9/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	0.0021 (+/- 0.0039)	0.0068									U
Carr: BARIUM	15400		16020		95.9	40-110					

The following samples were analyzed in this batch: 1909037-1 1909037-2

AQUATOX
AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

TOXICITY TEST REPORT

Daphnia magna
EPS 1/RM/14

Work Order : 240163
Sample Number : 60492

SAMPLE IDENTIFICATION

Company :	ALS Laboratory Group, Waterloo	Date Collected :	2019-09-02
Location :	Waterloo ON	Time Collected :	15:15
Job Number :	L2339844	Date Received :	2019-09-03
Substance :	MS-06	Time Received :	11:55
Sampling Method :	Grab	Temperature on Receipt :	9.0 °C
Sampled By :	KB/CP	Date Tested :	2019-09-03
Sample Description :	Clear, light brown, odourless.		

Test Method : Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna* . Environment Canada EPS 1/RM/14 (Second Edition, December 2000, with February 2016 amendments).

48-HOUR TEST RESULTS

Substance	Effect	Value
Control	Mean Immobility	0.0 %
	Mean Mortality	0.0 %
100%	Mean Immobility	0.0 %
	Mean Mortality	0.0 %

The results reported relate only to the sample tested and as received.

TEST ORGANISM

Species :	*Daphnia magna*	Time to First Brood :	8.4 days
Organism Batch :	Dm19-17	Average Brood Size :	42.0 young
Culture Mortality :	0% (previous 7 days)		

TEST CONDITIONS

Sample Treatment :	None	Number of Replicates :	3
pH Adjustment :	None	Organisms / Replicate :	10
Pre-aeration Rate :	~30 mL/min/L	Organisms / Test Level :	30
Pre-aeration Time :	30 minutes	Organism Loading Rate :	15.0 mL/organism
Test Aeration :	None	Impaired Control Organisms :	0.0%
Hardness Adjustment :	None	Test Method Deviation(s) :	None

REFERENCE TOXICANT DATA

Toxicant :	Sodium Chloride	Historical Mean LC50 :	6.4 g/L
Date Tested :	2019-09-03	Warning Limits (± 2SD) :	5.8 - 7.2 g/L
LC50 :	6.2 g/L	Organism Batch :	Dm19-17
95% Confidence Limits :	6.0 - 6.4 g/L	Analyst(s) :	MJT, RK
Statistical Method :	Spearman-Kärber		

COMMENTS

All test validity criteria as specified in the test method were satisfied.

Date : 2019-09-09
yyyy-mm-dd

Approved By : *Project Manager*

AQUATOX

TOXICITY TEST REPORT

Daphnia magna

EPS 1/RM/14

Work Order : 240163
Sample Number : 60492

TEST DATA

	pH	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	Temperature (°C)	O_2 Saturation (%)*	Hardness (as $CaCO_3$)
Initial Water Chemistry (100%) :	7.3	10.5	2244	20.0	122	>1000 mg/L

0 HOURS

Date & Time 2019-09-03 14:00
Analyst(s) : KP

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O_2	Conductivity	Temperature	O_2 Saturation (%)*	Hardness
100	A	0	0	7.3	9.9	2244	20.0	115	>1000
100	B	0	0	7.3	9.9	2244	20.0	115	>1000
100	C	0	0	7.3	9.9	2244	20.0	115	>1000
Control	A	0	0	8.5	8.8	780	20.0	100	220
Control	B	0	0	8.5	8.8	780	20.0	100	220
Control	C	0	0	8.5	8.8	780	20.0	100	220

Notes:

24 HOURS

Date & Time 2019-09-04 14:00
Analyst(s) : RK (MJT)

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O_2	Conductivity	Temperature
100	A	–	0	–	–	–	19.0
100	B	–	0	–	–	–	19.0
100	C	–	0	–	–	–	19.0
Control	A	–	0	–	–	–	19.0
Control	B	–	0	–	–	–	19.0
Control	C	–	0	–	–	–	19.0

Notes: Some test organisms in the 100% rep C concentration were floating.

48 HOURS

Date & Time 2019-09-05 14:00
Analyst(s) : KP

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O_2	Conductivity	Temperature
100	A	0	0	7.3	8.5	2268	19.0
100	B	0	0	7.3	8.6	2258	19.0
100	C	0	0	7.4	8.6	2251	19.0
Control	A	0	0	8.5	8.6	798	19.0
Control	B	0	0	8.5	8.6	795	19.0
Control	C	0	0	8.5	8.5	796	19.0

Notes:

Number immobile does not include number dead.

– = not measured/not required
* adjusted for temperature and barometric pressure

Test Data Reviewed By : FS
Date : 2019-09-09

AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

TOXICITY TEST REPORT

Rainbow Trout
EPS 1/RM/13

Work Order : 240163
Sample Number : 60492

SAMPLE IDENTIFICATION

Company :	ALS Laboratory Group, Waterloo	Date Collected :	2019-09-02
Location :	Waterloo ON	Time Collected :	15:15
Job Number :	L2339844	Date Received :	2019-09-03
Substance :	MS-06	Time Received :	11:55
Sampling Method :	Grab	Temperature on Receipt :	9.0 °C
Sampled By :	KB/CP	Date Tested :	2019-09-03
Sample Description :	Clear, light brown, odourless.		

Test Method(s) : Reference Method for Determining Acute Lethality of Liquid Effluents to Rainbow Trout. Environment Canada, EPS 1/RM/13 (2nd Edition, December 2000, with May 2007 and February 2016 amendments).

96-HOUR TEST RESULTS

Substance	Effect	Value
Control	Mean Impairment	0.0 %
	Mean Mortality	0.0 %
100%	Mean Impairment	0.0 %
	Mean Mortality	0.0 %

The results reported relate only to the sample tested and as received.

TEST ORGANISM

Test Organism :	*Oncorhynchus mykiss*	Average Fork Length (± 2 SD) :	41.9 mm (±4.9)
Organism Batch :	T19-16	Range of Fork Lengths :	39 - 47 mm
Control Sample Size :	10	Average Wet Weight (± 2 SD) :	0.61 g (±0.22)
Cumulative stock tank mortality rate :	0% (previous 7 days)	Range of Wet Weights :	0.46 - 0.80 g
Control organisms showing stress :	0 (at test completion)	Organism Loading Rate :	0.3 g/L

TEST CONDITIONS

Sample Treatment :	None	Volume Tested (L) :	20
pH Adjustment :	None	Number of Replicates :	1
Test Aeration :	Yes	Organisms Per Replicate :	10
Pre-aeration/Aeration Rate :	6.5 ± 1 mL/min/L	Organisms Per Test Level :	10
Total Pre-Aeration Time :	120 minutes	Test Method Deviation(s) :	None

REFERENCE TOXICANT DATA

Toxicant :	Potassium Chloride	Date Tested :	2019-09-03
Organism Batch :	T19-16	Historical Mean LC50 :	3760 mg/L
LC50 :	3661 mg/L	Warning Limits (± 2SD) :	3139 - 4503 mg/L
95% Confidence Limits :	3264 - 4089 mg/L	Analyst(s) :	MDH, ALC, KTL, FS
Statistical Method :	Linear Regression (MLE)		

COMMENTS

•All test validity criteria as specified in the test method were satisfied.

Date : 2019-09-09
yyyy-mm-dd

Approved By : *Project Manager*

Work Order : 240163
Sample Number : 60492

TEST DATA

	pH	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	Temperature (°C)	O_2 Saturation (%)*
Initial Water Chemistry (100%) :	6.9	10.3	2368	14.0	108
After 30 min pre-aeration :	6.8	10.1	2365	14.0	106

0 HOURS

Date & Time 2019-09-03 15:45
Analyst(s) : MDH

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature	O_2 Saturation*
100%	0	0	6.7	6.6	2363	14.0	101
Control	0	0	8.1	9.6	927	14.5	100

Notes:

24 HOURS

Date & Time 2019-09-04 15:45
Analyst(s) : FS

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	7.5	–	–	15.0
Control	0	0	–	–	–	15.0

Notes:

48 HOURS

Date & Time 2019-09-05 15:45
Analyst(s) : MDH

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	6.9	–	–	15.0
Control	0	0	8.2	–	–	15.0

Notes:

72 HOURS

Date & Time 2019-09-06 15:45
Analyst(s) : TL

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	6.9	–	–	15.0
Control	0	0	8.2	–	–	15.0

Notes:

96 HOURS

Date & Time 2019-09-07 15:45
Analyst(s) : MDH

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	7.0	9.3	2370	14.5
Control	0	0	8.2	9.3	890	14.5

Notes:

"–" = not measured/not required
Number impaired does not include number dead.
* adjusted for temperature and barometric pressure

Test Data Reviewed By : FS
Date : 2019-09-09

CHAIN OF CUSTODY RECORD

AQUATOX

AquaTox Work Order No: 240163

Shipping Address: AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, Ontario Canada N0B 2J0

Voice: (519) 763-4412 **Fax:** (519) 763-4419

P.O. Number: 4500057496

Field Sampler Name (print): KB/CP

Signature:

Affiliation: Baffinland Iron Mine / ALS Environmental

Sample Storage (prior to shipping):

Custody Relinquished by: Kendra Button

Date/Time Shipped: 2-Sep-19/20:00

Client: ALS Environmental c/o Baffinland Iron Mine

Quote # (2019): 162705399-19

Phone: (519) 886-6910

Fax: (519) 886-9047

Contact: Rick Hawthorne (ALS) / Martina Rendas (Aquatox)

Sample Identification					Analyses Requested									Sample Method and Volume		
Date Collected (yyyy-mm-dd)	Time Collected (e.g. 14:30, 24 hr clock)	Sample Name	AquaTox Sample Number	Temp. on arrival	Rainbow Trout Single Concentration	Rainbow Trout LC50	*Daphnia magna* Single Concentration	*Daphnia magna* LC50	Fathead Minnow Survival & Growth	*Ceriodaphnia dubia* Survival & Reproduction	*Lemna minor* Growth	*Pseudokirchneriella subcapitata* Growth	Other (please specify below)	Grab	Composite	# of Containers and Volume (eg. 2 x 1L, 3 x 10L, etc.)
2019-09-02	15:15	MS-06	604929	9.0°C	✓		✓							✓		2 x 10LCarboy

1L 2339844

For Lab Use Only

Received By: AS/RD

Date: 2019-09-03

Time: 11:55

Storage Location:

Storage Temp.(°C)

Please list any special requests or instructions:

Rush TAT w/ Daily updates. PH required.

Report Distribution: bimcore@alsglobal.com, rick.hawthorne@alsglobal.com

ALS Environmental

L2339844

WATERLOO

Subcontract Request Form

Subcontract To:

AQUATOX TESTING AND CONSULTING
11B NICHOLAS BEAVER ROAD
RR3
GUELPH,ON N1H 6H9

NOTES: Please reference on final report and invoice: PO# *L2339844*
ALS requires QC data to be provided with your final results.

Please see enclosed 1 **sample(s) in** 0 **Container(s)**

SAMPLE NUMBER	ANALYTICAL REQUIRED	DATE SAMPLED / DUE DATE	Priority Flag
L2339844-1 MS-06		9/ 2/ 2019	E
	Special Request Aquatox (SPECIAL REQUEST2-AQT 14)	9/9/2019	
	Special Request Aquatox (SPECIAL REQUEST-AQT 14)	9/9/2019	

Subcontract Info Contact: Mary-Lynn Pike (519) 886-6910
Analysis and reporting info contact: Rick Hawthorne
60 NORTHLAND ROAD, UNIT 1
WATERLOO,ON N2V 2B8
Phone: (519) 886-6910 Email: Rick.Hawthorne@alsglobal.com

Please email confirmation of receipt to: **Rick.Hawthorne@alsglobal.com**

Shipped By: _____ Date Shipped: _____

Received By: _____ Date Received: _____

Verified By: _____ Date Verified: _____

Temperature: _____

Sample Integrity Issues: _____

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

L2339844-COFC

COC Number: 15 -

Page 1 of 1

Report To	Contact and company name below will appear on the final report
Company:	Baffinland Iron Mines Corp.
Contact:	Wiliam Bowden and Connor Devereaux
Phone:	647-253-0596 EXT 6016
	Company address below will appear on the final report
Street:	2275 Upper Middle Rd. E., Suite #300
City/Province:	Oakville, ON
Postal Code:	L6H 0C3
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	
Contact:	

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	bimcore@alsglobal.com
Email 2	bimww@alsglobal.com
Email 3	

Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	ap@baffinland.com
Email 2	commercial@baffinland.com

Project Information	
ALS Account # / Quote #:	23642 /Q42455
Job #:	MS-06 WT TOX
PO / AFE:	4500057496
LSD:	

Oil and Gas Required Fields (client use)	
AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only): L2339844

ALS Contact: **Sampler:** KB/CP

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☐ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
	4 day [P4] ☐		1 Business day [E1] ☑
	3 day [P3] ☐		Same Day, Weekend or Statutory holiday [E0] ☐
	2 day [P2] ☐		

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	BIM-MMER-WT	Group 3	Number of Containers
1	MS-06	2-Sep-19	15:15	Water	E0	E1	11
2	MS-0601	2-Sep-19	15:15	Water	R		9

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human drinking water use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☑ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			8.0		

SHIPMENT RELEASE (client use)		
Released by: Kendra Button	Release Date: 2-Sep-19	Time: 16:40

INITIAL SHIPMENT RECEPTION (lab use only)		
Received by:	Date:	Time:

FINAL SHIPMENT RECEPTION (lab use only)		
Received by:	Date: 3 Sep 19	Time: 1000

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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 specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Baffinland Iron Mine's Corporation (Oakville)
ATTN: William Bowden/Connor Devereaux
2275 Upper Middle Rd. E.
Suite #300
Oakville ON L6H 0C3

Date Received: 12-JUN-19
Report Date: 05-JUL-19 15:58 (MT)
Version: FINAL REV. 2

Client Phone: 647-253-0596

Certificate of Analysis

Lab Work Order #: L2287961

Project P.O. #: 4500057496
Job Reference: MS-08 WT TOX
C of C Numbers:
Legal Site Desc:

Comments:

5-JUL-2019 Job ID MS-08 WT TOX

Rick Hawthorne
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2287961-1 MS-08 Sampled By: KB/BE on 07-JUN-19 @ 22:30 Matrix: WATER							
Physical Tests							
Conductivity	5380		3.0	umhos/cm		12-JUN-19	R4668310
Hardness (as CaCO3)	502		0.50	mg/L		12-JUN-19	
pH	6.43		0.10	pH units		07-JUN-19	R4661705
Total Suspended Solids	20.0		2.0	mg/L		07-JUN-19	R4662055
Total Dissolved Solids	742		20	mg/L		08-JUN-19	R4662058
Turbidity	18.7		0.10	NTU		07-JUN-19	R4661704
Anions and Nutrients							
Acidity (as CaCO3)	632		2.0	mg/L		14-JUN-19	R4670047
Alkalinity, Total (as CaCO3)	<10	NR:PH4	10	mg/L		20-JUN-19	R4678306
Ammonia, Total (as N)	0.405		0.010	mg/L		13-JUN-19	R4668555
Chloride (Cl)	1.98		0.50	mg/L		19-JUN-19	R4674012
Fluoride (F)	0.042		0.020	mg/L		19-JUN-19	R4674012
Nitrate (as N)	186		0.020	mg/L		19-JUN-19	R4674012
Total Kjeldahl Nitrogen	0.63	TKNI	0.15	mg/L	12-JUN-19	13-JUN-19	R4668542
Phosphorus, Total	0.0095		0.0030	mg/L	12-JUN-19	13-JUN-19	R4668512
Sulfate (SO4)	498		0.30	mg/L		19-JUN-19	R4674012
Cyanides							
Cyanide, Total	<0.0020		0.0020	mg/L		12-JUN-19	R4665587
Organic / Inorganic Carbon							
Dissolved Carbon Filtration Location	LAB	PEHR				12-JUN-19	R4660319
Dissolved Organic Carbon	1.75		0.50	mg/L	12-JUN-19	13-JUN-19	R4668327
Total Organic Carbon	1.58		0.50	mg/L		13-JUN-19	R4668329
Total Metals							
Aluminum (Al)-Total	0.605	DLHC	0.050	mg/L	12-JUN-19	12-JUN-19	R4666488
Antimony (Sb)-Total	<0.0010	DLHC	0.0010	mg/L	12-JUN-19	12-JUN-19	R4666488
Arsenic (As)-Total	<0.0010	DLHC	0.0010	mg/L	12-JUN-19	12-JUN-19	R4666488
Barium (Ba)-Total	0.0096	DLHC	0.0010	mg/L	12-JUN-19	12-JUN-19	R4666488
Beryllium (Be)-Total	<0.0010	DLHC	0.0010	mg/L	12-JUN-19	12-JUN-19	R4666488
Bismuth (Bi)-Total	<0.00050	DLHC	0.00050	mg/L	12-JUN-19	12-JUN-19	R4666488
Boron (B)-Total	<0.10	DLHC	0.10	mg/L	12-JUN-19	12-JUN-19	R4666488
Cadmium (Cd)-Total	0.000085	DLHC	0.000050	mg/L	12-JUN-19	12-JUN-19	R4666488
Calcium (Ca)-Total	17.8	DLHC	0.50	mg/L	12-JUN-19	12-JUN-19	R4666488
Cesium (Cs)-Total	<0.00010	DLHC	0.00010	mg/L	12-JUN-19	12-JUN-19	R4666488
Chromium (Cr)-Total	<0.0050	DLHC	0.0050	mg/L	12-JUN-19	12-JUN-19	R4666488
Cobalt (Co)-Total	0.0742	DLHC	0.0010	mg/L	12-JUN-19	12-JUN-19	R4666488
Copper (Cu)-Total	<0.010	DLHC	0.010	mg/L	12-JUN-19	12-JUN-19	R4666488
Iron (Fe)-Total	6.58	DLHC	0.10	mg/L	12-JUN-19	12-JUN-19	R4666488
Lead (Pb)-Total	<0.00050	DLHC	0.00050	mg/L	12-JUN-19	12-JUN-19	R4666488
Lithium (Li)-Total	0.011	DLHC	0.010	mg/L	12-JUN-19	12-JUN-19	R4666488
Magnesium (Mg)-Total	107	DLHC	0.050	mg/L	12-JUN-19	12-JUN-19	R4666488
Manganese (Mn)-Total	3.93	DLHC	0.0050	mg/L	12-JUN-19	12-JUN-19	R4666488
Mercury (Hg)-Total	<0.000010		0.000010	mg/L		12-JUN-19	R4664566

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2287961-1 MS-08 Sampled By: KB/BE on 07-JUN-19 @ 22:30 Matrix: WATER							
Total Metals							
Molybdenum (Mo)-Total	<0.00050	DLHC	0.00050	mg/L	12-JUN-19	12-JUN-19	R4666488
Nickel (Ni)-Total	0.0775	DLHC	0.0050	mg/L	12-JUN-19	12-JUN-19	R4666488
Phosphorus (P)-Total	<0.50	DLHC	0.50	mg/L	12-JUN-19	12-JUN-19	R4666488
Potassium (K)-Total	1.72	DLHC	0.50	mg/L	12-JUN-19	12-JUN-19	R4666488
Rubidium (Rb)-Total	0.0027	DLHC	0.0020	mg/L	12-JUN-19	12-JUN-19	R4666488
Selenium (Se)-Total	0.00112	DLHC	0.00050	mg/L	12-JUN-19	12-JUN-19	R4666488
Silicon (Si)-Total	1.3	DLHC	1.0	mg/L	12-JUN-19	12-JUN-19	R4666488
Silver (Ag)-Total	<0.00050	DLHC	0.00050	mg/L	12-JUN-19	12-JUN-19	R4666488
Sodium (Na)-Total	0.83	DLHC	0.50	mg/L	12-JUN-19	12-JUN-19	R4666488
Strontium (Sr)-Total	0.025	DLHC	0.010	mg/L	12-JUN-19	12-JUN-19	R4666488
Sulfur (S)-Total	162	DLHC	5.0	mg/L	12-JUN-19	12-JUN-19	R4666488
Tellurium (Te)-Total	<0.0020	DLHC	0.0020	mg/L	12-JUN-19	12-JUN-19	R4666488
Thallium (Tl)-Total	<0.00010	DLHC	0.00010	mg/L	12-JUN-19	12-JUN-19	R4666488
Thorium (Th)-Total	<0.0010	DLHC	0.0010	mg/L	12-JUN-19	12-JUN-19	R4666488
Tin (Sn)-Total	<0.0010	DLHC	0.0010	mg/L	12-JUN-19	12-JUN-19	R4666488
Titanium (Ti)-Total	0.0240	DLHC	0.0030	mg/L	12-JUN-19	12-JUN-19	R4666488
Tungsten (W)-Total	<0.0010	DLHC	0.0010	mg/L	12-JUN-19	12-JUN-19	R4666488
Uranium (U)-Total	0.00052	DLHC	0.00010	mg/L	12-JUN-19	12-JUN-19	R4666488
Vanadium (V)-Total	<0.0050	DLHC	0.0050	mg/L	12-JUN-19	12-JUN-19	R4666488
Zinc (Zn)-Total	<0.030	DLHC	0.030	mg/L	12-JUN-19	12-JUN-19	R4666488
Zirconium (Zr)-Total	<0.0020	DLHC	0.0020	mg/L	12-JUN-19	12-JUN-19	R4666488
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					12-JUN-19	R4664219
Dissolved Metals Filtration Location	FIELD					12-JUN-19	R4664206
Aluminum (Al)-Dissolved	0.0086		0.0050	mg/L	12-JUN-19	12-JUN-19	R4664388
Antimony (Sb)-Dissolved	<0.00010		0.00010	mg/L	12-JUN-19	12-JUN-19	R4664388
Arsenic (As)-Dissolved	<0.00010		0.00010	mg/L	12-JUN-19	12-JUN-19	R4664388
Barium (Ba)-Dissolved	0.00694		0.00010	mg/L	12-JUN-19	12-JUN-19	R4664388
Beryllium (Be)-Dissolved	<0.00010		0.00010	mg/L	12-JUN-19	12-JUN-19	R4664388
Bismuth (Bi)-Dissolved	<0.000050		0.000050	mg/L	12-JUN-19	12-JUN-19	R4664388
Boron (B)-Dissolved	0.011		0.010	mg/L	12-JUN-19	12-JUN-19	R4664388
Cadmium (Cd)-Dissolved	0.0000918		0.0000050	mg/L	12-JUN-19	12-JUN-19	R4664388
Calcium (Ca)-Dissolved	19.2		0.050	mg/L	12-JUN-19	12-JUN-19	R4664388
Cesium (Cs)-Dissolved	<0.000010		0.000010	mg/L	12-JUN-19	12-JUN-19	R4664388
Chromium (Cr)-Dissolved	<0.00050		0.00050	mg/L	12-JUN-19	12-JUN-19	R4664388
Cobalt (Co)-Dissolved	0.0724		0.00010	mg/L	12-JUN-19	12-JUN-19	R4664388
Copper (Cu)-Dissolved	0.00074		0.00020	mg/L	12-JUN-19	12-JUN-19	R4664388
Iron (Fe)-Dissolved	4.70		0.010	mg/L	12-JUN-19	12-JUN-19	R4664388
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L	12-JUN-19	12-JUN-19	R4664388
Lithium (Li)-Dissolved	0.0074		0.0010	mg/L	12-JUN-19	12-JUN-19	R4664388
Magnesium (Mg)-Dissolved	110	DLHC	0.050	mg/L	12-JUN-19	12-JUN-19	R4664388

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2287961-1 MS-08 Sampled By: KB/BE on 07-JUN-19 @ 22:30 Matrix: WATER							
Dissolved Metals							
Manganese (Mn)-Dissolved	3.91	DLHC	0.0050	mg/L	12-JUN-19	12-JUN-19	R4664388
Mercury (Hg)-Dissolved	<0.000010		0.000010	mg/L	12-JUN-19	12-JUN-19	R4664592
Molybdenum (Mo)-Dissolved	0.000194		0.000050	mg/L	12-JUN-19	12-JUN-19	R4664388
Nickel (Ni)-Dissolved	0.0748		0.00050	mg/L	12-JUN-19	12-JUN-19	R4664388
Phosphorus (P)-Dissolved	<0.050		0.050	mg/L	12-JUN-19	12-JUN-19	R4664388
Potassium (K)-Dissolved	1.70		0.050	mg/L	12-JUN-19	12-JUN-19	R4664388
Rubidium (Rb)-Dissolved	0.00170		0.00020	mg/L	12-JUN-19	12-JUN-19	R4664388
Selenium (Se)-Dissolved	0.00147		0.000050	mg/L	12-JUN-19	12-JUN-19	R4664388
Silicon (Si)-Dissolved	0.466		0.050	mg/L	12-JUN-19	12-JUN-19	R4664388
Silver (Ag)-Dissolved	<0.000050		0.000050	mg/L	12-JUN-19	12-JUN-19	R4664388
Sodium (Na)-Dissolved	0.875		0.050	mg/L	12-JUN-19	12-JUN-19	R4664388
Strontium (Sr)-Dissolved	0.0259		0.0010	mg/L	12-JUN-19	12-JUN-19	R4664388
Sulfur (S)-Dissolved	173		0.50	mg/L	12-JUN-19	12-JUN-19	R4664388
Tellurium (Te)-Dissolved	<0.00020		0.00020	mg/L	12-JUN-19	12-JUN-19	R4664388
Thallium (Tl)-Dissolved	0.000019		0.000010	mg/L	12-JUN-19	12-JUN-19	R4664388
Thorium (Th)-Dissolved	<0.00010		0.00010	mg/L	12-JUN-19	12-JUN-19	R4664388
Tin (Sn)-Dissolved	<0.00010		0.00010	mg/L	12-JUN-19	12-JUN-19	R4664388
Titanium (Ti)-Dissolved	<0.00030		0.00030	mg/L	12-JUN-19	12-JUN-19	R4664388
Tungsten (W)-Dissolved	<0.00010		0.00010	mg/L	12-JUN-19	12-JUN-19	R4664388
Uranium (U)-Dissolved	0.000156		0.000010	mg/L	12-JUN-19	12-JUN-19	R4664388
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L	12-JUN-19	12-JUN-19	R4664388
Zinc (Zn)-Dissolved	0.0124		0.0010	mg/L	12-JUN-19	12-JUN-19	R4664388
Zirconium (Zr)-Dissolved	<0.00020		0.00020	mg/L	12-JUN-19	12-JUN-19	R4664388
Radiological Parameters							
Ra-226	<0.0093		0.0093	Bq/L	18-JUN-19	26-JUN-19	R4653808
Report Remarks : Sample received/analyzed by JS June 8, 2019							

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

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2287961-1
Matrix Spike	Cobalt (Co)-Dissolved	MS-B	L2287961-1
Matrix Spike	Iron (Fe)-Dissolved	MS-B	L2287961-1
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2287961-1
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L2287961-1
Matrix Spike	Nickel (Ni)-Dissolved	MS-B	L2287961-1
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2287961-1
Matrix Spike	Sulfur (S)-Dissolved	MS-B	L2287961-1
Matrix Spike	Aluminum (Al)-Total	MS-B	L2287961-1
Matrix Spike	Calcium (Ca)-Total	MS-B	L2287961-1
Matrix Spike	Cobalt (Co)-Total	MS-B	L2287961-1
Matrix Spike	Iron (Fe)-Total	MS-B	L2287961-1
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2287961-1
Matrix Spike	Manganese (Mn)-Total	MS-B	L2287961-1
Matrix Spike	Nickel (Ni)-Total	MS-B	L2287961-1
Matrix Spike	Silicon (Si)-Total	MS-B	L2287961-1
Matrix Spike	Strontium (Sr)-Total	MS-B	L2287961-1
Matrix Spike	Sulfur (S)-Total	MS-B	L2287961-1
Matrix Spike	Titanium (Ti)-Total	MS-B	L2287961-1
Matrix Spike	Uranium (U)-Total	MS-B	L2287961-1
Matrix Spike	Ammonia, Total (as N)	MS-B	L2287961-1
Matrix Spike	Total Kjeldahl Nitrogen	MS-B	L2287961-1

Sample Parameter Qualifier key listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
NR:PH4	No Result: No Alkalinity, pH Of Sample <4.5
PEHR	Parameter Exceeded Recommended Holding Time On Receipt: Proceed With Analysis As Requested.
TKNI	TKN result may be biased low due to Nitrate interference. Nitrate-N is > 10x TKN.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACY-TITR-TB	Water	Acidity	APHA 2310 B modified

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

ALK-WT	Water	Alkalinity, Total (as CaCO3)	EPA 310.2

This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.

CL-IC-N-WT	Water	Chloride by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

CN-TOT-WT	Water	Cyanide, Total	ISO 14403-2

Total cyanide is determined by the combination of UV digestion and distillation. Cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

When using this method, high levels of thiocyanate in samples can cause false positives at ~1-2% of the thiocyanate concentration. For samples with detectable cyanide analyzed by this method, ALS recommends analysis for thiocyanate to check for this potential interference

DOC-WT	Water	Dissolved Organic Carbon	APHA 5310B

Sample is filtered through a 0.45um filter, then injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic carbon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.

EC-SCREEN-WT	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

Reference Information

EC-WT	Water	Conductivity	APHA 2510 B

Water samples can be measured directly by immersing the conductivity cell into the sample.

F-IC-N-WT	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-WT	Water	Hardness	APHA 2340 B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-WT	Water	Dissolved Mercury in Water by CVAAS	EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

HG-T-CVAA-WT	Water	Total Mercury in Water by CVAAS	EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

MET-D-CCMS-WT	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

MET-T-CCMS-WT	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

NH3-F-WT	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO3-IC-WT	Water	Nitrate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-COL-WT	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is deteremined colourimetrically after persulphate digestion of the sample.

PH-BF	Water	pH	APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

RA226-MMER-FC	Water	Ra226 by Alpha Scint, MDC=0.01 Bq/L	EPA 903.1
SO4-IC-N-WT	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-BF	Water	Total Dissolved Solids	APHA 2540C

A well-mixed sample is filtered though glass fibres filter. A known volume of the filtrate is evaporated and dried at 180 +/- 2C for 1hr.

SOLIDS-TSS-BF	Water	Suspended solids	APHA 2540 D-Gravimetric

A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104 +/- 1C for a minimum of four hours or until a constant weight is achieved.

TKN-WT	Water	Total Kjeldahl Nitrogen	APHA 4500-Norg D

This analysis is carried out using procedures adapted from APHA Method 4500-Norg "Nitrogen (Organic)". Total Kjeldahl Nitrogen is determined by sample digestion at 380 Celsius with analysis using an automated colorimetric method.

TOC-WT	Water	Total Organic Carbon	APHA 5310B

Reference Information

Sample is injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic cabon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.

TURBIDITY-BF Water Turbidity APHA 2130 B

Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.

** 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
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA
FC	ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
TB	ALS ENVIRONMENTAL - THUNDER BAY, ONTARIO, CANADA
BF	ALS ENVIRONMENTAL - BAFFIN ISLAND, NUNAVUT, 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 weight of sample
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

Workorder: L2287961 Report Date: 05-JUL-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACY-TITR-TB	**Water**							
Batch R4670047								
WG3077078-2 LCS								
Acidity (as CaCO3)			98.6		%		85-115	14-JUN-19
WG3077078-1 MB								
Acidity (as CaCO3)			<2.0		mg/L		2	14-JUN-19
CL-IC-N-WT	**Water**							
Batch R4674012								
WG3081366-4 DUP		**WG3081366-3**						
Chloride (Cl)		52.0	51.9		mg/L	0.2	20	19-JUN-19
WG3081366-2 LCS								
Chloride (Cl)			101.5		%		90-110	19-JUN-19
WG3081366-1 MB								
Chloride (Cl)			<0.50		mg/L		0.5	19-JUN-19
WG3081366-5 MS		**WG3081366-3**						
Chloride (Cl)			102.5		%		75-125	19-JUN-19
CN-TOT-WT	**Water**							
Batch R4665587								
WG3074895-7 DUP		**L2287875-5**						
Cyanide, Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	12-JUN-19
WG3074895-6 LCS								
Cyanide, Total			89.7		%		80-120	12-JUN-19
WG3074895-5 MB								
Cyanide, Total			<0.0020		mg/L		0.002	12-JUN-19
WG3074895-8 MS		**L2287875-5**						
Cyanide, Total			121.8		%		70-130	12-JUN-19
DOC-WT	**Water**							
Batch R4668327								
WG3069770-3 DUP		**L2287922-1**						
Dissolved Organic Carbon		3.17	3.59		mg/L	13	25	13-JUN-19
WG3069770-2 LCS								
Dissolved Organic Carbon			101.8		%		70-130	13-JUN-19
WG3069770-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	13-JUN-19
WG3069770-4 MS		**L2287922-1**						
Dissolved Organic Carbon			99.2		%		70-130	13-JUN-19
F-IC-N-WT	**Water**							

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F-IC-N-WT	**Water**							
Batch R4674012								
WG3081366-4 DUP		**WG3081366-3**						
Fluoride (F)		0.280	0.282		mg/L	0.7	20	19-JUN-19
WG3081366-2 LCS								
Fluoride (F)			101.8		%		90-110	19-JUN-19
WG3081366-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	19-JUN-19
WG3081366-5 MS		**WG3081366-3**						
Fluoride (F)			103.7		%		75-125	19-JUN-19
HG-D-CVAA-WT	**Water**							
Batch R4664592								
WG3074749-4 DUP		**WG3074749-3**						
Mercury (Hg)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	12-JUN-19
WG3074749-2 LCS								
Mercury (Hg)-Dissolved			96.9		%		80-120	12-JUN-19
WG3074749-1 MB								
Mercury (Hg)-Dissolved			<0.000010		mg/L		0.00001	12-JUN-19
WG3074749-6 MS		**WG3074749-5**						
Mercury (Hg)-Dissolved			89.7		%		70-130	12-JUN-19
HG-T-CVAA-WT	**Water**							
Batch R4664566								
WG3074747-3 DUP		**L2288792-1**						
Mercury (Hg)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	12-JUN-19
WG3074747-2 LCS								
Mercury (Hg)-Total			96.4		%		80-120	12-JUN-19
WG3074747-1 MB								
Mercury (Hg)-Total			<0.000010		mg/L		0.00001	12-JUN-19
WG3074747-4 MS		**L2288792-2**						
Mercury (Hg)-Total			90.1		%		70-130	12-JUN-19
MET-D-CCMS-WT	**Water**							
Batch R4664388								
WG3074716-4 DUP		**WG3074716-3**						
Aluminum (Al)-Dissolved		0.0086	0.0089		mg/L	3.1	20	12-JUN-19
Antimony (Sb)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	12-JUN-19
Arsenic (As)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	12-JUN-19
Barium (Ba)-Dissolved		0.00694	0.00684		mg/L	1.4	20	12-JUN-19
Beryllium (Be)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	12-JUN-19
Bismuth (Bi)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	12-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4664388								
WG3074716-4 DUP		**WG3074716-3**						
Boron (B)-Dissolved		0.011	0.011		mg/L	3.8	20	12-JUN-19
Cadmium (Cd)-Dissolved		0.0000918	0.0000920		mg/L	0.2	20	12-JUN-19
Calcium (Ca)-Dissolved		19.2	18.5		mg/L	3.3	20	12-JUN-19
Cesium (Cs)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	12-JUN-19
Chromium (Cr)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	12-JUN-19
Cobalt (Co)-Dissolved		0.0724	0.0722		mg/L	0.2	20	12-JUN-19
Copper (Cu)-Dissolved		0.00074	0.00069		mg/L	6.2	20	12-JUN-19
Iron (Fe)-Dissolved		4.70	4.66		mg/L	1.0	20	12-JUN-19
Lead (Pb)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	12-JUN-19
Lithium (Li)-Dissolved		0.0074	0.0067		mg/L	9.6	20	12-JUN-19
Magnesium (Mg)-Dissolved		110	107		mg/L	3.0	20	12-JUN-19
Manganese (Mn)-Dissolved		3.91	4.05		mg/L	3.6	20	12-JUN-19
Molybdenum (Mo)-Dissolved		0.000194	0.000200		mg/L	2.9	20	12-JUN-19
Nickel (Ni)-Dissolved		0.0748	0.0744		mg/L	0.5	20	12-JUN-19
Phosphorus (P)-Dissolved		<0.050	<0.050	RPD-NA	mg/L	N/A	20	12-JUN-19
Potassium (K)-Dissolved		1.70	1.64		mg/L	3.8	20	12-JUN-19
Rubidium (Rb)-Dissolved		0.00170	0.00177		mg/L	4.0	20	12-JUN-19
Selenium (Se)-Dissolved		0.00147	0.00136		mg/L	7.8	20	12-JUN-19
Silicon (Si)-Dissolved		0.466	0.461		mg/L	0.9	20	12-JUN-19
Silver (Ag)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	12-JUN-19
Sodium (Na)-Dissolved		0.875	0.849		mg/L	3.1	20	12-JUN-19
Strontium (Sr)-Dissolved		0.0259	0.0265		mg/L	2.5	20	12-JUN-19
Sulfur (S)-Dissolved		173	166		mg/L	4.1	20	12-JUN-19
Tellurium (Te)-Dissolved		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	12-JUN-19
Thallium (Tl)-Dissolved		0.000019	0.000020		mg/L	5.6	20	12-JUN-19
Thorium (Th)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	12-JUN-19
Tin (Sn)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	12-JUN-19
Titanium (Ti)-Dissolved		<0.00030	<0.00030	RPD-NA	mg/L	N/A	20	12-JUN-19
Tungsten (W)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	12-JUN-19
Uranium (U)-Dissolved		0.000156	0.000165		mg/L	5.2	20	12-JUN-19
Vanadium (V)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	12-JUN-19
Zinc (Zn)-Dissolved		0.0124	0.0119		mg/L	4.7	20	12-JUN-19
Zirconium (Zr)-Dissolved		<0.00020	<0.00020		mg/L			12-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4664388								
WG3074716-4 DUP		**WG3074716-3**						
Zirconium (Zr)-Dissolved		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	12-JUN-19
WG3074716-2 LCS								
Aluminum (Al)-Dissolved			98.0		%		80-120	12-JUN-19
Antimony (Sb)-Dissolved			99.4		%		80-120	12-JUN-19
Arsenic (As)-Dissolved			98.5		%		80-120	12-JUN-19
Barium (Ba)-Dissolved			96.0		%		80-120	12-JUN-19
Beryllium (Be)-Dissolved			100.5		%		80-120	12-JUN-19
Bismuth (Bi)-Dissolved			98.9		%		80-120	12-JUN-19
Boron (B)-Dissolved			95.7		%		80-120	12-JUN-19
Cadmium (Cd)-Dissolved			100.8		%		80-120	12-JUN-19
Calcium (Ca)-Dissolved			101.1		%		80-120	12-JUN-19
Cesium (Cs)-Dissolved			98.8		%		80-120	12-JUN-19
Chromium (Cr)-Dissolved			97.0		%		80-120	12-JUN-19
Cobalt (Co)-Dissolved			98.7		%		80-120	12-JUN-19
Copper (Cu)-Dissolved			96.9		%		80-120	12-JUN-19
Iron (Fe)-Dissolved			95.0		%		80-120	12-JUN-19
Lead (Pb)-Dissolved			99.2		%		80-120	12-JUN-19
Lithium (Li)-Dissolved			99.8		%		80-120	12-JUN-19
Magnesium (Mg)-Dissolved			98.3		%		80-120	12-JUN-19
Manganese (Mn)-Dissolved			96.0		%		80-120	12-JUN-19
Molybdenum (Mo)-Dissolved			97.4		%		80-120	12-JUN-19
Nickel (Ni)-Dissolved			97.6		%		80-120	12-JUN-19
Phosphorus (P)-Dissolved			105.1		%		80-120	12-JUN-19
Potassium (K)-Dissolved			98.7		%		80-120	12-JUN-19
Rubidium (Rb)-Dissolved			97.4		%		80-120	12-JUN-19
Selenium (Se)-Dissolved			98.4		%		80-120	12-JUN-19
Silicon (Si)-Dissolved			98.1		%		60-140	12-JUN-19
Silver (Ag)-Dissolved			96.5		%		80-120	12-JUN-19
Sodium (Na)-Dissolved			100.9		%		80-120	12-JUN-19
Strontium (Sr)-Dissolved			96.2		%		80-120	12-JUN-19
Sulfur (S)-Dissolved			99.2		%		80-120	12-JUN-19
Tellurium (Te)-Dissolved			93.2		%		80-120	12-JUN-19
Thallium (Tl)-Dissolved			97.6		%		80-120	12-JUN-19
Thorium (Th)-Dissolved			95.9		%		80-120	12-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4664388								
WG3074716-2 LCS								
Tin (Sn)-Dissolved			96.5		%		80-120	12-JUN-19
Titanium (Ti)-Dissolved			98.2		%		80-120	12-JUN-19
Tungsten (W)-Dissolved			96.9		%		80-120	12-JUN-19
Uranium (U)-Dissolved			97.2		%		80-120	12-JUN-19
Vanadium (V)-Dissolved			99.4		%		80-120	12-JUN-19
Zinc (Zn)-Dissolved			96.5		%		80-120	12-JUN-19
Zirconium (Zr)-Dissolved			96.3		%		80-120	12-JUN-19
WG3074716-1 MB								
Aluminum (Al)-Dissolved			<0.0050		mg/L		0.005	12-JUN-19
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	12-JUN-19
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	12-JUN-19
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	12-JUN-19
Beryllium (Be)-Dissolved			<0.00010		mg/L		0.0001	12-JUN-19
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	12-JUN-19
Boron (B)-Dissolved			<0.010		mg/L		0.01	12-JUN-19
Cadmium (Cd)-Dissolved			<0.000005(		mg/L		0.000005	12-JUN-19
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	12-JUN-19
Cesium (Cs)-Dissolved			<0.000010		mg/L		0.00001	12-JUN-19
Chromium (Cr)-Dissolved			<0.00050		mg/L		0.0005	12-JUN-19
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	12-JUN-19
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	12-JUN-19
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	12-JUN-19
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	12-JUN-19
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	12-JUN-19
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	12-JUN-19
Manganese (Mn)-Dissolved			<0.00050		mg/L		0.0005	12-JUN-19
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	12-JUN-19
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	12-JUN-19
Phosphorus (P)-Dissolved			<0.050		mg/L		0.05	12-JUN-19
Potassium (K)-Dissolved			<0.050		mg/L		0.05	12-JUN-19
Rubidium (Rb)-Dissolved			<0.00020		mg/L		0.0002	12-JUN-19
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	12-JUN-19
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	12-JUN-19
Silver (Ag)-Dissolved			<0.000050		mg/L		0.00005	12-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4664388								
WG3074716-1 MB								
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	12-JUN-19
Strontium (Sr)-Dissolved			<0.0010		mg/L		0.001	12-JUN-19
Sulfur (S)-Dissolved			<0.50		mg/L		0.5	12-JUN-19
Tellurium (Te)-Dissolved			<0.00020		mg/L		0.0002	12-JUN-19
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	12-JUN-19
Thorium (Th)-Dissolved			<0.00010		mg/L		0.0001	12-JUN-19
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	12-JUN-19
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	12-JUN-19
Tungsten (W)-Dissolved			<0.00010		mg/L		0.0001	12-JUN-19
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	12-JUN-19
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	12-JUN-19
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	12-JUN-19
Zirconium (Zr)-Dissolved			<0.00020		mg/L		0.0002	12-JUN-19
WG3074716-5 MS		**WG3074716-3**						
Aluminum (Al)-Dissolved			89.0		%		70-130	12-JUN-19
Antimony (Sb)-Dissolved			95.5		%		70-130	12-JUN-19
Arsenic (As)-Dissolved			104.4		%		70-130	12-JUN-19
Barium (Ba)-Dissolved			91.2		%		70-130	12-JUN-19
Beryllium (Be)-Dissolved			94.7		%		70-130	12-JUN-19
Bismuth (Bi)-Dissolved			88.9		%		70-130	12-JUN-19
Boron (B)-Dissolved			83.8		%		70-130	12-JUN-19
Cadmium (Cd)-Dissolved			103.7		%		70-130	12-JUN-19
Calcium (Ca)-Dissolved			N/A	MS-B	%		-	12-JUN-19
Cesium (Cs)-Dissolved			102.8		%		70-130	12-JUN-19
Chromium (Cr)-Dissolved			95.9		%		70-130	12-JUN-19
Cobalt (Co)-Dissolved			N/A	MS-B	%		-	12-JUN-19
Copper (Cu)-Dissolved			95.5		%		70-130	12-JUN-19
Iron (Fe)-Dissolved			N/A	MS-B	%		-	12-JUN-19
Lead (Pb)-Dissolved			97.3		%		70-130	12-JUN-19
Lithium (Li)-Dissolved			86.4		%		70-130	12-JUN-19
Magnesium (Mg)-Dissolved			N/A	MS-B	%		-	12-JUN-19
Manganese (Mn)-Dissolved			N/A	MS-B	%		-	12-JUN-19
Molybdenum (Mo)-Dissolved			98.4		%		70-130	12-JUN-19
Nickel (Ni)-Dissolved			N/A	MS-B	%		-	12-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4664388								
WG3074716-5 MS		**WG3074716-3**						
Phosphorus (P)-Dissolved			107.9		%		70-130	12-JUN-19
Potassium (K)-Dissolved			87.7		%		70-130	12-JUN-19
Rubidium (Rb)-Dissolved			102.0		%		70-130	12-JUN-19
Selenium (Se)-Dissolved			120.9		%		70-130	12-JUN-19
Silicon (Si)-Dissolved			90.1		%		70-130	12-JUN-19
Silver (Ag)-Dissolved			84.7		%		70-130	12-JUN-19
Sodium (Na)-Dissolved			97.0		%		70-130	12-JUN-19
Strontium (Sr)-Dissolved			N/A	MS-B	%		-	12-JUN-19
Sulfur (S)-Dissolved			N/A	MS-B	%		-	12-JUN-19
Tellurium (Te)-Dissolved			102.4		%		70-130	12-JUN-19
Thallium (Tl)-Dissolved			99.1		%		70-130	12-JUN-19
Thorium (Th)-Dissolved			97.3		%		70-130	12-JUN-19
Tin (Sn)-Dissolved			96.9		%		70-130	12-JUN-19
Titanium (Ti)-Dissolved			96.6		%		70-130	12-JUN-19
Tungsten (W)-Dissolved			96.8		%		70-130	12-JUN-19
Uranium (U)-Dissolved			96.5		%		70-130	12-JUN-19
Vanadium (V)-Dissolved			99.3		%		70-130	12-JUN-19
Zinc (Zn)-Dissolved			94.2		%		70-130	12-JUN-19
Zirconium (Zr)-Dissolved			95.6		%		70-130	12-JUN-19
MET-T-CCMS-WT	**Water**							
Batch R4666488								
WG3074728-4 DUP		**WG3074728-3**						
Aluminum (Al)-Total		0.605	0.700		mg/L	15	20	12-JUN-19
Antimony (Sb)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	12-JUN-19
Arsenic (As)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	12-JUN-19
Barium (Ba)-Total		0.0096	0.0100		mg/L	4.7	20	12-JUN-19
Beryllium (Be)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	12-JUN-19
Bismuth (Bi)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	12-JUN-19
Boron (B)-Total		<0.10	<0.10	RPD-NA	mg/L	N/A	20	12-JUN-19
Cadmium (Cd)-Total		0.000085	0.000101		mg/L	17	20	12-JUN-19
Calcium (Ca)-Total		17.8	17.9		mg/L	0.6	20	12-JUN-19
Chromium (Cr)-Total		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	12-JUN-19
Cesium (Cs)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	12-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4666488								
WG3074728-4 DUP		**WG3074728-3**						
Cobalt (Co)-Total		0.0742	0.0743		mg/L	0.2	20	12-JUN-19
Copper (Cu)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	12-JUN-19
Iron (Fe)-Total		6.58	6.79		mg/L	3.2	20	12-JUN-19
Lead (Pb)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	12-JUN-19
Lithium (Li)-Total		0.011	0.011		mg/L	4.5	20	12-JUN-19
Magnesium (Mg)-Total		107	108		mg/L	0.4	20	12-JUN-19
Manganese (Mn)-Total		3.93	3.95		mg/L	0.6	20	12-JUN-19
Molybdenum (Mo)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	12-JUN-19
Nickel (Ni)-Total		0.0775	0.0784		mg/L	1.1	20	12-JUN-19
Phosphorus (P)-Total		<0.50	<0.50	RPD-NA	mg/L	N/A	20	12-JUN-19
Potassium (K)-Total		1.72	1.80		mg/L	4.5	20	12-JUN-19
Rubidium (Rb)-Total		0.0027	0.0031		mg/L	12	20	12-JUN-19
Selenium (Se)-Total		0.00112	0.00119		mg/L	5.5	20	12-JUN-19
Silicon (Si)-Total		1.3	1.5		mg/L	13	20	12-JUN-19
Silver (Ag)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	12-JUN-19
Sodium (Na)-Total		0.83	0.84		mg/L	0.6	20	12-JUN-19
Strontium (Sr)-Total		0.025	0.025		mg/L	0.9	20	12-JUN-19
Sulfur (S)-Total		162	164		mg/L	0.9	25	12-JUN-19
Thallium (Tl)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	12-JUN-19
Tellurium (Te)-Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	12-JUN-19
Thorium (Th)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	25	12-JUN-19
Tin (Sn)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	12-JUN-19
Titanium (Ti)-Total		0.0240	0.0290		mg/L	19	20	12-JUN-19
Tungsten (W)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	12-JUN-19
Uranium (U)-Total		0.00052	0.00051		mg/L	2.3	20	12-JUN-19
Vanadium (V)-Total		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	12-JUN-19
Zinc (Zn)-Total		<0.030	<0.030	RPD-NA	mg/L	N/A	20	12-JUN-19
Zirconium (Zr)-Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	12-JUN-19
WG3074728-2 LCS								
Aluminum (Al)-Total			96.1		%		80-120	12-JUN-19
Antimony (Sb)-Total			97.5		%		80-120	12-JUN-19
Arsenic (As)-Total			94.9		%		80-120	12-JUN-19
Barium (Ba)-Total			96.0		%		80-120	12-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4666488								
WG3074728-2 LCS								
Beryllium (Be)-Total			93.8		%		80-120	12-JUN-19
Bismuth (Bi)-Total			93.6		%		80-120	12-JUN-19
Boron (B)-Total			87.0		%		80-120	12-JUN-19
Cadmium (Cd)-Total			94.8		%		80-120	12-JUN-19
Calcium (Ca)-Total			92.2		%		80-120	12-JUN-19
Chromium (Cr)-Total			96.2		%		80-120	12-JUN-19
Cesium (Cs)-Total			94.3		%		80-120	12-JUN-19
Cobalt (Co)-Total			94.5		%		80-120	12-JUN-19
Copper (Cu)-Total			94.3		%		80-120	12-JUN-19
Iron (Fe)-Total			97.2		%		80-120	12-JUN-19
Lead (Pb)-Total			94.2		%		80-120	12-JUN-19
Lithium (Li)-Total			93.8		%		80-120	12-JUN-19
Magnesium (Mg)-Total			96.7		%		80-120	12-JUN-19
Manganese (Mn)-Total			95.3		%		80-120	12-JUN-19
Molybdenum (Mo)-Total			97.0		%		80-120	12-JUN-19
Nickel (Ni)-Total			94.5		%		80-120	12-JUN-19
Phosphorus (P)-Total			104.4		%		70-130	12-JUN-19
Potassium (K)-Total			95.5		%		80-120	12-JUN-19
Rubidium (Rb)-Total			95.6		%		80-120	12-JUN-19
Selenium (Se)-Total			92.3		%		80-120	12-JUN-19
Silicon (Si)-Total			96.8		%		60-140	12-JUN-19
Silver (Ag)-Total			95.6		%		80-120	12-JUN-19
Sodium (Na)-Total			95.1		%		80-120	12-JUN-19
Strontium (Sr)-Total			93.7		%		80-120	12-JUN-19
Sulfur (S)-Total			97.1		%		80-120	12-JUN-19
Thallium (Tl)-Total			93.1		%		80-120	12-JUN-19
Tellurium (Te)-Total			90.3		%		80-120	12-JUN-19
Thorium (Th)-Total			92.8		%		70-130	12-JUN-19
Tin (Sn)-Total			94.2		%		80-120	12-JUN-19
Titanium (Ti)-Total			93.8		%		80-120	12-JUN-19
Tungsten (W)-Total			94.6		%		80-120	12-JUN-19
Uranium (U)-Total			92.8		%		80-120	12-JUN-19
Vanadium (V)-Total			95.8		%		80-120	12-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4666488								
WG3074728-2 LCS								
Zinc (Zn)-Total			94.6		%		80-120	12-JUN-19
Zirconium (Zr)-Total			93.5		%		80-120	12-JUN-19
WG3074728-1 MB								
Aluminum (Al)-Total			<0.0050		mg/L		0.005	12-JUN-19
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	12-JUN-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	12-JUN-19
Barium (Ba)-Total			<0.00010		mg/L		0.0001	12-JUN-19
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	12-JUN-19
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	12-JUN-19
Boron (B)-Total			<0.010		mg/L		0.01	12-JUN-19
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	12-JUN-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	12-JUN-19
Chromium (Cr)-Total			<0.00050		mg/L		0.0005	12-JUN-19
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	12-JUN-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	12-JUN-19
Copper (Cu)-Total			<0.0010		mg/L		0.001	12-JUN-19
Iron (Fe)-Total			<0.010		mg/L		0.01	12-JUN-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	12-JUN-19
Lithium (Li)-Total			<0.0010		mg/L		0.001	12-JUN-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	12-JUN-19
Manganese (Mn)-Total			<0.00050		mg/L		0.0005	12-JUN-19
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	12-JUN-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	12-JUN-19
Phosphorus (P)-Total			<0.050		mg/L		0.05	12-JUN-19
Potassium (K)-Total			<0.050		mg/L		0.05	12-JUN-19
Rubidium (Rb)-Total			<0.00020		mg/L		0.0002	12-JUN-19
Selenium (Se)-Total			<0.000050		mg/L		0.00005	12-JUN-19
Silicon (Si)-Total			<0.10		mg/L		0.1	12-JUN-19
Silver (Ag)-Total			<0.000050		mg/L		0.00005	12-JUN-19
Sodium (Na)-Total			<0.050		mg/L		0.05	12-JUN-19
Strontium (Sr)-Total			<0.0010		mg/L		0.001	12-JUN-19
Sulfur (S)-Total			<0.50		mg/L		0.5	12-JUN-19
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	12-JUN-19
Tellurium (Te)-Total			<0.00020		mg/L		0.0002	12-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4666488								
WG3074728-1 MB								
Thorium (Th)-Total			<0.00010		mg/L		0.0001	12-JUN-19
Tin (Sn)-Total			<0.00010		mg/L		0.0001	12-JUN-19
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	12-JUN-19
Tungsten (W)-Total			<0.00010		mg/L		0.0001	12-JUN-19
Uranium (U)-Total			<0.000010		mg/L		0.00001	12-JUN-19
Vanadium (V)-Total			<0.00050		mg/L		0.0005	12-JUN-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	12-JUN-19
Zirconium (Zr)-Total			<0.00020		mg/L		0.0002	12-JUN-19
WG3074728-5 MS		**WG3074728-3**						
Aluminum (Al)-Total			N/A	MS-B	%		-	12-JUN-19
Antimony (Sb)-Total			95.2		%		70-130	12-JUN-19
Arsenic (As)-Total			94.7		%		70-130	12-JUN-19
Barium (Ba)-Total			97.3		%		70-130	12-JUN-19
Beryllium (Be)-Total			94.6		%		70-130	12-JUN-19
Bismuth (Bi)-Total			96.5		%		70-130	12-JUN-19
Boron (B)-Total			92.1		%		70-130	12-JUN-19
Cadmium (Cd)-Total			91.2		%		70-130	12-JUN-19
Calcium (Ca)-Total			N/A	MS-B	%		-	12-JUN-19
Chromium (Cr)-Total			94.9		%		70-130	12-JUN-19
Cesium (Cs)-Total			95.2		%		70-130	12-JUN-19
Cobalt (Co)-Total			N/A	MS-B	%		-	12-JUN-19
Copper (Cu)-Total			90.9		%		70-130	12-JUN-19
Iron (Fe)-Total			N/A	MS-B	%		-	12-JUN-19
Lead (Pb)-Total			96.3		%		70-130	12-JUN-19
Lithium (Li)-Total			94.7		%		70-130	12-JUN-19
Magnesium (Mg)-Total			N/A	MS-B	%		-	12-JUN-19
Manganese (Mn)-Total			N/A	MS-B	%		-	12-JUN-19
Molybdenum (Mo)-Total			94.9		%		70-130	12-JUN-19
Nickel (Ni)-Total			N/A	MS-B	%		-	12-JUN-19
Phosphorus (P)-Total			102.2		%		70-130	12-JUN-19
Potassium (K)-Total			91.7		%		70-130	12-JUN-19
Rubidium (Rb)-Total			105.3		%		70-130	12-JUN-19
Selenium (Se)-Total			90.7		%		70-130	12-JUN-19
Silicon (Si)-Total			N/A	MS-B	%		-	12-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4666488								
WG3074728-5 MS		**WG3074728-3**						
Silver (Ag)-Total			92.2		%		70-130	12-JUN-19
Sodium (Na)-Total			87.1		%		70-130	12-JUN-19
Strontium (Sr)-Total			N/A	MS-B	%		-	12-JUN-19
Sulfur (S)-Total			N/A	MS-B	%		-	12-JUN-19
Thallium (Tl)-Total			95.6		%		70-130	12-JUN-19
Tellurium (Te)-Total			99.9		%		70-130	12-JUN-19
Thorium (Th)-Total			91.2		%		70-130	12-JUN-19
Tin (Sn)-Total			93.4		%		70-130	12-JUN-19
Titanium (Ti)-Total			N/A	MS-B	%		-	12-JUN-19
Tungsten (W)-Total			91.8		%		70-130	12-JUN-19
Uranium (U)-Total			N/A	MS-B	%		-	12-JUN-19
Vanadium (V)-Total			92.9		%		70-130	12-JUN-19
Zinc (Zn)-Total			86.1		%		70-130	12-JUN-19
Zirconium (Zr)-Total			92.2		%		70-130	12-JUN-19
NH3-F-WT	**Water**							
Batch R4668555								
WG3076326-15 DUP		**L2290682-1**						
Ammonia, Total (as N)		0.302	0.300		mg/L	0.5	20	13-JUN-19
WG3076326-14 LCS								
Ammonia, Total (as N)			108.0		%		85-115	13-JUN-19
WG3076326-13 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	13-JUN-19
WG3076326-16 MS		**L2290682-1**						
Ammonia, Total (as N)			N/A	MS-B	%		-	13-JUN-19
NO3-IC-WT	**Water**							
Batch R4674012								
WG3081366-4 DUP		**WG3081366-3**						
Nitrate (as N)		0.097	0.097		mg/L	0.2	20	19-JUN-19
WG3081366-2 LCS								
Nitrate (as N)			100.9		%		90-110	19-JUN-19
WG3081366-1 MB								
Nitrate (as N)			<0.020		mg/L		0.02	19-JUN-19
WG3081366-5 MS		**WG3081366-3**						
Nitrate (as N)			100.1		%		75-125	19-JUN-19
P-T-COL-WT	**Water**							

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
P-T-COL-WT	**Water**							
Batch R4668512								
WG3075309-3 DUP		**L2286754-4**						
Phosphorus, Total		0.0459	0.0441		mg/L	4.2	20	13-JUN-19
WG3075309-2 LCS								
Phosphorus, Total			98.1		%		80-120	13-JUN-19
WG3075309-1 MB								
Phosphorus, Total			<0.0030		mg/L		0.003	13-JUN-19
WG3075309-4 MS		**L2286754-4**						
Phosphorus, Total			92.3		%		70-130	13-JUN-19
WG3075309-5 MS		**L2283144-2**						
Phosphorus, Total			91.6		%		70-130	13-JUN-19
PH-BF	**Water**							
Batch R4661705								
WG3071428-2 DUP		**L2287920-1**						
pH		7.98	8.02	J	pH units	0.04	0.2	07-JUN-19
WG3071428-1 LCS								
pH			7.02		pH units		6.9-7.1	07-JUN-19
SO4-IC-N-WT	**Water**							
Batch R4674012								
WG3081366-4 DUP		**WG3081366-3**						
Sulfate (SO4)		10.4	10.4		mg/L	0.1	20	19-JUN-19
WG3081366-2 LCS								
Sulfate (SO4)			102.1		%		90-110	19-JUN-19
WG3081366-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	19-JUN-19
WG3081366-5 MS		**WG3081366-3**						
Sulfate (SO4)			104.6		%		75-125	19-JUN-19
SOLIDS-TDS-BF	**Water**							
Batch R4662058								
WG3071431-3 DUP		**L2287930-1**						
Total Dissolved Solids		125	121		mg/L	2.9	20	07-JUN-19
WG3071431-2 LCS								
Total Dissolved Solids			97.9		%		85-115	07-JUN-19
WG3071431-1 MB								
Total Dissolved Solids			<20		mg/L		20	07-JUN-19
SOLIDS-TSS-BF	**Water**							

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SOLIDS-TSS-BF	**Water**							
Batch R4662055								
WG3071430-3 DUP		**L2287930-1**						
Total Suspended Solids		<2.0	<2.0	RPD-NA	mg/L	N/A	25	07-JUN-19
WG3071430-2 LCS								
Total Suspended Solids			97.8		%		85-115	07-JUN-19
WG3071430-1 MB								
Total Suspended Solids			<2.0		mg/L		2	07-JUN-19
TKN-WT	**Water**							
Batch R4668542								
WG3075205-3 DUP		**L2283580-1**						
Total Kjeldahl Nitrogen		12.5	12.4		mg/L	1.2	20	13-JUN-19
WG3075205-2 LCS								
Total Kjeldahl Nitrogen			105.0		%		75-125	13-JUN-19
WG3075205-1 MB								
Total Kjeldahl Nitrogen			<0.15		mg/L		0.15	13-JUN-19
WG3075205-4 MS		**L2283580-1**						
Total Kjeldahl Nitrogen			N/A	MS-B	%		-	13-JUN-19
TOC-WT	**Water**							
Batch R4668329								
WG3075858-3 DUP		**L2287922-1**						
Total Organic Carbon		3.46	3.60		mg/L	4.1	20	13-JUN-19
WG3075858-2 LCS								
Total Organic Carbon			101.3		%		80-120	13-JUN-19
WG3075858-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	13-JUN-19
WG3075858-4 MS		**L2287922-1**						
Total Organic Carbon			97.3		%		70-130	13-JUN-19
TURBIDITY-BF	**Water**							
Batch R4661704								
WG3071429-3 DUP		**L2287920-1**						
Turbidity		3.75	3.80		NTU	1.3	15	07-JUN-19
WG3071429-2 LCS								
Turbidity			111.0		%		85-115	07-JUN-19
WG3071429-1 MB								
Turbidity			<0.10		NTU		0.1	07-JUN-19

Quality Control Report

Workorder: L2287961 Report Date: 05-JUL-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

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

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Quality Control Report

Workorder: L2287961 Report Date: 05-JUL-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Leachable Anions & Nutrients							
Nitrate in Water by IC							
	1	07-JUN-19 22:30	19-JUN-19 13:32	7	12	days	EHT
Organic / Inorganic Carbon							
Dissolved Organic Carbon							
	1	07-JUN-19 22:30	12-JUN-19 20:00	3	5	days	EHTR

Legend & Qualifier Definitions:

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR: Exceeded ALS recommended hold time prior to sample receipt.
EHTL: Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT: Exceeded ALS recommended hold time prior to analysis.
Rec. HT: ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2287961 were received on 12-JUN-19 09:30.

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.

Thursday, June 27, 2019

Rick Hawthorne
ALS Environmental
60 Northland Rd, Unit 1
Waterloo Canada, ON N2V 2B8

Re: ALS Workorder: 1906284
Project Name:
Project Number: L2287961

Dear Mr. Hawthorne:

One water sample was received from ALS Environmental, on 6/13/2019. The sample was scheduled for the following analysis:

Radium-226

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,

ALS Environmental
Katie M. OBrien
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
AIHA	214884
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280

1906284

Radium-226:

The sample was prepared and analyzed according to the current revision of SOP 783.

All acceptance criteria were met.

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1906284
Client Name: ALS Environmental
Client Project Name:
Client Project Number: L2287961
Client PO Number: L2287961

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
L2287961-1	1906284-1		WATER	07-Jun-19	

ALS Environmental

L2287961

WATERLOO

1906284
~~1906283~~
MJ 6.14.19

Subcontract Request Form

Subcontract To:

ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
225 COMMERCE DRIVE
FORT COLLINS,CO 80524

NOTES: Please reference on final report and invoice: PO# *L2287961*
ALS requires QC data to be provided with your final results.

1x1L HDPE

Please see enclosed 1 **sample(s) in** 1 **Container(s)**

SAMPLE NUMBER	ANALYTICAL REQUIRED	DATE SAMPLED / DUE DATE	Priority Flag
L2287961-1 MS-08		6/7/2019	E
	Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	6/13/2019	

Subcontract Info Contact: Mary-Lynn Pike (519) 886-6910
Analysis and reporting info contact: Rick Hawthorne
60 NORTHLAND ROAD, UNIT 1
WATERLOO,ON N2V 2B8
Phone: (519) 886-6910 Email: Rick.Hawthorne@alsglobal.com

Please email confirmation of receipt to: **Rick.Hawthorne@alsglobal.com**

Shipped By: _____ Date Shipped: _____

Received By: AJ Date Received: 6.13.19 1550

Verified By: _____ Date Verified: _____

Temperature: _____

Sample Integrity Issues: _____

ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: ALS Water 100 Workorder No: 1906284

Project Manager: KO Initials: NJ Date: 6.14.19

1.	Are airbills / shipping documents present and/or removable?	DROP OFF	YES	NO
2.	Are custody seals on **shipping** containers intact?	NONE	YES	NO *
3.	Are custody seals on **sample** containers intact?	NONE	YES	NO *
4.	Is there a COC (chain-of-custody) present?		YES	NO *
5.	Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)		YES	NO *
6.	Are short-hold samples present?		YES	NO
7.	Are all samples within holding times for the requested analyses?		YES	NO *
8.	Were all sample containers received intact? (not broken or leaking)		YES	NO *
9.	Is there sufficient sample for the requested analyses?		YES	NO *
10.	Are all samples in the proper containers for the requested analyses?		YES	NO *
11.	Are all aqueous samples preserved correctly, if required? (excluding volatiles)	N/A	YES	NO *
12.	Are all aqueous non-preserved samples pH 4-9?	N/A	YES	NO *
13.	Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm (1/4 inch) diameter? (i.e. size of green pea)	N/A	YES	NO
14.	Were the samples shipped on ice?		YES	NO
15.	Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: #1 #3 #4	RAD ONLY	YES	NO

Cooler #:	1
Temperature (°C):	16.7
No. of custody seals on cooler:	0
DOT Survey/ Acceptance Information — External µR/hr reading:	8
DOT Survey/ Acceptance Information — Background µR/hr reading:	10

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? **YES / NO / NA** (If no, see Form 008.)

*** Please provide details here for NO responses to gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.**

Sample had an initial pH of 4
-1.0 ml HNO3 added, final pH is ≤ 2 LOT # 197345

All client bottle ID's vs ALS lab ID's double-checked by: NJ

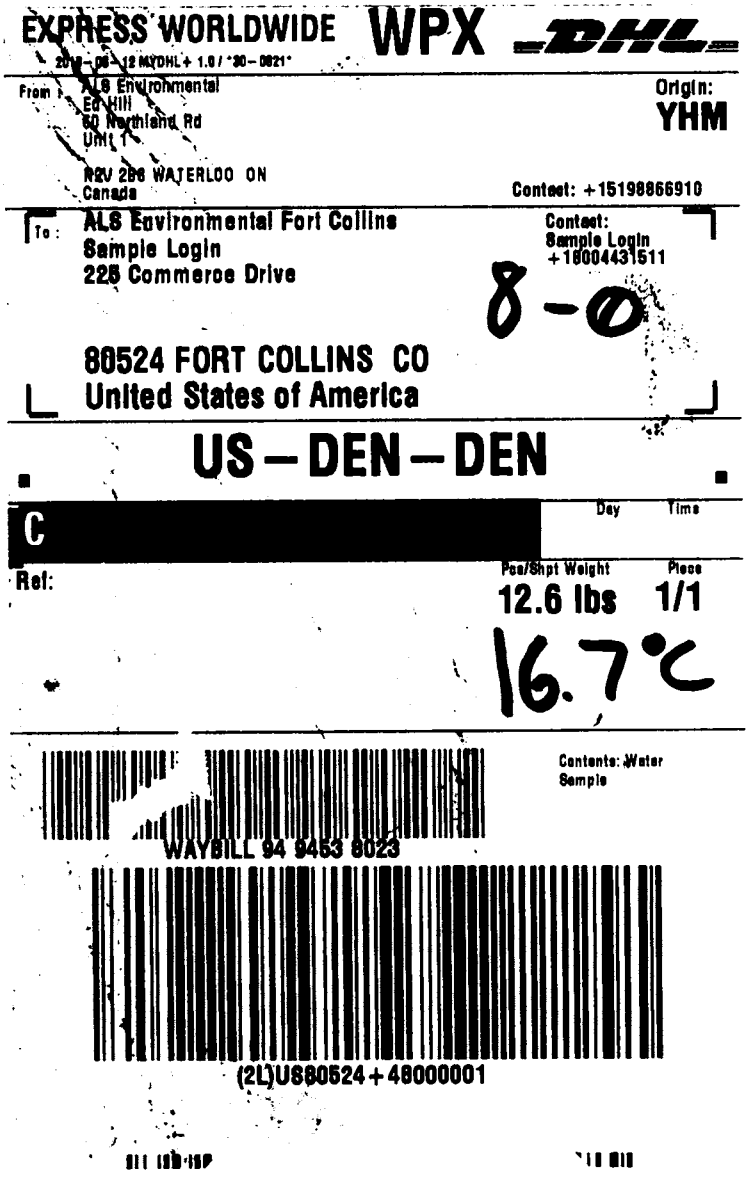
If applicable, was the client contacted? **YES / NO / NA** Contact: _____ Date/Time: _____

Project Manager Signature / Date: 6/14/19

Form 201r27.xls
(02/11/2019)

*IR Gun #1, VWR SN 170560549
*IR Gun #3, VWR SN 170647571
*IR Gun #4, Oakton, SN 2372220101-0002

1906284


EXPRESS WORLDWIDE WPX DHL

From: ALS Environmental
Ed Hill
50 Northland Rd
Unit 1
N2V 2B8 WATERLOO ON
Canada

Origin:
YHM

Contact: +15198866910

To: ALS Environmental Fort Collins
Sample Login
225 Commerce Drive

Contact:
Sample Login
+18004431511

8-0

80524 FORT COLLINS CO
United States of America

US – DEN – DEN

C [redacted]

Day Time

Ref:

Pce/Shpt Weight 12.6 lbs
Piece 1/1

16.7°C

Contents: Water Sample

WAYBILL 94 9453 8023

(2L)US80524+48000001

Client:	ALS Environmental	**Date:**	*27-Jun-19*
Project:	L2287961	**Work Order:**	1906284
Sample ID:	L2287961-1	**Lab ID:**	1906284-1
Legal Location:		**Matrix:**	WATER
Collection Date:	6/7/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1			**SOP 783**		Prep Date: **6/18/2019**	PrepBy: **JXH**
Ra-226	0.0037 (+/- 0.0056)	U	0.0093	BQ/l	NA	6/26/2019 12:27
Carr: BARIUM	*96*		*40-110*	*%REC*	DL = NA	6/26/2019 12:27

Client:	ALS Environmental	**Date:**	*27-Jun-19*
Project:	L2287961	**Work Order:**	1906284
Sample ID:	L2287961-1	**Lab ID:**	1906284-1
Legal Location:		**Matrix:**	WATER
Collection Date:	6/7/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed

Explanation of Qualifiers

Radiochemistry:

- "Report Limit" is the MDC

U or ND - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

Y2 - Chemical Yield outside default limits.

W - DER is greater than Warning Limit of 1.42

* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.
# - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.
G - Sample density differs by more than 15% of LCS density.
D - DER is greater than Control Limit

M - Requested MDC not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS, Matrix Spike Recovery within control limits.

N - Matrix Spike Recovery outside control limits

NC - Not Calculated for duplicate results less than 5 times MDC

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

Inorganics:

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).

U or ND - Indicates that the compound was analyzed for but not detected.

E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.

M - Duplicate injection precision was not met.

N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.

Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.

* - Duplicate analysis (relative percent difference) not within control limits.

S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

Organics:

U or ND - Indicates that the compound was analyzed for but not detected.

B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.

E - Analyte concentration exceeds the upper level of the calibration range.

J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).

A - A tentatively identified compound is a suspected aldol-condensation product.

X - The analyte was diluted below an accurate quantitation level.

* - The spike recovery is equal to or outside the control criteria used.

+ - The relative percent difference (RPD) equals or exceeds the control criteria.

G - A pattern resembling gasoline was detected in this sample.

D - A pattern resembling diesel was detected in this sample.

M - A pattern resembling motor oil was detected in this sample.

C - A pattern resembling crude oil was detected in this sample.

4 - A pattern resembling JP-4 was detected in this sample.

5 - A pattern resembling JP-5 was detected in this sample.

H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.

L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.

Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
- gasoline
- JP-8
- diesel
- mineral spirits
- motor oil
- Stoddard solvent
- bunker C

QC BATCH REPORT

Batch ID: **RE190618-1-1** Instrument ID **Alpha Scin** Method: **Radium-226 by Radon Emanation**

LCS Sample ID: **RE190618-1** Units: **BQ/l** Analysis Date: **6/26/2019 13:01**

Client ID: Run ID: **RE190618-1A** Prep Date: **6/18/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.47 (+/- 0.372)	0.0105	1.771		83.1	67-120					P,M3
Carr: BARIUM	16100		16960		95.1	40-110					

LCSD Sample ID: **RE190618-1** Units: **BQ/l** Analysis Date: **6/26/2019 13:01**

Client ID: Run ID: **RE190618-1A** Prep Date: **6/18/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.85 (+/- 0.462)	0.015	1.771		104	67-120		1.47	0.6	2.1	P,M3
Carr: BARIUM	16400		16960		96.7	40-110		16100			

MB Sample ID: **RE190618-1** Units: **BQ/l** Analysis Date: **6/26/2019 13:01**

Client ID: Run ID: **RE190618-1A** Prep Date: **6/18/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	0.00048 (+/- 0.0044)	0.0084									U
Carr: BARIUM	16200		16960		95.8	40-110					

The following samples were analyzed in this batch: 1906284-1

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

L2287961-COFC

COC Number: 15 -

Report To	Contact and company name below will appear on the final report
Company:	Baffinland Iron Mines Corp.
Contact:	Wiliam Bowden and Connor Devereaux
Phone:	647-253-0596 EXT 6016
	Company address below will appear on the final report
Street:	2275 Upper Middle Rd. E., Suite #300
City/Province:	Oakville, ON
Postal Code:	L6H 0C3
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)

Quality Control (QC) Report with Report ☑ YES ☐ NO

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: bimcore@alsglobal.com

Email 2: bimww@alsglobal.com

Email 3:

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: ap@baffinland.com

Email 2: commercial@baffinland.com

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☐ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4] ☐ | 3 day [P3] ☐ | 2 day [P2] ☐

EMERGENCY: 1 Business day [E1] ☐ | Same Day, Weekend or Statutory holiday [E0] ☑

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information

ALS Account # / Quote #:	23642 /Q42455
Job #:	MS-08
PO / AFE:	4500057496
LSD:	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only): L2287961 08

ALS Contact: **Sampler:** KB/BE

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	BIM-MMER-WT	Group 3	Number of Containers
1	MS-08	7-Jun-19	22:30	Water	E0	R	11

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human drinking water use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Kendra Button	Date: 7-Jun-19	Time: 23:30	Received by:	Date:	Time:	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Baffinland Iron Mine's Corporation (Oakville)
ATTN: William Bowden/Connor Devereaux
2275 Upper Middle Rd. E.
Suite #300
Oakville ON L6H 0C3

Date Received: 12-JUN-19
Report Date: 28-JUN-19 08:04 (MT)
Version: FINAL

Client Phone: 647-253-0596

Certificate of Analysis

Lab Work Order #: L2289712

Project P.O. #: 4500057496
Job Reference: MS-08 DEL
C of C Numbers:
Legal Site Desc:

Rick Hawthorne
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2289712-1 MS-08 Sampled By: CP/AZ/RH on 11-JUN-19 @ 08:25 Matrix: WATER							
Physical Tests							
Conductivity	888		3.0	umhos/cm		12-JUN-19	R4668310
pH	6.63		0.10	pH units		11-JUN-19	R4663765
Total Suspended Solids	28.0		2.0	mg/L		12-JUN-19	R4664286
Total Dissolved Solids	684		20	mg/L		12-JUN-19	R4666587
Turbidity	34.5		0.10	NTU		11-JUN-19	R4663766
Anions and Nutrients							
Ammonia, Total (as N)	0.379		0.010	mg/L		13-JUN-19	R4668555
Cyanides							
Cyanide, Total	<0.0020		0.0020	mg/L		12-JUN-19	R4665587
Total Metals							
Aluminum (Al)-Total	1.07	DLHC	0.050	mg/L	12-JUN-19	12-JUN-19	R4666488
Antimony (Sb)-Total	<0.0010	DLHC	0.0010	mg/L	12-JUN-19	12-JUN-19	R4666488
Arsenic (As)-Total	<0.0010	DLHC	0.0010	mg/L	12-JUN-19	12-JUN-19	R4666488
Barium (Ba)-Total	0.0164	DLHC	0.0010	mg/L	12-JUN-19	12-JUN-19	R4666488
Beryllium (Be)-Total	<0.0010	DLHC	0.0010	mg/L	12-JUN-19	12-JUN-19	R4666488
Bismuth (Bi)-Total	<0.00050	DLHC	0.00050	mg/L	12-JUN-19	12-JUN-19	R4666488
Boron (B)-Total	<0.10	DLHC	0.10	mg/L	12-JUN-19	12-JUN-19	R4666488
Cadmium (Cd)-Total	0.000078	DLHC	0.000050	mg/L	12-JUN-19	12-JUN-19	R4666488
Calcium (Ca)-Total	20.3	DLHC	0.50	mg/L	12-JUN-19	12-JUN-19	R4666488
Cesium (Cs)-Total	<0.00010	DLHC	0.00010	mg/L	12-JUN-19	12-JUN-19	R4666488
Chromium (Cr)-Total	<0.0050	DLHC	0.0050	mg/L	12-JUN-19	12-JUN-19	R4666488
Cobalt (Co)-Total	0.0629	DLHC	0.0010	mg/L	12-JUN-19	12-JUN-19	R4666488
Copper (Cu)-Total	<0.010	DLHC	0.010	mg/L	12-JUN-19	12-JUN-19	R4666488
Iron (Fe)-Total	4.93	DLHC	0.10	mg/L	12-JUN-19	12-JUN-19	R4666488
Lead (Pb)-Total	0.00068	DLHC	0.00050	mg/L	12-JUN-19	12-JUN-19	R4666488
Lithium (Li)-Total	0.013	DLHC	0.010	mg/L	12-JUN-19	12-JUN-19	R4666488
Magnesium (Mg)-Total	101	DLHC	0.050	mg/L	12-JUN-19	12-JUN-19	R4666488
Manganese (Mn)-Total	3.65	DLHC	0.0050	mg/L	12-JUN-19	12-JUN-19	R4666488
Molybdenum (Mo)-Total	<0.00050	DLHC	0.00050	mg/L	12-JUN-19	12-JUN-19	R4666488
Nickel (Ni)-Total	0.0672	DLHC	0.0050	mg/L	12-JUN-19	12-JUN-19	R4666488
Phosphorus (P)-Total	<0.50	DLHC	0.50	mg/L	12-JUN-19	12-JUN-19	R4666488
Potassium (K)-Total	2.05	DLHC	0.50	mg/L	12-JUN-19	12-JUN-19	R4666488
Rubidium (Rb)-Total	0.0047	DLHC	0.0020	mg/L	12-JUN-19	12-JUN-19	R4666488
Selenium (Se)-Total	0.00105	DLHC	0.00050	mg/L	12-JUN-19	12-JUN-19	R4666488
Silicon (Si)-Total	2.8	DLHC	1.0	mg/L	12-JUN-19	12-JUN-19	R4666488
Silver (Ag)-Total	<0.00050	DLHC	0.00050	mg/L	12-JUN-19	12-JUN-19	R4666488
Sodium (Na)-Total	0.92	DLHC	0.50	mg/L	12-JUN-19	12-JUN-19	R4666488
Strontium (Sr)-Total	0.027	DLHC	0.010	mg/L	12-JUN-19	12-JUN-19	R4666488
Sulfur (S)-Total	164	DLHC	5.0	mg/L	12-JUN-19	12-JUN-19	R4666488
Tellurium (Te)-Total	<0.0020	DLHC	0.0020	mg/L	12-JUN-19	12-JUN-19	R4666488
Thallium (Tl)-Total	<0.00010	DLHC	0.00010	mg/L	12-JUN-19	12-JUN-19	R4666488
Thorium (Th)-Total	<0.0010	DLHC	0.0010	mg/L	12-JUN-19	12-JUN-19	R4666488

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2289712-1 MS-08 Sampled By: CP/AZ/RH on 11-JUN-19 @ 08:25 Matrix: WATER							
Total Metals							
Tin (Sn)-Total	<0.0010	DLHC	0.0010	mg/L	12-JUN-19	12-JUN-19	R4666488
Titanium (Ti)-Total	0.0449	DLHC	0.0030	mg/L	12-JUN-19	12-JUN-19	R4666488
Tungsten (W)-Total	<0.0010	DLHC	0.0010	mg/L	12-JUN-19	12-JUN-19	R4666488
Uranium (U)-Total	0.00035	DLHC	0.00010	mg/L	12-JUN-19	12-JUN-19	R4666488
Vanadium (V)-Total	<0.0050	DLHC	0.0050	mg/L	12-JUN-19	12-JUN-19	R4666488
Zinc (Zn)-Total	<0.030	DLHC	0.030	mg/L	12-JUN-19	12-JUN-19	R4666488
Zirconium (Zr)-Total	<0.0020	DLHC	0.0020	mg/L	12-JUN-19	12-JUN-19	R4666488
Radiological Parameters							
Ra-226	0.012		0.0099	Bq/L	18-JUN-19	26-JUN-19	R4653808

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

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Barium (Ba)-Total	MS-B	L2289712-1
Matrix Spike	Boron (B)-Total	MS-B	L2289712-1
Matrix Spike	Calcium (Ca)-Total	MS-B	L2289712-1
Matrix Spike	Iron (Fe)-Total	MS-B	L2289712-1
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2289712-1
Matrix Spike	Manganese (Mn)-Total	MS-B	L2289712-1
Matrix Spike	Potassium (K)-Total	MS-B	L2289712-1
Matrix Spike	Silicon (Si)-Total	MS-B	L2289712-1
Matrix Spike	Sodium (Na)-Total	MS-B	L2289712-1
Matrix Spike	Strontium (Sr)-Total	MS-B	L2289712-1
Matrix Spike	Sulfur (S)-Total	MS-B	L2289712-1
Matrix Spike	Uranium (U)-Total	MS-B	L2289712-1
Matrix Spike	Zinc (Zn)-Total	MS-B	L2289712-1
Matrix Spike	Ammonia, Total (as N)	MS-B	L2289712-1

Sample Parameter Qualifier key listed:

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
CN-TOT-WT	Water	Cyanide, Total	ISO 14403-2

Total cyanide is determined by the combination of UV digestion and distillation. Cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

When using this method, high levels of thiocyanate in samples can cause false positives at ~1-2% of the thiocyanate concentration. For samples with detectable cyanide analyzed by this method, ALS recommends analysis for thiocyanate to check for this potential interference

EC-SCREEN-WT	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

EC-WT	Water	Conductivity	APHA 2510 B

Water samples can be measured directly by immersing the conductivity cell into the sample.

MET-T-CCMS-WT	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

NH3-F-WT	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

PH-BF	Water	pH	APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

RA226-MMER-FC	Water	Ra226 by Alpha Scint, MDC=0.01 Bq/L	EPA 903.1

SOLIDS-TDS-BF	Water	Total Dissolved Solids	APHA 2540C

A well-mixed sample is filtered though glass fibres filter. A known volume of the filtrate is evaporated and dried at 180 +/- 2C for 1hr.

SOLIDS-TSS-BF	Water	Suspended solids	APHA 2540 D-Gravimetric

A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104 +/- 1C for a minimum of four hours or until a constant weight is achieved.

TURBIDITY-BF	Water	Turbidity	APHA 2130 B

Reference Information

Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.

** 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
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA
FC	ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
BF	ALS ENVIRONMENTAL - BAFFIN ISLAND, NUNAVUT, 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 weight of sample
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

Workorder: L2289712 Report Date: 28-JUN-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CN-TOT-WT	**Water**							
Batch R4665587								
WG3074895-19 DUP		**L2288432-1**						
Cyanide, Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	12-JUN-19
WG3074895-18 LCS								
Cyanide, Total			90.0		%		80-120	12-JUN-19
WG3074895-17 MB								
Cyanide, Total			<0.0020		mg/L		0.002	12-JUN-19
WG3074895-20 MS		**L2288432-1**						
Cyanide, Total			87.7		%		70-130	12-JUN-19
EC-WT	**Water**							
Batch R4668310								
WG3075298-4 DUP		**WG3075298-3**						
Conductivity		145	144		umhos/cm	0.4	10	12-JUN-19
WG3075298-2 LCS								
Conductivity			99.1		%		90-110	12-JUN-19
WG3075298-1 MB								
Conductivity			<3.0		umhos/cm		3	12-JUN-19
MET-T-CCMS-WT	**Water**							
Batch R4666488								
WG3075458-4 DUP		**WG3075458-3**						
Aluminum (Al)-Total		0.0240	0.0266		mg/L	10	20	12-JUN-19
Antimony (Sb)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	12-JUN-19
Arsenic (As)-Total		0.00025	0.00027		mg/L	4.0	20	12-JUN-19
Barium (Ba)-Total		0.101	0.104		mg/L	2.6	20	12-JUN-19
Beryllium (Be)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	12-JUN-19
Bismuth (Bi)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	12-JUN-19
Boron (B)-Total		0.172	0.166		mg/L	3.2	20	12-JUN-19
Cadmium (Cd)-Total		0.000233	0.000251		mg/L	7.4	20	12-JUN-19
Calcium (Ca)-Total		137	134		mg/L	2.4	20	12-JUN-19
Chromium (Cr)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	12-JUN-19
Cesium (Cs)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	12-JUN-19
Cobalt (Co)-Total		0.00052	0.00053		mg/L	1.7	20	12-JUN-19
Copper (Cu)-Total		0.0014	0.0014		mg/L	2.2	20	12-JUN-19
Iron (Fe)-Total		0.965	0.964		mg/L	0.1	20	12-JUN-19
Lead (Pb)-Total		0.000404	0.000411		mg/L	1.8	20	12-JUN-19
Lithium (Li)-Total		0.0057	0.0054		mg/L	5.7	20	12-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4666488								
WG3075458-4 DUP		**WG3075458-3**						
Magnesium (Mg)-Total		31.6	32.1		mg/L	1.7	20	12-JUN-19
Manganese (Mn)-Total		0.445	0.442		mg/L	0.8	20	12-JUN-19
Molybdenum (Mo)-Total		0.00139	0.00141		mg/L	1.2	20	12-JUN-19
Nickel (Ni)-Total		0.00407	0.00406		mg/L	0.2	20	12-JUN-19
Phosphorus (P)-Total		<0.050	<0.050	RPD-NA	mg/L	N/A	20	12-JUN-19
Potassium (K)-Total		4.33	4.37		mg/L	0.9	20	12-JUN-19
Rubidium (Rb)-Total		0.00151	0.00141		mg/L	6.3	20	12-JUN-19
Selenium (Se)-Total		0.000547	0.000560		mg/L	2.3	20	12-JUN-19
Silicon (Si)-Total		3.99	4.03		mg/L	0.9	20	12-JUN-19
Silver (Ag)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	12-JUN-19
Sodium (Na)-Total		257	263		mg/L	2.5	20	12-JUN-19
Strontium (Sr)-Total		0.720	0.721		mg/L	0.2	20	12-JUN-19
Sulfur (S)-Total		36.4	36.7		mg/L	1.0	25	12-JUN-19
Thallium (Tl)-Total		0.000039	0.000038		mg/L	2.6	20	12-JUN-19
Tellurium (Te)-Total		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	12-JUN-19
Thorium (Th)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	25	12-JUN-19
Tin (Sn)-Total		0.00041	0.00043		mg/L	5.3	20	12-JUN-19
Titanium (Ti)-Total		0.00058	0.00063		mg/L	9.5	20	12-JUN-19
Tungsten (W)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	12-JUN-19
Uranium (U)-Total		0.000531	0.000524		mg/L	1.5	20	12-JUN-19
Vanadium (V)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	12-JUN-19
Zinc (Zn)-Total		0.0914	0.0913		mg/L	0.1	20	12-JUN-19
Zirconium (Zr)-Total		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	12-JUN-19
WG3075458-2 LCS								
Aluminum (Al)-Total			93.8		%		80-120	12-JUN-19
Antimony (Sb)-Total			98.0		%		80-120	12-JUN-19
Arsenic (As)-Total			93.3		%		80-120	12-JUN-19
Barium (Ba)-Total			99.9		%		80-120	12-JUN-19
Beryllium (Be)-Total			95.8		%		80-120	12-JUN-19
Bismuth (Bi)-Total			95.3		%		80-120	12-JUN-19
Boron (B)-Total			91.4		%		80-120	12-JUN-19
Cadmium (Cd)-Total			92.2		%		80-120	12-JUN-19
Calcium (Ca)-Total			95.7		%		80-120	12-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4666488								
WG3075458-2 LCS								
Chromium (Cr)-Total			90.5		%		80-120	12-JUN-19
Cesium (Cs)-Total			96.4		%		80-120	12-JUN-19
Cobalt (Co)-Total			90.0		%		80-120	12-JUN-19
Copper (Cu)-Total			87.0		%		80-120	12-JUN-19
Iron (Fe)-Total			92.4		%		80-120	12-JUN-19
Lead (Pb)-Total			95.8		%		80-120	12-JUN-19
Lithium (Li)-Total			102.0		%		80-120	12-JUN-19
Magnesium (Mg)-Total			91.1		%		80-120	12-JUN-19
Manganese (Mn)-Total			94.1		%		80-120	12-JUN-19
Molybdenum (Mo)-Total			93.8		%		80-120	12-JUN-19
Nickel (Ni)-Total			88.4		%		80-120	12-JUN-19
Phosphorus (P)-Total			96.9		%		70-130	12-JUN-19
Potassium (K)-Total			94.5		%		80-120	12-JUN-19
Rubidium (Rb)-Total			96.3		%		80-120	12-JUN-19
Selenium (Se)-Total			88.3		%		80-120	12-JUN-19
Silicon (Si)-Total			98.4		%		60-140	12-JUN-19
Silver (Ag)-Total			93.4		%		80-120	12-JUN-19
Sodium (Na)-Total			88.4		%		80-120	12-JUN-19
Strontium (Sr)-Total			93.6		%		80-120	12-JUN-19
Sulfur (S)-Total			97.5		%		80-120	12-JUN-19
Thallium (Tl)-Total			94.8		%		80-120	12-JUN-19
Tellurium (Te)-Total			88.3		%		80-120	12-JUN-19
Thorium (Th)-Total			96.5		%		70-130	12-JUN-19
Tin (Sn)-Total			95.2		%		80-120	12-JUN-19
Titanium (Ti)-Total			89.2		%		80-120	12-JUN-19
Tungsten (W)-Total			95.0		%		80-120	12-JUN-19
Uranium (U)-Total			98.8		%		80-120	12-JUN-19
Vanadium (V)-Total			93.0		%		80-120	12-JUN-19
Zinc (Zn)-Total			89.1		%		80-120	12-JUN-19
Zirconium (Zr)-Total			92.9		%		80-120	12-JUN-19
WG3075458-1 MB								
Aluminum (Al)-Total			<0.0050		mg/L		0.005	12-JUN-19
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	12-JUN-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	12-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4666488								
WG3075458-1 MB								
Barium (Ba)-Total			<0.00010		mg/L		0.0001	12-JUN-19
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	12-JUN-19
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	12-JUN-19
Boron (B)-Total			<0.010		mg/L		0.01	12-JUN-19
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	12-JUN-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	12-JUN-19
Chromium (Cr)-Total			<0.00050		mg/L		0.0005	12-JUN-19
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	12-JUN-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	12-JUN-19
Copper (Cu)-Total			<0.0010		mg/L		0.001	12-JUN-19
Iron (Fe)-Total			<0.010		mg/L		0.01	12-JUN-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	12-JUN-19
Lithium (Li)-Total			<0.0010		mg/L		0.001	12-JUN-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	12-JUN-19
Manganese (Mn)-Total			<0.00050		mg/L		0.0005	12-JUN-19
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	12-JUN-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	12-JUN-19
Phosphorus (P)-Total			<0.050		mg/L		0.05	12-JUN-19
Potassium (K)-Total			<0.050		mg/L		0.05	12-JUN-19
Rubidium (Rb)-Total			<0.00020		mg/L		0.0002	12-JUN-19
Selenium (Se)-Total			<0.000050		mg/L		0.00005	12-JUN-19
Silicon (Si)-Total			<0.10		mg/L		0.1	12-JUN-19
Silver (Ag)-Total			<0.000050		mg/L		0.00005	12-JUN-19
Sodium (Na)-Total			<0.050		mg/L		0.05	12-JUN-19
Strontium (Sr)-Total			<0.0010		mg/L		0.001	12-JUN-19
Sulfur (S)-Total			<0.50		mg/L		0.5	12-JUN-19
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	12-JUN-19
Tellurium (Te)-Total			<0.00020		mg/L		0.0002	12-JUN-19
Thorium (Th)-Total			<0.00010		mg/L		0.0001	12-JUN-19
Tin (Sn)-Total			<0.00010		mg/L		0.0001	12-JUN-19
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	12-JUN-19
Tungsten (W)-Total			<0.00010		mg/L		0.0001	12-JUN-19
Uranium (U)-Total			<0.000010		mg/L		0.00001	12-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4666488								
WG3075458-1 MB								
Vanadium (V)-Total			<0.00050		mg/L		0.0005	12-JUN-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	12-JUN-19
Zirconium (Zr)-Total			<0.00020		mg/L		0.0002	12-JUN-19
WG3075458-5 MS		**WG3075458-6**						
Aluminum (Al)-Total			102.5		%		70-130	12-JUN-19
Antimony (Sb)-Total			100.2		%		70-130	12-JUN-19
Arsenic (As)-Total			97.5		%		70-130	12-JUN-19
Barium (Ba)-Total			N/A	MS-B	%		-	12-JUN-19
Beryllium (Be)-Total			97.7		%		70-130	12-JUN-19
Bismuth (Bi)-Total			85.6		%		70-130	12-JUN-19
Boron (B)-Total			N/A	MS-B	%		-	12-JUN-19
Cadmium (Cd)-Total			88.6		%		70-130	12-JUN-19
Calcium (Ca)-Total			N/A	MS-B	%		-	12-JUN-19
Chromium (Cr)-Total			95.6		%		70-130	12-JUN-19
Cesium (Cs)-Total			101.2		%		70-130	12-JUN-19
Cobalt (Co)-Total			91.7		%		70-130	12-JUN-19
Copper (Cu)-Total			83.7		%		70-130	12-JUN-19
Iron (Fe)-Total			N/A	MS-B	%		-	12-JUN-19
Lead (Pb)-Total			89.7		%		70-130	12-JUN-19
Lithium (Li)-Total			105.7		%		70-130	12-JUN-19
Magnesium (Mg)-Total			N/A	MS-B	%		-	12-JUN-19
Manganese (Mn)-Total			N/A	MS-B	%		-	12-JUN-19
Molybdenum (Mo)-Total			100.8		%		70-130	12-JUN-19
Nickel (Ni)-Total			87.0		%		70-130	12-JUN-19
Phosphorus (P)-Total			102.4		%		70-130	12-JUN-19
Potassium (K)-Total			N/A	MS-B	%		-	12-JUN-19
Rubidium (Rb)-Total			100.6		%		70-130	12-JUN-19
Selenium (Se)-Total			92.5		%		70-130	12-JUN-19
Silicon (Si)-Total			N/A	MS-B	%		-	12-JUN-19
Silver (Ag)-Total			88.4		%		70-130	12-JUN-19
Sodium (Na)-Total			N/A	MS-B	%		-	12-JUN-19
Strontium (Sr)-Total			N/A	MS-B	%		-	12-JUN-19
Sulfur (S)-Total			N/A	MS-B	%		-	12-JUN-19
Thallium (Tl)-Total			89.8		%		70-130	12-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4666488								
WG3075458-5 MS		**WG3075458-6**						
Tellurium (Te)-Total			85.5		%		70-130	12-JUN-19
Thorium (Th)-Total			97.5		%		70-130	12-JUN-19
Tin (Sn)-Total			97.3		%		70-130	12-JUN-19
Titanium (Ti)-Total			97.6		%		70-130	12-JUN-19
Tungsten (W)-Total			96.1		%		70-130	12-JUN-19
Uranium (U)-Total			N/A	MS-B	%		-	12-JUN-19
Vanadium (V)-Total			100.3		%		70-130	12-JUN-19
Zinc (Zn)-Total			N/A	MS-B	%		-	12-JUN-19
Zirconium (Zr)-Total			97.3		%		70-130	12-JUN-19
NH3-F-WT	**Water**							
Batch R4668555								
WG3076326-15 DUP		**L2290682-1**						
Ammonia, Total (as N)		0.302	0.300		mg/L	0.5	20	13-JUN-19
WG3076326-14 LCS								
Ammonia, Total (as N)			108.0		%		85-115	13-JUN-19
WG3076326-13 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	13-JUN-19
WG3076326-16 MS		**L2290682-1**						
Ammonia, Total (as N)			N/A	MS-B	%		-	13-JUN-19
PH-BF	**Water**							
Batch R4663765								
WG3074050-2 DUP		**L2288672-3**						
pH		7.99	7.99	J	pH units	0.00	0.2	11-JUN-19
WG3074050-1 LCS								
pH			7.01		pH units		6.9-7.1	11-JUN-19
SOLIDS-TDS-BF	**Water**							
Batch R4666587								
WG3074386-3 DUP		**L2288672-1**						
Total Dissolved Solids		417	397		mg/L	4.9	20	12-JUN-19
WG3074386-2 LCS								
Total Dissolved Solids			103.3		%		85-115	12-JUN-19
WG3074386-1 MB								
Total Dissolved Solids			<20		mg/L		20	12-JUN-19
SOLIDS-TSS-BF	**Water**							

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SOLIDS-TSS-BF	**Water**							
Batch R4664286								
WG3074385-3 DUP		**L2289615-1**						
Total Suspended Solids		2.8	2.8		mg/L	0.0	25	12-JUN-19
WG3074385-2 LCS								
Total Suspended Solids			100.4		%		85-115	12-JUN-19
WG3074385-1 MB								
Total Suspended Solids			<2.0		mg/L		2	12-JUN-19
TURBIDITY-BF	**Water**							
Batch R4663766								
WG3074052-3 DUP		**L2288672-3**						
Turbidity		4.84	4.85		NTU	0.2	15	11-JUN-19
WG3074052-2 LCS								
Turbidity			100.0		%		85-115	11-JUN-19
WG3074052-1 MB								
Turbidity			<0.10		NTU		0.1	11-JUN-19

Quality Control Report

Workorder: L2289712 Report Date: 28-JUN-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

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

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

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.

Thursday, June 27, 2019

Rick Hawthorne
ALS Environmental
60 Northland Rd, Unit 1
Waterloo Canada, ON N2V 2B8

Re: ALS Workorder: 1906283
Project Name:
Project Number: L2289712

Dear Mr. Hawthorne:

One water sample was received from ALS Environmental, on 6/13/2019. The sample was scheduled for the following analysis:

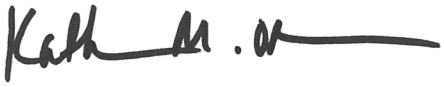
Radium-226

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,



ALS Environmental
Katie M. OBrien
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
AIHA	214884
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280

1906283

Radium-226:

The sample was prepared and analyzed according to the current revision of SOP 783.

All acceptance criteria were met.

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1906283
Client Name: ALS Environmental
Client Project Name:
Client Project Number: L2289712
Client PO Number: L2289712

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
L2289712-1	1906283-1		WATER	11-Jun-19	

ALS Environmental

L2289712

WATERLOO

1906283

Subcontract Request Form

Subcontract To:

ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
225 COMMERCE DRIVE
FORT COLLINS,CO 80524

NOTES: Please reference on final report and invoice: PO# *L2289712*
ALS requires QC data to be provided with your final results.

1 x 1L HDPE

Please see enclosed 1 sample(s) in 1 Container(s)

SAMPLE NUMBER	ANALYTICAL REQUIRED	DATE SAMPLED / DUE DATE	Priority Flag
L2289712-1 MS-08		6/11/2019	**E**
	Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	7/2/2019	

Subcontract Info Contact: Mary-Lynn Pike (519) 886-6910
Analysis and reporting info contact: Rick Hawthorne
60 NORTHLAND ROAD, UNIT 1
WATERLOO,ON N2V 2B8
Phone: (519) 886-6910 Email: Rick.Hawthorne@alsglobal.com

Please email confirmation of receipt to: **Rick.Hawthorne@alsglobal.com**

Shipped By: _____ Date Shipped: _____

Received By: VTJ Date Received: 6.13.19 1550

Verified By: _____ Date Verified: _____

Temperature: _____

Sample Integrity Issues: _____

ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: ALS Water100 Workorder No: 1906283

Project Manager: KO Initials: KO Date: 6.13.19

1. Are airbills / shipping documents present and/or removable?	DROP OFF	YES	NO
2. Are custody seals on **shipping** containers intact?	NONE	YES	NO *
3. Are custody seals on **sample** containers intact?	NONE	YES	NO *
4. Is there a COC (chain-of-custody) present?		YES	NO *
5. Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)		YES	NO *
6. Are short-hold samples present?		YES	NO
7. Are all samples within holding times for the requested analyses?		YES	NO *
8. Were all sample containers received intact? (not broken or leaking)		YES	NO *
9. Is there sufficient sample for the requested analyses?		YES	NO *
10. Are all samples in the proper containers for the requested analyses?		YES	NO *
11. Are all aqueous samples preserved correctly, if required? (excluding volatiles)	N/A	YES	NO *
12. Are all aqueous non-preserved samples pH 4-9?	N/A	YES	NO *
13. Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm (1/4 inch) diameter? (i.e. size of green pea)	N/A	YES	NO
14. Were the samples shipped on ice?		YES	NO
15. Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: #1 #3 #4	RAD ONLY	YES	NO

Cooler #:	1							
Temperature (°C):	16.7							
No. of custody seals on cooler:	0							
DOT Survey/ Acceptance Information — External µR/hr reading:	8							
Background µR/hr reading:	9							

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? **YES / NO / NA** (If no, see Form 008.)

*** Please provide details here for NO responses to gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.**

The client bottle labels list Radium 223 as the test, but the COC and ALS labels list Radium 226. All other sample information is correct.

Per Rich, analyze for Ra226

All client bottle ID's vs ALS lab ID's double-checked by: KO

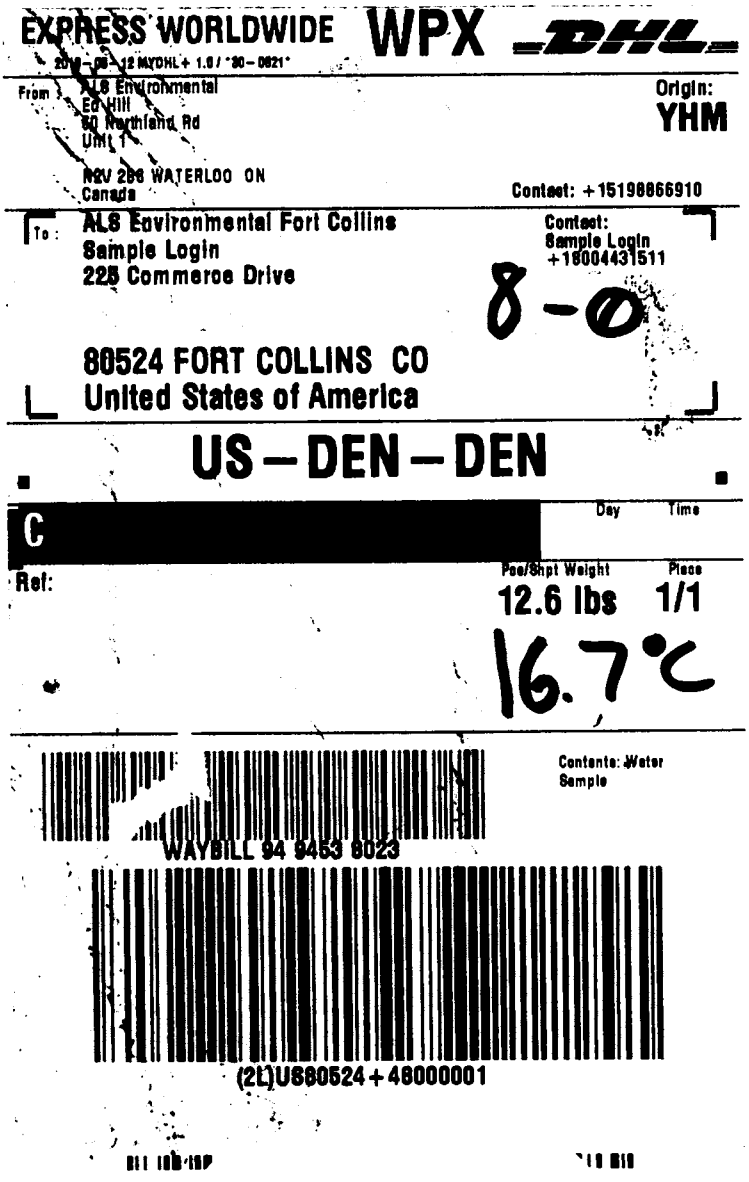
If applicable, was the client contacted? YES / NO / NA Contact: Rich Hawthorne Date/Time: 6/14/19 8:40

Project Manager Signature / Date: 6/14/19

Form 201r27.xls
(02/11/2019)

*IR Gun #1, VWR SN 170560549
*IR Gun #3, VWR SN 170647571
*IR Gun #4, Oakton, SN 2372220101-0002

1906283


EXPRESS WORLDWIDE WPX DHL

From: ALS Environmental
Ed Hill
50 Northland Rd
Unit 1
N2V 2B8 WATERLOO ON
Canada

Origin:
YHM

Contact: +15198866910

To: ALS Environmental Fort Collins
Sample Login
225 Commerce Drive

Contact:
Sample Login
+16004431511

8-0

80524 FORT COLLINS CO
United States of America

US – DEN – DEN

C [redacted] Day Time

Ref:

Pce/Shpt Weight: 12.6 lbs
Piece: 1/1

16.7°C

Contents: Water Sample

WAYBILL 94 9453 8023

(2L)US80524+48000001

Client:	ALS Environmental	**Date:**	*27-Jun-19*
Project:	L2289712	**Work Order:**	1906283
Sample ID:	L2289712-1	**Lab ID:**	1906283-1
Legal Location:		**Matrix:**	WATER
Collection Date:	6/11/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **6/18/2019**		PrepBy: **JXH**
Ra-226	**0.012 (+/- 0.0078)**		**0.0099**	**BQ/l**	NA	6/26/2019 12:27
Carr: BARIUM	*96.5*		*40-110*	*%REC*	DL = NA	6/26/2019 12:27

Client:	ALS Environmental	**Date:**	*27-Jun-19*
Project:	L2289712	**Work Order:**	1906283
Sample ID:	L2289712-1	**Lab ID:**	1906283-1
Legal Location:		**Matrix:**	WATER
Collection Date:	6/11/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed

Explanation of Qualifiers

Radiochemistry:

- "Report Limit" is the MDC

U or ND - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

Y2 - Chemical Yield outside default limits.

W - DER is greater than Warning Limit of 1.42

* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.
# - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.
G - Sample density differs by more than 15% of LCS density.
D - DER is greater than Control Limit

M - Requested MDC not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS, Matrix Spike Recovery within control limits.

N - Matrix Spike Recovery outside control limits

NC - Not Calculated for duplicate results less than 5 times MDC

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

Inorganics:

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).

U or ND - Indicates that the compound was analyzed for but not detected.

E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.

M - Duplicate injection precision was not met.

N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.

Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.

* - Duplicate analysis (relative percent difference) not within control limits.

S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

Organics:

U or ND - Indicates that the compound was analyzed for but not detected.

B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.

E - Analyte concentration exceeds the upper level of the calibration range.

J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).

A - A tentatively identified compound is a suspected aldol-condensation product.

X - The analyte was diluted below an accurate quantitation level.

* - The spike recovery is equal to or outside the control criteria used.

+ - The relative percent difference (RPD) equals or exceeds the control criteria.

G - A pattern resembling gasoline was detected in this sample.

D - A pattern resembling diesel was detected in this sample.

M - A pattern resembling motor oil was detected in this sample.

C - A pattern resembling crude oil was detected in this sample.

4 - A pattern resembling JP-4 was detected in this sample.

5 - A pattern resembling JP-5 was detected in this sample.

H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.

L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.

Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
- gasoline
- JP-8
- diesel
- mineral spirits
- motor oil
- Stoddard solvent
- bunker C

QC BATCH REPORT

Batch ID: **RE190618-1-1** Instrument ID **Alpha Scin** Method: **Radium-226 by Radon Emanation**

LCS Sample ID: **RE190618-1** Units: **BQ/l** Analysis Date: **6/26/2019 13:01**

Client ID: Run ID: **RE190618-1A** Prep Date: **6/18/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.47 (+/- 0.372)	0.0105	1.771		83.1	67-120					P,M3
Carr: BARIUM	16100		16960		95.1	40-110					

LCSD Sample ID: **RE190618-1** Units: **BQ/l** Analysis Date: **6/26/2019 13:01**

Client ID: Run ID: **RE190618-1A** Prep Date: **6/18/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.85 (+/- 0.462)	0.015	1.771		104	67-120		1.47	0.6	2.1	P,M3
Carr: BARIUM	16400		16960		96.7	40-110		16100			

MB Sample ID: **RE190618-1** Units: **BQ/l** Analysis Date: **6/26/2019 13:01**

Client ID: Run ID: **RE190618-1A** Prep Date: **6/18/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	0.00048 (+/- 0.0044)	0.0084									U
Carr: BARIUM	16200		16960		95.8	40-110					

The following samples were analyzed in this batch: 1906283-1

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

L2289712-COFC

COC Number: 15 -

Report To	Contact and company name below will appear on the final report
Company:	Baffinland Iron Mines Corp.
Contact:	Wiliam Bowden and Connor Devereaux
Phone:	647-253-0596 EXT 6016
	Company address below will appear on the final report
Street:	2275 Upper Middle Rd. E., Suite #300
City/Province:	Oakville, ON
Postal Code:	L6H 0C3
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)

Quality Control (QC) Report with Report ☑ YES ☐ NO

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax bimcore@alsglobal.com

Email 2 bimww@alsglobal.com

Email 3

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax ap@baffinland.com

Email 2 commercial@baffinland.com

Project Information

ALS Account # / Quote #:	23642 /Q42455
Job #:	MS-08 DEL
PO / AFE:	4500057496
LSD:	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only): L2289712

ALS Contact:

Sampler: CP/AZ/RH

n all E&P TATs with your AM - surcharges will apply

Regular [R] ☐ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4] ☐ | 3 day [P3] ☐ | 2 day [P2] ☐

EMERGENCY: 1 Business day [E1] ☐ | Same Day, Weekend or Statutory holiday [E0] ☑

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	BIM-MMER-DEL	Number of Containers
	MS-08	11-Jun-19	8:25	Water	E0	6

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human drinking water use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ | SIF Observations Yes ☐ No ☐

Ice Packs ☐ | Ice Cubes ☒ | Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			3.2		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Kendra Button	Date: 11-Jun-19	Time: 11:25	Received by:	Date:	Time:	Received by:	Date: 12-6-19	Time: 9:30

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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 specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Baffinland Iron Mine's Corporation
(Oakville)
ATTN: William Bowden/Connor Devereaux
2275 Upper Middle Rd. E.
Suite #300
Oakville ON L6H 0C3

Date Received: 17-JUN-19
Report Date: 19-JUL-19 13:49 (MT)
Version: FINAL

Client Phone: 647-253-0596

Certificate of Analysis

Lab Work Order #: L2293039

Project P.O. #: 4500057496
Job Reference: MS-08 TOX AND EFF CHARACTERIZATION
C of C Numbers:
Legal Site Desc:

Rick Hawthorne
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2293039-1 MS-08 Sampled By: CP/LM/KB on 17-JUN-19 @ 09:25 Matrix: Water							
Physical Tests							
Conductivity	712		3.0	umhos/cm		18-JUN-19	R4673872
Hardness (as CaCO3)	375		0.50	mg/L		19-JUN-19	
pH	6.70		0.10	pH units		17-JUN-19	R4672022
Total Suspended Solids	10.8		2.0	mg/L		17-JUN-19	R4672091
Total Dissolved Solids	561		20	mg/L		18-JUN-19	R4673058
Turbidity	20.3		0.10	NTU		19-JUN-19	R4673290
Anions and Nutrients							
Acidity (as CaCO3)	4.8		2.0	mg/L		22-JUN-19	R4682053
Alkalinity, Total (as CaCO3)	<10		10	mg/L		18-JUN-19	R4673872
Ammonia, Total (as N)	0.425		0.010	mg/L		18-JUN-19	R4672917
Chloride (Cl)	1.38		0.50	mg/L		19-JUN-19	R4674012
Fluoride (F)	0.034		0.020	mg/L		19-JUN-19	R4674012
Nitrate (as N)	1.76		0.020	mg/L		19-JUN-19	R4674012
Total Kjeldahl Nitrogen	0.67		0.15	mg/L	18-JUN-19	19-JUN-19	R4674366
Phosphorus, Total	0.0096		0.0030	mg/L	18-JUN-19	19-JUN-19	R4673670
Sulfate (SO4)	375		0.30	mg/L		19-JUN-19	R4674012
Cyanides							
Cyanide, Total	<0.20	DLM	0.20	mg/L		19-JUN-19	R4675171
Organic / Inorganic Carbon							
Dissolved Carbon Filtration Location	LAB					18-JUN-19	R4673010
Dissolved Organic Carbon	0.99		0.50	mg/L	18-JUN-19	19-JUN-19	R4674209
Total Organic Carbon	1.64		0.50	mg/L		18-JUN-19	R4673217
Total Metals							
Aluminum (Al)-Total	0.531		0.0050	mg/L	19-JUN-19	19-JUN-19	R4673448
Antimony (Sb)-Total	<0.00010		0.00010	mg/L	19-JUN-19	19-JUN-19	R4673448
Arsenic (As)-Total	0.00011		0.00010	mg/L	19-JUN-19	19-JUN-19	R4673448
Barium (Ba)-Total	0.0136		0.00010	mg/L	19-JUN-19	19-JUN-19	R4673448
Beryllium (Be)-Total	<0.00010		0.00010	mg/L	19-JUN-19	19-JUN-19	R4673448
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L	19-JUN-19	19-JUN-19	R4673448
Boron (B)-Total	0.015		0.010	mg/L	19-JUN-19	19-JUN-19	R4673448
Cadmium (Cd)-Total	0.0000588		0.0000050	mg/L	19-JUN-19	19-JUN-19	R4673448
Calcium (Ca)-Total	21.6		0.050	mg/L	19-JUN-19	19-JUN-19	R4673448
Cesium (Cs)-Total	0.000048		0.000010	mg/L	19-JUN-19	19-JUN-19	R4673448
Chromium (Cr)-Total	0.00130		0.00050	mg/L	19-JUN-19	19-JUN-19	R4673448
Cobalt (Co)-Total	0.0405		0.00010	mg/L	19-JUN-19	19-JUN-19	R4673448
Copper (Cu)-Total	0.0024		0.0010	mg/L	19-JUN-19	19-JUN-19	R4673448
Iron (Fe)-Total	2.65		0.010	mg/L	19-JUN-19	19-JUN-19	R4673448
Lead (Pb)-Total	0.000453		0.000050	mg/L	19-JUN-19	19-JUN-19	R4673448
Lithium (Li)-Total	0.0084		0.0010	mg/L	19-JUN-19	19-JUN-19	R4673448
Magnesium (Mg)-Total	81.0		0.0050	mg/L	19-JUN-19	19-JUN-19	R4673448
Manganese (Mn)-Total	2.79	DLHC	0.0050	mg/L	19-JUN-19	19-JUN-19	R4673448
Mercury (Hg)-Total	<0.000010		0.000010	mg/L		19-JUN-19	R4674168

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2293039-1 MS-08 Sampled By: CP/LM/KB on 17-JUN-19 @ 09:25 Matrix: Water							
Total Metals							
Molybdenum (Mo)-Total	0.000536		0.000050	mg/L	19-JUN-19	19-JUN-19	R4673448
Nickel (Ni)-Total	0.0419		0.00050	mg/L	19-JUN-19	19-JUN-19	R4673448
Phosphorus (P)-Total	<0.050		0.050	mg/L	19-JUN-19	19-JUN-19	R4673448
Potassium (K)-Total	2.16		0.050	mg/L	19-JUN-19	19-JUN-19	R4673448
Rubidium (Rb)-Total	0.00307		0.00020	mg/L	19-JUN-19	19-JUN-19	R4673448
Selenium (Se)-Total	0.00113		0.000050	mg/L	19-JUN-19	19-JUN-19	R4673448
Silicon (Si)-Total	1.69		0.10	mg/L	19-JUN-19	19-JUN-19	R4673448
Silver (Ag)-Total	<0.000050		0.000050	mg/L	19-JUN-19	19-JUN-19	R4673448
Sodium (Na)-Total	0.971		0.050	mg/L	19-JUN-19	19-JUN-19	R4673448
Strontium (Sr)-Total	0.0421		0.0010	mg/L	19-JUN-19	19-JUN-19	R4673448
Sulfur (S)-Total	131		0.50	mg/L	19-JUN-19	19-JUN-19	R4673448
Tellurium (Te)-Total	<0.00020		0.00020	mg/L	19-JUN-19	19-JUN-19	R4673448
Thallium (Tl)-Total	0.000026		0.000010	mg/L	19-JUN-19	19-JUN-19	R4673448
Thorium (Th)-Total	0.00045		0.00010	mg/L	19-JUN-19	19-JUN-19	R4673448
Tin (Sn)-Total	<0.00010		0.00010	mg/L	19-JUN-19	19-JUN-19	R4673448
Titanium (Ti)-Total	0.0243		0.00030	mg/L	19-JUN-19	19-JUN-19	R4673448
Tungsten (W)-Total	<0.00010		0.00010	mg/L	19-JUN-19	19-JUN-19	R4673448
Uranium (U)-Total	0.000407		0.000010	mg/L	19-JUN-19	19-JUN-19	R4673448
Vanadium (V)-Total	0.00090		0.00050	mg/L	19-JUN-19	19-JUN-19	R4673448
Zinc (Zn)-Total	0.0070		0.0030	mg/L	19-JUN-19	19-JUN-19	R4673448
Zirconium (Zr)-Total	0.00065		0.00020	mg/L	19-JUN-19	19-JUN-19	R4673448
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					19-JUN-19	R4673153
Dissolved Metals Filtration Location	FIELD					18-JUN-19	R4672640
Aluminum (Al)-Dissolved	<0.0050		0.0050	mg/L	18-JUN-19	18-JUN-19	R4672659
Antimony (Sb)-Dissolved	<0.00010		0.00010	mg/L	18-JUN-19	18-JUN-19	R4672659
Arsenic (As)-Dissolved	<0.00010		0.00010	mg/L	18-JUN-19	18-JUN-19	R4672659
Barium (Ba)-Dissolved	0.0116		0.00010	mg/L	18-JUN-19	18-JUN-19	R4672659
Beryllium (Be)-Dissolved	<0.00010		0.00010	mg/L	18-JUN-19	18-JUN-19	R4672659
Bismuth (Bi)-Dissolved	<0.000050		0.000050	mg/L	18-JUN-19	18-JUN-19	R4672659
Boron (B)-Dissolved	0.014		0.010	mg/L	18-JUN-19	18-JUN-19	R4672659
Cadmium (Cd)-Dissolved	0.0000617		0.0000050	mg/L	18-JUN-19	18-JUN-19	R4672659
Calcium (Ca)-Dissolved	22.3		0.050	mg/L	18-JUN-19	18-JUN-19	R4672659
Cesium (Cs)-Dissolved	<0.000010		0.000010	mg/L	18-JUN-19	18-JUN-19	R4672659
Chromium (Cr)-Dissolved	<0.00050		0.00050	mg/L	18-JUN-19	18-JUN-19	R4672659
Cobalt (Co)-Dissolved	0.0381		0.00010	mg/L	18-JUN-19	18-JUN-19	R4672659
Copper (Cu)-Dissolved	0.00107		0.00020	mg/L	18-JUN-19	18-JUN-19	R4672659
Iron (Fe)-Dissolved	1.10		0.010	mg/L	18-JUN-19	18-JUN-19	R4672659
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L	18-JUN-19	18-JUN-19	R4672659
Lithium (Li)-Dissolved	0.0077		0.0010	mg/L	18-JUN-19	18-JUN-19	R4672659
Magnesium (Mg)-Dissolved	77.5		0.0050	mg/L	18-JUN-19	18-JUN-19	R4672659

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2293039-1 MS-08 Sampled By: CP/LM/KB on 17-JUN-19 @ 09:25 Matrix: Water							
Dissolved Metals							
Manganese (Mn)-Dissolved	2.56	DLHC	0.0050	mg/L	18-JUN-19	18-JUN-19	R4672659
Mercury (Hg)-Dissolved	<0.000010		0.000010	mg/L	19-JUN-19	19-JUN-19	R4674229
Molybdenum (Mo)-Dissolved	0.000300		0.000050	mg/L	18-JUN-19	18-JUN-19	R4672659
Nickel (Ni)-Dissolved	0.0391		0.00050	mg/L	18-JUN-19	18-JUN-19	R4672659
Phosphorus (P)-Dissolved	<0.050		0.050	mg/L	18-JUN-19	18-JUN-19	R4672659
Potassium (K)-Dissolved	1.86		0.050	mg/L	18-JUN-19	18-JUN-19	R4672659
Rubidium (Rb)-Dissolved	0.00194		0.00020	mg/L	18-JUN-19	18-JUN-19	R4672659
Selenium (Se)-Dissolved	0.00125		0.000050	mg/L	18-JUN-19	18-JUN-19	R4672659
Silicon (Si)-Dissolved	0.650		0.050	mg/L	18-JUN-19	18-JUN-19	R4672659
Silver (Ag)-Dissolved	<0.000050		0.000050	mg/L	18-JUN-19	18-JUN-19	R4672659
Sodium (Na)-Dissolved	0.921		0.050	mg/L	18-JUN-19	18-JUN-19	R4672659
Strontium (Sr)-Dissolved	0.0397		0.0010	mg/L	18-JUN-19	18-JUN-19	R4672659
Sulfur (S)-Dissolved	130		0.50	mg/L	18-JUN-19	18-JUN-19	R4672659
Tellurium (Te)-Dissolved	<0.00020		0.00020	mg/L	18-JUN-19	18-JUN-19	R4672659
Thallium (Tl)-Dissolved	0.000019		0.000010	mg/L	18-JUN-19	18-JUN-19	R4672659
Thorium (Th)-Dissolved	<0.00010		0.00010	mg/L	18-JUN-19	18-JUN-19	R4672659
Tin (Sn)-Dissolved	<0.00010		0.00010	mg/L	18-JUN-19	18-JUN-19	R4672659
Titanium (Ti)-Dissolved	<0.00030		0.00030	mg/L	18-JUN-19	18-JUN-19	R4672659
Tungsten (W)-Dissolved	<0.00010		0.00010	mg/L	18-JUN-19	18-JUN-19	R4672659
Uranium (U)-Dissolved	0.000135		0.000010	mg/L	18-JUN-19	18-JUN-19	R4672659
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L	18-JUN-19	18-JUN-19	R4672659
Zinc (Zn)-Dissolved	0.0054		0.0010	mg/L	18-JUN-19	18-JUN-19	R4672659
Zirconium (Zr)-Dissolved	<0.00020		0.00020	mg/L	18-JUN-19	18-JUN-19	R4672659
Radiological Parameters							
Ra-226	0.0097		0.0047	Bq/L	24-JUN-19	02-JUL-19	R4692536
L2293039-2 MS-0801 Sampled By: CP/LM/KB on 17-JUN-19 @ 09:25 Matrix: Water							
Physical Tests							
Conductivity	714		3.0	umhos/cm		18-JUN-19	R4673872
Hardness (as CaCO3)	378		0.50	mg/L		19-JUN-19	
pH	6.71		0.10	pH units		17-JUN-19	R4672022
Total Suspended Solids	9.6		2.0	mg/L		17-JUN-19	R4672091
Total Dissolved Solids	457		20	mg/L		19-JUN-19	R4676267
Turbidity	19.9		0.10	NTU		19-JUN-19	R4673290
Anions and Nutrients							
Acidity (as CaCO3)	3.5		2.0	mg/L		22-JUN-19	R4682053
Alkalinity, Total (as CaCO3)	<10		10	mg/L		18-JUN-19	R4673872
Ammonia, Total (as N)	0.428		0.010	mg/L		18-JUN-19	R4672917
Chloride (Cl)	1.39		0.50	mg/L		19-JUN-19	R4674012
Fluoride (F)	0.033		0.020	mg/L		19-JUN-19	R4674012
Nitrate (as N)	1.77		0.020	mg/L		19-JUN-19	R4674012

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2293039-2 MS-0801 Sampled By: CP/LM/KB on 17-JUN-19 @ 09:25 Matrix: Water							
Anions and Nutrients							
Total Kjeldahl Nitrogen	0.63		0.15	mg/L	18-JUN-19	19-JUN-19	R4674366
Phosphorus, Total	0.0055		0.0030	mg/L	18-JUN-19	19-JUN-19	R4673670
Sulfate (SO4)	377		0.30	mg/L		19-JUN-19	R4674012
Cyanides							
Cyanide, Total	0.0026		0.0020	mg/L		18-JUN-19	R4674395
Organic / Inorganic Carbon							
Dissolved Carbon Filtration Location	LAB					18-JUN-19	R4673010
Dissolved Organic Carbon	0.92		0.50	mg/L	18-JUN-19	19-JUN-19	R4674209
Total Organic Carbon	1.33		0.50	mg/L		18-JUN-19	R4673217
Total Metals							
Aluminum (Al)-Total	0.479		0.0050	mg/L	19-JUN-19	19-JUN-19	R4673448
Antimony (Sb)-Total	<0.00010		0.00010	mg/L	19-JUN-19	19-JUN-19	R4673448
Arsenic (As)-Total	<0.00010		0.00010	mg/L	19-JUN-19	19-JUN-19	R4673448
Barium (Ba)-Total	0.0138		0.00010	mg/L	19-JUN-19	19-JUN-19	R4673448
Beryllium (Be)-Total	<0.00010		0.00010	mg/L	19-JUN-19	19-JUN-19	R4673448
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L	19-JUN-19	19-JUN-19	R4673448
Boron (B)-Total	0.014		0.010	mg/L	19-JUN-19	19-JUN-19	R4673448
Cadmium (Cd)-Total	0.0000605		0.0000050	mg/L	19-JUN-19	19-JUN-19	R4673448
Calcium (Ca)-Total	21.5		0.050	mg/L	19-JUN-19	19-JUN-19	R4673448
Cesium (Cs)-Total	0.000045		0.000010	mg/L	19-JUN-19	19-JUN-19	R4673448
Chromium (Cr)-Total	0.00114		0.00050	mg/L	19-JUN-19	19-JUN-19	R4673448
Cobalt (Co)-Total	0.0403		0.00010	mg/L	19-JUN-19	19-JUN-19	R4673448
Copper (Cu)-Total	0.0021		0.0010	mg/L	19-JUN-19	19-JUN-19	R4673448
Iron (Fe)-Total	2.31		0.010	mg/L	19-JUN-19	19-JUN-19	R4673448
Lead (Pb)-Total	0.000403		0.000050	mg/L	19-JUN-19	19-JUN-19	R4673448
Lithium (Li)-Total	0.0080		0.0010	mg/L	19-JUN-19	19-JUN-19	R4673448
Magnesium (Mg)-Total	81.0		0.0050	mg/L	19-JUN-19	19-JUN-19	R4673448
Manganese (Mn)-Total	2.61	DLHC	0.0050	mg/L	19-JUN-19	19-JUN-19	R4673448
Mercury (Hg)-Total	<0.000010		0.000010	mg/L		19-JUN-19	R4674168
Molybdenum (Mo)-Total	0.000533		0.000050	mg/L	19-JUN-19	19-JUN-19	R4673448
Nickel (Ni)-Total	0.0421		0.00050	mg/L	19-JUN-19	19-JUN-19	R4673448
Phosphorus (P)-Total	<0.050		0.050	mg/L	19-JUN-19	19-JUN-19	R4673448
Potassium (K)-Total	2.14		0.050	mg/L	19-JUN-19	19-JUN-19	R4673448
Rubidium (Rb)-Total	0.00299		0.00020	mg/L	19-JUN-19	19-JUN-19	R4673448
Selenium (Se)-Total	0.00114		0.000050	mg/L	19-JUN-19	19-JUN-19	R4673448
Silicon (Si)-Total	1.62		0.10	mg/L	19-JUN-19	19-JUN-19	R4673448
Silver (Ag)-Total	<0.000050		0.000050	mg/L	19-JUN-19	19-JUN-19	R4673448
Sodium (Na)-Total	0.962		0.050	mg/L	19-JUN-19	19-JUN-19	R4673448
Strontium (Sr)-Total	0.0420		0.0010	mg/L	19-JUN-19	19-JUN-19	R4673448
Sulfur (S)-Total	131		0.50	mg/L	19-JUN-19	19-JUN-19	R4673448
Tellurium (Te)-Total	<0.00020		0.00020	mg/L	19-JUN-19	19-JUN-19	R4673448
Thallium (Tl)-Total	0.000025		0.000010	mg/L	19-JUN-19	19-JUN-19	R4673448

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2293039-2 MS-0801 Sampled By: CP/LM/KB on 17-JUN-19 @ 09:25 Matrix: Water							
Total Metals							
Thorium (Th)-Total	0.00036		0.00010	mg/L	19-JUN-19	19-JUN-19	R4673448
Tin (Sn)-Total	<0.00010		0.00010	mg/L	19-JUN-19	19-JUN-19	R4673448
Titanium (Ti)-Total	0.0234		0.00030	mg/L	19-JUN-19	19-JUN-19	R4673448
Tungsten (W)-Total	<0.00010		0.00010	mg/L	19-JUN-19	19-JUN-19	R4673448
Uranium (U)-Total	0.000351		0.000010	mg/L	19-JUN-19	19-JUN-19	R4673448
Vanadium (V)-Total	0.00084		0.00050	mg/L	19-JUN-19	19-JUN-19	R4673448
Zinc (Zn)-Total	0.0062		0.0030	mg/L	19-JUN-19	19-JUN-19	R4673448
Zirconium (Zr)-Total	0.00065		0.00020	mg/L	19-JUN-19	19-JUN-19	R4673448
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					19-JUN-19	R4673153
Dissolved Metals Filtration Location	FIELD					18-JUN-19	R4672640
Aluminum (Al)-Dissolved	<0.0050		0.0050	mg/L	18-JUN-19	18-JUN-19	R4672659
Antimony (Sb)-Dissolved	<0.00010		0.00010	mg/L	18-JUN-19	18-JUN-19	R4672659
Arsenic (As)-Dissolved	<0.00010		0.00010	mg/L	18-JUN-19	18-JUN-19	R4672659
Barium (Ba)-Dissolved	0.0118		0.00010	mg/L	18-JUN-19	18-JUN-19	R4672659
Beryllium (Be)-Dissolved	<0.00010		0.00010	mg/L	18-JUN-19	18-JUN-19	R4672659
Bismuth (Bi)-Dissolved	<0.000050		0.000050	mg/L	18-JUN-19	18-JUN-19	R4672659
Boron (B)-Dissolved	0.014		0.010	mg/L	18-JUN-19	18-JUN-19	R4672659
Cadmium (Cd)-Dissolved	0.0000604		0.0000050	mg/L	18-JUN-19	18-JUN-19	R4672659
Calcium (Ca)-Dissolved	22.6		0.050	mg/L	18-JUN-19	18-JUN-19	R4672659
Cesium (Cs)-Dissolved	<0.000010		0.000010	mg/L	18-JUN-19	18-JUN-19	R4672659
Chromium (Cr)-Dissolved	<0.00050		0.00050	mg/L	18-JUN-19	18-JUN-19	R4672659
Cobalt (Co)-Dissolved	0.0378		0.00010	mg/L	18-JUN-19	18-JUN-19	R4672659
Copper (Cu)-Dissolved	0.00108		0.00020	mg/L	18-JUN-19	18-JUN-19	R4672659
Iron (Fe)-Dissolved	1.13		0.010	mg/L	18-JUN-19	18-JUN-19	R4672659
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L	18-JUN-19	18-JUN-19	R4672659
Lithium (Li)-Dissolved	0.0074		0.0010	mg/L	18-JUN-19	18-JUN-19	R4672659
Magnesium (Mg)-Dissolved	78.2		0.0050	mg/L	18-JUN-19	18-JUN-19	R4672659
Manganese (Mn)-Dissolved	2.57	DLHC	0.0050	mg/L	18-JUN-19	18-JUN-19	R4672659
Mercury (Hg)-Dissolved	<0.000010		0.000010	mg/L	19-JUN-19	19-JUN-19	R4674229
Molybdenum (Mo)-Dissolved	0.000342		0.000050	mg/L	18-JUN-19	18-JUN-19	R4672659
Nickel (Ni)-Dissolved	0.0390		0.00050	mg/L	18-JUN-19	18-JUN-19	R4672659
Phosphorus (P)-Dissolved	<0.050		0.050	mg/L	18-JUN-19	18-JUN-19	R4672659
Potassium (K)-Dissolved	1.87		0.050	mg/L	18-JUN-19	18-JUN-19	R4672659
Rubidium (Rb)-Dissolved	0.00188		0.00020	mg/L	18-JUN-19	18-JUN-19	R4672659
Selenium (Se)-Dissolved	0.00120		0.000050	mg/L	18-JUN-19	18-JUN-19	R4672659
Silicon (Si)-Dissolved	0.634		0.050	mg/L	18-JUN-19	18-JUN-19	R4672659
Silver (Ag)-Dissolved	<0.000050		0.000050	mg/L	18-JUN-19	18-JUN-19	R4672659
Sodium (Na)-Dissolved	0.914		0.050	mg/L	18-JUN-19	18-JUN-19	R4672659
Strontium (Sr)-Dissolved	0.0406		0.0010	mg/L	18-JUN-19	18-JUN-19	R4672659
Sulfur (S)-Dissolved	132		0.50	mg/L	18-JUN-19	18-JUN-19	R4672659

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2293039-2 MS-0801 Sampled By: CP/LM/KB on 17-JUN-19 @ 09:25 Matrix: Water							
Dissolved Metals							
Tellurium (Te)-Dissolved	<0.00020		0.00020	mg/L	18-JUN-19	18-JUN-19	R4672659
Thallium (Tl)-Dissolved	0.000018		0.000010	mg/L	18-JUN-19	18-JUN-19	R4672659
Thorium (Th)-Dissolved	<0.00010		0.00010	mg/L	18-JUN-19	18-JUN-19	R4672659
Tin (Sn)-Dissolved	<0.00010		0.00010	mg/L	18-JUN-19	18-JUN-19	R4672659
Titanium (Ti)-Dissolved	<0.00030		0.00030	mg/L	18-JUN-19	18-JUN-19	R4672659
Tungsten (W)-Dissolved	<0.00010		0.00010	mg/L	18-JUN-19	18-JUN-19	R4672659
Uranium (U)-Dissolved	0.000131		0.000010	mg/L	18-JUN-19	18-JUN-19	R4672659
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L	18-JUN-19	18-JUN-19	R4672659
Zinc (Zn)-Dissolved	0.0058		0.0010	mg/L	18-JUN-19	18-JUN-19	R4672659
Zirconium (Zr)-Dissolved	<0.00020		0.00020	mg/L	18-JUN-19	18-JUN-19	R4672659
Radiological Parameters							
Ra-226	0.011		0.0077	Bq/L	24-JUN-19	02-JUL-19	R4692536

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

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2293039-1, -2
Matrix Spike	Cobalt (Co)-Dissolved	MS-B	L2293039-1, -2
Matrix Spike	Iron (Fe)-Dissolved	MS-B	L2293039-1, -2
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2293039-1, -2
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L2293039-1, -2
Matrix Spike	Nickel (Ni)-Dissolved	MS-B	L2293039-1, -2
Matrix Spike	Silicon (Si)-Dissolved	MS-B	L2293039-1, -2
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2293039-1, -2
Matrix Spike	Sulfur (S)-Dissolved	MS-B	L2293039-1, -2
Matrix Spike	Calcium (Ca)-Total	MS-B	L2293039-1, -2
Matrix Spike	Chromium (Cr)-Total	MS-B	L2293039-1, -2
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2293039-1, -2
Matrix Spike	Potassium (K)-Total	MS-B	L2293039-1, -2
Matrix Spike	Silicon (Si)-Total	MS-B	L2293039-1, -2
Matrix Spike	Sodium (Na)-Total	MS-B	L2293039-1, -2
Matrix Spike	Strontium (Sr)-Total	MS-B	L2293039-1, -2
Matrix Spike	Sulfur (S)-Total	MS-B	L2293039-1, -2
Matrix Spike	Uranium (U)-Total	MS-B	L2293039-1, -2

Sample Parameter Qualifier key listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACY-TITR-TB	Water	Acidity	APHA 2310 B modified

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

ALK-WT	Water	Alkalinity, Total (as CaCO3)	EPA 310.2

This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.

CL-IC-N-WT	Water	Chloride by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

CN-TOT-WT	Water	Cyanide, Total	ISO 14403-2

Total cyanide is determined by the combination of UV digestion and distillation. Cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

When using this method, high levels of thiocyanate in samples can cause false positives at ~1-2% of the thiocyanate concentration. For samples with detectable cyanide analyzed by this method, ALS recommends analysis for thiocyanate to check for this potential interference

DOC-WT	Water	Dissolved Organic Carbon	APHA 5310B

Sample is filtered through a 0.45um filter, then injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic carbon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.

EC-SCREEN-WT	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

EC-WT	Water	Conductivity	APHA 2510 B

Water samples can be measured directly by immersing the conductivity cell into the sample.

F-IC-N-WT	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-WT	Water	Hardness	APHA 2340 B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents.

Reference Information

Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-WT	Water	Dissolved Mercury in Water by CVAAS	EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

HG-T-CVAA-WT	Water	Total Mercury in Water by CVAAS	EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

MET-D-CCMS-WT	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

MET-T-CCMS-WT	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

NH3-F-WT	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO3-IC-WT	Water	Nitrate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-COL-WT	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is deteremined colourimetrically after persulphate digestion of the sample.

PH-BF	Water	pH	APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

RA226-MMER-FC	Water	Ra226 by Alpha Scint, MDC=0.01 Bq/L	EPA 903.1
SO4-IC-N-WT	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-BF	Water	Total Dissolved Solids	APHA 2540C

A well-mixed sample is filtered though glass fibres filter. A known volume of the filtrate is evaporated and dried at 180 +/- 2C for 1hr.

SOLIDS-TSS-BF	Water	Suspended solids	APHA 2540 D-Gravimetric

A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104 +/- 1C for a minimum of four hours or until a constant weight is achieved.

TKN-WT	Water	Total Kjeldahl Nitrogen	APHA 4500-Norg D

This analysis is carried out using procedures adapted from APHA Method 4500-Norg "Nitrogen (Organic)". Total Kjeldahl Nitrogen is determined by sample digestion at 380 Celsius with analysis using an automated colorimetric method.

TOC-WT	Water	Total Organic Carbon	APHA 5310B

Sample is injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic cabon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.

TURBIDITY-WT	Water	Turbidity	APHA 2130 B

Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.

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

Reference Information

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
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA
FC	ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
TB	ALS ENVIRONMENTAL - THUNDER BAY, ONTARIO, CANADA
BF	ALS ENVIRONMENTAL - BAFFIN ISLAND, NUNAVUT, 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 weight of sample
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

Workorder: L2293039 Report Date: 19-JUL-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACY-TITR-TB	**Water**							
Batch R4682053								
WG3085278-3 DUP		**L2293202-1**						
Acidity (as CaCO3)		10.2	9.4		mg/L	8.1	20	22-JUN-19
WG3085278-2 LCS								
Acidity (as CaCO3)			91.6		%		85-115	22-JUN-19
WG3085278-1 MB								
Acidity (as CaCO3)			<2.0		mg/L		2	22-JUN-19
ALK-WT	**Water**							
Batch R4673872								
WG3080204-28 DUP		**WG3080204-27**						
Alkalinity, Total (as CaCO3)		<10	<10	RPD-NA	mg/L	N/A	20	18-JUN-19
WG3080204-26 LCS								
Alkalinity, Total (as CaCO3)			101.5		%		85-115	18-JUN-19
WG3080204-25 MB								
Alkalinity, Total (as CaCO3)			<10		mg/L		10	18-JUN-19
CL-IC-N-WT	**Water**							
Batch R4674012								
WG3081366-4 DUP		**WG3081366-3**						
Chloride (Cl)		52.0	51.9		mg/L	0.2	20	19-JUN-19
WG3081366-2 LCS								
Chloride (Cl)			101.5		%		90-110	19-JUN-19
WG3081366-1 MB								
Chloride (Cl)			<0.50		mg/L		0.5	19-JUN-19
WG3081366-5 MS		**WG3081366-3**						
Chloride (Cl)			102.5		%		75-125	19-JUN-19
CN-TOT-WT	**Water**							
Batch R4674395								
WG3080331-5 DUP		**L2292912-1**						
Cyanide, Total		0.0036	0.0030	J	mg/L	0.0007	0.004	18-JUN-19
WG3080331-2 LCS								
Cyanide, Total			86.8		%		80-120	18-JUN-19
WG3080331-1 MB								
Cyanide, Total			<0.0020		mg/L		0.002	18-JUN-19
WG3080331-6 MS		**L2292912-1**						
Cyanide, Total			86.0		%		70-130	18-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CN-TOT-WT	**Water**							
Batch R4675171								
WG3082008-7 DUP		**L2293402-2**						
Cyanide, Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	19-JUN-19
WG3082008-6 LCS								
Cyanide, Total			85.5		%		80-120	19-JUN-19
WG3082008-5 MB								
Cyanide, Total			<0.0020		mg/L		0.002	19-JUN-19
WG3082008-8 MS		**L2293402-2**						
Cyanide, Total			80.8		%		70-130	19-JUN-19
DOC-WT	**Water**							
Batch R4674209								
WG3081035-3 DUP		**L2281505-1**						
Dissolved Organic Carbon		3.27	3.38		mg/L	3.6	25	19-JUN-19
WG3081035-2 LCS								
Dissolved Organic Carbon			98.1		%		70-130	19-JUN-19
WG3081035-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	19-JUN-19
WG3081035-4 MS		**L2281505-1**						
Dissolved Organic Carbon			95.2		%		70-130	19-JUN-19
EC-WT	**Water**							
Batch R4673872								
WG3080204-28 DUP		**WG3080204-27**						
Conductivity		30.3	29.3		umhos/cm	3.4	10	18-JUN-19
WG3080204-26 LCS								
Conductivity			98.1		%		90-110	18-JUN-19
WG3080204-25 MB								
Conductivity			<3.0		umhos/cm		3	18-JUN-19
F-IC-N-WT	**Water**							
Batch R4674012								
WG3081366-4 DUP		**WG3081366-3**						
Fluoride (F)		0.280	0.282		mg/L	0.7	20	19-JUN-19
WG3081366-2 LCS								
Fluoride (F)			101.8		%		90-110	19-JUN-19
WG3081366-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	19-JUN-19
WG3081366-5 MS		**WG3081366-3**						
Fluoride (F)			103.7		%		75-125	19-JUN-19
HG-D-CVAA-WT	**Water**							

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
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Oakville ON L6H 0C3
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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-D-CVAA-WT	**Water**							
Batch R4674229								
WG3081282-4 DUP		**WG3081282-3**						
Mercury (Hg)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	19-JUN-19
WG3081282-2 LCS								
Mercury (Hg)-Dissolved			97.3		%		80-120	19-JUN-19
WG3081282-1 MB								
Mercury (Hg)-Dissolved			<0.000010		mg/L		0.00001	19-JUN-19
WG3081282-6 MS		**WG3081282-5**						
Mercury (Hg)-Dissolved			99.8		%		70-130	19-JUN-19
HG-T-CVAA-WT	**Water**							
Batch R4674168								
WG3081277-3 DUP		**L2293039-2**						
Mercury (Hg)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	19-JUN-19
WG3081277-2 LCS								
Mercury (Hg)-Total			98.0		%		80-120	19-JUN-19
WG3081277-1 MB								
Mercury (Hg)-Total			<0.000010		mg/L		0.00001	19-JUN-19
WG3081277-4 MS		**L2293039-1**						
Mercury (Hg)-Total			95.0		%		70-130	19-JUN-19
MET-D-CCMS-WT	**Water**							
Batch R4672659								
WG3080585-4 DUP		**WG3080585-3**						
Aluminum (Al)-Dissolved		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	18-JUN-19
Antimony (Sb)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	18-JUN-19
Arsenic (As)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	18-JUN-19
Barium (Ba)-Dissolved		0.0116	0.0116		mg/L	0.4	20	18-JUN-19
Beryllium (Be)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	18-JUN-19
Bismuth (Bi)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	18-JUN-19
Boron (B)-Dissolved		0.014	0.014		mg/L	0.9	20	18-JUN-19
Cadmium (Cd)-Dissolved		0.0000617	0.0000676		mg/L	9.1	20	18-JUN-19
Calcium (Ca)-Dissolved		22.3	21.9		mg/L	1.7	20	18-JUN-19
Cesium (Cs)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	18-JUN-19
Chromium (Cr)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	18-JUN-19
Cobalt (Co)-Dissolved		0.0381	0.0381		mg/L	0.1	20	18-JUN-19
Copper (Cu)-Dissolved		0.00107	0.00109		mg/L	1.7	20	18-JUN-19
Iron (Fe)-Dissolved		1.10	1.13		mg/L	2.8	20	18-JUN-19
Lead (Pb)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	18-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
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Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4672659								
WG3080585-4 DUP		**WG3080585-3**						
Lithium (Li)-Dissolved		0.0077	0.0076		mg/L	1.5	20	18-JUN-19
Magnesium (Mg)-Dissolved		77.5	78.6		mg/L	1.4	20	18-JUN-19
Manganese (Mn)-Dissolved		2.56	2.62		mg/L	2.1	20	18-JUN-19
Molybdenum (Mo)-Dissolved		0.000300	0.000357		mg/L	17	20	18-JUN-19
Nickel (Ni)-Dissolved		0.0391	0.0394		mg/L	0.6	20	18-JUN-19
Phosphorus (P)-Dissolved		<0.050	<0.050	RPD-NA	mg/L	N/A	20	18-JUN-19
Potassium (K)-Dissolved		1.86	1.86		mg/L	0.3	20	18-JUN-19
Rubidium (Rb)-Dissolved		0.00194	0.00186		mg/L	3.9	20	18-JUN-19
Selenium (Se)-Dissolved		0.00125	0.00130		mg/L	3.8	20	18-JUN-19
Silicon (Si)-Dissolved		0.650	0.638		mg/L	1.8	20	18-JUN-19
Silver (Ag)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	18-JUN-19
Sodium (Na)-Dissolved		0.921	0.914		mg/L	0.7	20	18-JUN-19
Strontium (Sr)-Dissolved		0.0397	0.0417		mg/L	4.9	20	18-JUN-19
Sulfur (S)-Dissolved		130	129		mg/L	0.1	20	18-JUN-19
Tellurium (Te)-Dissolved		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	18-JUN-19
Thallium (Tl)-Dissolved		0.000019	0.000018		mg/L	4.3	20	18-JUN-19
Thorium (Th)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	18-JUN-19
Tin (Sn)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	18-JUN-19
Titanium (Ti)-Dissolved		<0.00030	<0.00030	RPD-NA	mg/L	N/A	20	18-JUN-19
Tungsten (W)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	18-JUN-19
Uranium (U)-Dissolved		0.000135	0.000139		mg/L	2.7	20	18-JUN-19
Vanadium (V)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	18-JUN-19
Zinc (Zn)-Dissolved		0.0054	0.0053		mg/L	2.3	20	18-JUN-19
Zirconium (Zr)-Dissolved		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	18-JUN-19
WG3080585-2 LCS								
Aluminum (Al)-Dissolved			102.2		%		80-120	18-JUN-19
Antimony (Sb)-Dissolved			99.1		%		80-120	18-JUN-19
Arsenic (As)-Dissolved			101.6		%		80-120	18-JUN-19
Barium (Ba)-Dissolved			100.6		%		80-120	18-JUN-19
Beryllium (Be)-Dissolved			96.0		%		80-120	18-JUN-19
Bismuth (Bi)-Dissolved			94.2		%		80-120	18-JUN-19
Boron (B)-Dissolved			93.3		%		80-120	18-JUN-19
Cadmium (Cd)-Dissolved			96.1		%		80-120	18-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4672659								
WG3080585-2 LCS								
Calcium (Ca)-Dissolved			98.5		%		80-120	18-JUN-19
Cesium (Cs)-Dissolved			102.6		%		80-120	18-JUN-19
Chromium (Cr)-Dissolved			99.6		%		80-120	18-JUN-19
Cobalt (Co)-Dissolved			98.1		%		80-120	18-JUN-19
Copper (Cu)-Dissolved			97.8		%		80-120	18-JUN-19
Iron (Fe)-Dissolved			97.4		%		80-120	18-JUN-19
Lead (Pb)-Dissolved			98.3		%		80-120	18-JUN-19
Lithium (Li)-Dissolved			88.2		%		80-120	18-JUN-19
Magnesium (Mg)-Dissolved			101.1		%		80-120	18-JUN-19
Manganese (Mn)-Dissolved			101.3		%		80-120	18-JUN-19
Molybdenum (Mo)-Dissolved			100.1		%		80-120	18-JUN-19
Nickel (Ni)-Dissolved			98.4		%		80-120	18-JUN-19
Phosphorus (P)-Dissolved			109.1		%		80-120	18-JUN-19
Potassium (K)-Dissolved			102.0		%		80-120	18-JUN-19
Rubidium (Rb)-Dissolved			104.1		%		80-120	18-JUN-19
Selenium (Se)-Dissolved			98.9		%		80-120	18-JUN-19
Silicon (Si)-Dissolved			100.2		%		60-140	18-JUN-19
Silver (Ag)-Dissolved			96.9		%		80-120	18-JUN-19
Sodium (Na)-Dissolved			100.9		%		80-120	18-JUN-19
Strontium (Sr)-Dissolved			101.7		%		80-120	18-JUN-19
Sulfur (S)-Dissolved			100.3		%		80-120	18-JUN-19
Tellurium (Te)-Dissolved			98.6		%		80-120	18-JUN-19
Thallium (Tl)-Dissolved			96.0		%		80-120	18-JUN-19
Thorium (Th)-Dissolved			93.8		%		80-120	18-JUN-19
Tin (Sn)-Dissolved			100.3		%		80-120	18-JUN-19
Titanium (Ti)-Dissolved			100.9		%		80-120	18-JUN-19
Tungsten (W)-Dissolved			98.5		%		80-120	18-JUN-19
Uranium (U)-Dissolved			97.9		%		80-120	18-JUN-19
Vanadium (V)-Dissolved			100.9		%		80-120	18-JUN-19
Zinc (Zn)-Dissolved			100.9		%		80-120	18-JUN-19
Zirconium (Zr)-Dissolved			99.0		%		80-120	18-JUN-19
WG3080585-1 MB								
Aluminum (Al)-Dissolved			<0.0050		mg/L		0.005	18-JUN-19
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	18-JUN-19

Quality Control Report

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Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4672659								
WG3080585-1 MB								
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	18-JUN-19
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	18-JUN-19
Beryllium (Be)-Dissolved			<0.00010		mg/L		0.0001	18-JUN-19
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	18-JUN-19
Boron (B)-Dissolved			<0.010		mg/L		0.01	18-JUN-19
Cadmium (Cd)-Dissolved			<0.000005C		mg/L		0.000005	18-JUN-19
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	18-JUN-19
Cesium (Cs)-Dissolved			<0.000010		mg/L		0.00001	18-JUN-19
Chromium (Cr)-Dissolved			<0.00050		mg/L		0.0005	18-JUN-19
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	18-JUN-19
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	18-JUN-19
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	18-JUN-19
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	18-JUN-19
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	18-JUN-19
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	18-JUN-19
Manganese (Mn)-Dissolved			<0.00050		mg/L		0.0005	18-JUN-19
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	18-JUN-19
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	18-JUN-19
Phosphorus (P)-Dissolved			<0.050		mg/L		0.05	18-JUN-19
Potassium (K)-Dissolved			<0.050		mg/L		0.05	18-JUN-19
Rubidium (Rb)-Dissolved			<0.00020		mg/L		0.0002	18-JUN-19
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	18-JUN-19
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	18-JUN-19
Silver (Ag)-Dissolved			<0.000050		mg/L		0.00005	18-JUN-19
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	18-JUN-19
Strontium (Sr)-Dissolved			<0.0010		mg/L		0.001	18-JUN-19
Sulfur (S)-Dissolved			<0.50		mg/L		0.5	18-JUN-19
Tellurium (Te)-Dissolved			<0.00020		mg/L		0.0002	18-JUN-19
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	18-JUN-19
Thorium (Th)-Dissolved			<0.00010		mg/L		0.0001	18-JUN-19
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	18-JUN-19
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	18-JUN-19
Tungsten (W)-Dissolved			<0.00010		mg/L		0.0001	18-JUN-19

Quality Control Report

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Oakville ON L6H 0C3
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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4672659								
WG3080585-1 MB								
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	18-JUN-19
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	18-JUN-19
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	18-JUN-19
Zirconium (Zr)-Dissolved			<0.00020		mg/L		0.0002	18-JUN-19
WG3080585-5 MS		**WG3080585-3**						
Aluminum (Al)-Dissolved			98.7		%		70-130	18-JUN-19
Antimony (Sb)-Dissolved			94.2		%		70-130	18-JUN-19
Arsenic (As)-Dissolved			108.6		%		70-130	18-JUN-19
Barium (Ba)-Dissolved			94.6		%		70-130	18-JUN-19
Beryllium (Be)-Dissolved			101.9		%		70-130	18-JUN-19
Bismuth (Bi)-Dissolved			88.0		%		70-130	18-JUN-19
Boron (B)-Dissolved			92.9		%		70-130	18-JUN-19
Cadmium (Cd)-Dissolved			100.9		%		70-130	18-JUN-19
Calcium (Ca)-Dissolved			N/A	MS-B	%		-	18-JUN-19
Cesium (Cs)-Dissolved			97.2		%		70-130	18-JUN-19
Chromium (Cr)-Dissolved			98.5		%		70-130	18-JUN-19
Cobalt (Co)-Dissolved			N/A	MS-B	%		-	18-JUN-19
Copper (Cu)-Dissolved			96.1		%		70-130	18-JUN-19
Iron (Fe)-Dissolved			N/A	MS-B	%		-	18-JUN-19
Lead (Pb)-Dissolved			95.8		%		70-130	18-JUN-19
Lithium (Li)-Dissolved			91.9		%		70-130	18-JUN-19
Magnesium (Mg)-Dissolved			N/A	MS-B	%		-	18-JUN-19
Manganese (Mn)-Dissolved			N/A	MS-B	%		-	18-JUN-19
Molybdenum (Mo)-Dissolved			97.1		%		70-130	18-JUN-19
Nickel (Ni)-Dissolved			N/A	MS-B	%		-	18-JUN-19
Phosphorus (P)-Dissolved			115.9		%		70-130	18-JUN-19
Potassium (K)-Dissolved			102.5		%		70-130	18-JUN-19
Rubidium (Rb)-Dissolved			100.6		%		70-130	18-JUN-19
Selenium (Se)-Dissolved			120.1		%		70-130	18-JUN-19
Silicon (Si)-Dissolved			N/A	MS-B	%		-	18-JUN-19
Silver (Ag)-Dissolved			78.2		%		70-130	18-JUN-19
Sodium (Na)-Dissolved			96.9		%		70-130	18-JUN-19
Strontium (Sr)-Dissolved			N/A	MS-B	%		-	18-JUN-19
Sulfur (S)-Dissolved			N/A	MS-B	%		-	18-JUN-19

Quality Control Report

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Oakville ON L6H 0C3
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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4672659								
WG3080585-5 MS		**WG3080585-3**						
Tellurium (Te)-Dissolved			97.4		%		70-130	18-JUN-19
Thallium (Tl)-Dissolved			96.9		%		70-130	18-JUN-19
Thorium (Th)-Dissolved			93.1		%		70-130	18-JUN-19
Tin (Sn)-Dissolved			96.1		%		70-130	18-JUN-19
Titanium (Ti)-Dissolved			99.9		%		70-130	18-JUN-19
Tungsten (W)-Dissolved			96.0		%		70-130	18-JUN-19
Uranium (U)-Dissolved			92.2		%		70-130	18-JUN-19
Vanadium (V)-Dissolved			103.2		%		70-130	18-JUN-19
Zinc (Zn)-Dissolved			103.7		%		70-130	18-JUN-19
Zirconium (Zr)-Dissolved			94.6		%		70-130	18-JUN-19
MET-T-CCMS-WT	**Water**							
Batch R4673448								
WG3081157-4 DUP		**WG3081157-3**						
Aluminum (Al)-Total		<0.050	<0.050	RPD-NA	mg/L	N/A	20	19-JUN-19
Antimony (Sb)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	19-JUN-19
Arsenic (As)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	19-JUN-19
Barium (Ba)-Total		0.0124	0.0127		mg/L	2.0	20	19-JUN-19
Beryllium (Be)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	19-JUN-19
Bismuth (Bi)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	19-JUN-19
Boron (B)-Total		<0.10	<0.10	RPD-NA	mg/L	N/A	20	19-JUN-19
Cadmium (Cd)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	19-JUN-19
Calcium (Ca)-Total		90.2	90.3		mg/L	0.1	20	19-JUN-19
Chromium (Cr)-Total		1.69	1.70		mg/L	0.2	20	19-JUN-19
Cesium (Cs)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	19-JUN-19
Cobalt (Co)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	19-JUN-19
Copper (Cu)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	19-JUN-19
Iron (Fe)-Total		<0.10	<0.10	RPD-NA	mg/L	N/A	20	19-JUN-19
Lead (Pb)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	19-JUN-19
Lithium (Li)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	19-JUN-19
Magnesium (Mg)-Total		17.8	17.9		mg/L	0.8	20	19-JUN-19
Manganese (Mn)-Total		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	19-JUN-19
Molybdenum (Mo)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	19-JUN-19
Nickel (Ni)-Total		0.0106	0.0104		mg/L	2.0	20	19-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4673448								
WG3081157-4 DUP		**WG3081157-3**						
Phosphorus (P)-Total		<0.50	<0.50	RPD-NA	mg/L	N/A	20	19-JUN-19
Potassium (K)-Total		3.65	3.62		mg/L	0.6	20	19-JUN-19
Rubidium (Rb)-Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	19-JUN-19
Selenium (Se)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	19-JUN-19
Silicon (Si)-Total		2.9	3.0		mg/L	2.7	20	19-JUN-19
Silver (Ag)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	19-JUN-19
Sodium (Na)-Total		107	109		mg/L	1.3	20	19-JUN-19
Strontium (Sr)-Total		0.153	0.155		mg/L	1.0	20	19-JUN-19
Sulfur (S)-Total		9.5	10.2		mg/L	6.8	25	19-JUN-19
Thallium (Tl)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	19-JUN-19
Tellurium (Te)-Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	19-JUN-19
Thorium (Th)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	25	19-JUN-19
Tin (Sn)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	19-JUN-19
Titanium (Ti)-Total		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	19-JUN-19
Tungsten (W)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	19-JUN-19
Uranium (U)-Total		0.00068	0.00071		mg/L	3.8	20	19-JUN-19
Vanadium (V)-Total		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	19-JUN-19
Zinc (Zn)-Total		<0.030	<0.030	RPD-NA	mg/L	N/A	20	19-JUN-19
Zirconium (Zr)-Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	19-JUN-19
WG3081157-2 LCS								
Aluminum (Al)-Total			100.6		%		80-120	19-JUN-19
Antimony (Sb)-Total			104.1		%		80-120	19-JUN-19
Arsenic (As)-Total			99.8		%		80-120	19-JUN-19
Barium (Ba)-Total			102.6		%		80-120	19-JUN-19
Beryllium (Be)-Total			95.5		%		80-120	19-JUN-19
Bismuth (Bi)-Total			101.3		%		80-120	19-JUN-19
Boron (B)-Total			86.2		%		80-120	19-JUN-19
Cadmium (Cd)-Total			96.3		%		80-120	19-JUN-19
Calcium (Ca)-Total			98.1		%		80-120	19-JUN-19
Chromium (Cr)-Total			100.5		%		80-120	19-JUN-19
Cesium (Cs)-Total			101.9		%		80-120	19-JUN-19
Cobalt (Co)-Total			99.9		%		80-120	19-JUN-19
Copper (Cu)-Total			97.8		%		80-120	19-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4673448								
WG3081157-2 LCS								
Iron (Fe)-Total			102.0		%		80-120	19-JUN-19
Lead (Pb)-Total			102.3		%		80-120	19-JUN-19
Lithium (Li)-Total			93.5		%		80-120	19-JUN-19
Magnesium (Mg)-Total			100.7		%		80-120	19-JUN-19
Manganese (Mn)-Total			100.9		%		80-120	19-JUN-19
Molybdenum (Mo)-Total			101.2		%		80-120	19-JUN-19
Nickel (Ni)-Total			99.1		%		80-120	19-JUN-19
Phosphorus (P)-Total			105.3		%		70-130	19-JUN-19
Potassium (K)-Total			102.6		%		80-120	19-JUN-19
Rubidium (Rb)-Total			100.2		%		80-120	19-JUN-19
Selenium (Se)-Total			96.6		%		80-120	19-JUN-19
Silicon (Si)-Total			105.1		%		60-140	19-JUN-19
Silver (Ag)-Total			100.4		%		80-120	19-JUN-19
Sodium (Na)-Total			102.4		%		80-120	19-JUN-19
Strontium (Sr)-Total			102.4		%		80-120	19-JUN-19
Sulfur (S)-Total			97.3		%		80-120	19-JUN-19
Thallium (Tl)-Total			100.7		%		80-120	19-JUN-19
Tellurium (Te)-Total			92.4		%		80-120	19-JUN-19
Thorium (Th)-Total			99.9		%		70-130	19-JUN-19
Tin (Sn)-Total			99.0		%		80-120	19-JUN-19
Titanium (Ti)-Total			97.9		%		80-120	19-JUN-19
Tungsten (W)-Total			101.2		%		80-120	19-JUN-19
Uranium (U)-Total			102.9		%		80-120	19-JUN-19
Vanadium (V)-Total			101.0		%		80-120	19-JUN-19
Zinc (Zn)-Total			100.6		%		80-120	19-JUN-19
Zirconium (Zr)-Total			99.7		%		80-120	19-JUN-19
WG3081157-1 MB								
Aluminum (Al)-Total			<0.0050		mg/L		0.005	19-JUN-19
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	19-JUN-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	19-JUN-19
Barium (Ba)-Total			<0.00010		mg/L		0.0001	19-JUN-19
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	19-JUN-19
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	19-JUN-19
Boron (B)-Total			<0.010		mg/L		0.01	19-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4673448								
WG3081157-1 MB								
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	19-JUN-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	19-JUN-19
Chromium (Cr)-Total			<0.00050		mg/L		0.0005	19-JUN-19
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	19-JUN-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	19-JUN-19
Copper (Cu)-Total			<0.0010		mg/L		0.001	19-JUN-19
Iron (Fe)-Total			<0.010		mg/L		0.01	19-JUN-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	19-JUN-19
Lithium (Li)-Total			<0.0010		mg/L		0.001	19-JUN-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	19-JUN-19
Manganese (Mn)-Total			<0.00050		mg/L		0.0005	19-JUN-19
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	19-JUN-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	19-JUN-19
Phosphorus (P)-Total			<0.050		mg/L		0.05	19-JUN-19
Potassium (K)-Total			<0.050		mg/L		0.05	19-JUN-19
Rubidium (Rb)-Total			<0.00020		mg/L		0.0002	19-JUN-19
Selenium (Se)-Total			<0.000050		mg/L		0.00005	19-JUN-19
Silicon (Si)-Total			<0.10		mg/L		0.1	19-JUN-19
Silver (Ag)-Total			<0.000050		mg/L		0.00005	19-JUN-19
Sodium (Na)-Total			<0.050		mg/L		0.05	19-JUN-19
Strontium (Sr)-Total			<0.0010		mg/L		0.001	19-JUN-19
Sulfur (S)-Total			<0.50		mg/L		0.5	19-JUN-19
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	19-JUN-19
Tellurium (Te)-Total			<0.00020		mg/L		0.0002	19-JUN-19
Thorium (Th)-Total			<0.00010		mg/L		0.0001	19-JUN-19
Tin (Sn)-Total			<0.00010		mg/L		0.0001	19-JUN-19
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	19-JUN-19
Tungsten (W)-Total			<0.00010		mg/L		0.0001	19-JUN-19
Uranium (U)-Total			<0.000010		mg/L		0.00001	19-JUN-19
Vanadium (V)-Total			<0.00050		mg/L		0.0005	19-JUN-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	19-JUN-19
Zirconium (Zr)-Total			<0.00020		mg/L		0.0002	19-JUN-19
WG3081157-5 MS		**WG3081157-3**						
Aluminum (Al)-Total			100.1		%		70-130	19-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4673448								
WG3081157-5 MS		**WG3081157-3**						
Antimony (Sb)-Total			100.7		%		70-130	19-JUN-19
Arsenic (As)-Total			99.9		%		70-130	19-JUN-19
Barium (Ba)-Total			92.3		%		70-130	19-JUN-19
Beryllium (Be)-Total			100.0		%		70-130	19-JUN-19
Bismuth (Bi)-Total			97.9		%		70-130	19-JUN-19
Boron (B)-Total			83.1		%		70-130	19-JUN-19
Cadmium (Cd)-Total			96.0		%		70-130	19-JUN-19
Calcium (Ca)-Total			N/A	MS-B	%		-	19-JUN-19
Chromium (Cr)-Total			N/A	MS-B	%		-	19-JUN-19
Cesium (Cs)-Total			99.8		%		70-130	19-JUN-19
Cobalt (Co)-Total			97.8		%		70-130	19-JUN-19
Copper (Cu)-Total			97.8		%		70-130	19-JUN-19
Iron (Fe)-Total			100.9		%		70-130	19-JUN-19
Lead (Pb)-Total			99.0		%		70-130	19-JUN-19
Magnesium (Mg)-Total			N/A	MS-B	%		-	19-JUN-19
Manganese (Mn)-Total			96.7		%		70-130	19-JUN-19
Molybdenum (Mo)-Total			99.1		%		70-130	19-JUN-19
Nickel (Ni)-Total			96.3		%		70-130	19-JUN-19
Phosphorus (P)-Total			104.9		%		70-130	19-JUN-19
Potassium (K)-Total			N/A	MS-B	%		-	19-JUN-19
Rubidium (Rb)-Total			103.0		%		70-130	19-JUN-19
Selenium (Se)-Total			98.4		%		70-130	19-JUN-19
Silicon (Si)-Total			N/A	MS-B	%		-	19-JUN-19
Silver (Ag)-Total			97.0		%		70-130	19-JUN-19
Sodium (Na)-Total			N/A	MS-B	%		-	19-JUN-19
Strontium (Sr)-Total			N/A	MS-B	%		-	19-JUN-19
Sulfur (S)-Total			N/A	MS-B	%		-	19-JUN-19
Thallium (Tl)-Total			99.3		%		70-130	19-JUN-19
Tellurium (Te)-Total			98.5		%		70-130	19-JUN-19
Thorium (Th)-Total			94.9		%		70-130	19-JUN-19
Tin (Sn)-Total			98.1		%		70-130	19-JUN-19
Titanium (Ti)-Total			98.7		%		70-130	19-JUN-19
Tungsten (W)-Total			99.7		%		70-130	19-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4673448								
WG3081157-5 MS		**WG3081157-3**						
Uranium (U)-Total			N/A	MS-B	%		-	19-JUN-19
Vanadium (V)-Total			99.96		%		70-130	19-JUN-19
Zinc (Zn)-Total			99.7		%		70-130	19-JUN-19
Zirconium (Zr)-Total			99.9		%		70-130	19-JUN-19
NH3-F-WT	**Water**							
Batch R4672917								
WG3080650-19 DUP		**L2290839-1**						
Ammonia, Total (as N)		<0.010	<0.010	RPD-NA	mg/L	N/A	20	18-JUN-19
WG3080650-18 LCS								
Ammonia, Total (as N)			99.2		%		85-115	18-JUN-19
WG3080650-17 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	18-JUN-19
WG3080650-20 MS		**L2290839-1**						
Ammonia, Total (as N)			86.2		%		75-125	18-JUN-19
NO3-IC-WT	**Water**							
Batch R4674012								
WG3081366-4 DUP		**WG3081366-3**						
Nitrate (as N)		0.097	0.097		mg/L	0.2	20	19-JUN-19
WG3081366-2 LCS								
Nitrate (as N)			100.9		%		90-110	19-JUN-19
WG3081366-1 MB								
Nitrate (as N)			<0.020		mg/L		0.02	19-JUN-19
WG3081366-5 MS		**WG3081366-3**						
Nitrate (as N)			100.1		%		75-125	19-JUN-19
P-T-COL-WT	**Water**							
Batch R4673670								
WG3081040-3 DUP		**L2293039-1**						
Phosphorus, Total		0.0096	0.0094		mg/L	2.2	20	19-JUN-19
WG3081040-2 LCS								
Phosphorus, Total			99.6		%		80-120	19-JUN-19
WG3081040-1 MB								
Phosphorus, Total			<0.0030		mg/L		0.003	19-JUN-19
WG3081040-4 MS		**L2293039-1**						
Phosphorus, Total			100.4		%		70-130	19-JUN-19
PH-BF	**Water**							

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PH-BF	**Water**							
Batch R4672022								
WG3079768-2 DUP		**L2293039-2**						
pH		6.71	6.74	J	pH units	0.03	0.2	17-JUN-19
WG3079768-1 LCS								
pH			7.02		pH units		6.9-7.1	17-JUN-19
SO4-IC-N-WT	**Water**							
Batch R4674012								
WG3081366-4 DUP		**WG3081366-3**						
Sulfate (SO4)		10.4	10.4		mg/L	0.1	20	19-JUN-19
WG3081366-2 LCS								
Sulfate (SO4)			102.1		%		90-110	19-JUN-19
WG3081366-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	19-JUN-19
WG3081366-5 MS		**WG3081366-3**						
Sulfate (SO4)			104.6		%		75-125	19-JUN-19
SOLIDS-TDS-BF	**Water**							
Batch R4673058								
WG3079944-3 DUP		**L2293082-4**						
Total Dissolved Solids		33000	33200		mg/L	0.5	20	18-JUN-19
WG3079944-2 LCS								
Total Dissolved Solids			104.5		%		85-115	18-JUN-19
WG3079944-1 MB								
Total Dissolved Solids			<20		mg/L		20	18-JUN-19
Batch R4676267								
WG3081127-3 DUP		**L2293039-2**						
Total Dissolved Solids		457	436		mg/L	4.7	20	19-JUN-19
WG3081127-2 LCS								
Total Dissolved Solids			96.6		%		85-115	19-JUN-19
WG3081127-1 MB								
Total Dissolved Solids			<20		mg/L		20	19-JUN-19
SOLIDS-TSS-BF	**Water**							
Batch R4672091								
WG3079839-3 DUP		**L2293039-2**						
Total Suspended Solids		9.6	9.6		mg/L	0.0	25	17-JUN-19
WG3079839-2 LCS								
Total Suspended Solids			99.8		%		85-115	17-JUN-19
WG3079839-1 MB								
Total Suspended Solids			<2.0		mg/L		2	17-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TKN-WT	**Water**							
Batch R4674366								
WG3080816-3 DUP		**L2293039-2**						
Total Kjeldahl Nitrogen		0.63	0.60		mg/L	4.6	20	19-JUN-19
WG3080816-2 LCS								
Total Kjeldahl Nitrogen			103.2		%		75-125	19-JUN-19
WG3080816-1 MB								
Total Kjeldahl Nitrogen			<0.15		mg/L		0.15	19-JUN-19
WG3080816-4 MS		**L2293039-2**						
Total Kjeldahl Nitrogen			104.6		%		70-130	19-JUN-19
TOC-WT	**Water**							
Batch R4673217								
WG3080377-3 DUP		**L2291275-7**						
Total Organic Carbon		0.59	0.54		mg/L	8.7	20	18-JUN-19
WG3080377-2 LCS								
Total Organic Carbon			97.5		%		80-120	18-JUN-19
WG3080377-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	18-JUN-19
WG3080377-4 MS		**L2291275-7**						
Total Organic Carbon			97.0		%		70-130	18-JUN-19
TURBIDITY-WT	**Water**							
Batch R4673290								
WG3080340-3 DUP		**L2293238-2**						
Turbidity		2.65	2.66		NTU	0.4	15	19-JUN-19
WG3080340-2 LCS								
Turbidity			104.0		%		85-115	19-JUN-19
WG3080340-1 MB								
Turbidity			<0.10		NTU		0.1	19-JUN-19

Quality Control Report

Workorder: L2293039 Report Date: 19-JUL-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

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

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

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.

AquaTox Testing & Consulting Inc.
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TOXICITY TEST REPORT

Daphnia magna
EPS 1/RM/14

Work Order : 239474
Sample Number : 59519

SAMPLE IDENTIFICATION

Company :	ALS Laboratory Group, Waterloo	Date Collected :	2019-06-17
Location :	Waterloo ON	Time Collected :	09:25
Job Number :	L2293039-1	Date Received :	2019-06-18
Substance :	MS-08	Time Received :	13:00
Sampling Method :	Grab	Temperature on Receipt :	8.0 °C
Sampled By :	KB/LM/CP	Date Tested :	2019-06-18
Sample Description :	Cloudy, yellow, odourless.		

Test Method : Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*. Environment Canada EPS 1/RM/14 (Second Edition, December 2000, with February 2016 amendments).

48-HOUR TEST RESULTS

Substance	Effect	Value
Control	Mean Immobility	0.0 %
	Mean Mortality	0.0 %
100%	Mean Immobility	0.0 %
	Mean Mortality	0.0 %

The results reported relate only to the sample tested and as received.

TEST ORGANISM

Species :	*Daphnia magna*	Time to First Brood :	9.2 days
Organism Batch :	Dm19-11	Average Brood Size :	31.2 young
Culture Mortality :	0.0% (previous 7 days)		

TEST CONDITIONS

Sample Treatment :	None	Number of Replicates :	3
pH Adjustment :	None	Organisms / Replicate :	10
Pre-aeration Rate :	~30 mL/min/L	Organisms / Test Level :	30
Pre-aeration Time :	30 minutes	Organism Loading Rate :	15.0 mL/organism
Test Aeration :	None	Impaired Control Organisms :	0.0%
Hardness Adjustment :	None	Test Method Deviation(s) :	None

REFERENCE TOXICANT DATA

Toxicant :	Sodium Chloride	Historical Mean LC50 :	6.3 g/L
Date Tested :	2019-06-11	Warning Limits (± 2SD) :	5.6 - 7.0 g/L
LC50 :	6.7 g/L	Organism Batch :	Dm19-11
95% Confidence Limits :	6.4 - 7.0 g/L	Analyst(s) :	SV, MW, NM
Statistical Method :	Spearman-Kärber		

COMMENTS

All test validity criteria as specified in the test method were satisfied.

Date : 2019-06-24
yyyy-mm-dd

Approved By : _____
Project Manager

AQUATOX

TOXICITY TEST REPORT

Daphnia magna

EPS 1/RM/14

Work Order : 239474
Sample Number : 59519

TEST DATA

	pH	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	Temperature (°C)	O_2 Saturation (%)*	Hardness (as $CaCO_3$)
Initial Water Chemistry (100%) :	7.0	11.1	758	20.0	130	400 mg/L

0 HOURS

Date & Time 2019-06-18 14:40
Analyst(s) : KP

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O_2	Conductivity	Temperature	O_2 Saturation (%)*	Hardness
100	A	0	0	7.0	10.7	755	20.0	125	400
100	B	0	0	7.0	10.7	755	20.0	125	400
100	C	0	0	7.0	10.7	755	20.0	125	400
Control	A	0	0	8.6	8.6	787	20.0	100	200
Control	B	0	0	8.6	8.6	787	20.0	100	200
Control	C	0	0	8.6	8.6	787	20.0	100	200

Notes:

24 HOURS

Date & Time 2019-06-19 14:40
Analyst(s) : MJT

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O_2	Conductivity	Temperature
100	A	–	1	–	–	–	20.0
100	B	–	2	–	–	–	20.0
100	C	–	1	–	–	–	20.0
Control	A	–	0	–	–	–	20.0
Control	B	–	0	–	–	–	20.0
Control	C	–	0	–	–	–	20.0

Notes:

48 HOURS

Date & Time 2019-06-20 14:40
Analyst(s) : NM(SV)

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O_2	Conductivity	Temperature
100	A	0	0	7.4	8.1	756	20.0
100	B	0	0	7.4	8.1	758	20.0
100	C	0	0	7.4	8.2	786	20.0
Control	A	0	0	8.4	8.2	804	20.0
Control	B	0	0	8.4	8.1	804	20.0
Control	C	0	0	8.4	8.2	821	20.0

Notes: Test organisms in the 100% concentration appeared to be adhered to gas bubbles on the sides and bottom of the test chamber (NM).

Number immobile does not include number dead.

– = not measured/not required
* adjusted for temperature and barometric pressure

Test Data Reviewed By : FS
Date : 2019-06-24

AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

TOXICITY TEST REPORT

Rainbow Trout
EPS 1/RM/13

Work Order : 239474
Sample Number : 59519

SAMPLE IDENTIFICATION

Company :	ALS Laboratory Group, Waterloo	Date Collected :	2019-06-17
Location :	Waterloo ON	Time Collected :	09:25
Job Number :	L2293039-1	Date Received :	2019-06-18
Substance :	MS-08	Time Received :	13:00
Sampling Method :	Grab	Temperature on Receipt :	8.0 °C
Sampled By :	KB/LM/CP	Date Tested :	2019-06-18
Sample Description :	Cloudy, yellow, odourless.		

Test Method(s) : Reference Method for Determining Acute Lethality of Liquid Effluents to Rainbow Trout. Environment Canada, EPS 1/RM/13 (2nd Edition, December 2000, with May 2007 and February 2016 amendments).

96-HOUR TEST RESULTS

Substance	Effect	Value
Control	Mean Impairment	0.0 %
	Mean Mortality	0.0 %
100%	Mean Impairment	0.0 %
	Mean Mortality	0.0 %

The results reported relate only to the sample tested and as received.

TEST ORGANISM

Test Organism :	*Oncorhynchus mykiss*	Average Fork Length (± 2 SD) :	34.8 mm (±6.6)
Organism Batch :	T19-11	Range of Fork Lengths :	30 - 42 mm
Control Sample Size :	10	Average Wet Weight (± 2 SD) :	0.40 g (±0.20)
Cumulative stock tank mortality rate :	0% (previous 7 days)	Range of Wet Weights :	0.34 - 0.67 g
Control organisms showing stress :	0 (at test completion)	Organism Loading Rate :	0.2 g/L

TEST CONDITIONS

Sample Treatment :	None	Volume Tested (L) :	20
pH Adjustment :	None	Number of Replicates :	1
Test Aeration :	Yes	Organisms Per Replicate :	10
Pre-aeration/Aeration Rate :	6.5 ± 1 mL/min/L	Organisms Per Test Level :	10
Total Pre-Aeration Time :	120 minutes	Test Method Deviation(s) :	None

REFERENCE TOXICANT DATA

Toxicant :	Potassium Chloride	Date Tested :	2019-06-07
Organism Batch :	T19-11	Historical Mean LC50 :	3843 mg/L
LC50 :	3553 mg/L	Warning Limits (± 2SD) :	3265 - 4522 mg/L
95% Confidence Limits :	3111 - 3890 mg/L	Analyst(s) :	MW, TA, FS, KP
Statistical Method :	Linear Regression (MLE)		

COMMENTS

•All test validity criteria as specified in the test method were satisfied.

Date : 2019-06-24
yyyy-mm-dd

Approved By : *Project Manager*

Work Order : 239474
Sample Number : 59519

TEST DATA

	pH	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	Temperature (°C)	O_2 Saturation (%)*
Initial Water Chemistry (100%) :	7.8	10.8	763	14.0	–
After 30 min pre-aeration :	7.6	10.1	761	14.0	103

0 HOURS

Date & Time 2019-06-18 16:25
Analyst(s) : FS

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature	O_2 Saturation*
100%	0	0	7.7	9.9	760	14.0	101
Control	0	0	8.0	9.5	944	15.0	100

Notes:

24 HOURS

Date & Time 2019-06-19 16:25
Analyst(s) : TA

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	7.5	9.2	–	15.0
Control	0	0	–	–	–	15.0

Notes:

48 HOURS

Date & Time 2019-06-20 16:25
Analyst(s) : TA

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	7.3	9.2	–	15.0
Control	0	0	–	–	–	15.0

Notes:

72 HOURS

Date & Time 2019-06-21 16:25
Analyst(s) : TA

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	7.2	9.3	–	15.0
Control	0	0	–	–	–	15.0

Notes:

96 HOURS

Date & Time 2019-06-22 16:25
Analyst(s) : FS

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	7.5	9.3	765	15.0
Control	0	0	8.3	9.5	898	15.0

Notes:

"–" = not measured/not required
Number impaired does not include number dead.
* adjusted for temperature and barometric pressure

Test Data Reviewed By : FS
Date : 2019-06-24

CHAIN OF CUSTODY RECORD

AQUATOX

AquaTox Work Order No: 239474

Shipping Address: AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, Ontario Canada N0B 2J0

Voice: (519) 763-4412 **Fax:** (519) 763-4419

P.O. Number:	4500057496
Field Sampler Name (print):	KB/LM/CP
Signature:	KoButton
Affiliation:	Baffinland Iron Mine / ALS Environmental
Sample Storage (prior to shipping):	Cooler
Custody Relinquished by:	Kendra Button
Date/Time Shipped:	2019-06-17/20:00 RH

Client:	ALS Environmental c/o Baffinland Iron Mine Quote # (2019): 162705399-19
Phone:	(519) 886-6910
Fax:	(519) 886-9047
Contact:	Rick Hawthorne (ALS) / Martina Rendas (Aquatox)

Sample Identification					Analyses Requested									Sample Method and Volume		
Date Collected (yyyy-mm-dd)	Time Collected (e.g. 14:30, 24 hr clock)	Sample Name (L2293039-1)	AquaTox Sample Number	Temp. on arrival	Rainbow Trout Single Concentration	Rainbow Trout LC50	*Daphnia magna* Single Concentration	*Daphnia magna* LC50	Fathead Minnow Survival & Growth	*Ceriodaphnia dubia* Survival & Reproduction	*Lemna minor* Growth	*Pseudokirchneriella subcapitata* Growth	Other (please specify below)	Grab	Composite	# of Containers and Volume (eg. 2 x 1L, 3 x 10L, etc.)
2019-06-17	09:25	MS-08	59519	8.0	✓		✓		✓	✓	✓	✓	✓	✓		5 x 10LCarboy

For Lab Use Only	
Received By:	DV / MDH
Date:	2019-06-18
Time:	13:00
Storage Location:	
Storage Temp.(°C)	

Please list any special requests or instructions: "Other" Note: RISS upload required

Rush TAT w/ Daily updates. PH required.

Report Distribution: bimcore@alsglobal.com, rick.hawthorne@alsglobal.com

Sublethal submission #1 for BIM 2019 MDER

ALS Environmental

L2293039

WATERLOO

Subcontract Request Form

Subcontract To:

AQUATOX TESTING AND CONSULTING
11B NICHOLAS BEAVER ROAD
RR3
GUELPH,ON N1H 6H9

NOTES: Please reference on final report and invoice: PO# *L2293039*
ALS requires QC data to be provided with your final results.

Please see enclosed 1 **sample(s) in** 0 **Container(s)**

SAMPLE NUMBER	ANALYTICAL REQUIRED	DATE SAMPLED / DUE DATE	Priority Flag
L2293039-1 MS-08		6/ 17/ 2019	
	Special Request Aquatox (SPECIAL REQUEST2-AQT 14)	6/21/2019	
	Special Request Aquatox (SPECIAL REQUEST-AQT 14)	6/21/2019	

Subcontract Info Contact: Mary-Lynn Pike (519) 886-6910
Analysis and reporting info contact: Rick Hawthorne
60 NORTHLAND ROAD, UNIT 1
WATERLOO,ON N2V 2B8
Phone: (519) 886-6910 Email: Rick.Hawthorne@alsglobal.com

Please email confirmation of receipt to: **Rick.Hawthorne@alsglobal.com**

Shipped By: _____ Date Shipped: _____

Received By: _____ Date Received: _____

Verified By: _____ Date Verified: _____

Temperature: _____

Sample Integrity Issues: _____

AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

July 19, 2019

Rick Hawthorne
ALS Laboratory Group, Waterloo
60 Northland Road, Unit #1
Waterloo ON
N2V 2B8

Dear Rick,

Re: Report on Sublethal Toxicity Analysis of Wastewater for MDMER - June 2019

Enclosed are the reports for sublethal testing conducted on the sample of MS-08 collected 2019-06-17 . Data are presented in electronic format.

You have previously provided us with an 'ECCC Key' to access MERS (Mining Effluent Reporting System). As requested on the sample chain of custody, we would be pleased to enter this sublethal toxicity information on your behalf via MERS. In order for us to do so, you must first create the report 'Information related to effluent and water quality monitoring studies' in MERS. Once created, please indicate this in an email to reporter@aquatox.ca. We will enter the test data, and will notify you by email once data entry has been completed, however you are responsible for final submission of the data, as we do not have permissions to release the report.

If you have any questions about the results, do not hesitate to contact me.

Sincerely,

AQUATOX TESTING & CONSULTING INC.

Martina Rendas
Project Manager

MR/jl

AQUATOX
AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Rd.
Puslinch ON N0B 2J0
Tel: (519) 763-4412 Fax: (519) 763-4419

TOXICITY TEST REPORT

Fathead minnow
EPS 1/RM/22

Work Order : 239474
Sample Number : 59519

SAMPLE IDENTIFICATION

Company :	ALS Laboratory Group, Waterloo		
Location :	Waterloo ON	Sampled By :	KB/LM/CP
Job Number :	L2293039-1	Date Collected :	2019-06-17
Substance :	MS-08	Time Collected :	09:25
Sampling Method :	Grab	Date Received :	2019-06-18
Temp. on arrival :	8.0°C	Time Received :	13:00
Sample Description :	Cloudy, yellow, odourless.	Date Tested :	2019-06-19
Test Method :	Test of Larval Growth and Survival Using Fathead Minnows. Environment Canada, Conservation and Protection. Ottawa, Ontario. Report EPS 1/RM/22 , 2nd ed. (February 2011).		

TEST RESULTS

Effect	Value	95% Confidence Limits	Statistical Method
IC25 (Growth from Biomass)	>100%	-	-
LC50	>100%	-	-

The results reported relate only to the sample tested and as received.

POTASSIUM CHLORIDE REFERENCE TOXICANT DATA

Date Tested :	2019-06-27	Analyst(s) :	RK, TL, KJW
Organism Batch :	Fm19-06	Test Duration :	7 days
IC25 Growth (from Biomass) :	0.95 g/L	LC50 :	1.08 g/L
95% Confidence Limits :	0.89 - 1.00 g/L	95% Confidence Limits :	1.04 - 1.13 g/L
Statistical Method :	Linear Interpolation (CETIS)[a]	Statistical Method :	Spearman-Kärber (CETIS)[a]
Historical Mean IC25 :	0.93 g/L	Historical Mean LC50 :	1.07 g/L
Warning Limits (± 2SD) :	0.70 - 1.23 g/L	Warning Limits (± 2SD) :	0.92 - 1.26 g/L

The reference toxicity test was performed under the same experimental conditions as those used with the test sample.

TEST CONDITIONS

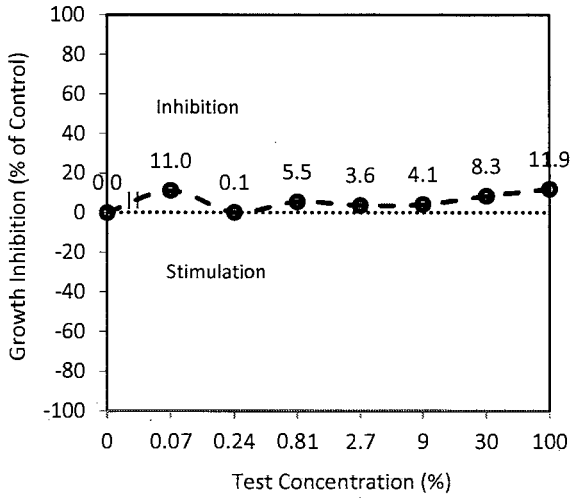
Test Organism :	*Pimephales promelas*	Test Type :	Static Renewal
Organism Batch :	Fm19-06	Control/Dilution Water :	Well water (no chemicals added)
Organism Age :	~07:00 - 20:20 h at start of test	Test Volume / Replicate :	300 mL
Source :	In-house culture	Test Vessel :	420 mL polystyrene beaker
Culture Mortality/Diseased :	0 % (previous 7 days)	Depth of Test Solution :	8 cm
pH Adjustment :	None	Organisms per Replicate :	10
Sample Filtration :	None	Number of Replicates :	3
Hardness Adjustment :	None	Daily Renewal Method :	80-85% syphoned and replaced
Test Aeration :	None	Test Method Deviation(s):	None

COMMENTS

•All test validity criteria as specified in the test method cited above were satisfied.
•No organisms exhibiting unusual appearance, behaviour, or undergoing unusual treatment were used in the test.
•Inflated swim bladders were confirmed in all test organisms used in this test.

Work Order : 239474
Sample Number : 59519

Fathead Minnow Growth Inhibition (based on Biomass)



REFERENCES

[a] CETIS™, © 2000-2018. V.1.9.4.7. Comprehensive Environmental Toxicity Information System. Tidepool Scientific Software, LLC, McKinleyville, CA 95519 [Program on disk and printed User's Guide].

[b] Grubbs, F.E., 1969. Procedures for detecting outlying observations in samples. *Technometrics, 11* :1-21.

Date : 2019-07-18
yyyy-mm-dd

Approved By : *Project Manager*

AQUATOX

TOXICITY TEST REPORT

Fathead minnow
EPS 1/RM/22

Work Order : 239474
Sample Number : 59519

CUMULATIVE DAILY CONTROL MORTALITY AND IMPAIRMENT (±SD)

Date :	2019-06-19	2019-06-20	2019-06-21	2019-06-22	2019-06-23	2019-06-24	2019-06-25	2019-06-26
	0.00% (±0.0)	0.00% (±0.0)	0.00% (±0.0)	0.00% (±0.0)	0.00% (±0.0)	0.00% (±0.0)	0.00% (±0.0)	0.00% (±0.0)

FATHEAD MINNOW CUMULATIVE DAILY MORTALITY

Initiation Time : 12:00
Initiation Date : 2019-06-19
Completion Date : 2019-06-26

		Day 0		Day 1		Day 2		Day 3		Day 4		Day 5		Day 6		Day 7		Treatment Mean Mortality (± SD)
Date :		2019-06-19		2019-06-20		2019-06-21		2019-06-22		2019-06-23		2019-06-24		2019-06-25		2019-06-26		
Analyst(s):		KJW(SEW)		MV		SEW		EJS		EJS		SV		MV		KJW(SEW)		
Concentration		Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	%
(%)	Replicate	Dead	Dead	Dead	Dead	Dead	Dead	Dead	Dead	Dead	Dead	Dead	Dead	Dead	Dead	Dead	Dead	
	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
Control	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**0.00 (±0.00)**
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
0.07	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**0.00 (±0.00)**
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
0.24	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**0.00 (±0.00)**
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
0.81	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**0.00 (±0.00)**
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
2.7	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**0.00 (±0.00)**
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
9	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**0.00 (±0.00)**
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
30	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**3.33 (±5.77)**
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	1	**10**	1	**10**	1	**10**	
	A	0	**0**	0	**0**	0	**0**	0	**0**	1	**10**	1	**10**	1	**10**	1	**10**	
100	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**3.33 (±5.77)**
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	

Aberrant behaviour or swimming impairment : None

Test Data Reviewed By: VC
Date : 2019-07-17

Work Order : 239474
Sample Number : 59519

FATHEAD MINNOW DRY WEIGHT AND BIOMASS DATA

Concentration (%)	Replicate	Number of Larvae Exposed	Replicate Mean Dry Weight (mg)	Treatment Mean Biomass (mg)	Standard Deviation
Control	A	10	0.875	0.801	0.072
	B	10	0.796		
	C	10	0.731		
0.07	A	10	0.779	0.713	0.075
	B	10	0.728		
	C	10	0.631		
0.24	A	10	0.790	0.800	0.015
	B	10	0.792		
	C	10	0.817		
0.81	A	10	0.735[1]	0.757	0.019
	B	10	0.769		
	C	10	0.767		
2.7	A	10	0.773	0.772	0.004
	B	10	0.775		
	C	10	0.767		
9	A	10	0.680	0.768	0.083
	B	10	0.778		
	C	10	0.846		
30	A	10	0.712	0.734	0.037
	B	10	0.777		
	C	10	0.713		
100	A	10	0.658	0.706	0.043
	B	10	0.741		
	C	10	0.718		

NOTES :

- [1]Outlier according to Grubbs Test[b]. Outlying data points were not excluded from statistical analysis, since they could not be attributed to error.
- Control average dry weight per surviving organism = 0.801 mg

Test Data Reviewed By: VC
Date : 2019-07-17

AQUATOX

TOXICITY TEST REPORT

Fathead minnow
EPS 1/RM/22

Work Order : 239474
Sample Number: 59519

WATER CHEMISTRY DATA

Initial Chemistry:	Temp. (°C)	DO (mg/L)	pH	Conductivity (µmhos/cm)	Hardness (mg/L as $CaCO_3$)
	25.0	9.5	6.7	735	400

		Day 0 - 1 2019-06-19	Day 1 - 2 2019-06-20	Day 2 - 3 2019-06-21	Day 3 - 4 2019-06-22	Day 4 - 5 2019-06-23	Day 5 - 6 2019-06-24	Day 6 - 7 2019-06-25
Sub-sample Used		1	1	1	2	2	3	3
Temperature (°C)		25.0	24.0	24.0	24.5	24.0	24.0	24.0
Dissolved Oxygen (mg/L)		9.5	9.7	9.4	9.6	10.9	10.0	9.6
Dissolved Oxygen % Sat.[2]		116	119	114	116	131	122	117
pH		6.7	6.6	6.7	6.8	7.0	7.1	6.8
Pre-aeration Time (min)[3]		20	20	20	20	20	20	20
Analyst(s) :	Initial	MDH(SEW)	KJW(SEW)	KJW(SEW)	BZ	BZ	RK	RK
	Final	RK	SEW	SEW	EJS	SV	MV	KJW(SEW)
Control (0%)								
Temp.(°C)	Initial	25.0	25.0	25.0	24.0	24.0	24.0	25.0
	Final	24.0	25.0	24.0	24.0	24.5	24.5	24.0
DO % Sat.	Initial	99	100	100	99	100	100	100
DO (mg/L)	Initial	8.0	8.1	8.2	8.2	8.3	8.2	8.1
	Final	8.1	6.5	7.4	6.8	7.3	7.3	7.4
pH	Initial	8.4	8.5	8.4	8.4	8.4	8.3	8.4
	Final	8.3	8.0	8.2	8.2	8.0	8.1	8.1
Cond. (µmhos/cm)	Initial	716	759	754	764	754	760	733
0.07 %								
Temp.(°C)	Initial	25.0	25.0	25.0	24.0	24.0	24.0	25.0
	Final	24.0	25.0	24.0	24.0	24.5	24.5	24.0
DO (mg/L)	Initial	8.1	8.2	8.2	8.3	8.4	8.3	8.1
	Final	8.2	6.6	7.4	6.9	7.4	7.4	7.6
pH	Initial	8.4	8.4	8.4	8.4	8.5	8.3	8.3
	Final	8.3	8.0	8.2	8.2	8.1	8.1	8.1
Cond. (µmhos/cm)	Initial	709	752	761	768	760	740	733
9 %								
Temp.(°C)	Initial	25.0	25.0	25.0	24.0	24.0	24.0	25.0
	Final	24.0	25.0	24.0	24.0	24.5	24.5	24.0
DO (mg/L)	Initial	8.1	8.2	8.3	8.5	8.5	8.4	8.2
	Final	8.0	6.5	7.2	6.5	7.3	7.4	7.5
pH	Initial	8.3	8.4	8.4	8.4	8.5	8.4	8.3
	Final	8.2	8.0	8.1	8.1	8.0	8.0	8.1
Cond. (µmhos/cm)	Initial	711	756	763	766	764	739	739
30 %								
Temp.(°C)	Initial	25.0	25.0	25.0	24.0	24.0	24.0	25.0
	Final	24.0	25.0	24.0	24.0	24.5	24.5	24.0
DO (mg/L)	Initial	8.9	8.9	8.5	9.0	10.1	9.1	8.9
	Final	7.9	7.1	7.3	6.9	7.4	7.5	7.6
pH	Initial	7.1	6.9	7.1	7.2	7.3	7.0	7.0
	Final	7.3	7.2	7.2	7.3	7.0	7.0	6.9
Cond. (µmhos/cm)	Initial	736	738	745	751	741	741	740

"–" = not measured

[2] % saturation (adjusted for actual temperature and barometric pressure)

[3] ≤100 bubbles/minute

Test Data Reviewed By : VC
Date: 2019-07-17

AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Rd.
Puslinch ON N0B 2J0
Tel: (519) 763-4412 Fax: (519) 763-4419

TOXICITY TEST REPORT

Ceriodaphnia dubia
EPS 1/RM/21

Work Order : 239474
Sample Number : 59519

SAMPLE IDENTIFICATION

Company :	ALS Laboratory Group, Waterloo		
Location :	Waterloo ON	Sampled By :	KB/LM/CP
Job Number :	L2293039-1	Date Collected :	2019-06-17
Substance :	MS-08	Time Collected :	09:25
Sampling Method :	Grab	Date Received :	2019-06-18
Temp. on arrival :	8.0°C	Time Received :	13:00
Sample Description :	Cloudy, yellow, odourless.	Date Tested :	2019-06-19

Test Method : Test of Reproduction and Survival using the Cladoceran *Ceriodaphnia dubia*. Environment Canada, Conservation and Protection. Ottawa, Ontario. Report EPS 1/RM/21, 2nd ed. (February 2007).

TEST RESULTS

Effect	Value	95% Confidence Limits	Statistical Method
LC50	>100%	-	-
IC25 (Reproduction)	37.4%	9.92-72.2	Linear Interpolation (TOXSTAT) d

The results reported relate only to the sample tested and as received.

SODIUM CHLORIDE REFERENCE TOXICANT DATA

Date Tested :	2019-06-25	Analyst(s) :	CG, MJT, RK
Organism Batch :	Cd19-06	Test Duration :	7 days
IC25 Reproduction :	1.35 g/L	LC50 :	2.32 g/L
95% Confidence Limits :	1.16 - 1.53 g/L	95% Confidence Limits :	1.80 - 3.00 g/L
Statistical Method :	Linear Interpolation (CETIS)[a]	Statistical Method :	Binomial (CETIS)[a]
Historical Mean IC25 :	1.27 g/L	Historical Mean LC50 :	2.19 g/L
Warning Limits (± 2SD) :	0.76 - 2.13 g/L	Warning Limits (± 2SD) :	1.55 - 3.09 g/L

The reference toxicity test was performed under the same experimental conditions as those used with the test sample.

TEST CONDITIONS

Sample Filtration :	None	Test Volume per Replicate :	15 mL
Test Aeration :	None	Test Vessel :	19 mL polystyrene vial
pH Adjustment :	None	Depth of Test Solution :	4.8 cm
Hardness Adjustment :	None	Organisms per Replicate :	1
Daily Renewal Method :	Transferred to fresh solutions	Number of Replicates :	10
Control/Dilution Water :	Well water (no chemicals added)	Test Method Deviation(s) :	None

COMMENTS

•All test validity criteria as specified in the test method cited above were satisfied.
•Statistical analysis could not be performed using non linear regression, since a suitable model could not be found. Therefore, test results were calculated using Linear Interpolation (Toxstat)[d]. In test concentrations where reproduction was stimulated (greater than the control), data were replaced with control values for the purposes of statistical analysis, as recommended by Environment Canada (2005).

Work Order : 239474
Sample Number : 59519

TEST ORGANISMS

Test Organism :	*Ceriodaphnia dubia*	Range of Age (at start of test) :	05:10 h - 17:10 h
Organism Batch :	Cd19-06	Mean Brood Organism Mortality :	0%
Organism Origin :	Single in-house mass culture	Ephippia in Culture :	No
Test Organism Origin :	Individual in-house cultures		

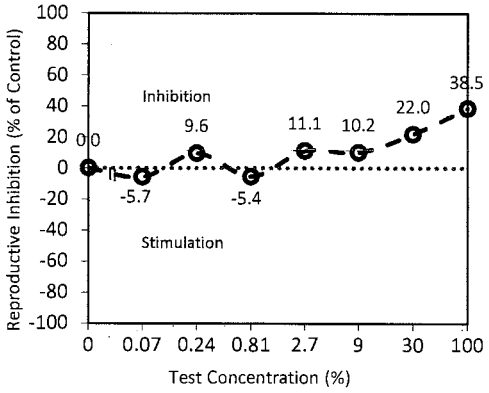
Brood Organism Neonate Production

Replicate :	1	2	3	4	5	6	7	8	9	10	Mean
Total (third or subsequent brood):	18	17	19	17	17	10	18	20	12	19	16.7
Total (first three broods):	25	24	29	24	25	23	23	27	25	25	25.0

No organisms exhibiting unusual appearance, behaviour, or undergoing unusual treatment were used in the test.

TEST DATA

***Ceriodaphnia dubia* Reproductive Inhibition**



Cumulative Daily Test Organism Mortality (%)

		Test Concentration (%)							
Date	**Test Day**	Control	0.07	0.24	0.81	2.7	9	30	100
2019-06-20	1	0	0	0	0	0	0	0	0
2019-06-21	2	0	0	0	0	0	0	0	0
2019-06-22	3	0	0	0	0	0	0	0	0
2019-06-23	4	0	0	0	0	0	0	0	10
2019-06-24	5	0	0	0	0	0	0	0	20
2019-06-25	6	0	0	0	0	0	0	0	20
Total Mortality (%)		0	0	0	0	0	0	0	20

REFERENCES

[a] CETIS™, © 2000-2018. V.1.9.4.7. Comprehensive Environmental Toxicity Information System. Tidepool Scientific Software, LLC, McKinleyville, CA 95519 [Program on disk and printed User's Guide].

[d] West, Inc. and D. Gulley. 1996. Toxstat Release 3.5. Western Ecosystems Technology. Cheyenne, WY, U.S.A.

Environment Canada, 2005. Guidance Document on Statistical Methods for Environmental Toxicity Tests. Environmental Protection Series, Ottawa, Ont., Rept. EPS 1/RM/46.

Date : 2019-07-19
yyyy-mm-dd

Approved By : _____
Project Manager

AQUATOX

TOXICITY TEST REPORT

Ceriodaphnia dubia
EPS 1/RM/21

Work Order : 239474
Sample Number : 59519

Ceriodaphnia dubia Survival and Reproduction

Test Initiation Date : 2019-06-19
Initiation Time : 11:10
Test Completion Date : 2019-06-25

Concentration (%) Control	Day	Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)	Analyst(s)
2019-06-20	1	0	0	0	0	0	0	0	0	0	0	0	MV
2019-06-21	2	0	0	0	0	0	0	0	0	0	0	0	MJT(SEW)
2019-06-22	3	0	0	0	0	0	0	0	0	0	0	0	FS
2019-06-23	4	4	5	4	8	6	6	7	7	7	5	5.9	BZ
2019-06-24	5	9	10	14	11	9	11	9	12	15	13	11.3	RK
2019-06-25	6	15	14	12	15	16	17	11	12	16	14	14.2	CG
Total		**28**	**29**	**30**	**34**	**31**	**34**	**27**	**31**	**38**	**32**	**31.4 (±3.3)**	

Concentration (%) 2.7	Day	Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2019-06-20	1	0	0	0	0	0	0	0	0	0	0	0
2019-06-21	2	0	0	0	0	0	0	0	0	0	0	0
2019-06-22	3	0	0	0	0	0	0	0	0	0	0	0
2019-06-23	4	1	3	4	7	7	4	6	4	5	4	4.5
2019-06-24	5	13	11	12	12	14	12	10	9	11	11	11.5
2019-06-25	6	14	14	6	15	12	15	10	8	12	13	11.9
Total		**28**	**28**	**22**	**34**	**33**	**31**	**26**	**21**	**28**	**28**	**27.9 (±4.2)**

Concentration (%) 0.07	Day	Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2019-06-20	1	0	0	0	0	0	0	0	0	0	0	0
2019-06-21	2	0	0	0	0	0	0	0	0	0	0	0
2019-06-22	3	0	0	0	0	0	0	0	0	0	0	0
2019-06-23	4	5	6	6	0	7	9	5	5	0	7	5
2019-06-24	5	11	14	8	15	8	13	12	13	14	15	12.3
2019-06-25	6	15	16	15	16	14	16	16	17	18	16	15.9
Total		**31**	**36**	**29**	**31**	**29**	**38**	**33**	**35**	**32**	**38**	**33.2 (±3.4)**

Concentration (%) 9	Day	Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2019-06-20	1	0	0	0	0	0	0	0	0	0	0	0
2019-06-21	2	0	0	0	0	0	0	0	0	0	0	0
2019-06-22	3	0	0	0	0	0	0	0	0	0	0	0
2019-06-23	4	8	5	7	7	6	6	6	7	4	5	6.1
2019-06-24	5	13	10	15	14	13	10	12	10	10	11	11.8
2019-06-25	6	14	13	14	15	15	0	11	8	0	13	10.3
Total		**35**	**28**	**36**	**36**	**34**	**16**	**29**	**25**	**14**	**29**	**28.2 (±7.9)**

Concentration (%) 0.24	Day	Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2019-06-20	1	0	0	0	0	0	0	0	0	0	0	0
2019-06-21	2	0	0	0	0	0	0	0	0	0	0	0
2019-06-22	3	0	0	0	0	0	0	0	0	0	0	0
2019-06-23	4	4	4	5	6	8	7	6	5	6	7	5.8
2019-06-24	5	10	12	11	13	10	12	10	11	11	12	11.2
2019-06-25	6	13	15	14	17	0	16	0	12	11	16	11.4
Total		**27**	**31**	**30**	**36**	**18**	**35**	**16**	**28**	**28**	**35**	**28.4 (±6.8)**

Concentration (%) 30	Day	Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2019-06-20	1	0	0	0	0	0	0	0	0	0	0	0
2019-06-21	2	0	0	0	0	0	0	0	0	0	0	0
2019-06-22	3	0	0	0	0	0	0	0	0	0	0	0
2019-06-23	4	4	6	4	6	5	5	6	5	6	6	5.3
2019-06-24	5	9	13	10	12	5	8	12	10	13	12	10.4
2019-06-25	6	10	10	0	12	0	11	12	10	9	14	8.8
Total		**23**	**29**	**14**	**30**	**10**	**24**	**30**	**25**	**28**	**32**	**24.5 (±7.2)**

Concentration (%) 0.81	Day	Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2019-06-20	1	0	0	0	0	0	0	0	0	0	0	0
2019-06-21	2	0	0	0	0	0	0	0	0	0	0	0
2019-06-22	3	0	0	0	0	0	0	0	0	0	0	0
2019-06-23	4	5	7	6	7	6	6	8	5	5	7	6.2
2019-06-24	5	12	10	13	10	14	14	13	12	12	14	12.4
2019-06-25	6	15	13	15	14	15	12	16	13	14	18	14.5
Total		**32**	**30**	**34**	**31**	**35**	**32**	**37**	**30**	**31**	**39**	**33.1 (±3.1)**

Concentration (%) 100	Day	Replicate 1	2	3	4	5	6	7	8	9	10	Mean Young (±SD)
2019-06-20	1	0	0	0	0	0	0	0	0	0	0	0
2019-06-21	2	0	0	0	0	0	0	0	0	0	0	0
2019-06-22	3	0	0	0	0	0	0	0	0	0	0	0
2019-06-23	4	5	5	4	4	3	6	9	6	2	x 1	4.5
2019-06-24	5	10	11	13	9	9	13	10	9	0	0 x	8.4
2019-06-25	6	12	11	11	12	0	6	12	0	0	0	6.4
Total		**27**	**27**	**28**	**25**	**12**	**25**	**31**	**15**	**2**	**1**	**19.3 (±11.1)**

NOTES : •All young produced by a test organism during its fourth and subsequent broods were discarded and not included in the above counts. The presence of two or more neonates in any test chamber, during any given day of the test, constitutes a brood.

•No outlying data points were detected according to Grubbs Test (CETIS)[a].

"x"= test organism mortality
"*"= accidental test organism mortality
"–"=4th brood (see 'NOTES')

Data Reviewed By : VC
Date : 2019-07-16

Work Order : 239474
Sample Number: 59519

Ceriodaphnia dubia Water Chemistry Data

	Initial Chemistry:	Temp. (°C)	DO (mg/L)	pH	Conductivity (µmhos/cm)	Hardness (mg/L as $CaCO_3$)
		25.0	9.5	6.7	735	400

Date :		Day 0 - 1 2019-06-19	Day 1 - 2 2019-06-20	Day 2 - 3 2019-06-21	Day 3 - 4 2019-06-22	Day 4 - 5 2019-06-23	Day 5 - 6 2019-06-24
Sub-sample Used		1	1	1	2	2	3
Temperature (°C)		25.0	24.0	24.0	24.5	24.0	24.0
Dissolved Oxygen (mg/L)		9.5	9.7	9.4	9.6	10.9	10.0
Dissolved Oxygen % Sat.[1]		116	119	114	116	131	122
pH		6.7	6.6	6.7	6.8	7.0	7.1
Pre-aeration Time (min)[2]		20	20	20	20	20	20
Analyst(s)	Initial	MDH(SEW)	KJW(SEW)	KJW(SEW)	BZ	BZ	RK
	Final	MV	KJW(SEW)	SEW	KJW(SEW)	RK	CG
Control (0%)							
Temp. (°C)	Initial	25.0	25.0	25.0	24.0	24.0	24.0
	Final	24.0	24.0	24.0	24.0	25.0	24.0
DO % Sat.[1]	Initial	99	100	100	99	100	100
DO (mg/L)	Initial	8.0	8.1	8.2	8.2	8.3	8.2
	Final	7.6	7.8	7.5	7.6	7.5	7.5
pH	Initial	8.4	8.5	8.4	8.4	8.4	8.3
	Final	8.2	8.3	8.2	8.2	8.1	8.1
Cond. (µmhos/cm)	Initial	716	759	754	764	754	760
0.07 %							
Temp. (°C)	Initial	25.0	25.0	25.0	24.0	24.0	24.0
	Final	24.0	24.0	24.0	24.0	25.0	24.0
DO (mg/L)	Initial	8.1	8.2	8.2	8.3	8.4	8.3
	Final	7.7	7.9	7.7	7.8	7.7	7.6
pH	Initial	8.4	8.4	8.4	8.4	8.5	8.3
	Final	8.2	8.3	8.2	8.3	8.2	8.2
Cond. (µmhos/cm)	Initial	709	752	761	768	760	740
9 %							
Temp. (°C)	Initial	25.0	25.0	25.0	24.0	24.0	24.0
	Final	24.0	24.0	24.0	24.0	25.0	24.0
DO (mg/L)	Initial	8.1	8.2	8.3	8.5	8.5	8.4
	Final	7.6	7.9	7.6	7.7	7.5	7.5
pH	Initial	8.3	8.4	8.4	8.4	8.5	8.4
	Final	8.2	8.2	8.2	8.2	8.1	8.1
Cond. (µmhos/cm)	Initial	711	756	763	766	764	739
100 %							
Temp. (°C)	Initial	25.0	25.0	25.0	24.0	24.0	24.0
	Final	24.0	24.0	24.0	24.0	25.0	24.0
DO (mg/L)	Initial	8.9	8.9	8.5	9.0	10.1	9.1
	Final	7.7	7.9	7.9	7.9	7.9	7.8
pH	Initial	7.1	6.9	7.1	7.2	7.3	7.0
	Final	7.3	7.2	7.4	7.3	7.3	7.3
Cond. (µmhos/cm)	Initial	736	738	745	751	741	741

"–" = not measured

[1] % saturation (adjusted for actual temperature and barometric pressure)

[2] ≤100 bubbles/minute

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Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

TOXICITY TEST REPORT

Pseudokirchneriella subcapitata
EPS 1/RM/25

Work Order : 239474
Sample Number : 59519

SAMPLE IDENTIFICATION

Company :	ALS Laboratory Group, Waterloo	Date Collected :	2019-06-17
Location :	Waterloo ON	Time Collected :	09:25
Job Number :	L2293039-1	Date Received :	2019-06-18
Substance :	MS-08	Time Received :	13:00
Sampling Method :	Grab	Temperature on Receipt :	8.0 °C
Sampled By :	KB/LM/CP	Date Tested :	2019-06-20

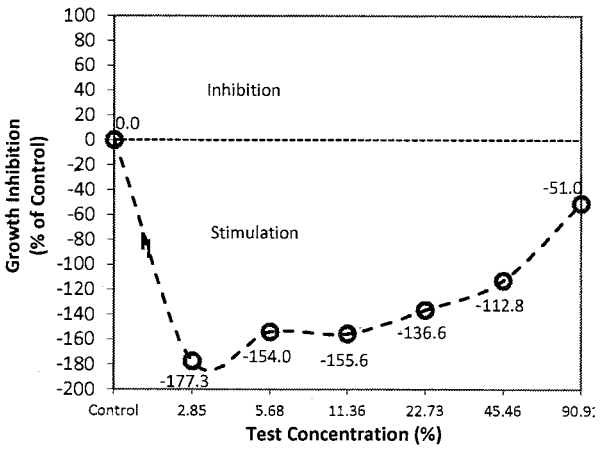
Sample Description : Cloudy, yellow, odourless.

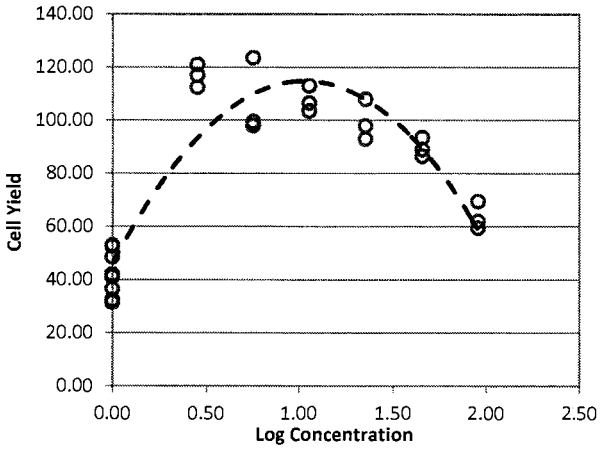
Test Method : Growth Inhibition Test Using a Freshwater Alga. Environment Canada, Conservation and Protection. Ottawa, Ontario. Report EPS 1/RM/25, 2nd ed. (March 2007).

72-HOUR TEST RESULTS

Effect	Value	95% Confidence Limits	Statistical Method
IC25 (Growth)	>90.91%	–	–

The results reported relate only to the sample tested and as received.





REFERENCE TOXICANT DATA

Toxicant :	Zinc (as Zinc Sulfate)	Historical Mean IC25 :	8.3 µg/L
Date Tested :	2019-06-25	Warning Limits (± 2SD) :	3.9 - 17.9 µg/L
IC25 Growth :	11.0 µg/L	Analyst(s) :	AS, RK, MDH, CG
95% Confidence Limits :	9.2 - 12.9 µg/L	Test Duration :	72 hours
Statistical Method :	Non-Linear Regression (CETIS)[a]		

The reference toxicity test was performed under the same experimental conditions as those used with the test sample.

COMMENTS

•All test validity criteria as specified in the test method cited above were satisfied.

Date : 2019-07-19
yyyy-mm-dd

Approved By : *Project Manager*

Work Order : 239474
Sample Number : 59519

TEST ORGANISM

Test Organism :	*Pseudokirchneriella subcapitata*	Organism Batch :	Ps19-06
Culture Origin :	University of Waterloo, Waterloo ON	Cell Density at 0-h :	10955 cells/mL
Strain Number :	CPCC 37	Inoculum Prepared :	15 min. prior to test initiation
Inoculum Source :	In-house culture	Age (at start of test) :	3 days (in exponential growth)

•Algal growth curve is determined at least twice per year as required by the test method cited above.
•No unusual appearance or treatment of culture prior to testing.

TEST CONDITIONS

Test Type :	Static	Volume per Replicate :	220 µL
Test Duration :	72 hours	Control Replicates :	10
Mean Temperature (± SD):	24.5°C (± 0.0)	Test Replicates :	4
Sample Pre-aeration :	None	Concentrations Tested :	10 + Control
Sample Filtration :	0.45 µm preconditioned filter	Photoperiod :	Continuous light
Volume Filtered:	≥10 mL	Light Intensity :	4020-4380 lux
Control/Dilution Water :	Millipore Milli-Q (no chemicals added)	Initial pH (100% sample) :	6.7
Enrichment Medium :	Stock 2B: EDTA reduced to 25%	pH Adjustment :	None
Test Vessel :	U-shaped polystyrene microplate	Hardness Adjustment :	None
Enumeration Method :	Manual (haemocytometer)	Test Method Deviation(s) :	None

CELL COUNTS AT 72-HOURS

Initiated By :	MJT	Control pH (at 0 hours) :	6.5
Date Counted :	2019-06-23	Control pH (at 72 hours) :	7.0
Counted By :	VC	Control Increase Factor :	39.4 times growth

Concentration	Cell Concentration (x 10000 cells/mL) Replicate								Cell Yield (x 10000 cells/mL)				
%	1	2	3	4	7	8	9	10	Mean	Standard Deviation	CV (%)	Stimulation (% of control)	
Control	42.0	49.5	53.5	32.5	54.0	43.0	33.5	37.5	42.09	8.49	20.2	–	
0.18	–	–	–	–	–	–	–	–	–	–	–	–	
0.35	–	–	–	–	–	–	–	–	–	–	–	–	
0.71	–	–	–	–	–	–	–	–	–	–	–	–	
1.42	–	–	–	–	–	–	–	–	–	–	–	–	
2.85	118.0	122.0	113.5	–	–	–	–	–	116.74	4.25	3.6	177.3	*
5.68	124.5	100.5	99.0	–	–	–	–	–	106.90	14.31	13.4	154.0	*
11.36	104.5	114.0	107.5	–	–	–	–	–	107.57	4.86	4.5	155.6	*
22.73	109.0	94.0	99.0	–	–	–	–	–	99.57	7.64	7.7	136.6	*
45.46	94.5	90.0	87.5	–	–	–	–	–	89.57	3.55	4.0	112.8	*
90.91	63.0	60.5	70.5	–	–	–	–	–	63.57	5.20	8.2	51.0	*

NOTES : *Statistically significant stimulation, according to ANOVA/Dunnett Multiple Comparison Test (CETIS)a, (α=0.05) .

- Control replicates 5 and 6 used for pH measurement.
- The Mann-Kendall test shows that there is no inhibitory gradient (α=0.05).
- No outlying data points were detected according to Grubbs Test (CETIS)[a].

"–" = not counted/not required

Test Data Reviewed By : VC

Date : 2019-07-17

REFERENCES

[a] CETIS™, © 2000-2018. V.1.9.4.7. Comprehensive Environmental Toxicity Information System. Tidepool Scientific Software, LLC, McKinleyville, CA 95519 [Program on disk and printed User's Guide].

AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Rd.
Puslinch ON N0B 2J0
Tel: (519) 763-4412 Fax: (519) 763-4419

TOXICITY TEST REPORT

Lemna minor
EPS 1/RM/37

Work Order : 239474
Sample Number : 59519

SAMPLE IDENTIFICATION

Company :	ALS Laboratory Group, Waterloo	Date Collected :	2019-06-17
Location :	Waterloo ON	Time Collected :	09:25
Substance :	MS-08	Date Received :	2019-06-18
Job Number :	L2293039-1	Time Received :	13:00
Sampling Method :	Grab	Temp. on arrival :	8.0°C
Sampled By :	KB/LM/CP	Date Tested :	2019-06-20
Sample Description :	Cloudy, yellow, odourless.		

Test Method : Test for Measuring the Inhibition of Growth using the Freshwater Macrophyte, *Lemna minor*. Method Development and Application Section, Environmental Technology Centre, Environment Canada. Ottawa, Ontario. Report EPS 1/RM/37, 2nd ed. (January 2007).

TEST RESULTS

Effect	Value	95% Confidence Limits	Statistical Method
IC25 (Weight)	66.2%	44.3-88.2	Nonlinear Regression (CETIS) a
IC25 (Frond Production)	35.8%	27.2-48.2	Nonlinear Regression (CETIS) a

The results reported relate only to the sample tested and as received.

POTASSIUM CHLORIDE REFERENCE TOXICANT DATA

Date Tested :	2019-06-27	Statistical Method :	Non-Linear Regression (CETIS)[a]
Organism Batch :	Lm19-06	Historical Geometric Mean IC25 :	2.21 g/L
Test Duration :	7 days	Warning Limits (± 2SD) :	1.56 - 3.13 g/L
IC25 (Frond Production) :	2.26 g/L	Growth Medium :	Modified APHA
95% Confidence Limits :	1.87 - 2.64 g/L	Analyst(s) :	MDH, CG

The reference toxicant test was performed under the same experimental conditions as those used with the test sample.

TEST CONDITIONS

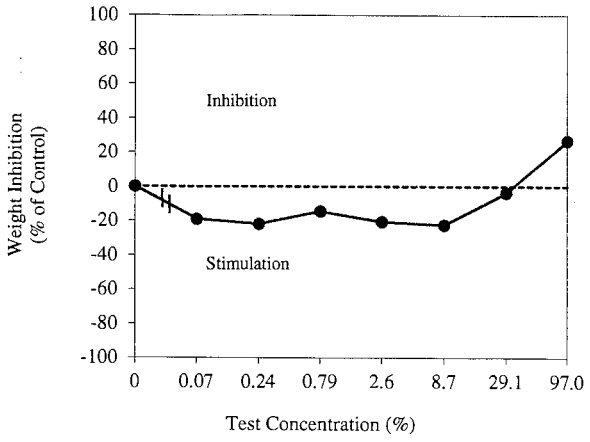
Test Organism :	*Lemna minor* L., Strain 7730	Test Type :	Static (no sub-samples required)
Organism Batch :	Lm19-06	Control/Dilution Medium :	Modified APHA
Culture Origin :	UTCC 492	Medium Preparation Water :	Distilled Water
Test Organism Source :	Axenic in-house culture	Source of Water :	Morning Mist
Culture Medium :	Modified Hoaglands E+	Medium Preparation Chemicals :	Modified APHA stocks A, B, C (10 mL/L)
Age (on Test Day 0) :	9 days	Nutrient Spiking of Sample :	Modified APHA stocks A, B, C (10 mL/L)
Health Criteria (in APHA) :	19.8-fold frond increase in 7 days	Replicates per Concentration :	4
Organism Acclimation :	23:15 h in APHA medium	Test Volume per Replicate :	100 mL
Inoculum (Test Day 0) :	2 plants (3 fronds per plant)	Test Vessel :	210 mL glass jar
Sample Filtration :	1 µm (Whatman GF/C)	Depth of Test Solution :	4.0 cm
Sample Pre-aeration :	20 min. at ≤100 bubbles/min.	Photoperiod/Light Intensity :	Continuous, 4360 - 5030 lux
pH Adjustment :	None	Test Method Deviation(s) :	None
Hardness Adjustment :	None		

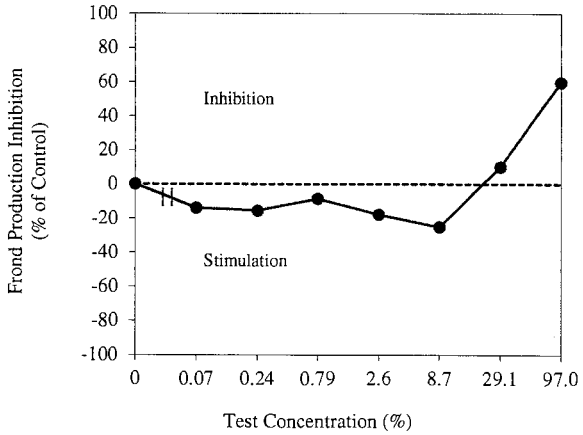
COMMENTS

•All test validity criteria as specified in the test method cited above were satisfied.

Work Order : 239474
Sample Number : 59519

Lemna minor Growth Inhibition





TEST MONITORING

Initiation Date : 2019-06-20
Intitiation Time : 15:15
Initiated By : MDH

Termination Date : 2019-06-27
Termination Time : 16:05
Terminated By : MJT

Temperature Monitoring

Test Day	Date	Temperature (°C)
0 (unmodified sample)	2019-06-20	25.0
0	2019-06-20	25.0
1	2019-06-21	25.0
2	2019-06-22	25.0
3	2019-06-23	25.0
4	2019-06-24	25.0
5	2019-06-25	25.0
6	2019-06-26	25.0
7	2019-06-27	25.0

pH Monitoring

Concentration (%)	Day 0	Day 7
100 (unmodified sample)	6.7	–
Control	8.4	8.5
0.07	8.3	8.5
0.24	–	–
0.79	–	–
2.6	8.3	8.6
8.7	–	–
29.1	–	–
97.0	7.8	8.4

"–" = not required

REFERENCES

[a] CETIS™, © 2000-2018. V.1.9.4.7. Comprehensive Environmental Toxicity Information System. Tidepool Scientific Software, LLC, McKinleyville, CA 95519 [Program on disk and printed User's Guide].

Date : 2019-07-19
yyyy-mm-dd

Approved By:
Project Manager

Work Order : 239474
Sample Number : 59519

***Lemna minor* Frond Increase**

Test Concentration (%)	Replicate	Frond Count Day 0*	Frond Count Day 7	Frond Increase	Mean Frond Increase	Standard Deviation	CV (%)	Frond/Root Appearance (Day 7)
Control	A	6	86	80	69.50	11.39	16.4	Fronds healthy, appearance normal in all replicates.
	B	6	72	66				
	C	6	83	77				
	D	6	61	55				
0.07	A	6	73	67	79.25	8.73	11.0	Fronds healthy, appearance normal in all replicates.
	B	6	91	85				
	C	6	92	86				
	D	6	85	79				
0.24	A	6	92	86	80.33	8.96	11.2	Fronds healthy, appearance normal in all replicates.
	B	6	6	0[1]				
	C	6	91	85				
	D	6	76	70				
0.79	A	6	84	78	75.50	7.14	9.5	Fronds healthy, appearance normal in all replicates.
	B	6	81	75				
	C	6	89	83				
	D	6	72	66				
2.6	A	6	70	64	82.00	16.99	20.7	Fronds healthy, appearance normal in all replicates.
	B	6	102	96				
	C	6	77	71				
	D	6	103	97				
8.7	A	6	89	83	87.00	5.94	6.8	Fronds healthy, appearance normal in all replicates.
	B	6	94	88				
	C	6	88	82				
	D	6	101	95				
29.1	A	6	52	46	62.50	13.18	21.1	Some fronds appear chlorotic and smaller in all replicates.
	B	6	67	61				
	C	6	84	78				
	D	6	71	65				
97.0	A	6	29	23	28.00	7.39	26.4	Most fronds appear smaller and chlorotic, and have small roots in all replicates.
	B	6	45	39				
	C	6	31	25				
	D	6	31	25				

NOTES: *No unusual appearance or treatment of culture prior to testing. Test inoculated with healthy plants.

•No significant stimulation (α=0.05) of frond increase was detected by ANOVA-Dunnett Multiple Comparison Test (CETIS)[a] at any test level compared to the control.

•A 12.6-fold increase in frond number was observed in the control over the testing period.

• [1] At the 6 day observation period, some plants were found adhered to the side of the test vessel in replicate 0.24B (AS). This replicate was determined to be an outlier according to Grubbs Test (CETIS)[a] and was therefore excluded from statistical analysis. Test endpoints were calculated using replicates A, C and D of the 0.24% exposure.

"–" = not available/not required

Test Data Reviewed By : VC
Date : 2019-07-17

Work Order : 239474
Sample Number : 59519

Lemna minor Frond Weight Data

Test Concentration (%)	Replicate	Dry Weight of Fronds (mg)	Treatment Mean Dry Weight (mg)	Standard Deviation
Control	A	7.52	6.68	0.74
	B	6.06		
	C	7.08		
	D	6.04		
0.07	A	6.65	7.95	0.89
	B	8.26		
	C	8.67		
	D	8.22		
0.24	A	8.96	8.15	0.72
	B	1.59[2]		
	C	7.89		
	D	7.59		
0.79	A	7.27	7.64	0.26
	B	7.76		
	C	7.69		
	D	7.85		
2.6	A	6.59	8.06	1.68
	B	9.29		
	C	6.63		
	D	9.71		
8.7	A	8.26	8.18	0.77
	B	7.80		
	C	7.44		
	D	9.23		
29.1	A	5.52	6.92	0.94
	B	7.34		
	C	7.56		
	D	7.27		
97.0	A	4.57	4.89	0.68
	B	5.91		
	C	4.58		
	D	4.51		

NOTES :

- No significant stimulation (α=0.05) of frond weight was detected by ANOVA-Dunnett Multiple Comparison Test (CETIS)[a] at any test level compared to the control.
- [2]Outlier according to Grubbs Test (CETIS)[a]. This replicate was therefore excluded from statistical analysis (refer to 'NOTES' section on page 3).

"–" = not available/not required

Test Data Reviewed By : VC
Date : 2019-03-12

CHAIN OF CUSTODY RECORD

AQUATOX

AquaTox Work Order No: 239474

Shipping Address: AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, Ontario Canada N0B 2J0

Voice: (519) 763-4412 **Fax:** (519) 763-4419

P.O. Number:	4500057496
Field Sampler Name (print):	KB/LM/CP
Signature:	KaButton
Affiliation:	Baffinland Iron Mine / ALS Environmental
Sample Storage (prior to shipping):	Cooler
Custody Relinquished by:	Kendra Button
Date/Time Shipped:	2019-06-17/20:00 RH

Client:	ALS Environmental c/o Baffinland Iron Mine Quote # (2019): 162705399-19
Phone:	(519) 886-6910
Fax:	(519) 886-9047
Contact:	Rick Hawthorne (ALS) / Martina Rendas (Aquatox)

Sample Identification					Analyses Requested									Sample Method and Volume		
Date Collected (yyyy-mm-dd)	Time Collected (e.g. 14:30, 24 hr clock)	Sample Name (L2293039-1)	AquaTox Sample Number	Temp. on arrival	Rainbow Trout Single Concentration	Rainbow Trout LC50	*Daphnia magna* Single Concentration	*Daphnia magna* LC50	Fathead Minnow Survival & Growth	*Ceriodaphnia dubia* Survival & Reproduction	*Lemna minor* Growth	*Pseudokirchneriella subcapitata* Growth	Other (please specify below)	Grab	Composite	# of Containers and Volume (eg. 2 x 1L, 3 x 10L, etc.)
2019-06-17	09:25	MS-08	59519	8.0	✓		✓		✓	✓	✓	✓	✓	✓		5 x 10LCarboy

For Lab Use Only

Received By:	DV / MDH
Date:	2019-06-18
Time:	13:00
Storage Location:	
Storage Temp.(°C)	

Please list any special requests or instructions: "Other" Note: RISS upload required

Rush TAT w/ Daily updates. PH required.

Report Distribution: bimcore@alsglobal.com, rick.hawthorne@alsglobal.com

Sublethal submission #1 for BIM 2019 MDER

ALS Environmental

L2293039

WATERLOO

Subcontract Request Form

Subcontract To:

AQUATOX TESTING AND CONSULTING
11B NICHOLAS BEAVER ROAD
RR3
GUELPH,ON N1H 6H9

NOTES: Please reference on final report and invoice: PO# *L2293039*
ALS requires QC data to be provided with your final results.

Please see enclosed 1 **sample(s) in** 0 **Container(s)**

SAMPLE NUMBER	ANALYTICAL REQUIRED	DATE SAMPLED / DUE DATE	Priority Flag
L2293039-1 MS-08		6/ 17/ 2019	
	Special Request Aquatox (SPECIAL REQUEST2-AQT 14)	6/21/2019	
	Special Request Aquatox (SPECIAL REQUEST-AQT 14)	6/21/2019	

Subcontract Info Contact: Mary-Lynn Pike (519) 886-6910
Analysis and reporting info contact: Rick Hawthorne
60 NORTHLAND ROAD, UNIT 1
WATERLOO,ON N2V 2B8
Phone: (519) 886-6910 Email: Rick.Hawthorne@alsglobal.com

Please email confirmation of receipt to: **Rick.Hawthorne@alsglobal.com**

Shipped By: _____ Date Shipped: _____

Received By: _____ Date Received: _____

Verified By: _____ Date Verified: _____

Temperature: _____

Sample Integrity Issues: _____

Wednesday, July 03, 2019

Rick Hawthorne
ALS Environmental
60 Northland Rd, Unit 1
Waterloo Canada, ON N2V 2B8

Re: ALS Workorder: 1906435
Project Name:
Project Number: L2293039

Dear Mr. Hawthorne:

Two water samples were received from ALS Environmental, on 6/19/2019. The samples were scheduled for the following analysis:

Radium-226

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,

ALS Environmental
Katie M. OBrien
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
AIHA	214884
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280

1906435

Radium-226:

The samples were prepared and analyzed according to the current revision of SOP 783.

All acceptance criteria were met.

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1906435
Client Name: ALS Environmental
Client Project Name:
Client Project Number: L2293039
Client PO Number: L2293039

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
L2293039-1	1906435-1		WATER	17-Jun-19	
L2293039-2	1906435-2		WATER	17-Jun-19	

ALS Environmental

1906435

Subcontract Request Form

Subcontract To:

ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
225 COMMERCE DRIVE
FORT COLLINS,CO 80524

NOTES: Please reference on final report and invoice: PO# L2293039
ALS requires QC data to be provided with your final results.

2x950mL HDPE (HNO_3).

Please see enclosed 2 sample(s) in 2 Container(s)

SAMPLE NUMBER	ANALYTICAL REQUIRED	DATE SAMPLED / DUE DATE	Priority Flag
1 **L2293039-1 MS-08**		6/ 17/ 2019	
	Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	7/10/2019	
2 **L2293039-2 MS-0801**		6/ 17/ 2019	
	Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	7/5/2019	

Subcontract Info Contact: Mary-Lynn Pike (519) 886-6910
Analysis and reporting info contact: Rick Hawthorne
60 NORTHLAND ROAD, UNIT 1
WATERLOO,ON N2V 2B8
Phone: (519) 886-6910 Email: Rick.Hawthorne@alsglobal.com

Please email confirmation of receipt to: Rick.Hawthorne@alsglobal.com

Shipped By: _____ Date Shipped: _____
Received By: KELI-JEAN SMITH Date Received: 6·19·19 1340
Verified By: _____ Date Verified: _____
Temperature: _____

Sample Integrity Issues: _____

ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: ALS WATERLOO Workorder No: 1906435

Project Manager: KMO Initials: KZ Date: 6-19-19

1.	Are airbills / shipping documents present and/or removable?	DROP OFF	YES	NO
2.	Are custody seals on **shipping** containers intact?	NONE	YES	NO *
3.	Are custody seals on **sample** containers intact?	NONE	YES	NO *
4.	Is there a COC (chain-of-custody) present?		YES	NO *
5.	Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)		YES	NO *
6.	Are short-hold samples present?		YES	NO
7.	Are all samples within holding times for the requested analyses?		YES	NO *
8.	Were all sample containers received intact? (not broken or leaking)		YES	NO *
9.	Is there sufficient sample for the requested analyses?		YES	NO *
10.	Are all samples in the proper containers for the requested analyses?		YES	NO *
11.	Are all aqueous samples preserved correctly, if required? (excluding volatiles)	N/A	YES	NO *
12.	Are all aqueous non-preserved samples pH 4-9?	N/A	YES	NO *
13.	Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm (1/4 inch) diameter? (i.e. size of green pea)	N/A	YES	NO
14.	Were the samples shipped on ice?		YES	NO
15.	Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: #1 #3 #4	RAD ONLY	YES	NO

Cooler #:	1							
Temperature (°C):	12.9							
No. of custody seals on cooler:	0							
DOT Survey/ Acceptance Information — External µR/hr reading:	9							
DOT Survey/ Acceptance Information — Background µR/hr reading:	10							

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? **YES** / **NO** / **NA** (If no, see Form 008.)

*** Please provide details here for NO responses to gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.**

14;15) ice included but melted upon arrival.

5) no times on COC -vs- times on bottles
Sample 1 925
Sample 2 925

All client bottle ID's vs ALS lab ID's double-checked by: KZ

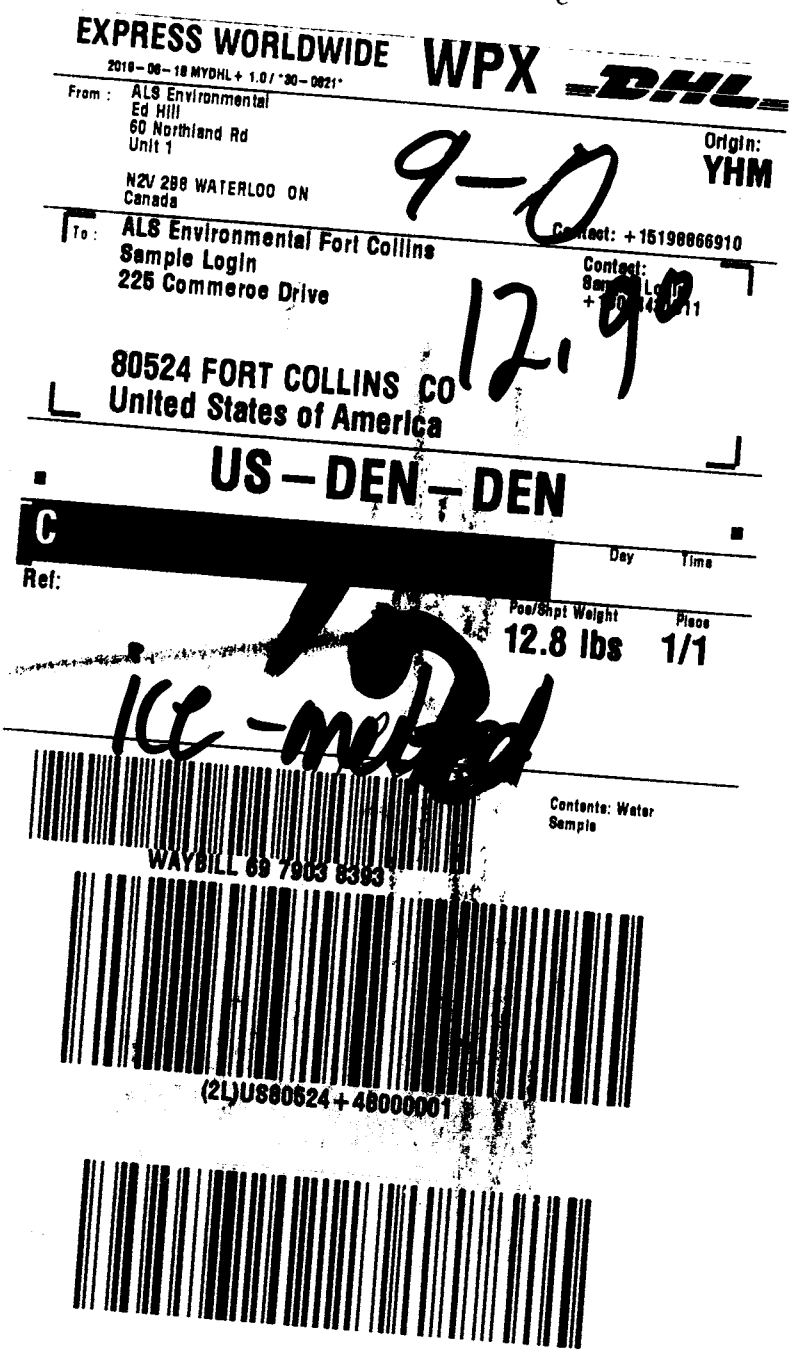
If applicable, was the client contacted? **YES** / **NO** / **NA** Contact: _____ Date/Time: _____

Project Manager Signature / Date: 6/19/19

Form 201r27.xls
(02/11/2019)

*IR Gun #1, VWR SN 170560549
*IR Gun #3, VWR SN 170647571
*IR Gun #4, Oakton, SN 2372220101-0002

1906435



EXPRESS WORLDWIDE WPX DHL

2018-06-18 MYDHL+ 1.0/*30-0821*

From : ALS Environmental
Ed Hill
60 Northland Rd
Unit 1

N2V 2B8 WATERLOO ON
Canada

Origin:
YHM

9-0

To : ALS Environmental Fort Collins
Sample Login
225 Commerce Drive

Contact: +15198866910

Contact:
Sample Login
+1 970 490 1511

12.9

80524 FORT COLLINS CO
United States of America

US-DEN-DEN

C

Day Time

Ref:

Pcs/Shpt Weight 12.8 lbs

Piece 1/1

ICE - melted

Contents: Water Sample

WAYBILL 69 7903 8393

(2L)US80624+48000001

Client:	ALS Environmental	**Date:**	*03-Jul-19*
Project:	L2293039	**Work Order:**	1906435
Sample ID:	L2293039-1	**Lab ID:**	1906435-1
Legal Location:		**Matrix:**	WATER
Collection Date:	6/17/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **6/24/2019**		PrepBy: **JXH**
Ra-226	**0.0097 (+/- 0.0052)**		**0.0047**	**BQ/l**	NA	7/2/2019 11:46
Carr: BARIUM	*96.4*		*40-110*	*%REC*	DL = NA	7/2/2019 11:46

Client:	ALS Environmental	**Date:**	*03-Jul-19*
Project:	L2293039	**Work Order:**	1906435
Sample ID:	L2293039-2	**Lab ID:**	1906435-2
Legal Location:		**Matrix:**	WATER
Collection Date:	6/17/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **6/24/2019**		PrepBy: **JXH**
Ra-226	**0.011 (+/- 0.0065)**		**0.0077**	**BQ/l**	NA	7/2/2019 11:46
Carr: BARIUM	*96.9*		*40-110*	*%REC*	DL = NA	7/2/2019 11:46

Client:	ALS Environmental	**Date:**	*03-Jul-19*
Project:	L2293039	**Work Order:**	1906435
Sample ID:	L2293039-2	**Lab ID:**	1906435-2
Legal Location:		**Matrix:**	WATER
Collection Date:	6/17/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed

Explanation of Qualifiers

Radiochemistry:

- "Report Limit" is the MDC

U or ND - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

Y2 - Chemical Yield outside default limits.

W - DER is greater than Warning Limit of 1.42

* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.
# - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.
G - Sample density differs by more than 15% of LCS density.
D - DER is greater than Control Limit

M - Requested MDC not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS, Matrix Spike Recovery within control limits.

N - Matrix Spike Recovery outside control limits

NC - Not Calculated for duplicate results less than 5 times MDC

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

Inorganics:

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).

U or ND - Indicates that the compound was analyzed for but not detected.

E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.

M - Duplicate injection precision was not met.

N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.

Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.

* - Duplicate analysis (relative percent difference) not within control limits.

S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

Organics:

U or ND - Indicates that the compound was analyzed for but not detected.

B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.

E - Analyte concentration exceeds the upper level of the calibration range.

J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).

A - A tentatively identified compound is a suspected aldol-condensation product.

X - The analyte was diluted below an accurate quantitation level.

* - The spike recovery is equal to or outside the control criteria used.

+ - The relative percent difference (RPD) equals or exceeds the control criteria.

G - A pattern resembling gasoline was detected in this sample.

D - A pattern resembling diesel was detected in this sample.

M - A pattern resembling motor oil was detected in this sample.

C - A pattern resembling crude oil was detected in this sample.

4 - A pattern resembling JP-4 was detected in this sample.

5 - A pattern resembling JP-5 was detected in this sample.

H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.

L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.

Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
- gasoline
- JP-8
- diesel
- mineral spirits
- motor oil
- Stoddard solvent
- bunker C

Batch ID: **RE190624-1-1** Instrument ID **Alpha Scin** Method: **Radium-226 by Radon Emanation**

LCS Sample ID: **RE190624-1** Units: **BQ/l** Analysis Date: **7/2/2019 12:23**
Client ID: Run ID: **RE190624-1A** Prep Date: **6/24/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.90 (+/- 0.473)	0.0233	1.771		107	67-120					P,M3
Carr: BARIUM	15300		16100		95.1	40-110					

LCSD Sample ID: **RE190624-1** Units: **BQ/l** Analysis Date: **7/2/2019 12:23**
Client ID: Run ID: **RE190624-1A** Prep Date: **6/24/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.65 (+/- 0.412)	0.0193	1.771		92.9	67-120		1.9	0.4	2.1	P,M3
Carr: BARIUM	15200		16110		94.2	40-110		15300			

MB Sample ID: **RE190624-1** Units: **BQ/l** Analysis Date: **7/2/2019 12:23**
Client ID: Run ID: **RE190624-1A** Prep Date: **6/24/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	0.00090 (+/- 0.0042)	0.0079									U
Carr: BARIUM	15500		16100		96.4	40-110					

The following samples were analyzed in this batch: 1906435-1 1906435-2

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2293039-COFC

COC Number: 15 -

Report To	Contact and company name below will appear on the final report
Company:	Baffinland Iron Mines Corp.
Contact:	Wiliam Bowden and Connor Devereaux
Phone:	647-253-0596 EXT 6016
	Company address below will appear on the final report
Street:	2275 Upper Middle Rd. E., Suite #300
City/Province:	Oakville, ON
Postal Code:	L6H 0C3
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report ☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax bimcore@alsglobal.com
Email 2 bimww@alsglobal.com
Email 3

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax ap@baffinland.com
Email 2 commercial@baffinland.com

Oil and Gas Required Fields (client use)

AFE/Cost Center: | PO#
Major/Minor Code: | Routing Code:
Requisitioner:
Location:

Project Information

ALS Account # / Quote #: 23642 /Q42455
Job #: MS-08 Tox and Eff Characterization
PO / AFE: 4500057496
LSD:

ALS Lab Work Order # (lab use only): L2293039
ALS Contact: Sampler: CP/LM/KB

all E&P TATs with your AM - surcharges will apply

Regular [R] ☐ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
4 day [P4]	☐	1 Business day [E1]	☑
3 day [P3]	☐	Same Day, Weekend or Statutory holiday [E0]	☐
2 day [P2]	☐		

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	BIM MMER-WT	Group 3	Sublethal	Number of Containers
1	MS-08	17-Jun-19	9:25	Water	E1	R	R	16
2	MS-0801	17-Jun-19	9:25	Water	E1			11

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System?
☐ YES ☑ NO
Are samples for human drinking water use?
☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐
Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
	4C				

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Kendra Button	Date: 17-Jun-19	Time: 13:00	Received by: AJ/CV	Date: June 17, 2019	Time: 2pm	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

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 specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Baffinland Iron Mine's Corporation (Oakville)
ATTN: William Bowden/Connor Devereaux
2275 Upper Middle Rd. E.
Suite #300
Oakville ON L6H 0C3

Date Received: 17-JUN-19
Report Date: 04-JUL-19 08:27 (MT)
Version: FINAL

Client Phone: 647-253-0596

Certificate of Analysis

Lab Work Order #: L2293074

Project P.O. #: 4500057496
Job Reference: MS-08 EFF CHARACTERIZATION - REFERENCE AND EXPOSURE
C of C Numbers:
Legal Site Desc:

Rick Hawthorne
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2293074-1 MS-08-DS Sampled By: KB/JB/BC on 17-JUN-19 @ 14:40 Matrix: Water							
Physical Tests							
Conductivity	28.3		3.0	umhos/cm		18-JUN-19	R4673872
Hardness (as CaCO3)	16.0	HTC	0.50	mg/L		19-JUN-19	
pH	7.37		0.10	pH units		18-JUN-19	R4672122
Total Suspended Solids	6.0		2.0	mg/L		18-JUN-19	R4672121
Anions and Nutrients							
Alkalinity, Total (as CaCO3)	13		10	mg/L		18-JUN-19	R4673872
Ammonia, Total (as N)	<0.010		0.010	mg/L		18-JUN-19	R4672917
Chloride (Cl)	0.50		0.50	mg/L		19-JUN-19	R4674012
Fluoride (F)	<0.020		0.020	mg/L		19-JUN-19	R4674012
Nitrate (as N)	<0.020		0.020	mg/L		19-JUN-19	R4674012
Total Kjeldahl Nitrogen	0.16		0.15	mg/L	18-JUN-19	19-JUN-19	R4674366
Phosphorus, Total	0.0295		0.0030	mg/L	18-JUN-19	19-JUN-19	R4673670
Sulfate (SO4)	0.90		0.30	mg/L		19-JUN-19	R4674012
Organic / Inorganic Carbon							
Dissolved Carbon Filtration Location	LAB					18-JUN-19	R4673010
Dissolved Organic Carbon	1.29		0.50	mg/L	18-JUN-19	19-JUN-19	R4674209
Total Organic Carbon	1.91		0.50	mg/L		19-JUN-19	R4674213
Total Metals							
Aluminum (Al)-Total	0.665		0.0050	mg/L	19-JUN-19	19-JUN-19	R4673448
Antimony (Sb)-Total	<0.00010		0.00010	mg/L	19-JUN-19	19-JUN-19	R4673448
Arsenic (As)-Total	0.00010		0.00010	mg/L	19-JUN-19	19-JUN-19	R4673448
Barium (Ba)-Total	0.00553		0.00010	mg/L	19-JUN-19	19-JUN-19	R4673448
Beryllium (Be)-Total	<0.00010		0.00010	mg/L	19-JUN-19	19-JUN-19	R4673448
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L	19-JUN-19	19-JUN-19	R4673448
Boron (B)-Total	<0.010		0.010	mg/L	19-JUN-19	19-JUN-19	R4673448
Cadmium (Cd)-Total	<0.0000050		0.0000050	mg/L	19-JUN-19	19-JUN-19	R4673448
Calcium (Ca)-Total	2.85		0.050	mg/L	19-JUN-19	19-JUN-19	R4673448
Cesium (Cs)-Total	0.000070		0.000010	mg/L	19-JUN-19	19-JUN-19	R4673448
Chromium (Cr)-Total	0.00159		0.00050	mg/L	19-JUN-19	19-JUN-19	R4673448
Cobalt (Co)-Total	0.00046		0.00010	mg/L	19-JUN-19	19-JUN-19	R4673448
Copper (Cu)-Total	0.0011		0.0010	mg/L	19-JUN-19	19-JUN-19	R4673448
Iron (Fe)-Total	0.912		0.010	mg/L	19-JUN-19	19-JUN-19	R4673448
Lead (Pb)-Total	0.000426		0.000050	mg/L	19-JUN-19	19-JUN-19	R4673448
Lithium (Li)-Total	<0.0010		0.0010	mg/L	19-JUN-19	19-JUN-19	R4673448
Magnesium (Mg)-Total	2.17		0.0050	mg/L	19-JUN-19	19-JUN-19	R4673448
Manganese (Mn)-Total	0.0189		0.00050	mg/L	19-JUN-19	19-JUN-19	R4673448
Mercury (Hg)-Total	<0.000010		0.000010	mg/L		19-JUN-19	R4674168
Molybdenum (Mo)-Total	0.000056		0.000050	mg/L	19-JUN-19	19-JUN-19	R4673448
Nickel (Ni)-Total	0.00146		0.00050	mg/L	19-JUN-19	19-JUN-19	R4673448
Phosphorus (P)-Total	<0.050		0.050	mg/L	19-JUN-19	19-JUN-19	R4673448
Potassium (K)-Total	0.512		0.050	mg/L	19-JUN-19	19-JUN-19	R4673448
Rubidium (Rb)-Total	0.00221		0.00020	mg/L	19-JUN-19	19-JUN-19	R4673448

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2293074-1 MS-08-DS Sampled By: KB/JB/BC on 17-JUN-19 @ 14:40 Matrix: Water							
Total Metals							
Selenium (Se)-Total	<0.000050		0.000050	mg/L	19-JUN-19	19-JUN-19	R4673448
Silicon (Si)-Total	1.38		0.10	mg/L	19-JUN-19	19-JUN-19	R4673448
Silver (Ag)-Total	<0.000050		0.000050	mg/L	19-JUN-19	19-JUN-19	R4673448
Sodium (Na)-Total	0.280		0.050	mg/L	19-JUN-19	19-JUN-19	R4673448
Strontium (Sr)-Total	0.0025		0.0010	mg/L	19-JUN-19	19-JUN-19	R4673448
Sulfur (S)-Total	<0.50		0.50	mg/L	19-JUN-19	19-JUN-19	R4673448
Tellurium (Te)-Total	<0.00020		0.00020	mg/L	19-JUN-19	19-JUN-19	R4673448
Thallium (Tl)-Total	0.000012		0.000010	mg/L	19-JUN-19	19-JUN-19	R4673448
Thorium (Th)-Total	0.00032		0.00010	mg/L	19-JUN-19	19-JUN-19	R4673448
Tin (Sn)-Total	<0.00010		0.00010	mg/L	19-JUN-19	19-JUN-19	R4673448
Titanium (Ti)-Total	0.0372		0.00030	mg/L	19-JUN-19	19-JUN-19	R4673448
Tungsten (W)-Total	<0.00010		0.00010	mg/L	19-JUN-19	19-JUN-19	R4673448
Uranium (U)-Total	0.000183		0.000010	mg/L	19-JUN-19	19-JUN-19	R4673448
Vanadium (V)-Total	0.00119		0.00050	mg/L	19-JUN-19	19-JUN-19	R4673448
Zinc (Zn)-Total	<0.0030		0.0030	mg/L	19-JUN-19	19-JUN-19	R4673448
Zirconium (Zr)-Total	0.00032		0.00020	mg/L	19-JUN-19	19-JUN-19	R4673448
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					19-JUN-19	R4673153
Mercury (Hg)-Dissolved	<0.000010		0.000010	mg/L	19-JUN-19	19-JUN-19	R4674229
Radiological Parameters							
Ra-226	0.0100		0.0055	Bq/L	24-JUN-19	02-JUL-19	R4692536
L2293074-2 MS-08-US Sampled By: KB/JB/BC on 17-JUN-19 @ 15:10 Matrix: Water							
Physical Tests							
Conductivity	23.3		3.0	umhos/cm		18-JUN-19	R4673872
Hardness (as CaCO3)	12.1	HTC	0.50	mg/L		19-JUN-19	
pH	7.33		0.10	pH units		18-JUN-19	R4672122
Total Suspended Solids	2.4		2.0	mg/L		18-JUN-19	R4672121
Anions and Nutrients							
Alkalinity, Total (as CaCO3)	11		10	mg/L		18-JUN-19	R4673872
Ammonia, Total (as N)	<0.010		0.010	mg/L		18-JUN-19	R4672917
Chloride (Cl)	<0.50		0.50	mg/L		19-JUN-19	R4674012
Fluoride (F)	<0.020		0.020	mg/L		19-JUN-19	R4674012
Nitrate (as N)	<0.020		0.020	mg/L		19-JUN-19	R4674012
Total Kjeldahl Nitrogen	0.17		0.15	mg/L	18-JUN-19	19-JUN-19	R4674366
Phosphorus, Total	0.0200		0.0030	mg/L	18-JUN-19	19-JUN-19	R4673670
Sulfate (SO4)	<0.30		0.30	mg/L		19-JUN-19	R4674012
Organic / Inorganic Carbon							
Dissolved Carbon Filtration Location	LAB					18-JUN-19	R4673010
Dissolved Organic Carbon	1.35		0.50	mg/L	18-JUN-19	19-JUN-19	R4674209
Total Organic Carbon	1.97		0.50	mg/L		19-JUN-19	R4674213

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2293074-2 MS-08-US Sampled By: KB/JB/BC on 17-JUN-19 @ 15:10 Matrix: Water							
Organic / Inorganic Carbon							
Total Metals							
Aluminum (Al)-Total	0.295		0.0050	mg/L	19-JUN-19	19-JUN-19	R4673448
Antimony (Sb)-Total	<0.00010		0.00010	mg/L	19-JUN-19	19-JUN-19	R4673448
Arsenic (As)-Total	<0.00010		0.00010	mg/L	19-JUN-19	19-JUN-19	R4673448
Barium (Ba)-Total	0.00382		0.00010	mg/L	19-JUN-19	19-JUN-19	R4673448
Beryllium (Be)-Total	<0.00010		0.00010	mg/L	19-JUN-19	19-JUN-19	R4673448
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L	19-JUN-19	19-JUN-19	R4673448
Boron (B)-Total	<0.010		0.010	mg/L	19-JUN-19	19-JUN-19	R4673448
Cadmium (Cd)-Total	0.0000081		0.0000050	mg/L	19-JUN-19	19-JUN-19	R4673448
Calcium (Ca)-Total	2.45		0.050	mg/L	19-JUN-19	19-JUN-19	R4673448
Cesium (Cs)-Total	0.000038		0.000010	mg/L	19-JUN-19	19-JUN-19	R4673448
Chromium (Cr)-Total	0.00061		0.00050	mg/L	19-JUN-19	19-JUN-19	R4673448
Cobalt (Co)-Total	0.00015		0.00010	mg/L	19-JUN-19	19-JUN-19	R4673448
Copper (Cu)-Total	<0.0010		0.0010	mg/L	19-JUN-19	19-JUN-19	R4673448
Iron (Fe)-Total	0.295		0.010	mg/L	19-JUN-19	19-JUN-19	R4673448
Lead (Pb)-Total	0.000282		0.000050	mg/L	19-JUN-19	19-JUN-19	R4673448
Lithium (Li)-Total	<0.0010		0.0010	mg/L	19-JUN-19	19-JUN-19	R4673448
Magnesium (Mg)-Total	1.46		0.0050	mg/L	19-JUN-19	19-JUN-19	R4673448
Manganese (Mn)-Total	0.00581		0.00050	mg/L	19-JUN-19	19-JUN-19	R4673448
Mercury (Hg)-Total	<0.000010		0.000010	mg/L		19-JUN-19	R4674168
Molybdenum (Mo)-Total	0.000054		0.000050	mg/L	19-JUN-19	19-JUN-19	R4673448
Nickel (Ni)-Total	0.00054		0.00050	mg/L	19-JUN-19	19-JUN-19	R4673448
Phosphorus (P)-Total	<0.050		0.050	mg/L	19-JUN-19	19-JUN-19	R4673448
Potassium (K)-Total	0.412		0.050	mg/L	19-JUN-19	19-JUN-19	R4673448
Rubidium (Rb)-Total	0.00135		0.00020	mg/L	19-JUN-19	19-JUN-19	R4673448
Selenium (Se)-Total	<0.000050		0.000050	mg/L	19-JUN-19	19-JUN-19	R4673448
Silicon (Si)-Total	0.88		0.10	mg/L	19-JUN-19	19-JUN-19	R4673448
Silver (Ag)-Total	<0.000050		0.000050	mg/L	19-JUN-19	19-JUN-19	R4673448
Sodium (Na)-Total	0.353		0.050	mg/L	19-JUN-19	19-JUN-19	R4673448
Strontium (Sr)-Total	0.0025		0.0010	mg/L	19-JUN-19	19-JUN-19	R4673448
Sulfur (S)-Total	<0.50		0.50	mg/L	19-JUN-19	19-JUN-19	R4673448
Tellurium (Te)-Total	<0.00020		0.00020	mg/L	19-JUN-19	19-JUN-19	R4673448
Thallium (Tl)-Total	<0.000010		0.000010	mg/L	19-JUN-19	19-JUN-19	R4673448
Thorium (Th)-Total	0.00025		0.00010	mg/L	19-JUN-19	19-JUN-19	R4673448
Tin (Sn)-Total	<0.00010		0.00010	mg/L	19-JUN-19	19-JUN-19	R4673448
Titanium (Ti)-Total	0.0176		0.00030	mg/L	19-JUN-19	19-JUN-19	R4673448
Tungsten (W)-Total	<0.00010		0.00010	mg/L	19-JUN-19	19-JUN-19	R4673448
Uranium (U)-Total	0.000162		0.000010	mg/L	19-JUN-19	19-JUN-19	R4673448
Vanadium (V)-Total	0.00066		0.00050	mg/L	19-JUN-19	19-JUN-19	R4673448
Zinc (Zn)-Total	0.0066		0.0030	mg/L	19-JUN-19	19-JUN-19	R4673448
Zirconium (Zr)-Total	0.00034		0.00020	mg/L	19-JUN-19	19-JUN-19	R4673448

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2293074-2 MS-08-US Sampled By: KB/JB/BC on 17-JUN-19 @ 15:10 Matrix: Water							
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					19-JUN-19	R4673153
Mercury (Hg)-Dissolved	<0.000010		0.000010	mg/L	19-JUN-19	19-JUN-19	R4674229
Radiological Parameters							
Ra-226	<0.0076		0.0076	Bq/L	24-JUN-19	02-JUL-19	R4692536

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

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Calcium (Ca)-Total	MS-B	L2293074-1, -2
Matrix Spike	Chromium (Cr)-Total	MS-B	L2293074-1, -2
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2293074-1, -2
Matrix Spike	Potassium (K)-Total	MS-B	L2293074-1, -2
Matrix Spike	Silicon (Si)-Total	MS-B	L2293074-1, -2
Matrix Spike	Sodium (Na)-Total	MS-B	L2293074-1, -2
Matrix Spike	Strontium (Sr)-Total	MS-B	L2293074-1, -2
Matrix Spike	Sulfur (S)-Total	MS-B	L2293074-1, -2
Matrix Spike	Uranium (U)-Total	MS-B	L2293074-1, -2

Sample Parameter Qualifier key listed:

Qualifier	Description
HTC	Hardness was calculated from Total Ca and/or Mg concentrations and may be biased high (dissolved Ca/Mg results unavailable).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-WT	Water	Alkalinity, Total (as CaCO3)	EPA 310.2

This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.

CL-IC-N-WT	Water	Chloride by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

DOC-WT	Water	Dissolved Organic Carbon	APHA 5310B

Sample is filtered through a 0.45um filter, then injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic carbon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.

EC-SCREEN-WT	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

EC-WT	Water	Conductivity	APHA 2510 B

Water samples can be measured directly by immersing the conductivity cell into the sample.

F-IC-N-WT	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-WT	Water	Hardness	APHA 2340 B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-WT	Water	Dissolved Mercury in Water by CVAAS	EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

HG-T-CVAA-WT	Water	Total Mercury in Water by CVAAS	EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

MET-T-CCMS-WT	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

NH3-F-WT	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society

Reference Information

of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO3-IC-WT	Water	Nitrate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-COL-WT	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is deteremined colourimetrically after persulphate digestion of the sample.

PH-BF	Water	pH	APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

RA226-MMER-FC	Water	Ra226 by Alpha Scint, MDC=0.01 Bq/L	EPA 903.1
SO4-IC-N-WT	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TSS-BF	Water	Suspended solids	APHA 2540 D-Gravimetric

A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104 +/- 1C for a minimum of four hours or until a constant weight is achieved.

TKN-WT	Water	Total Kjeldahl Nitrogen	APHA 4500-Norg D

This analysis is carried out using procedures adapted from APHA Method 4500-Norg "Nitrogen (Organic)". Total Kjeldahl Nitrogen is determined by sample digestion at 380 Celsius with analysis using an automated colorimetric method.

TOC-WT	Water	Total Organic Carbon	APHA 5310B

Sample is injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic cabon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.

** 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
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA
FC	ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
BF	ALS ENVIRONMENTAL - BAFFIN ISLAND, NUNAVUT, 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 weight of sample
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

Workorder: L2293074 Report Date: 04-JUL-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ALK-WT	**Water**							
Batch R4673872								
WG3080204-28 DUP		**WG3080204-27**						
Alkalinity, Total (as CaCO3)		<10	<10	RPD-NA	mg/L	N/A	20	18-JUN-19
WG3080204-26 LCS								
Alkalinity, Total (as CaCO3)			101.5		%		85-115	18-JUN-19
WG3080204-25 MB								
Alkalinity, Total (as CaCO3)			<10		mg/L		10	18-JUN-19
CL-IC-N-WT	**Water**							
Batch R4674012								
WG3081366-4 DUP		**WG3081366-3**						
Chloride (Cl)		52.0	51.9		mg/L	0.2	20	19-JUN-19
WG3081366-2 LCS								
Chloride (Cl)			101.5		%		90-110	19-JUN-19
WG3081366-1 MB								
Chloride (Cl)			<0.50		mg/L		0.5	19-JUN-19
WG3081366-5 MS		**WG3081366-3**						
Chloride (Cl)			102.5		%		75-125	19-JUN-19
DOC-WT	**Water**							
Batch R4674209								
WG3081035-3 DUP		**L2281505-1**						
Dissolved Organic Carbon		3.27	3.38		mg/L	3.6	25	19-JUN-19
WG3081035-2 LCS								
Dissolved Organic Carbon			98.1		%		70-130	19-JUN-19
WG3081035-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	19-JUN-19
WG3081035-4 MS		**L2281505-1**						
Dissolved Organic Carbon			95.2		%		70-130	19-JUN-19
EC-WT	**Water**							
Batch R4673872								
WG3080204-28 DUP		**WG3080204-27**						
Conductivity		30.3	29.3		umhos/cm	3.4	10	18-JUN-19
WG3080204-26 LCS								
Conductivity			98.1		%		90-110	18-JUN-19
WG3080204-25 MB								
Conductivity			<3.0		umhos/cm		3	18-JUN-19
F-IC-N-WT	**Water**							

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F-IC-N-WT	**Water**							
Batch R4674012								
WG3081366-4 DUP		**WG3081366-3**						
Fluoride (F)		0.280	0.282		mg/L	0.7	20	19-JUN-19
WG3081366-2 LCS								
Fluoride (F)			101.8		%		90-110	19-JUN-19
WG3081366-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	19-JUN-19
WG3081366-5 MS		**WG3081366-3**						
Fluoride (F)			103.7		%		75-125	19-JUN-19
HG-D-CVAA-WT	**Water**							
Batch R4674229								
WG3081282-4 DUP		**WG3081282-3**						
Mercury (Hg)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	19-JUN-19
WG3081282-2 LCS								
Mercury (Hg)-Dissolved			97.3		%		80-120	19-JUN-19
WG3081282-1 MB								
Mercury (Hg)-Dissolved			<0.000010		mg/L		0.00001	19-JUN-19
WG3081282-6 MS		**WG3081282-5**						
Mercury (Hg)-Dissolved			99.8		%		70-130	19-JUN-19
HG-T-CVAA-WT	**Water**							
Batch R4674168								
WG3081277-3 DUP		**L2293039-2**						
Mercury (Hg)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	19-JUN-19
WG3081277-2 LCS								
Mercury (Hg)-Total			98.0		%		80-120	19-JUN-19
WG3081277-1 MB								
Mercury (Hg)-Total			<0.000010		mg/L		0.00001	19-JUN-19
WG3081277-4 MS		**L2293039-1**						
Mercury (Hg)-Total			95.0		%		70-130	19-JUN-19
MET-T-CCMS-WT	**Water**							
Batch R4673448								
WG3081157-4 DUP		**WG3081157-3**						
Aluminum (Al)-Total		<0.050	<0.050	RPD-NA	mg/L	N/A	20	19-JUN-19
Antimony (Sb)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	19-JUN-19
Arsenic (As)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	19-JUN-19
Barium (Ba)-Total		0.0124	0.0127		mg/L	2.0	20	19-JUN-19
Beryllium (Be)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	19-JUN-19
Bismuth (Bi)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	19-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4673448								
WG3081157-4 DUP		**WG3081157-3**						
Boron (B)-Total		<0.10	<0.10	RPD-NA	mg/L	N/A	20	19-JUN-19
Cadmium (Cd)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	19-JUN-19
Calcium (Ca)-Total		90.2	90.3		mg/L	0.1	20	19-JUN-19
Chromium (Cr)-Total		1.69	1.70		mg/L	0.2	20	19-JUN-19
Cesium (Cs)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	19-JUN-19
Cobalt (Co)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	19-JUN-19
Copper (Cu)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	19-JUN-19
Iron (Fe)-Total		<0.10	<0.10	RPD-NA	mg/L	N/A	20	19-JUN-19
Lead (Pb)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	19-JUN-19
Lithium (Li)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	19-JUN-19
Magnesium (Mg)-Total		17.8	17.9		mg/L	0.8	20	19-JUN-19
Manganese (Mn)-Total		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	19-JUN-19
Molybdenum (Mo)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	19-JUN-19
Nickel (Ni)-Total		0.0106	0.0104		mg/L	2.0	20	19-JUN-19
Phosphorus (P)-Total		<0.50	<0.50	RPD-NA	mg/L	N/A	20	19-JUN-19
Potassium (K)-Total		3.65	3.62		mg/L	0.6	20	19-JUN-19
Rubidium (Rb)-Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	19-JUN-19
Selenium (Se)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	19-JUN-19
Silicon (Si)-Total		2.9	3.0		mg/L	2.7	20	19-JUN-19
Silver (Ag)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	19-JUN-19
Sodium (Na)-Total		107	109		mg/L	1.3	20	19-JUN-19
Strontium (Sr)-Total		0.153	0.155		mg/L	1.0	20	19-JUN-19
Sulfur (S)-Total		9.5	10.2		mg/L	6.8	25	19-JUN-19
Thallium (Tl)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	19-JUN-19
Tellurium (Te)-Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	19-JUN-19
Thorium (Th)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	25	19-JUN-19
Tin (Sn)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	19-JUN-19
Titanium (Ti)-Total		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	19-JUN-19
Tungsten (W)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	19-JUN-19
Uranium (U)-Total		0.00068	0.00071		mg/L	3.8	20	19-JUN-19
Vanadium (V)-Total		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	19-JUN-19
Zinc (Zn)-Total		<0.030	<0.030	RPD-NA	mg/L	N/A	20	19-JUN-19
Zirconium (Zr)-Total		<0.0020	<0.0020		mg/L			19-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4673448								
WG3081157-4 DUP		**WG3081157-3**						
Zirconium (Zr)-Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	19-JUN-19
WG3081157-2 LCS								
Aluminum (Al)-Total			100.6		%		80-120	19-JUN-19
Antimony (Sb)-Total			104.1		%		80-120	19-JUN-19
Arsenic (As)-Total			99.8		%		80-120	19-JUN-19
Barium (Ba)-Total			102.6		%		80-120	19-JUN-19
Beryllium (Be)-Total			95.5		%		80-120	19-JUN-19
Bismuth (Bi)-Total			101.3		%		80-120	19-JUN-19
Boron (B)-Total			86.2		%		80-120	19-JUN-19
Cadmium (Cd)-Total			96.3		%		80-120	19-JUN-19
Calcium (Ca)-Total			98.1		%		80-120	19-JUN-19
Chromium (Cr)-Total			100.5		%		80-120	19-JUN-19
Cesium (Cs)-Total			101.9		%		80-120	19-JUN-19
Cobalt (Co)-Total			99.9		%		80-120	19-JUN-19
Copper (Cu)-Total			97.8		%		80-120	19-JUN-19
Iron (Fe)-Total			102.0		%		80-120	19-JUN-19
Lead (Pb)-Total			102.3		%		80-120	19-JUN-19
Lithium (Li)-Total			93.5		%		80-120	19-JUN-19
Magnesium (Mg)-Total			100.7		%		80-120	19-JUN-19
Manganese (Mn)-Total			100.9		%		80-120	19-JUN-19
Molybdenum (Mo)-Total			101.2		%		80-120	19-JUN-19
Nickel (Ni)-Total			99.1		%		80-120	19-JUN-19
Phosphorus (P)-Total			105.3		%		70-130	19-JUN-19
Potassium (K)-Total			102.6		%		80-120	19-JUN-19
Rubidium (Rb)-Total			100.2		%		80-120	19-JUN-19
Selenium (Se)-Total			96.6		%		80-120	19-JUN-19
Silicon (Si)-Total			105.1		%		60-140	19-JUN-19
Silver (Ag)-Total			100.4		%		80-120	19-JUN-19
Sodium (Na)-Total			102.4		%		80-120	19-JUN-19
Strontium (Sr)-Total			102.4		%		80-120	19-JUN-19
Sulfur (S)-Total			97.3		%		80-120	19-JUN-19
Thallium (Tl)-Total			100.7		%		80-120	19-JUN-19
Tellurium (Te)-Total			92.4		%		80-120	19-JUN-19
Thorium (Th)-Total			99.9		%		70-130	19-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4673448								
WG3081157-2 LCS								
Tin (Sn)-Total			99.0		%		80-120	19-JUN-19
Titanium (Ti)-Total			97.9		%		80-120	19-JUN-19
Tungsten (W)-Total			101.2		%		80-120	19-JUN-19
Uranium (U)-Total			102.9		%		80-120	19-JUN-19
Vanadium (V)-Total			101.0		%		80-120	19-JUN-19
Zinc (Zn)-Total			100.6		%		80-120	19-JUN-19
Zirconium (Zr)-Total			99.7		%		80-120	19-JUN-19
WG3081157-1 MB								
Aluminum (Al)-Total			<0.0050		mg/L		0.005	19-JUN-19
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	19-JUN-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	19-JUN-19
Barium (Ba)-Total			<0.00010		mg/L		0.0001	19-JUN-19
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	19-JUN-19
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	19-JUN-19
Boron (B)-Total			<0.010		mg/L		0.01	19-JUN-19
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	19-JUN-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	19-JUN-19
Chromium (Cr)-Total			<0.00050		mg/L		0.0005	19-JUN-19
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	19-JUN-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	19-JUN-19
Copper (Cu)-Total			<0.0010		mg/L		0.001	19-JUN-19
Iron (Fe)-Total			<0.010		mg/L		0.01	19-JUN-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	19-JUN-19
Lithium (Li)-Total			<0.0010		mg/L		0.001	19-JUN-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	19-JUN-19
Manganese (Mn)-Total			<0.00050		mg/L		0.0005	19-JUN-19
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	19-JUN-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	19-JUN-19
Phosphorus (P)-Total			<0.050		mg/L		0.05	19-JUN-19
Potassium (K)-Total			<0.050		mg/L		0.05	19-JUN-19
Rubidium (Rb)-Total			<0.00020		mg/L		0.0002	19-JUN-19
Selenium (Se)-Total			<0.000050		mg/L		0.00005	19-JUN-19
Silicon (Si)-Total			<0.10		mg/L		0.1	19-JUN-19
Silver (Ag)-Total			<0.000050		mg/L		0.00005	19-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
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Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4673448								
WG3081157-1 MB								
Sodium (Na)-Total			<0.050		mg/L		0.05	19-JUN-19
Strontium (Sr)-Total			<0.0010		mg/L		0.001	19-JUN-19
Sulfur (S)-Total			<0.50		mg/L		0.5	19-JUN-19
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	19-JUN-19
Tellurium (Te)-Total			<0.00020		mg/L		0.0002	19-JUN-19
Thorium (Th)-Total			<0.00010		mg/L		0.0001	19-JUN-19
Tin (Sn)-Total			<0.00010		mg/L		0.0001	19-JUN-19
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	19-JUN-19
Tungsten (W)-Total			<0.00010		mg/L		0.0001	19-JUN-19
Uranium (U)-Total			<0.000010		mg/L		0.00001	19-JUN-19
Vanadium (V)-Total			<0.00050		mg/L		0.0005	19-JUN-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	19-JUN-19
Zirconium (Zr)-Total			<0.00020		mg/L		0.0002	19-JUN-19
WG3081157-5 MS		**WG3081157-3**						
Aluminum (Al)-Total			100.1		%		70-130	19-JUN-19
Antimony (Sb)-Total			100.7		%		70-130	19-JUN-19
Arsenic (As)-Total			99.9		%		70-130	19-JUN-19
Barium (Ba)-Total			92.3		%		70-130	19-JUN-19
Beryllium (Be)-Total			100.0		%		70-130	19-JUN-19
Bismuth (Bi)-Total			97.9		%		70-130	19-JUN-19
Boron (B)-Total			83.1		%		70-130	19-JUN-19
Cadmium (Cd)-Total			96.0		%		70-130	19-JUN-19
Calcium (Ca)-Total			N/A	MS-B	%		-	19-JUN-19
Chromium (Cr)-Total			N/A	MS-B	%		-	19-JUN-19
Cesium (Cs)-Total			99.8		%		70-130	19-JUN-19
Cobalt (Co)-Total			97.8		%		70-130	19-JUN-19
Copper (Cu)-Total			97.8		%		70-130	19-JUN-19
Iron (Fe)-Total			100.9		%		70-130	19-JUN-19
Lead (Pb)-Total			99.0		%		70-130	19-JUN-19
Magnesium (Mg)-Total			N/A	MS-B	%		-	19-JUN-19
Manganese (Mn)-Total			96.7		%		70-130	19-JUN-19
Molybdenum (Mo)-Total			99.1		%		70-130	19-JUN-19
Nickel (Ni)-Total			96.3		%		70-130	19-JUN-19
Phosphorus (P)-Total			104.9		%		70-130	19-JUN-19

Quality Control Report

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Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4673448								
WG3081157-5 MS		**WG3081157-3**						
Potassium (K)-Total			N/A	MS-B	%		-	19-JUN-19
Rubidium (Rb)-Total			103.0		%		70-130	19-JUN-19
Selenium (Se)-Total			98.4		%		70-130	19-JUN-19
Silicon (Si)-Total			N/A	MS-B	%		-	19-JUN-19
Silver (Ag)-Total			97.0		%		70-130	19-JUN-19
Sodium (Na)-Total			N/A	MS-B	%		-	19-JUN-19
Strontium (Sr)-Total			N/A	MS-B	%		-	19-JUN-19
Sulfur (S)-Total			N/A	MS-B	%		-	19-JUN-19
Thallium (Tl)-Total			99.3		%		70-130	19-JUN-19
Tellurium (Te)-Total			98.5		%		70-130	19-JUN-19
Thorium (Th)-Total			94.9		%		70-130	19-JUN-19
Tin (Sn)-Total			98.1		%		70-130	19-JUN-19
Titanium (Ti)-Total			98.7		%		70-130	19-JUN-19
Tungsten (W)-Total			99.7		%		70-130	19-JUN-19
Uranium (U)-Total			N/A	MS-B	%		-	19-JUN-19
Vanadium (V)-Total			99.96		%		70-130	19-JUN-19
Zinc (Zn)-Total			99.7		%		70-130	19-JUN-19
Zirconium (Zr)-Total			99.9		%		70-130	19-JUN-19
NH3-F-WT	**Water**							
Batch R4672917								
WG3080650-19 DUP		**L2290839-1**						
Ammonia, Total (as N)		<0.010	<0.010	RPD-NA	mg/L	N/A	20	18-JUN-19
WG3080650-7 DUP		**L2290690-1**						
Ammonia, Total (as N)		0.051	0.048		mg/L	7.5	20	18-JUN-19
WG3080650-18 LCS								
Ammonia, Total (as N)			99.2		%		85-115	18-JUN-19
WG3080650-6 LCS								
Ammonia, Total (as N)			101.9		%		85-115	18-JUN-19
WG3080650-17 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	18-JUN-19
WG3080650-5 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	18-JUN-19
WG3080650-20 MS		**L2290839-1**						
Ammonia, Total (as N)			86.2		%		75-125	18-JUN-19
WG3080650-8 MS		**L2290690-1**						

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NH3-F-WT	**Water**							
Batch R4672917								
WG3080650-8 MS		**L2290690-1**						
Ammonia, Total (as N)			88.3		%		75-125	18-JUN-19
NO3-IC-WT	**Water**							
Batch R4674012								
WG3081366-4 DUP		**WG3081366-3**						
Nitrate (as N)		0.097	0.097		mg/L	0.2	20	19-JUN-19
WG3081366-2 LCS								
Nitrate (as N)			100.9		%		90-110	19-JUN-19
WG3081366-1 MB								
Nitrate (as N)			<0.020		mg/L		0.02	19-JUN-19
WG3081366-5 MS		**WG3081366-3**						
Nitrate (as N)			100.1		%		75-125	19-JUN-19
P-T-COL-WT	**Water**							
Batch R4673670								
WG3081040-3 DUP		**L2293039-1**						
Phosphorus, Total		0.0096	0.0094		mg/L	2.2	20	19-JUN-19
WG3081040-2 LCS								
Phosphorus, Total			99.6		%		80-120	19-JUN-19
WG3081040-1 MB								
Phosphorus, Total			<0.0030		mg/L		0.003	19-JUN-19
WG3081040-4 MS		**L2293039-1**						
Phosphorus, Total			100.4		%		70-130	19-JUN-19
PH-BF	**Water**							
Batch R4672122								
WG3079907-2 DUP		**L2293082-4**						
pH		7.84	7.84	J	pH units	0.00	0.2	18-JUN-19
WG3079907-1 LCS								
pH			7.03		pH units		6.9-7.1	18-JUN-19
SO4-IC-N-WT	**Water**							
Batch R4674012								
WG3081366-4 DUP		**WG3081366-3**						
Sulfate (SO4)		10.4	10.4		mg/L	0.1	20	19-JUN-19
WG3081366-2 LCS								
Sulfate (SO4)			102.1		%		90-110	19-JUN-19
WG3081366-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	19-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SO4-IC-N-WT	**Water**							
Batch R4674012								
WG3081366-5 MS		**WG3081366-3**						
Sulfate (SO4)			104.6		%		75-125	19-JUN-19
SOLIDS-TSS-BF	**Water**							
Batch R4672121								
WG3079840-3 DUP		**L2293082-4**						
Total Suspended Solids		14.0	12.4		mg/L	12	25	18-JUN-19
WG3079840-2 LCS								
Total Suspended Solids			99.4		%		85-115	18-JUN-19
WG3079840-1 MB								
Total Suspended Solids			<2.0		mg/L		2	18-JUN-19
TKN-WT	**Water**							
Batch R4674366								
WG3080816-3 DUP		**L2293039-2**						
Total Kjeldahl Nitrogen		0.63	0.60		mg/L	4.6	20	19-JUN-19
WG3080816-2 LCS								
Total Kjeldahl Nitrogen			103.2		%		75-125	19-JUN-19
WG3080816-1 MB								
Total Kjeldahl Nitrogen			<0.15		mg/L		0.15	19-JUN-19
WG3080816-4 MS		**L2293039-2**						
Total Kjeldahl Nitrogen			104.6		%		70-130	19-JUN-19
TOC-WT	**Water**							
Batch R4674213								
WG3081263-3 DUP		**L2293074-1**						
Total Organic Carbon		1.91	1.97		mg/L	3.3	20	19-JUN-19
WG3081263-2 LCS								
Total Organic Carbon			100.2		%		80-120	19-JUN-19
WG3081263-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	19-JUN-19
WG3081263-4 MS		**L2293074-1**						
Total Organic Carbon			97.5		%		70-130	19-JUN-19

Quality Control Report

Workorder: L2293074 Report Date: 04-JUL-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

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

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

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.

Wednesday, July 03, 2019

Rick Hawthorne
ALS Environmental
60 Northland Rd, Unit 1
Waterloo Canada, ON N2V 2B8

Re: ALS Workorder: 1906437
Project Name:
Project Number: L2293074

Dear Mr. Hawthorne:

Two water samples were received from ALS Environmental, on 6/19/2019. The samples were scheduled for the following analysis:

Radium-226

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,

ALS Environmental
Katie M. OBrien
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
AIHA	214884
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280

1906437

Radium-226:

The samples were prepared and analyzed according to the current revision of SOP 783.

All acceptance criteria were met.

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1906437
Client Name: ALS Environmental
Client Project Name:
Client Project Number: L2293074
Client PO Number: L2293074

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
L2293074-1	1906437-1		WATER	17-Jun-19	
L2293074-2	1906437-2		WATER	17-Jun-19	

ALS Environmental

Subcontract Request Form

19814437

Subcontract To:

ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
225 COMMERCE DRIVE
FORT COLLINS,CO 80524

NOTES: Please reference on final report and invoice: PO# *L2293074*
ALS requires QC data to be provided with your final results.

2x950mL w HNO3.

Please see enclosed 2 sample(s) in 2 Container(s)

SAMPLE NUMBER	ANALYTICAL REQUIRED	DATE SAMPLED / DUE DATE	Priority Flag
1 **L2293074-1 MS-08-DS**		6/ 17/ 2019	E
	Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	7/8/2019	
2 **L2293074-2 MS-08-US**		6/ 17/ 2019	E
	Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	7/8/2019	

Subcontract Info Contact: Mary-Lynn Pike (519) 886-6910
Analysis and reporting info contact: Rick Hawthorne
60 NORTHLAND ROAD, UNIT 1
WATERLOO,ON N2V 2B8
Phone: (519) 886-6910 Email: Rick.Hawthorne@alsglobal.com

Please email confirmation of receipt to: Rick.Hawthorne@alsglobal.com

Shipped By: _____ Date Shipped: _____
Received By: KELI-JEAN SMITH Date Received: 6·19·19 1340
Verified By: _____ Date Verified: _____
Temperature: _____
Sample Integrity Issues: _____

ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: ALS WATERLOO Workorder No: 1906137

Project Manager: KMO Initials: KG Date: 6.19.19

1.	Are airbills / shipping documents present and/or removable?	DROP OFF	YES	NO
2.	Are custody seals on **shipping** containers intact?	NONE	YES	NO *
3.	Are custody seals on **sample** containers intact?	NONE	YES	NO *
4.	Is there a COC (chain-of-custody) present?		YES	NO *
5.	Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)		YES	NO *
6.	Are short-hold samples present?		YES	NO
7.	Are all samples within holding times for the requested analyses?		YES	NO *
8.	Were all sample containers received intact? (not broken or leaking)		YES	NO *
9.	Is there sufficient sample for the requested analyses?		YES	NO *
10.	Are all samples in the proper containers for the requested analyses?		YES	NO *
11.	Are all aqueous samples preserved correctly, if required? (excluding volatiles)	N/A	YES	NO *
12.	Are all aqueous non-preserved samples pH 4-9?	N/A	YES	NO *
13.	Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm (1/4 inch) diameter? (i.e. size of green pea)	N/A	YES	NO
14.	Were the samples shipped on ice?		YES	NO
15.	Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: #1 #3 #4	RAD ONLY	YES	NO

Cooler #:	1							
Temperature (°C):	12.9							
No. of custody seals on cooler:	0							
DOT Survey Acceptance Information — External µR/hr reading:	9							
DOT Survey Acceptance Information — Background µR/hr reading:	10							

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? YES / NO / NA (If no, see Form 008.)

*** Please provide details here for NO responses to gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.**

14;15) ice included but melted upon arrival.

5) no times on COC -vs- times on bottles
Sample 1 1440
Sample 2 1510

All client bottle ID's vs ALS lab ID's double-checked by:

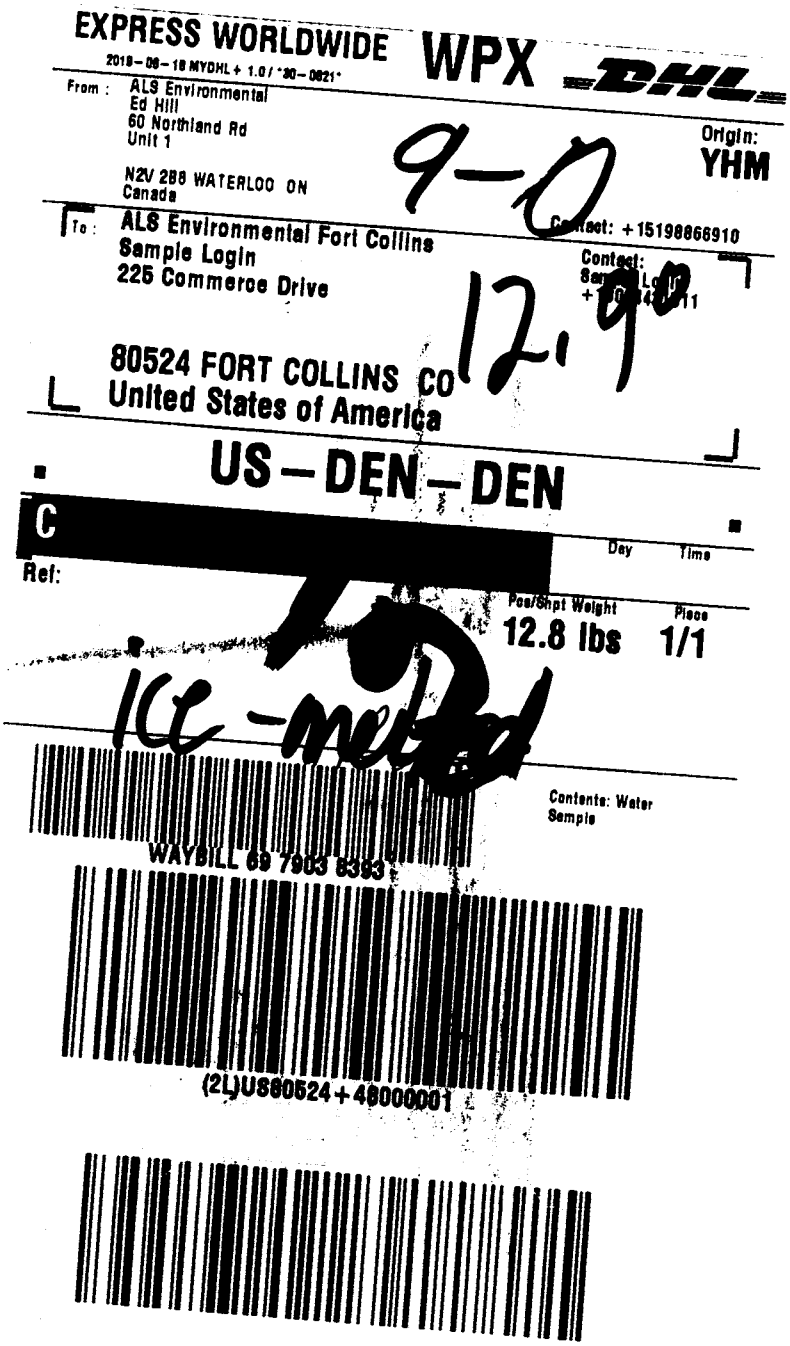
If applicable, was the client contacted? **YES / NO / NA** Contact: Date/Time:

Project Manager Signature / Date: 6/19/19

Form 201r27.xls
(02/11/2019)

*IR Gun #1, VWR SN 170560549
*IR Gun #3, VWR SN 170647571
*IR Gun #4, Oakton, SN 2372220101-0002

1906437



EXPRESS WORLDWIDE WPX DHL

2019-06-18 MYDHL+ 1.0 / *30-0621*

From : ALS Environmental
Ed Hill
60 Northland Rd
Unit 1

N2V 2B8 WATERLOO ON
Canada

Origin:
YHM

9-0

Contact: +15198866910

To : ALS Environmental Fort Collins
Sample Login
225 Commerce Drive

Contact:
Sa[illegible] Lo[illegible]
+[illegible]

12.9

80524 FORT COLLINS CO
United States of America

US-DEN-DEN

C [redacted]

Day Time

Ref:

Pce/Shpt Weight 12.8 lbs

Piece 1/1

ICE-packed

Contents: Water Sample

WAYBILL 69 7903 8393

(2L)US80524+48000001

Client:	ALS Environmental	**Date:**	*03-Jul-19*
Project:	L2293074	**Work Order:**	1906437
Sample ID:	L2293074-1	**Lab ID:**	1906437-1
Legal Location:		**Matrix:**	WATER
Collection Date:	6/17/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **6/24/2019**		PrepBy: **JXH**
Ra-226	**0.010 (+/- 0.0059)**		**0.0055**	**BQ/l**	NA	7/2/2019 11:46
Carr: BARIUM	*85.6*		*40-110*	*%REC*	DL = NA	7/2/2019 11:46

Client:	ALS Environmental	**Date:**	*03-Jul-19*
Project:	L2293074	**Work Order:**	1906437
Sample ID:	L2293074-2	**Lab ID:**	1906437-2
Legal Location:		**Matrix:**	WATER
Collection Date:	6/17/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1			**SOP 783**		Prep Date: **6/24/2019**	PrepBy: **JXH**
Ra-226	0.0021 (+/- 0.0043)	U	0.0076	BQ/l	NA	7/2/2019 11:46
Carr: BARIUM	*91.2*		*40-110*	*%REC*	DL = NA	7/2/2019 11:46

Client:	ALS Environmental	**Date:**	*03-Jul-19*
Project:	L2293074	**Work Order:**	1906437
Sample ID:	L2293074-2	**Lab ID:**	1906437-2
Legal Location:		**Matrix:**	WATER
Collection Date:	6/17/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed

Explanation of Qualifiers

Radiochemistry:

- "Report Limit" is the MDC

U or ND - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

Y2 - Chemical Yield outside default limits.

W - DER is greater than Warning Limit of 1.42

* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.
# - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.
G - Sample density differs by more than 15% of LCS density.
D - DER is greater than Control Limit

M - Requested MDC not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS, Matrix Spike Recovery within control limits.

N - Matrix Spike Recovery outside control limits

NC - Not Calculated for duplicate results less than 5 times MDC

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

Inorganics:

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).

U or ND - Indicates that the compound was analyzed for but not detected.

E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.

M - Duplicate injection precision was not met.

N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.

Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.

* - Duplicate analysis (relative percent difference) not within control limits.

S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

Organics:

U or ND - Indicates that the compound was analyzed for but not detected.

B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.

E - Analyte concentration exceeds the upper level of the calibration range.

J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).

A - A tentatively identified compound is a suspected aldol-condensation product.

X - The analyte was diluted below an accurate quantitation level.

* - The spike recovery is equal to or outside the control criteria used.

+ - The relative percent difference (RPD) equals or exceeds the control criteria.

G - A pattern resembling gasoline was detected in this sample.

D - A pattern resembling diesel was detected in this sample.

M - A pattern resembling motor oil was detected in this sample.

C - A pattern resembling crude oil was detected in this sample.

4 - A pattern resembling JP-4 was detected in this sample.

5 - A pattern resembling JP-5 was detected in this sample.

H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.

L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.

Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
- gasoline
- JP-8
- diesel
- mineral spirits
- motor oil
- Stoddard solvent
- bunker C

Batch ID: **RE190624-1-1** Instrument ID **Alpha Scin** Method: **Radium-226 by Radon Emanation**

LCS Sample ID: **RE190624-1** Units: **BQ/l** Analysis Date: **7/2/2019 12:23**
Client ID: Run ID: **RE190624-1A** Prep Date: **6/24/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.90 (+/- 0.473)	0.0233	1.771		107	67-120					P,M3
Carr: BARIUM	15300		16100		95.1	40-110					

LCSD Sample ID: **RE190624-1** Units: **BQ/l** Analysis Date: **7/2/2019 12:23**
Client ID: Run ID: **RE190624-1A** Prep Date: **6/24/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.65 (+/- 0.412)	0.0193	1.771		92.9	67-120		1.9	0.4	2.1	P,M3
Carr: BARIUM	15200		16110		94.2	40-110		15300			

MB Sample ID: **RE190624-1** Units: **BQ/l** Analysis Date: **7/2/2019 12:23**
Client ID: Run ID: **RE190624-1A** Prep Date: **6/24/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	0.00090 (+/- 0.0042)	0.0079									U
Carr: BARIUM	15500		16100		96.4	40-110					

The following samples were analyzed in this batch: 1906437-1 1906437-2

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2293074-COFC

COC Number: 15 -

Report To	Contact and company name below will appear on the final report
Company:	Baffinland Iron Mines Corp.
Contact:	Wiliam Bowden and Connor Devereaux
Phone:	647-253-0596 EXT 6016
	Company address below will appear on the final report
Street:	2275 Upper Middle Rd. E., Suite #300
City/Province:	Oakville, ON
Postal Code:	L6H 0C3
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)

Quality Control (QC) Report with Report ☑ YES ☐ NO

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax bimcore@alsglobal.com

Email 2 bimww@alsglobal.com

Email 3

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax ap@baffinland.com

Email 2 commercial@baffinland.com

Project Information

ALS Account # / Quote #:	23642 /Q42455
Job #:	MS-08 Eff Characterization - Reference and Exposure
PO / AFE:	4500057496
LSD:	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only) L2293074 | **ALS Contact:** | **Sampler:** KB/JB/BC

Select service level below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☐ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): **4 day [P4]** ☐ | **3 day [P3]** ☐ | **2 day [P2]** ☐

EMERGENCY: **1 Business day [E1]** ☐ | **Same Day, Weekend or Statutory holiday [E0]** ☑

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	F/P	BIM-MMER-EFF	Number of Containers
1	MS-08-DS	17-Jun-19	14:40	Water	E0		9
2	MS-08-US	17-Jun-19	15:10	Water	E0		9

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human drinking water use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ | SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ | Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
	4C				

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Kendra Button	Release Date: 17-Jun-19	Time: 18:20	Received by: CV	Date: June 17, 2019	Time: 8pm	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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 specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Baffinland Iron Mine's Corporation (Oakville)
ATTN: William Bowden/Connor Devereaux
2275 Upper Middle Rd. E.
Suite #300
Oakville ON L6H 0C3

Date Received: 24-JUN-19
Report Date: 19-JUL-19 13:56 (MT)
Version: FINAL

Client Phone: 647-253-0596

Certificate of Analysis

Lab Work Order #: L2297608

Project P.O. #: 4500057496
Job Reference: MS-08 DEL
C of C Numbers:
Legal Site Desc:

Rick Hawthorne
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2297608-1 MS-08 Sampled By: LM/SJS/BW on 24-JUN-19 @ 11:35 Matrix: Water							
Physical Tests							
Conductivity	930		3.0	umhos/cm		26-JUN-19	R4688344
pH	7.20		0.10	pH units		24-JUN-19	R4683161
Total Suspended Solids	15.6		2.0	mg/L		25-JUN-19	R4683222
Total Dissolved Solids	772		20	mg/L		25-JUN-19	R4686554
Turbidity	19.8		0.10	NTU		24-JUN-19	R4683185
Anions and Nutrients							
Ammonia, Total (as N)	0.537		0.010	mg/L		26-JUN-19	R4687969
Cyanides							
Cyanide, Total	0.0039		0.0020	mg/L		26-JUN-19	R4688262
Total Metals							
Aluminum (Al)-Total	0.712	DLHC	0.050	mg/L	26-JUN-19	26-JUN-19	R4688244
Antimony (Sb)-Total	<0.0010	DLHC	0.0010	mg/L	26-JUN-19	26-JUN-19	R4688244
Arsenic (As)-Total	<0.0010	DLHC	0.0010	mg/L	26-JUN-19	26-JUN-19	R4688244
Barium (Ba)-Total	0.0139	DLHC	0.0010	mg/L	26-JUN-19	26-JUN-19	R4688244
Beryllium (Be)-Total	<0.0010	DLHC	0.0010	mg/L	26-JUN-19	26-JUN-19	R4688244
Bismuth (Bi)-Total	<0.00050	DLHC	0.00050	mg/L	26-JUN-19	26-JUN-19	R4688244
Boron (B)-Total	<0.10	DLHC	0.10	mg/L	26-JUN-19	26-JUN-19	R4688244
Cadmium (Cd)-Total	0.000063	DLHC	0.000050	mg/L	26-JUN-19	26-JUN-19	R4688244
Calcium (Ca)-Total	34.9	DLHC	0.50	mg/L	26-JUN-19	26-JUN-19	R4688244
Cesium (Cs)-Total	<0.00010	DLHC	0.00010	mg/L	26-JUN-19	26-JUN-19	R4688244
Chromium (Cr)-Total	<0.0050	DLHC	0.0050	mg/L	26-JUN-19	26-JUN-19	R4688244
Cobalt (Co)-Total	0.0375	DLHC	0.0010	mg/L	26-JUN-19	26-JUN-19	R4688244
Copper (Cu)-Total	<0.010	DLHC	0.010	mg/L	26-JUN-19	26-JUN-19	R4688244
Iron (Fe)-Total	1.76	DLHC	0.10	mg/L	26-JUN-19	26-JUN-19	R4688244
Lead (Pb)-Total	0.00051	DLHC	0.00050	mg/L	26-JUN-19	26-JUN-19	R4688244
Lithium (Li)-Total	<0.010	DLHC	0.010	mg/L	26-JUN-19	26-JUN-19	R4688244
Magnesium (Mg)-Total	109	DLHC	0.050	mg/L	26-JUN-19	26-JUN-19	R4688244
Manganese (Mn)-Total	2.80	DLHC	0.0050	mg/L	26-JUN-19	26-JUN-19	R4688244
Molybdenum (Mo)-Total	0.00075	DLHC	0.00050	mg/L	26-JUN-19	26-JUN-19	R4688244
Nickel (Ni)-Total	0.0399	DLHC	0.0050	mg/L	26-JUN-19	26-JUN-19	R4688244
Phosphorus (P)-Total	<0.50	DLHC	0.50	mg/L	26-JUN-19	26-JUN-19	R4688244
Potassium (K)-Total	2.73	DLHC	0.50	mg/L	26-JUN-19	26-JUN-19	R4688244
Rubidium (Rb)-Total	0.0038	DLHC	0.0020	mg/L	26-JUN-19	26-JUN-19	R4688244
Selenium (Se)-Total	0.00152	DLHC	0.00050	mg/L	26-JUN-19	26-JUN-19	R4688244
Silicon (Si)-Total	1.9	DLHC	1.0	mg/L	26-JUN-19	26-JUN-19	R4688244
Silver (Ag)-Total	<0.00050	DLHC	0.00050	mg/L	26-JUN-19	26-JUN-19	R4688244
Sodium (Na)-Total	1.32	DLHC	0.50	mg/L	26-JUN-19	26-JUN-19	R4688244
Strontium (Sr)-Total	0.083	DLHC	0.010	mg/L	26-JUN-19	26-JUN-19	R4688244
Sulfur (S)-Total	172	DLHC	5.0	mg/L	26-JUN-19	26-JUN-19	R4688244
Tellurium (Te)-Total	<0.0020	DLHC	0.0020	mg/L	26-JUN-19	26-JUN-19	R4688244
Thallium (Tl)-Total	<0.00010	DLHC	0.00010	mg/L	26-JUN-19	26-JUN-19	R4688244
Thorium (Th)-Total	<0.0010	DLHC	0.0010	mg/L	26-JUN-19	26-JUN-19	R4688244

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2297608-1 MS-08 Sampled By: LM/SJS/BW on 24-JUN-19 @ 11:35 Matrix: Water							
Total Metals							
Tin (Sn)-Total	<0.0010	DLHC	0.0010	mg/L	26-JUN-19	26-JUN-19	R4688244
Titanium (Ti)-Total	0.0305	DLHC	0.0030	mg/L	26-JUN-19	26-JUN-19	R4688244
Tungsten (W)-Total	<0.0010	DLHC	0.0010	mg/L	26-JUN-19	26-JUN-19	R4688244
Uranium (U)-Total	0.00066	DLHC	0.00010	mg/L	26-JUN-19	26-JUN-19	R4688244
Vanadium (V)-Total	<0.0050	DLHC	0.0050	mg/L	26-JUN-19	26-JUN-19	R4688244
Zinc (Zn)-Total	<0.030	DLHC	0.030	mg/L	26-JUN-19	26-JUN-19	R4688244
Zirconium (Zr)-Total	<0.0020	DLHC	0.0020	mg/L	26-JUN-19	26-JUN-19	R4688244
Radiological Parameters							
Ra-226	0.0086		0.0075	Bq/L	09-JUL-19	17-JUL-19	R4692536
L2297608-2 MS-0801 Sampled By: LM/SJS/BW on 24-JUN-19 @ 11:35 Matrix: Water							
Physical Tests							
Conductivity	940		3.0	umhos/cm		26-JUN-19	R4688344
pH	7.23		0.10	pH units		24-JUN-19	R4683161
Total Suspended Solids	15.6		2.0	mg/L		25-JUN-19	R4683222
Total Dissolved Solids	758		20	mg/L		25-JUN-19	R4686554
Turbidity	16.4		0.10	NTU		24-JUN-19	R4683185
Anions and Nutrients							
Ammonia, Total (as N)	0.541		0.010	mg/L		26-JUN-19	R4687969
Cyanides							
Cyanide, Total	0.0036		0.0020	mg/L		26-JUN-19	R4688262
Total Metals							
Aluminum (Al)-Total	0.597	DLHC	0.050	mg/L	26-JUN-19	26-JUN-19	R4688244
Antimony (Sb)-Total	<0.0010	DLHC	0.0010	mg/L	26-JUN-19	26-JUN-19	R4688244
Arsenic (As)-Total	<0.0010	DLHC	0.0010	mg/L	26-JUN-19	26-JUN-19	R4688244
Barium (Ba)-Total	0.0150	DLHC	0.0010	mg/L	26-JUN-19	26-JUN-19	R4688244
Beryllium (Be)-Total	<0.0010	DLHC	0.0010	mg/L	26-JUN-19	26-JUN-19	R4688244
Bismuth (Bi)-Total	<0.00050	DLHC	0.00050	mg/L	26-JUN-19	26-JUN-19	R4688244
Boron (B)-Total	<0.10	DLHC	0.10	mg/L	26-JUN-19	26-JUN-19	R4688244
Cadmium (Cd)-Total	0.000062	DLHC	0.000050	mg/L	26-JUN-19	26-JUN-19	R4688244
Calcium (Ca)-Total	35.2	DLHC	0.50	mg/L	26-JUN-19	26-JUN-19	R4688244
Cesium (Cs)-Total	<0.00010	DLHC	0.00010	mg/L	26-JUN-19	26-JUN-19	R4688244
Chromium (Cr)-Total	<0.0050	DLHC	0.0050	mg/L	26-JUN-19	26-JUN-19	R4688244
Cobalt (Co)-Total	0.0378	DLHC	0.0010	mg/L	26-JUN-19	26-JUN-19	R4688244
Copper (Cu)-Total	<0.010	DLHC	0.010	mg/L	26-JUN-19	26-JUN-19	R4688244
Iron (Fe)-Total	1.62	DLHC	0.10	mg/L	26-JUN-19	26-JUN-19	R4688244
Lead (Pb)-Total	0.00056	DLHC	0.00050	mg/L	26-JUN-19	26-JUN-19	R4688244
Lithium (Li)-Total	<0.010	DLHC	0.010	mg/L	26-JUN-19	26-JUN-19	R4688244
Magnesium (Mg)-Total	110	DLHC	0.050	mg/L	26-JUN-19	26-JUN-19	R4688244
Manganese (Mn)-Total	2.80	DLHC	0.0050	mg/L	26-JUN-19	26-JUN-19	R4688244
Molybdenum (Mo)-Total	0.00091	DLHC	0.00050	mg/L	26-JUN-19	26-JUN-19	R4688244

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2297608-2 MS-0801 Sampled By: LM/SJS/BW on 24-JUN-19 @ 11:35 Matrix: Water							
Total Metals							
Nickel (Ni)-Total	0.0407	DLHC	0.0050	mg/L	26-JUN-19	26-JUN-19	R4688244
Phosphorus (P)-Total	<0.50	DLHC	0.50	mg/L	26-JUN-19	26-JUN-19	R4688244
Potassium (K)-Total	2.59	DLHC	0.50	mg/L	26-JUN-19	26-JUN-19	R4688244
Rubidium (Rb)-Total	0.0036	DLHC	0.0020	mg/L	26-JUN-19	26-JUN-19	R4688244
Selenium (Se)-Total	0.00149	DLHC	0.00050	mg/L	26-JUN-19	26-JUN-19	R4688244
Silicon (Si)-Total	1.6	DLHC	1.0	mg/L	26-JUN-19	26-JUN-19	R4688244
Silver (Ag)-Total	<0.00050	DLHC	0.00050	mg/L	26-JUN-19	26-JUN-19	R4688244
Sodium (Na)-Total	1.35	DLHC	0.50	mg/L	26-JUN-19	26-JUN-19	R4688244
Strontium (Sr)-Total	0.083	DLHC	0.010	mg/L	26-JUN-19	26-JUN-19	R4688244
Sulfur (S)-Total	169	DLHC	5.0	mg/L	26-JUN-19	26-JUN-19	R4688244
Tellurium (Te)-Total	<0.0020	DLHC	0.0020	mg/L	26-JUN-19	26-JUN-19	R4688244
Thallium (Tl)-Total	<0.00010	DLHC	0.00010	mg/L	26-JUN-19	26-JUN-19	R4688244
Thorium (Th)-Total	<0.0010	DLHC	0.0010	mg/L	26-JUN-19	26-JUN-19	R4688244
Tin (Sn)-Total	<0.0010	DLHC	0.0010	mg/L	26-JUN-19	26-JUN-19	R4688244
Titanium (Ti)-Total	0.0259	DLHC	0.0030	mg/L	26-JUN-19	26-JUN-19	R4688244
Tungsten (W)-Total	<0.0010	DLHC	0.0010	mg/L	26-JUN-19	26-JUN-19	R4688244
Uranium (U)-Total	0.00065	DLHC	0.00010	mg/L	26-JUN-19	26-JUN-19	R4688244
Vanadium (V)-Total	<0.0050	DLHC	0.0050	mg/L	26-JUN-19	26-JUN-19	R4688244
Zinc (Zn)-Total	<0.030	DLHC	0.030	mg/L	26-JUN-19	26-JUN-19	R4688244
Zirconium (Zr)-Total	<0.0020	DLHC	0.0020	mg/L	26-JUN-19	26-JUN-19	R4688244
Radiological Parameters							
Ra-226	<0.0071		0.0071	Bq/L	09-JUL-19	17-JUL-19	R4692536

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

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Aluminum (Al)-Total	MS-B	L2297608-1, -2
Matrix Spike	Barium (Ba)-Total	MS-B	L2297608-1, -2
Matrix Spike	Calcium (Ca)-Total	MS-B	L2297608-1, -2
Matrix Spike	Cobalt (Co)-Total	MS-B	L2297608-1, -2
Matrix Spike	Iron (Fe)-Total	MS-B	L2297608-1, -2
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2297608-1, -2
Matrix Spike	Manganese (Mn)-Total	MS-B	L2297608-1, -2
Matrix Spike	Nickel (Ni)-Total	MS-B	L2297608-1, -2
Matrix Spike	Potassium (K)-Total	MS-B	L2297608-1, -2
Matrix Spike	Silicon (Si)-Total	MS-B	L2297608-1, -2
Matrix Spike	Strontium (Sr)-Total	MS-B	L2297608-1, -2
Matrix Spike	Sulfur (S)-Total	MS-B	L2297608-1, -2
Matrix Spike	Titanium (Ti)-Total	MS-B	L2297608-1, -2
Matrix Spike	Uranium (U)-Total	MS-B	L2297608-1, -2

Sample Parameter Qualifier key listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
CN-TOT-WT	Water	Cyanide, Total	ISO 14403-2

Total cyanide is determined by the combination of UV digestion and distillation. Cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

When using this method, high levels of thiocyanate in samples can cause false positives at ~1-2% of the thiocyanate concentration. For samples with detectable cyanide analyzed by this method, ALS recommends analysis for thiocyanate to check for this potential interference

EC-SCREEN-WT	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

EC-WT	Water	Conductivity	APHA 2510 B

Water samples can be measured directly by immersing the conductivity cell into the sample.

MET-T-CCMS-WT	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

NH3-F-WT	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

PH-BF	Water	pH	APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

RA226-MMER-FC	Water	Ra226 by Alpha Scint, MDC=0.01 Bq/L	EPA 903.1

SOLIDS-TDS-BF	Water	Total Dissolved Solids	APHA 2540C

A well-mixed sample is filtered though glass fibres filter. A known volume of the filtrate is evaporated and dried at 180 +/- 2C for 1hr.

SOLIDS-TSS-BF	Water	Suspended solids	APHA 2540 D-Gravimetric

A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104 +/- 1C for a minimum of four hours or until a constant weight is achieved.

TURBIDITY-BF	Water	Turbidity	APHA 2130 B

Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.

Reference Information

** 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
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA
FC	ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
BF	ALS ENVIRONMENTAL - BAFFIN ISLAND, NUNAVUT, 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 weight of sample
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: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CN-TOT-WT	**Water**							
Batch R4688262								
WG3088679-3 DUP		**L2297608-2**						
Cyanide, Total		0.0036	0.0036		mg/L	1.7	20	26-JUN-19
WG3088679-2 LCS								
Cyanide, Total			90.9		%		80-120	26-JUN-19
WG3088679-1 MB								
Cyanide, Total			<0.0020		mg/L		0.002	26-JUN-19
WG3088679-4 MS		**L2297608-2**						
Cyanide, Total			76.8		%		70-130	26-JUN-19
EC-WT	**Water**							
Batch R4688344								
WG3088759-4 DUP		**WG3088759-3**						
Conductivity		1170	1160		umhos/cm	0.7	10	26-JUN-19
WG3088759-2 LCS								
Conductivity			98.4		%		90-110	26-JUN-19
WG3088759-1 MB								
Conductivity			<3.0		umhos/cm		3	26-JUN-19
MET-T-CCMS-WT	**Water**							
Batch R4688244								
WG3088722-4 DUP		**WG3088722-3**						
Aluminum (Al)-Total		0.597	0.641		mg/L	7.2	20	26-JUN-19
Antimony (Sb)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	26-JUN-19
Arsenic (As)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	26-JUN-19
Barium (Ba)-Total		0.0150	0.0148		mg/L	1.8	20	26-JUN-19
Beryllium (Be)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	26-JUN-19
Bismuth (Bi)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	26-JUN-19
Boron (B)-Total		<0.10	<0.10	RPD-NA	mg/L	N/A	20	26-JUN-19
Cadmium (Cd)-Total		0.000062	0.000060		mg/L	2.1	20	26-JUN-19
Calcium (Ca)-Total		35.2	35.6		mg/L	1.2	20	26-JUN-19
Chromium (Cr)-Total		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	26-JUN-19
Cesium (Cs)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	26-JUN-19
Cobalt (Co)-Total		0.0378	0.0374		mg/L	1.1	20	26-JUN-19
Copper (Cu)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	26-JUN-19
Iron (Fe)-Total		1.62	1.69		mg/L	4.1	20	26-JUN-19
Lead (Pb)-Total		0.00056	<0.00050	RPD-NA	mg/L	N/A	20	26-JUN-19
Lithium (Li)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	26-JUN-19

Quality Control Report

Workorder: L2297608 Report Date: 19-JUL-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4688244								
WG3088722-4 DUP		**WG3088722-3**						
Magnesium (Mg)-Total		110	109		mg/L	1.1	20	26-JUN-19
Manganese (Mn)-Total		2.80	2.78		mg/L	0.9	20	26-JUN-19
Molybdenum (Mo)-Total		0.00091	0.00087		mg/L	3.5	20	26-JUN-19
Nickel (Ni)-Total		0.0407	0.0405		mg/L	0.4	20	26-JUN-19
Phosphorus (P)-Total		<0.50	<0.50	RPD-NA	mg/L	N/A	20	26-JUN-19
Potassium (K)-Total		2.59	2.53		mg/L	2.1	20	26-JUN-19
Rubidium (Rb)-Total		0.0036	0.0039		mg/L	6.2	20	26-JUN-19
Selenium (Se)-Total		0.00149	0.00144		mg/L	4.0	20	26-JUN-19
Silicon (Si)-Total		1.6	1.7		mg/L	4.3	20	26-JUN-19
Silver (Ag)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	26-JUN-19
Sodium (Na)-Total		1.35	1.29		mg/L	4.9	20	26-JUN-19
Strontium (Sr)-Total		0.083	0.083		mg/L	0.6	20	26-JUN-19
Sulfur (S)-Total		169	168		mg/L	0.7	25	26-JUN-19
Thallium (Tl)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	26-JUN-19
Tellurium (Te)-Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	26-JUN-19
Thorium (Th)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	25	26-JUN-19
Tin (Sn)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	26-JUN-19
Titanium (Ti)-Total		0.0259	0.0259		mg/L	0.3	20	26-JUN-19
Tungsten (W)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	26-JUN-19
Uranium (U)-Total		0.00065	0.00066		mg/L	1.8	20	26-JUN-19
Vanadium (V)-Total		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	26-JUN-19
Zinc (Zn)-Total		<0.030	<0.030	RPD-NA	mg/L	N/A	20	26-JUN-19
Zirconium (Zr)-Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	26-JUN-19
WG3088722-2 LCS								
Aluminum (Al)-Total			102.8		%		80-120	26-JUN-19
Antimony (Sb)-Total			102.4		%		80-120	26-JUN-19
Arsenic (As)-Total			101.3		%		80-120	26-JUN-19
Barium (Ba)-Total			100.7		%		80-120	26-JUN-19
Beryllium (Be)-Total			96.2		%		80-120	26-JUN-19
Bismuth (Bi)-Total			100.2		%		80-120	26-JUN-19
Boron (B)-Total			91.7		%		80-120	26-JUN-19
Cadmium (Cd)-Total			102.3		%		80-120	26-JUN-19
Calcium (Ca)-Total			99.2		%		80-120	26-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4688244								
WG3088722-2 LCS								
Chromium (Cr)-Total			101.8		%		80-120	26-JUN-19
Cesium (Cs)-Total			101.5		%		80-120	26-JUN-19
Cobalt (Co)-Total			100.5		%		80-120	26-JUN-19
Copper (Cu)-Total			100.1		%		80-120	26-JUN-19
Iron (Fe)-Total			104.9		%		80-120	26-JUN-19
Lead (Pb)-Total			101.6		%		80-120	26-JUN-19
Lithium (Li)-Total			95.5		%		80-120	26-JUN-19
Magnesium (Mg)-Total			102.1		%		80-120	26-JUN-19
Manganese (Mn)-Total			100.3		%		80-120	26-JUN-19
Molybdenum (Mo)-Total			101.2		%		80-120	26-JUN-19
Nickel (Ni)-Total			100.9		%		80-120	26-JUN-19
Phosphorus (P)-Total			105.1		%		70-130	26-JUN-19
Potassium (K)-Total			103.0		%		80-120	26-JUN-19
Rubidium (Rb)-Total			103.0		%		80-120	26-JUN-19
Selenium (Se)-Total			100.2		%		80-120	26-JUN-19
Silicon (Si)-Total			104.2		%		60-140	26-JUN-19
Silver (Ag)-Total			103.4		%		80-120	26-JUN-19
Sodium (Na)-Total			103.2		%		80-120	26-JUN-19
Strontium (Sr)-Total			101.4		%		80-120	26-JUN-19
Sulfur (S)-Total			96.1		%		80-120	26-JUN-19
Thallium (Tl)-Total			101.4		%		80-120	26-JUN-19
Tellurium (Te)-Total			96.8		%		80-120	26-JUN-19
Thorium (Th)-Total			102.3		%		70-130	26-JUN-19
Tin (Sn)-Total			101.5		%		80-120	26-JUN-19
Titanium (Ti)-Total			100.1		%		80-120	26-JUN-19
Tungsten (W)-Total			103.6		%		80-120	26-JUN-19
Uranium (U)-Total			102.6		%		80-120	26-JUN-19
Vanadium (V)-Total			101.9		%		80-120	26-JUN-19
Zinc (Zn)-Total			101.2		%		80-120	26-JUN-19
Zirconium (Zr)-Total			101.7		%		80-120	26-JUN-19
WG3088722-1 MB								
Aluminum (Al)-Total			<0.0050		mg/L		0.005	26-JUN-19
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	26-JUN-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	26-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4688244								
WG3088722-1 MB								
Barium (Ba)-Total			<0.00010		mg/L		0.0001	26-JUN-19
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	26-JUN-19
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	26-JUN-19
Boron (B)-Total			<0.010		mg/L		0.01	26-JUN-19
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	26-JUN-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	26-JUN-19
Chromium (Cr)-Total			<0.00050		mg/L		0.0005	26-JUN-19
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	26-JUN-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	26-JUN-19
Copper (Cu)-Total			<0.0010		mg/L		0.001	26-JUN-19
Iron (Fe)-Total			<0.010		mg/L		0.01	26-JUN-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	26-JUN-19
Lithium (Li)-Total			<0.0010		mg/L		0.001	26-JUN-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	26-JUN-19
Manganese (Mn)-Total			<0.00050		mg/L		0.0005	26-JUN-19
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	26-JUN-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	26-JUN-19
Phosphorus (P)-Total			<0.050		mg/L		0.05	26-JUN-19
Potassium (K)-Total			<0.050		mg/L		0.05	26-JUN-19
Rubidium (Rb)-Total			<0.00020		mg/L		0.0002	26-JUN-19
Selenium (Se)-Total			<0.000050		mg/L		0.00005	26-JUN-19
Silicon (Si)-Total			<0.10		mg/L		0.1	26-JUN-19
Silver (Ag)-Total			<0.000050		mg/L		0.00005	26-JUN-19
Sodium (Na)-Total			<0.050		mg/L		0.05	26-JUN-19
Strontium (Sr)-Total			<0.0010		mg/L		0.001	26-JUN-19
Sulfur (S)-Total			<0.50		mg/L		0.5	26-JUN-19
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	26-JUN-19
Tellurium (Te)-Total			<0.00020		mg/L		0.0002	26-JUN-19
Thorium (Th)-Total			<0.00010		mg/L		0.0001	26-JUN-19
Tin (Sn)-Total			<0.00010		mg/L		0.0001	26-JUN-19
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	26-JUN-19
Tungsten (W)-Total			<0.00010		mg/L		0.0001	26-JUN-19
Uranium (U)-Total			<0.000010		mg/L		0.00001	26-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4688244								
WG3088722-1 MB								
Vanadium (V)-Total			<0.00050		mg/L		0.0005	26-JUN-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	26-JUN-19
Zirconium (Zr)-Total			<0.00020		mg/L		0.0002	26-JUN-19
WG3088722-5 MS		**WG3088722-3**						
Aluminum (Al)-Total			N/A	MS-B	%		-	26-JUN-19
Antimony (Sb)-Total			103.3		%		70-130	26-JUN-19
Arsenic (As)-Total			103.2		%		70-130	26-JUN-19
Barium (Ba)-Total			N/A	MS-B	%		-	26-JUN-19
Beryllium (Be)-Total			95.6		%		70-130	26-JUN-19
Bismuth (Bi)-Total			103.5		%		70-130	26-JUN-19
Boron (B)-Total			93.5		%		70-130	26-JUN-19
Cadmium (Cd)-Total			102.9		%		70-130	26-JUN-19
Calcium (Ca)-Total			N/A	MS-B	%		-	26-JUN-19
Chromium (Cr)-Total			104.9		%		70-130	26-JUN-19
Cesium (Cs)-Total			100.5		%		70-130	26-JUN-19
Cobalt (Co)-Total			N/A	MS-B	%		-	26-JUN-19
Copper (Cu)-Total			98.5		%		70-130	26-JUN-19
Iron (Fe)-Total			N/A	MS-B	%		-	26-JUN-19
Lead (Pb)-Total			102.0		%		70-130	26-JUN-19
Magnesium (Mg)-Total			N/A	MS-B	%		-	26-JUN-19
Manganese (Mn)-Total			N/A	MS-B	%		-	26-JUN-19
Molybdenum (Mo)-Total			102.7		%		70-130	26-JUN-19
Nickel (Ni)-Total			N/A	MS-B	%		-	26-JUN-19
Phosphorus (P)-Total			112.1		%		70-130	26-JUN-19
Potassium (K)-Total			N/A	MS-B	%		-	26-JUN-19
Rubidium (Rb)-Total			100.4		%		70-130	26-JUN-19
Selenium (Se)-Total			102.7		%		70-130	26-JUN-19
Silicon (Si)-Total			N/A	MS-B	%		-	26-JUN-19
Silver (Ag)-Total			105.6		%		70-130	26-JUN-19
Sodium (Na)-Total			97.3		%		70-130	26-JUN-19
Strontium (Sr)-Total			N/A	MS-B	%		-	26-JUN-19
Sulfur (S)-Total			N/A	MS-B	%		-	26-JUN-19
Thallium (Tl)-Total			103.4		%		70-130	26-JUN-19
Tellurium (Te)-Total			94.0		%		70-130	26-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4688244								
WG3088722-5 MS		**WG3088722-3**						
Thorium (Th)-Total			101.8		%		70-130	26-JUN-19
Tin (Sn)-Total			102.2		%		70-130	26-JUN-19
Titanium (Ti)-Total			N/A	MS-B	%		-	26-JUN-19
Tungsten (W)-Total			100.8		%		70-130	26-JUN-19
Uranium (U)-Total			N/A	MS-B	%		-	26-JUN-19
Vanadium (V)-Total			102.8		%		70-130	26-JUN-19
Zirconium (Zr)-Total			100.7		%		70-130	26-JUN-19
NH3-F-WT	**Water**							
Batch R4687969								
WG3088732-19 DUP		**L2294644-1**						
Ammonia, Total (as N)		0.018	0.018		mg/L	0.5	20	26-JUN-19
WG3088732-18 LCS								
Ammonia, Total (as N)			103.9		%		85-115	26-JUN-19
WG3088732-17 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	26-JUN-19
WG3088732-20 MS		**L2294644-1**						
Ammonia, Total (as N)			84.5		%		75-125	26-JUN-19
PH-BF	**Water**							
Batch R4683161								
WG3086898-2 DUP		**L2297625-3**						
pH		6.93	6.92	J	pH units	0.01	0.2	24-JUN-19
WG3086898-1 LCS								
pH			7.04		pH units		6.9-7.1	24-JUN-19
SOLIDS-TDS-BF	**Water**							
Batch R4686554								
WG3086985-3 DUP		**L2297005-24**						
Total Dissolved Solids		80	89		mg/L	11	20	25-JUN-19
WG3086985-2 LCS								
Total Dissolved Solids			105.4		%		85-115	25-JUN-19
WG3086985-1 MB								
Total Dissolved Solids			<20		mg/L		20	25-JUN-19
SOLIDS-TSS-BF	**Water**							

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SOLIDS-TSS-BF	**Water**							
Batch R4683222								
WG3086962-3 DUP		**L2297625-3**						
Total Suspended Solids		41.8	42.6		mg/L	1.9	25	25-JUN-19
WG3086962-2 LCS								
Total Suspended Solids			100.2		%		85-115	25-JUN-19
WG3086962-1 MB								
Total Suspended Solids			<2.0		mg/L		2	25-JUN-19
TURBIDITY-BF	**Water**							
Batch R4683185								
WG3086913-3 DUP		**L2297633-1**						
Turbidity		11.3	12.1		NTU	6.8	15	24-JUN-19
WG3086913-2 LCS								
Turbidity			102.0		%		85-115	24-JUN-19
WG3086913-1 MB								
Turbidity			<0.10		NTU		0.1	24-JUN-19

Quality Control Report

Workorder: L2297608 Report Date: 19-JUL-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

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

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

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.

Wednesday, July 17, 2019

Rick Hawthorne
ALS Environmental
60 Northland Rd, Unit 1
Waterloo Canada, ON N2V 2B8

Re: ALS Workorder: 1906685
Project Name:
Project Number: L2297608

Dear Mr. Hawthorne:

Two water samples were received from ALS Environmental, on 6/27/2019. The samples were scheduled for the following analysis:

Radium-226

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,

ALS Environmental
Katie M. OBrien
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
AIHA	214884
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280

1906685

Radium-226:
The samples were prepared and analyzed according to the current revision of SOP 783.

All acceptance criteria were met.

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1906685
Client Name: ALS Environmental
Client Project Name:
Client Project Number: L2297608
Client PO Number: L2297608

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
L2297608-1	1906685-1		WATER	24-Jun-19	
L2297608-2	1906685-2		WATER	24-Jun-19	

ALS Environmental

L2297608

WATERLOO

Subcontract Request Form 1906685

Subcontract To:

ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
225 COMMERCE DRIVE
FORT COLLINS,CO 80524

NOTES: Please reference on final report and invoice: PO# *L2297608*
ALS requires QC data to be provided with your final results.

Please see enclosed 2 **sample(s) in** 2 **Container(s)**

SAMPLE NUMBER	ANALYTICAL REQUIRED	DATE SAMPLED / DUE DATE	Priority Flag
L2297608-1 MS-08		6/ 24/ 2019	E
	Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	7/15/2019	
L2297608-2 MS-0801		6/ 24/ 2019	E
	Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	7/15/2019	

1
2

Subcontract Info Contact: Mary-Lynn Pike (519) 886-6910
Analysis and reporting info contact: Rick Hawthorne
60 NORTHLAND ROAD, UNIT 1
WATERLOO,ON N2V 2B8
Phone: (519) 886-6910 Email: Rick.Hawthorne@alsglobal.com

Please email confirmation of receipt to: **Rick.Hawthorne@alsglobal.com**

Shipped By: _____ Date Shipped: _____
Received By: Emily Ayers Date Received: 06-27-19 1305
Verified By: _____ Date Verified: _____
Temperature: _____
Sample Integrity Issues: _____

ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: ALS. Waterloo Workorder No: 1906685

Project Manager: KMO Initials: Em Date: 06.27.19

1.	Are airbills / shipping documents present and/or removable?	DROP OFF	(YES)	NO
2.	Are custody seals on **shipping** containers intact?	NONE	(YES)	NO *
3.	Are custody seals on **sample** containers intact?	(NONE)	YES	NO *
4.	Is there a COC (chain-of-custody) present?		(YES)	NO *
5.	Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)		(YES)	NO *
6.	Are short-hold samples present?		YES	(NO)
7.	Are all samples within holding times for the requested analyses?		(YES)	NO *
8.	Were all sample containers received intact? (not broken or leaking)		(YES)	NO *
9.	Is there sufficient sample for the requested analyses?		(YES)	NO *
10.	Are all samples in the proper containers for the requested analyses?		(YES)	NO *
11.	Are all aqueous samples preserved correctly, if required? (excluding volatiles)	N/A	(YES)	NO *
12.	Are all aqueous non-preserved samples pH 4-9?	(N/A)	YES	NO *
13.	Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm (1/4 inch) diameter? (i.e. size of green pea)	(N/A)	YES	NO
14.	Were the samples shipped on ice?		(YES)	NO
15.	Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: #1 (#3) #4	(RAD ONLY)	YES	NO

Cooler #:	1
Temperature (°C):	12.6
No. of custody seals on cooler:	1
DOT Survey/ Acceptance Information — External µR/hr reading:	8
DOT Survey/ Acceptance Information — Background µR/hr reading:	8

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? **YES / NO / NA** (If no, see Form 008.)

*** Please provide details here for NO responses to gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.**

All client bottle ID's vs ALS lab ID's double-checked by: Em

If applicable, was the client contacted? **YES / NO / NA** Contact: _____ Date/Time: _____

Project Manager Signature / Date: _____ 6/28/19

Form 201r27.xls
(02/11/2019)

*IR Gun #1, VWR SN 170560549
*IR Gun #3, VWR SN 170647571
*IR Gun #4, Oakton, SN 2372220101-0002

1906685

EXPRESS WORLDWIDE **WPX** DHL

2019-08-26 MYDHL+ 1.0 / *30-0621*

From : ALS Environmental
Ed Hill
60 Northland Rd
Unit 1

N2V 2B8 WATERLOO ON
Canada

8-1
12.6

Origin:
YHM

Contact: +15198866910

To : **ALS Environmental Fort Collins**
Sample Login
225 Commerce Drive

Contact:
Sample Login
+18004431511

80524 FORT COLLINS CO
United States of America

US-DEN-DEN

C [redacted] Day Time

Ref:

Pce/Shpt Weight **10.4 lbs** Piece **1/1**

Contents: Water Sample

YBILL 49 6537 5741

0524+48000001

Client:	ALS Environmental	**Date:**	*17-Jul-19*
Project:	L2297608	**Work Order:**	1906685
Sample ID:	L2297608-1	**Lab ID:**	1906685-1
Legal Location:		**Matrix:**	WATER
Collection Date:	6/24/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1			**SOP 783**		Prep Date: **7/9/2019**	PrepBy: **JXH**
Ra-226	**0.0086 (+/- 0.0059)**		**0.0075**	**BQ/l**	NA	7/17/2019 12:29
Carr: BARIUM	*95.7*		*40-110*	*%REC*	DL = NA	7/17/2019 12:29

Client:	ALS Environmental	**Date:**	*17-Jul-19*
Project:	L2297608	**Work Order:**	1906685
Sample ID:	L2297608-2	**Lab ID:**	1906685-2
Legal Location:		**Matrix:**	WATER
Collection Date:	6/24/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **7/9/2019**		PrepBy: **JXH**
Ra-226	0.0037 (+/- 0.0045)	U	0.0071	BQ/l	NA	7/17/2019 12:29
Carr: BARIUM	*93.5*		*40-110*	*%REC*	DL = NA	7/17/2019 12:29

Client:	ALS Environmental	**Date:**	*17-Jul-19*
Project:	L2297608	**Work Order:**	1906685
Sample ID:	L2297608-2	**Lab ID:**	1906685-2
Legal Location:		**Matrix:**	WATER
Collection Date:	6/24/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed

Explanation of Qualifiers

Radiochemistry:

- "Report Limit" is the MDC

U or ND - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

Y2 - Chemical Yield outside default limits.

W - DER is greater than Warning Limit of 1.42

* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.
# - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.
G - Sample density differs by more than 15% of LCS density.
D - DER is greater than Control Limit

M - Requested MDC not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS, Matrix Spike Recovery within control limits.

N - Matrix Spike Recovery outside control limits

NC - Not Calculated for duplicate results less than 5 times MDC

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

Inorganics:

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).

U or ND - Indicates that the compound was analyzed for but not detected.

E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.

M - Duplicate injection precision was not met.

N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.

Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.

* - Duplicate analysis (relative percent difference) not within control limits.

S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

Organics:

U or ND - Indicates that the compound was analyzed for but not detected.

B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.

E - Analyte concentration exceeds the upper level of the calibration range.

J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).

A - A tentatively identified compound is a suspected aldol-condensation product.

X - The analyte was diluted below an accurate quantitation level.

* - The spike recovery is equal to or outside the control criteria used.

+ - The relative percent difference (RPD) equals or exceeds the control criteria.

G - A pattern resembling gasoline was detected in this sample.

D - A pattern resembling diesel was detected in this sample.

M - A pattern resembling motor oil was detected in this sample.

C - A pattern resembling crude oil was detected in this sample.

4 - A pattern resembling JP-4 was detected in this sample.

5 - A pattern resembling JP-5 was detected in this sample.

H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.

L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.

Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
- gasoline
- JP-8
- diesel
- mineral spirits
- motor oil
- Stoddard solvent
- bunker C

Batch ID: **RE190709-1-1** Instrument ID **Alpha Scin** Method: **Radium-226 by Radon Emanation**

LCS Sample ID: **RE190709-1** Units: **BQ/l** Analysis Date: **7/17/2019 13:48**
Client ID: Run ID: **RE190709-1A** Prep Date: **7/9/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.83 (+/- 0.456)	0.0165	1.771		103	67-120					P,M3
Carr: BARIUM	15800		16460		95.8	40-110					

LCSD Sample ID: **RE190709-1** Units: **BQ/l** Analysis Date: **7/17/2019 13:48**
Client ID: Run ID: **RE190709-1A** Prep Date: **7/9/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.66 (+/- 0.415)	0.011	1.771		93.6	67-120		1.83	0.3	2.1	P,M3
Carr: BARIUM	15500		16460		94.5	40-110		15800			

MB Sample ID: **RE190709-1** Units: **BQ/l** Analysis Date: **7/17/2019 12:29**
Client ID: Run ID: **RE190709-1A** Prep Date: **7/9/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	0 (+/- 0.0044)	0.0088									U
Carr: BARIUM	15800		16470		95.9	40-110					

The following samples were analyzed in this batch: 1906685-1 1906685-2

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2297608-COFC

COC Number: 15 -

Page 1 of 1

Report To	Contact and company name below will appear on the final report
Company:	Baffinland Iron Mines Corp.
Contact:	Wiliam Bowden and Connor Devereaux
Phone:	647-253-0596 EXT 6016
	Company address below will appear on the final report
Street:	2275 Upper Middle Rd. E., Suite #300
City/Province:	Oakville, ON
Postal Code:	L6H 0C3
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	
Contact:	

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	bimcore@alsglobal.com
Email 2	bimww@alsglobal.com
Email 3	

Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	ap@baffinland.com
Email 2	commercial@baffinland.com

Project Information	
ALS Account # / Quote #:	23642 /Q42455
Job #:	MS-08 DEL
PO / AFE:	4500057496
LSD:	

Oil and Gas Required Fields (client use)	
AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only)	L2297608	ALS Contact:	Sampler: LM/SJS/BW

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☐ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
4 day [P4]	☐	1 Business day [E1]	☐
3 day [P3]	☐	Same Day, Weekend or Statutory holiday [E0]	☑
2 day [P2]	☐		

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	BIM-MMER-DEL	Number of Containers
1	MS-08	24-Jun-19	11:35	Water	E0	8
2	MS-0801	24-Jun-19	11:35	Water	E0	8

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☑ NO	
Are samples for human drinking water use? ☐ YES ☑ NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☑ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☑

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			16.8		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released By: Ben Widdowson	Date: 24-Jun-19	Time: 16:20	Received by: AJ/CV	Date: June 24, 2019	Time: 6pm	Received by:	Date: 26-6-19	Time: 9:30

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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 specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Baffinland Iron Mine's Corporation (Oakville)
ATTN: William Bowden/Connor Devereaux
2275 Upper Middle Rd. E.
Suite #300
Oakville ON L6H 0C3

Date Received: 03-JUL-19
Report Date: 22-JUL-19 14:14 (MT)
Version: FINAL

Client Phone: 647-253-0596

Certificate of Analysis

Lab Work Order #: L2301638

Project P.O. #: 4500057496
Job Reference: MS-08 DEL
C of C Numbers:
Legal Site Desc:

Rick Hawthorne
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2301638-1 MS-08 Sampled By: OM on 30-JUN-19 @ 09:00 Matrix: WATER							
Physical Tests							
Conductivity	1060		3.0	umhos/cm		04-JUL-19	R4693916
pH	7.81		0.10	pH units		30-JUN-19	R4691537
Total Suspended Solids	3.2		2.0	mg/L		01-JUL-19	R4692181
Total Dissolved Solids	985		20	mg/L		02-JUL-19	R4692233
Turbidity	2.30		0.10	NTU		01-JUL-19	R4691540
Anions and Nutrients							
Ammonia, Total (as N)	0.86	DLHC	0.10	mg/L		03-JUL-19	R4693360
Cyanides							
Cyanide, Total	<0.020	DLM	0.020	mg/L		04-JUL-19	R4693835
Total Metals							
Aluminum (Al)-Total	<0.050	DLHC	0.050	mg/L	03-JUL-19	03-JUL-19	R4693191
Antimony (Sb)-Total	<0.0010	DLHC	0.0010	mg/L	03-JUL-19	03-JUL-19	R4693191
Arsenic (As)-Total	<0.0010	DLHC	0.0010	mg/L	03-JUL-19	03-JUL-19	R4693191
Barium (Ba)-Total	0.0110	DLHC	0.0010	mg/L	03-JUL-19	03-JUL-19	R4693191
Beryllium (Be)-Total	<0.0010	DLHC	0.0010	mg/L	03-JUL-19	03-JUL-19	R4693191
Bismuth (Bi)-Total	<0.00050	DLHC	0.00050	mg/L	03-JUL-19	03-JUL-19	R4693191
Boron (B)-Total	<0.10	DLHC	0.10	mg/L	03-JUL-19	03-JUL-19	R4693191
Cadmium (Cd)-Total	<0.000050	DLHC	0.000050	mg/L	03-JUL-19	03-JUL-19	R4693191
Calcium (Ca)-Total	51.6	DLHC	0.50	mg/L	03-JUL-19	03-JUL-19	R4693191
Cesium (Cs)-Total	<0.00010	DLHC	0.00010	mg/L	03-JUL-19	03-JUL-19	R4693191
Chromium (Cr)-Total	<0.0050	DLHC	0.0050	mg/L	03-JUL-19	03-JUL-19	R4693191
Cobalt (Co)-Total	0.0370	DLHC	0.0010	mg/L	03-JUL-19	03-JUL-19	R4693191
Copper (Cu)-Total	<0.010	DLHC	0.010	mg/L	03-JUL-19	03-JUL-19	R4693191
Iron (Fe)-Total	0.60	DLHC	0.10	mg/L	03-JUL-19	04-JUL-19	R4693191
Lead (Pb)-Total	<0.00050	DLHC	0.00050	mg/L	03-JUL-19	03-JUL-19	R4693191
Lithium (Li)-Total	0.016	DLHC	0.010	mg/L	03-JUL-19	03-JUL-19	R4693191
Magnesium (Mg)-Total	146	DLHC	0.050	mg/L	03-JUL-19	03-JUL-19	R4693191
Manganese (Mn)-Total	3.35	DLHC	0.0050	mg/L	03-JUL-19	03-JUL-19	R4693191
Molybdenum (Mo)-Total	0.00076	DLHC	0.00050	mg/L	03-JUL-19	03-JUL-19	R4693191
Nickel (Ni)-Total	0.0389	DLHC	0.0050	mg/L	03-JUL-19	03-JUL-19	R4693191
Phosphorus (P)-Total	<0.50	DLHC	0.50	mg/L	03-JUL-19	03-JUL-19	R4693191
Potassium (K)-Total	2.83	DLHC	0.50	mg/L	03-JUL-19	03-JUL-19	R4693191
Rubidium (Rb)-Total	0.0030	DLHC	0.0020	mg/L	03-JUL-19	03-JUL-19	R4693191
Selenium (Se)-Total	0.00194	DLHC	0.00050	mg/L	03-JUL-19	03-JUL-19	R4693191
Silicon (Si)-Total	<1.0	DLHC	1.0	mg/L	03-JUL-19	03-JUL-19	R4693191
Silver (Ag)-Total	<0.00050	DLHC	0.00050	mg/L	03-JUL-19	03-JUL-19	R4693191
Sodium (Na)-Total	1.62	DLHC	0.50	mg/L	03-JUL-19	03-JUL-19	R4693191
Strontium (Sr)-Total	0.151	DLHC	0.010	mg/L	03-JUL-19	03-JUL-19	R4693191
Sulfur (S)-Total	237	DLHC	5.0	mg/L	03-JUL-19	03-JUL-19	R4693191
Tellurium (Te)-Total	<0.0020	DLHC	0.0020	mg/L	03-JUL-19	03-JUL-19	R4693191
Thallium (Tl)-Total	<0.00010	DLHC	0.00010	mg/L	03-JUL-19	03-JUL-19	R4693191
Thorium (Th)-Total	<0.0010	DLHC	0.0010	mg/L	03-JUL-19	03-JUL-19	R4693191

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2301638-1 MS-08 Sampled By: OM on 30-JUN-19 @ 09:00 Matrix: WATER							
Total Metals							
Tin (Sn)-Total	<0.0010	DLHC	0.0010	mg/L	03-JUL-19	03-JUL-19	R4693191
Titanium (Ti)-Total	<0.0030	DLHC	0.0030	mg/L	03-JUL-19	03-JUL-19	R4693191
Tungsten (W)-Total	<0.0010	DLHC	0.0010	mg/L	03-JUL-19	03-JUL-19	R4693191
Uranium (U)-Total	0.00023	DLHC	0.00010	mg/L	03-JUL-19	03-JUL-19	R4693191
Vanadium (V)-Total	<0.0050	DLHC	0.0050	mg/L	03-JUL-19	03-JUL-19	R4693191
Zinc (Zn)-Total	<0.030	DLHC	0.030	mg/L	03-JUL-19	03-JUL-19	R4693191
Zirconium (Zr)-Total	<0.0020	DLHC	0.0020	mg/L	03-JUL-19	03-JUL-19	R4693191
Radiological Parameters							
Ra-226	<0.0071		0.0071	Bq/L	10-JUL-19	19-JUL-19	R4692536
L2301638-2 MS-0801 Sampled By: OM on 30-JUN-19 @ 09:00 Matrix: WATER							
Physical Tests							
Conductivity	1060		3.0	umhos/cm		04-JUL-19	R4693916
pH	7.75		0.10	pH units		30-JUN-19	R4691537
Total Suspended Solids	4.0		2.0	mg/L		01-JUL-19	R4692181
Total Dissolved Solids	978		20	mg/L		02-JUL-19	R4692233
Turbidity	2.41		0.10	NTU		01-JUL-19	R4691540
Anions and Nutrients							
Ammonia, Total (as N)	0.76	DLHC	0.10	mg/L		03-JUL-19	R4693360
Cyanides							
Cyanide, Total	0.0044		0.0020	mg/L		03-JUL-19	R4693727
Total Metals							
Aluminum (Al)-Total	<0.050	DLHC	0.050	mg/L	03-JUL-19	03-JUL-19	R4693191
Antimony (Sb)-Total	<0.0010	DLHC	0.0010	mg/L	03-JUL-19	03-JUL-19	R4693191
Arsenic (As)-Total	<0.0010	DLHC	0.0010	mg/L	03-JUL-19	03-JUL-19	R4693191
Barium (Ba)-Total	0.0113	DLHC	0.0010	mg/L	03-JUL-19	03-JUL-19	R4693191
Beryllium (Be)-Total	<0.0010	DLHC	0.0010	mg/L	03-JUL-19	03-JUL-19	R4693191
Bismuth (Bi)-Total	<0.00050	DLHC	0.00050	mg/L	03-JUL-19	03-JUL-19	R4693191
Boron (B)-Total	<0.10	DLHC	0.10	mg/L	03-JUL-19	03-JUL-19	R4693191
Cadmium (Cd)-Total	<0.000050	DLHC	0.000050	mg/L	03-JUL-19	03-JUL-19	R4693191
Calcium (Ca)-Total	53.3	DLHC	0.50	mg/L	03-JUL-19	03-JUL-19	R4693191
Cesium (Cs)-Total	<0.00010	DLHC	0.00010	mg/L	03-JUL-19	03-JUL-19	R4693191
Chromium (Cr)-Total	<0.0050	DLHC	0.0050	mg/L	03-JUL-19	03-JUL-19	R4693191
Cobalt (Co)-Total	0.0376	DLHC	0.0010	mg/L	03-JUL-19	03-JUL-19	R4693191
Copper (Cu)-Total	<0.010	DLHC	0.010	mg/L	03-JUL-19	03-JUL-19	R4693191
Iron (Fe)-Total	0.58	DLHC	0.10	mg/L	03-JUL-19	04-JUL-19	R4693191
Lead (Pb)-Total	<0.00050	DLHC	0.00050	mg/L	03-JUL-19	03-JUL-19	R4693191
Lithium (Li)-Total	0.018	DLHC	0.010	mg/L	03-JUL-19	03-JUL-19	R4693191
Magnesium (Mg)-Total	143	DLHC	0.050	mg/L	03-JUL-19	03-JUL-19	R4693191
Manganese (Mn)-Total	3.26	DLHC	0.0050	mg/L	03-JUL-19	03-JUL-19	R4693191
Molybdenum (Mo)-Total	0.00076	DLHC	0.00050	mg/L	03-JUL-19	03-JUL-19	R4693191

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2301638-2 MS-0801 Sampled By: OM on 30-JUN-19 @ 09:00 Matrix: WATER							
Total Metals							
Nickel (Ni)-Total	0.0382	DLHC	0.0050	mg/L	03-JUL-19	03-JUL-19	R4693191
Phosphorus (P)-Total	<0.50	DLHC	0.50	mg/L	03-JUL-19	03-JUL-19	R4693191
Potassium (K)-Total	2.84	DLHC	0.50	mg/L	03-JUL-19	03-JUL-19	R4693191
Rubidium (Rb)-Total	0.0030	DLHC	0.0020	mg/L	03-JUL-19	03-JUL-19	R4693191
Selenium (Se)-Total	0.00191	DLHC	0.00050	mg/L	03-JUL-19	03-JUL-19	R4693191
Silicon (Si)-Total	<1.0	DLHC	1.0	mg/L	03-JUL-19	03-JUL-19	R4693191
Silver (Ag)-Total	<0.00050	DLHC	0.00050	mg/L	03-JUL-19	03-JUL-19	R4693191
Sodium (Na)-Total	1.61	DLHC	0.50	mg/L	03-JUL-19	03-JUL-19	R4693191
Strontium (Sr)-Total	0.156	DLHC	0.010	mg/L	03-JUL-19	03-JUL-19	R4693191
Sulfur (S)-Total	235	DLHC	5.0	mg/L	03-JUL-19	03-JUL-19	R4693191
Tellurium (Te)-Total	<0.0020	DLHC	0.0020	mg/L	03-JUL-19	03-JUL-19	R4693191
Thallium (Tl)-Total	<0.00010	DLHC	0.00010	mg/L	03-JUL-19	03-JUL-19	R4693191
Thorium (Th)-Total	<0.0010	DLHC	0.0010	mg/L	03-JUL-19	03-JUL-19	R4693191
Tin (Sn)-Total	<0.0010	DLHC	0.0010	mg/L	03-JUL-19	03-JUL-19	R4693191
Titanium (Ti)-Total	<0.0030	DLHC	0.0030	mg/L	03-JUL-19	03-JUL-19	R4693191
Tungsten (W)-Total	<0.0010	DLHC	0.0010	mg/L	03-JUL-19	03-JUL-19	R4693191
Uranium (U)-Total	0.00022	DLHC	0.00010	mg/L	03-JUL-19	03-JUL-19	R4693191
Vanadium (V)-Total	<0.0050	DLHC	0.0050	mg/L	03-JUL-19	03-JUL-19	R4693191
Zinc (Zn)-Total	<0.030	DLHC	0.030	mg/L	03-JUL-19	03-JUL-19	R4693191
Zirconium (Zr)-Total	<0.0020	DLHC	0.0020	mg/L	03-JUL-19	03-JUL-19	R4693191
Radiological Parameters							
Ra-226	<0.0084		0.0084	Bq/L	10-JUL-19	19-JUL-19	R4692536

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

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Aluminum (Al)-Total	MS-B	L2301638-1, -2
Matrix Spike	Barium (Ba)-Total	MS-B	L2301638-1, -2
Matrix Spike	Calcium (Ca)-Total	MS-B	L2301638-1, -2
Matrix Spike	Iron (Fe)-Total	MS-B	L2301638-1, -2
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2301638-1, -2
Matrix Spike	Silicon (Si)-Total	MS-B	L2301638-1, -2
Matrix Spike	Sodium (Na)-Total	MS-B	L2301638-1, -2
Matrix Spike	Strontium (Sr)-Total	MS-B	L2301638-1, -2

Sample Parameter Qualifier key listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
CN-TOT-WT	Water	Cyanide, Total	ISO 14403-2

Total cyanide is determined by the combination of UV digestion and distillation. Cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

When using this method, high levels of thiocyanate in samples can cause false positives at ~1-2% of the thiocyanate concentration. For samples with detectable cyanide analyzed by this method, ALS recommends analysis for thiocyanate to check for this potential interference

EC-SCREEN-WT	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

EC-WT	Water	Conductivity	APHA 2510 B

Water samples can be measured directly by immersing the conductivity cell into the sample.

MET-T-CCMS-WT	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

NH3-F-WT	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

PH-BF	Water	pH	APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

RA226-MMER-FC	Water	Ra226 by Alpha Scint, MDC=0.01 Bq/L	EPA 903.1
SOLIDS-TDS-BF	Water	Total Dissolved Solids	APHA 2540C

A well-mixed sample is filtered though glass fibres filter. A known volume of the filtrate is evaporated and dried at 180 +/- 2C for 1hr.

SOLIDS-TSS-BF	Water	Suspended solids	APHA 2540 D-Gravimetric

A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104 +/- 1C for a minimum of four hours or until a constant weight is achieved.

TURBIDITY-BF	Water	Turbidity	APHA 2130 B

Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.

** 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

Reference Information

WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA
FC	ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
BF	ALS ENVIRONMENTAL - BAFFIN ISLAND, NUNAVUT, 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 weight of sample
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

Workorder: L2301638 Report Date: 22-JUL-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3

Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CN-TOT-WT	**Water**							
Batch R4693727								
WG3094352-3 DUP		**L2301745-2**						
Cyanide, Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	03-JUL-19
WG3094352-2 LCS								
Cyanide, Total			81.4		%		80-120	03-JUL-19
WG3094352-1 MB								
Cyanide, Total			<0.0020		mg/L		0.002	03-JUL-19
WG3094352-4 MS		**L2301745-2**						
Cyanide, Total			84.8		%		70-130	03-JUL-19
Batch R4693835								
WG3095421-3 DUP		**L2301267-1**						
Cyanide, Total		<0.020	<0.020	RPD-NA	mg/L	N/A	20	04-JUL-19
WG3095421-2 LCS								
Cyanide, Total			91.7		%		80-120	04-JUL-19
WG3095421-1 MB								
Cyanide, Total			<0.0020		mg/L		0.002	04-JUL-19
WG3095421-4 MS		**L2301267-1**						
Cyanide, Total			95.0		%		70-130	04-JUL-19
EC-WT	**Water**							
Batch R4693916								
WG3095814-4 DUP		**WG3095814-3**						
Conductivity		314	321		umhos/cm	2.2	10	04-JUL-19
WG3095814-2 LCS								
Conductivity			96.2		%		90-110	04-JUL-19
WG3095814-1 MB								
Conductivity			<3.0		umhos/cm		3	04-JUL-19
MET-T-CCMS-WT	**Water**							
Batch R4693191								
WG3094722-4 DUP		**WG3094722-3**						
Aluminum (Al)-Total		0.156	0.147		mg/L	6.0	20	03-JUL-19
Antimony (Sb)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	03-JUL-19
Arsenic (As)-Total		0.00041	0.00042		mg/L	2.7	20	03-JUL-19
Barium (Ba)-Total		0.0353	0.0334		mg/L	5.6	20	03-JUL-19
Beryllium (Be)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	03-JUL-19
Bismuth (Bi)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	03-JUL-19
Boron (B)-Total		0.011	0.010		mg/L	3.4	20	03-JUL-19
Cadmium (Cd)-Total		0.0000074	0.0000085		mg/L	14	20	03-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4693191								
WG3094722-4 DUP		**WG3094722-3**						
Calcium (Ca)-Total		41.0	41.0		mg/L	0.1	20	03-JUL-19
Chromium (Cr)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	03-JUL-19
Cesium (Cs)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	03-JUL-19
Cobalt (Co)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	03-JUL-19
Copper (Cu)-Total		0.0112	0.0108		mg/L	3.7	20	03-JUL-19
Iron (Fe)-Total		0.212	0.257		mg/L	19	20	04-JUL-19
Lead (Pb)-Total		0.00125	0.00124		mg/L	1.5	20	03-JUL-19
Lithium (Li)-Total		0.0011	0.0010		mg/L	8.1	20	03-JUL-19
Magnesium (Mg)-Total		3.98	3.72		mg/L	6.9	20	03-JUL-19
Manganese (Mn)-Total		0.0101	0.00963		mg/L	5.2	20	03-JUL-19
Molybdenum (Mo)-Total		0.000239	0.000260		mg/L	8.6	20	03-JUL-19
Nickel (Ni)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	03-JUL-19
Phosphorus (P)-Total		<0.050	<0.050	RPD-NA	mg/L	N/A	20	03-JUL-19
Potassium (K)-Total		1.13	1.11		mg/L	1.4	20	03-JUL-19
Rubidium (Rb)-Total		0.00147	0.00148		mg/L	0.7	20	03-JUL-19
Selenium (Se)-Total		0.000063	0.000064		mg/L	2.2	20	03-JUL-19
Silicon (Si)-Total		1.92	1.89		mg/L	1.6	20	03-JUL-19
Silver (Ag)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	03-JUL-19
Sodium (Na)-Total		11.5	11.5		mg/L	0.3	20	03-JUL-19
Strontium (Sr)-Total		0.125	0.126		mg/L	0.2	20	03-JUL-19
Sulfur (S)-Total		2.25	2.24		mg/L	0.8	25	03-JUL-19
Thallium (Tl)-Total		0.000012	0.000010		mg/L	16	20	03-JUL-19
Tellurium (Te)-Total		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	03-JUL-19
Thorium (Th)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	25	03-JUL-19
Tin (Sn)-Total		0.00018	0.00020		mg/L	14	20	03-JUL-19
Titanium (Ti)-Total		0.00291	0.00261		mg/L	11	20	03-JUL-19
Tungsten (W)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	03-JUL-19
Uranium (U)-Total		0.000052	0.000053		mg/L	0.2	20	03-JUL-19
Vanadium (V)-Total		0.00054	0.00051		mg/L	5.3	20	03-JUL-19
Zinc (Zn)-Total		0.0049	0.0038	J	mg/L	0.0011	0.006	03-JUL-19
Zirconium (Zr)-Total		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	03-JUL-19
WG3094722-2 LCS								
Aluminum (Al)-Total			104.2		%		80-120	03-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4693191								
WG3094722-2 LCS								
Antimony (Sb)-Total			104.5		%		80-120	03-JUL-19
Arsenic (As)-Total			101.3		%		80-120	03-JUL-19
Barium (Ba)-Total			98.5		%		80-120	03-JUL-19
Beryllium (Be)-Total			111.9		%		80-120	03-JUL-19
Bismuth (Bi)-Total			95.7		%		80-120	03-JUL-19
Boron (B)-Total			106.2		%		80-120	03-JUL-19
Cadmium (Cd)-Total			95.3		%		80-120	03-JUL-19
Calcium (Ca)-Total			106.2		%		80-120	03-JUL-19
Chromium (Cr)-Total			99.4		%		80-120	03-JUL-19
Cesium (Cs)-Total			99.8		%		80-120	03-JUL-19
Cobalt (Co)-Total			98.2		%		80-120	03-JUL-19
Copper (Cu)-Total			98.0		%		80-120	03-JUL-19
Iron (Fe)-Total			96.3		%		80-120	03-JUL-19
Lead (Pb)-Total			95.7		%		80-120	03-JUL-19
Lithium (Li)-Total			112.3		%		80-120	03-JUL-19
Magnesium (Mg)-Total			100.0		%		80-120	03-JUL-19
Manganese (Mn)-Total			101.8		%		80-120	03-JUL-19
Molybdenum (Mo)-Total			102.5		%		80-120	03-JUL-19
Nickel (Ni)-Total			98.9		%		80-120	03-JUL-19
Phosphorus (P)-Total			103.3		%		70-130	03-JUL-19
Potassium (K)-Total			104.6		%		80-120	03-JUL-19
Rubidium (Rb)-Total			100.7		%		80-120	03-JUL-19
Selenium (Se)-Total			101.6		%		80-120	03-JUL-19
Silicon (Si)-Total			103.5		%		60-140	03-JUL-19
Silver (Ag)-Total			98.2		%		80-120	03-JUL-19
Sodium (Na)-Total			98.4		%		80-120	03-JUL-19
Strontium (Sr)-Total			102.5		%		80-120	03-JUL-19
Sulfur (S)-Total			95.9		%		80-120	03-JUL-19
Thallium (Tl)-Total			91.6		%		80-120	03-JUL-19
Tellurium (Te)-Total			99.3		%		80-120	03-JUL-19
Thorium (Th)-Total			93.9		%		70-130	03-JUL-19
Tin (Sn)-Total			96.9		%		80-120	03-JUL-19
Titanium (Ti)-Total			98.8		%		80-120	03-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4693191								
WG3094722-2 LCS								
Tungsten (W)-Total			96.2		%		80-120	03-JUL-19
Uranium (U)-Total			94.6		%		80-120	03-JUL-19
Vanadium (V)-Total			101.7		%		80-120	03-JUL-19
Zinc (Zn)-Total			101.3		%		80-120	03-JUL-19
Zirconium (Zr)-Total			100.0		%		80-120	03-JUL-19
WG3094722-1 MB								
Aluminum (Al)-Total			<0.0050		mg/L		0.005	03-JUL-19
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	03-JUL-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	03-JUL-19
Barium (Ba)-Total			<0.00010		mg/L		0.0001	03-JUL-19
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	03-JUL-19
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	03-JUL-19
Boron (B)-Total			<0.010		mg/L		0.01	03-JUL-19
Cadmium (Cd)-Total			<0.000005C		mg/L		0.000005	03-JUL-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	03-JUL-19
Chromium (Cr)-Total			<0.00050		mg/L		0.0005	03-JUL-19
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	03-JUL-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	03-JUL-19
Copper (Cu)-Total			<0.0010		mg/L		0.001	03-JUL-19
Iron (Fe)-Total			<0.010		mg/L		0.01	03-JUL-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	03-JUL-19
Lithium (Li)-Total			<0.0010		mg/L		0.001	03-JUL-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	03-JUL-19
Manganese (Mn)-Total			<0.00050		mg/L		0.0005	03-JUL-19
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	03-JUL-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	03-JUL-19
Phosphorus (P)-Total			<0.050		mg/L		0.05	03-JUL-19
Potassium (K)-Total			<0.050		mg/L		0.05	03-JUL-19
Rubidium (Rb)-Total			<0.00020		mg/L		0.0002	03-JUL-19
Selenium (Se)-Total			<0.000050		mg/L		0.00005	03-JUL-19
Silicon (Si)-Total			<0.10		mg/L		0.1	03-JUL-19
Silver (Ag)-Total			<0.000050		mg/L		0.00005	03-JUL-19
Sodium (Na)-Total			<0.050		mg/L		0.05	03-JUL-19
Strontium (Sr)-Total			<0.0010		mg/L		0.001	03-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4693191								
WG3094722-1 MB								
Sulfur (S)-Total			<0.50		mg/L		0.5	03-JUL-19
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	03-JUL-19
Tellurium (Te)-Total			<0.00020		mg/L		0.0002	03-JUL-19
Thorium (Th)-Total			<0.00010		mg/L		0.0001	03-JUL-19
Tin (Sn)-Total			<0.00010		mg/L		0.0001	03-JUL-19
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	03-JUL-19
Tungsten (W)-Total			<0.00010		mg/L		0.0001	03-JUL-19
Uranium (U)-Total			<0.000010		mg/L		0.00001	03-JUL-19
Vanadium (V)-Total			<0.00050		mg/L		0.0005	03-JUL-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	03-JUL-19
Zirconium (Zr)-Total			<0.00020		mg/L		0.0002	03-JUL-19
WG3094722-5 MS		**WG3094722-3**						
Aluminum (Al)-Total			N/A	MS-B	%		-	03-JUL-19
Antimony (Sb)-Total			103.4		%		70-130	03-JUL-19
Arsenic (As)-Total			101.7		%		70-130	03-JUL-19
Barium (Ba)-Total			N/A	MS-B	%		-	03-JUL-19
Beryllium (Be)-Total			103.4		%		70-130	03-JUL-19
Bismuth (Bi)-Total			96.4		%		70-130	03-JUL-19
Boron (B)-Total			98.6		%		70-130	03-JUL-19
Cadmium (Cd)-Total			97.4		%		70-130	03-JUL-19
Calcium (Ca)-Total			N/A	MS-B	%		-	03-JUL-19
Chromium (Cr)-Total			101.7		%		70-130	03-JUL-19
Cesium (Cs)-Total			98.8		%		70-130	03-JUL-19
Cobalt (Co)-Total			99.5		%		70-130	03-JUL-19
Copper (Cu)-Total			92.6		%		70-130	03-JUL-19
Iron (Fe)-Total			N/A	MS-B	%		-	03-JUL-19
Lead (Pb)-Total			96.4		%		70-130	03-JUL-19
Lithium (Li)-Total			101.9		%		70-130	03-JUL-19
Magnesium (Mg)-Total			N/A	MS-B	%		-	03-JUL-19
Manganese (Mn)-Total			97.1		%		70-130	03-JUL-19
Molybdenum (Mo)-Total			105.2		%		70-130	03-JUL-19
Nickel (Ni)-Total			98.5		%		70-130	03-JUL-19
Phosphorus (P)-Total			102.9		%		70-130	03-JUL-19
Potassium (K)-Total			103.6		%		70-130	03-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4693191								
WG3094722-5 MS		**WG3094722-3**						
Rubidium (Rb)-Total			101.2		%		70-130	03-JUL-19
Selenium (Se)-Total			99.8		%		70-130	03-JUL-19
Silicon (Si)-Total			N/A	MS-B	%		-	03-JUL-19
Silver (Ag)-Total			98.6		%		70-130	03-JUL-19
Sodium (Na)-Total			N/A	MS-B	%		-	03-JUL-19
Strontium (Sr)-Total			N/A	MS-B	%		-	03-JUL-19
Sulfur (S)-Total			99.0		%		70-130	03-JUL-19
Thallium (Tl)-Total			93.6		%		70-130	03-JUL-19
Tellurium (Te)-Total			91.6		%		70-130	03-JUL-19
Thorium (Th)-Total			98.5		%		70-130	03-JUL-19
Tin (Sn)-Total			100.5		%		70-130	03-JUL-19
Titanium (Ti)-Total			98.0		%		70-130	03-JUL-19
Tungsten (W)-Total			101.2		%		70-130	03-JUL-19
Uranium (U)-Total			103.8		%		70-130	03-JUL-19
Vanadium (V)-Total			103.5		%		70-130	03-JUL-19
Zinc (Zn)-Total			100.9		%		70-130	03-JUL-19
Zirconium (Zr)-Total			104.0		%		70-130	03-JUL-19
NH3-F-WT	**Water**							
Batch R4693360								
WG3094359-19 DUP		**L2302716-1**						
Ammonia, Total (as N)		<0.010	<0.010	RPD-NA	mg/L	N/A	20	03-JUL-19
WG3094359-18 LCS								
Ammonia, Total (as N)			101.4		%		85-115	03-JUL-19
WG3094359-17 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	03-JUL-19
WG3094359-20 MS		**L2302716-1**						
Ammonia, Total (as N)			96.6		%		75-125	03-JUL-19
PH-BF	**Water**							
Batch R4691537								
WG3092921-2 DUP		**L2301607-4**						
pH		6.30	6.31	J	pH units	0.01	0.2	30-JUN-19
WG3092921-1 LCS								
pH			7.02		pH units		6.9-7.1	30-JUN-19
SOLIDS-TDS-BF	**Water**							

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SOLIDS-TDS-BF	**Water**							
Batch R4692233								
WG3092929-3 DUP		**L2301607-1**						
Total Dissolved Solids		897	875		mg/L	2.5	20	02-JUL-19
WG3092929-2 LCS								
Total Dissolved Solids			100.2		%		85-115	02-JUL-19
WG3092929-1 MB								
Total Dissolved Solids			<20		mg/L		20	02-JUL-19
SOLIDS-TSS-BF	**Water**							
Batch R4692181								
WG3092932-6 DUP		**L2301638-1**						
Total Suspended Solids		3.2	3.2		mg/L	0.0	25	01-JUL-19
WG3092932-5 LCS								
Total Suspended Solids			101.6		%		85-115	01-JUL-19
WG3092932-4 MB								
Total Suspended Solids			<2.0		mg/L		2	01-JUL-19
TURBIDITY-BF	**Water**							
Batch R4691540								
WG3092926-3 DUP		**L2301606-1**						
Turbidity		0.83	0.83		NTU	0.2	15	02-JUL-19
WG3092926-2 LCS								
Turbidity			110		%		85-115	02-JUL-19
WG3092926-1 MB								
Turbidity			<0.10		NTU		0.1	02-JUL-19

Quality Control Report

Workorder: L2301638 Report Date: 22-JUL-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

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

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

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.

Friday, July 19, 2019

Rick Hawthorne
ALS Environmental
60 Northland Rd, Unit 1
Waterloo Canada, ON N2V 2B8

Re: ALS Workorder: 1907109
Project Name:
Project Number: L2301638

Dear Mr. Hawthorne:

Two water samples were received from ALS Environmental, on 7/5/2019. The samples were scheduled for the following analysis:

Radium-226

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,

ALS Environmental
Katie M. OBrien
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
AIHA	214884
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280

1907109

Radium-226:
The samples were prepared and analyzed according to the current revision of SOP 783.

All acceptance criteria were met.

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1907109
Client Name: ALS Environmental
Client Project Name:
Client Project Number: L2301638
Client PO Number: L2301638

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
L2301638-1	1907109-1		WATER	30-Jun-19	
L2301638-2	1907109-2		WATER	30-Jun-19	

L2301638

WATERLOO

ALS Environmental

190709

Subcontract Request Form

Subcontract To:

ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
225 COMMERCE DRIVE
FORT COLLINS,CO 80524

NOTES: Please reference on final report and invoice: PO# *L2301638*
ALS requires QC data to be provided with your final results.

2x950mL HDPE.

Please see enclosed 2 sample(s) in 2 Container(s)

	SAMPLE NUMBER	ANALYTICAL REQUIRED	DATE SAMPLED / DUE DATE	Priority Flag
1	L2301638-1 MS-08		6/30/2019	E
		Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	7/19/2019	
2	L2301638-2 MS-0801		6/30/2019	E
		Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	7/19/2019	

Subcontract Info Contact: Mary-Lynn Pike (519) 886-6910
Analysis and reporting info contact: Rick Hawthorne
60 NORTHLAND ROAD, UNIT 1
WATERLOO,ON N2V 2B8
Phone: (519) 886-6910 Email: Rick.Hawthorne@alsglobal.com

Please email confirmation of receipt to: Rick.Hawthorne@alsglobal.com

Shipped By: _____ Date Shipped: _____

Received By: [signature] Date Received: 7/5/19 1350

Verified By: _____ Date Verified: _____

Temperature: _____

Sample Integrity Issues: _____

ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: ALS Waterloo Workorder No: 1907109

Project Manager: KMO Initials: EE Date: 7/5/19

1.	Are airbills / shipping documents present and/or removable?	DROP OFF	(YES)	NO
2.	Are custody seals on **shipping** containers intact?	(NONE)	YES	NO *
3.	Are custody seals on **sample** containers intact?	(NONE)	YES	NO *
4.	Is there a COC (chain-of-custody) present?		(YES)	NO *
5.	Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)		(YES)	NO *
6.	Are short-hold samples present?		YES	(NO)
7.	Are all samples within holding times for the requested analyses?		(YES)	NO *
8.	Were all sample containers received intact? (not broken or leaking)		(YES)	NO *
9.	Is there sufficient sample for the requested analyses?		(YES)	NO *
10.	Are all samples in the proper containers for the requested analyses?		(YES)	NO *
11.	Are all aqueous samples preserved correctly, if required? (excluding volatiles)	N/A	(YES)	NO *
12.	Are all aqueous non-preserved samples pH 4-9?	(N/A)	YES	NO *
13.	Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm (1/4 inch) diameter? (i.e. size of green pea)	(N/A)	YES	NO
14.	Were the samples shipped on ice?		(YES)	NO
15.	Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: #1 #3 #4	RAD ONLY	YES	(NO)

Cooler #:	1								
Temperature (°C):	22.4								
No. of custody seals on cooler:	0								
DOT Survey/ Acceptance Information — External µR/hr reading:	10								
Background µR/hr reading:	10								

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? (YES) / NO / NA (If no, see Form 008.)

*** Please provide details here for NO responses to gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.**

All client bottle ID's vs ALS lab ID's double-checked by: EE

If applicable, was the client contacted? **YES / NO / NA** Contact: _____ Date/Time: _____

Project Manager Signature / Date: 7/8/19

Form 201r27.xls
(02/11/2019)

*IR Gun #1, VWR SN 170560549
*IR Gun #3, VWR SN 170647571
*IR Gun #4, Oakton, SN 2372220101-0002

1907109

EXPRESS WORLDWIDE **WPX** DHL

2018-07-03 MYDHL+ 1.0 / *30-0621*

From : ALS Environmental
Ed Hill
60 Northland Rd
Unit 1

N2V 2B8 WATERLOO ON
Canada

Origin:
YHM

Contact: +15198866910

To : ALS Environmental Fort Collins
Sample Login
225 Commerce Drive

Contact:
Sample Login
+18004431511

10-0

80524 FORT COLLINS CO
United States of America

US-DEN-DEN

C [redacted] Day Time

Ref:

Pce/Shpt Weight 10.4 lbs Piece 1/1

22.4°C

WAYBILL 79 1851 1930

Contents: Water Samples

(2L)US80524+48000001

Client:	ALS Environmental	**Date:**	*19-Jul-19*
Project:	L2301638	**Work Order:**	1907109
Sample ID:	L2301638-1	**Lab ID:**	1907109-1
Legal Location:		**Matrix:**	WATER
Collection Date:	6/30/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **7/10/2019**		PrepBy: **JXH**
Ra-226	0.0070 (+/- 0.0055)	U	0.0071	BQ/l	NA	7/19/2019 13:00
Carr: BARIUM	*90.7*		*40-110*	*%REC*	DL = NA	7/19/2019 13:00

Client:	ALS Environmental	**Date:**	*19-Jul-19*
Project:	L2301638	**Work Order:**	1907109
Sample ID:	L2301638-2	**Lab ID:**	1907109-2
Legal Location:		**Matrix:**	WATER
Collection Date:	6/30/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1			**SOP 783**		Prep Date: **7/10/2019**	PrepBy: **JXH**
Ra-226	0.0030 (+/- 0.0050)	U	0.0084	BQ/l	NA	7/19/2019 13:00
Carr: BARIUM	*94.4*		*40-110*	*%REC*	DL = NA	7/19/2019 13:00

Client:	ALS Environmental	**Date:**	*19-Jul-19*
Project:	L2301638	**Work Order:**	1907109
Sample ID:	L2301638-2	**Lab ID:**	1907109-2
Legal Location:		**Matrix:**	WATER
Collection Date:	6/30/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed

Explanation of Qualifiers

Radiochemistry:

- "Report Limit" is the MDC

U or ND - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

Y2 - Chemical Yield outside default limits.

W - DER is greater than Warning Limit of 1.42

* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.
# - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.
G - Sample density differs by more than 15% of LCS density.
D - DER is greater than Control Limit

M - Requested MDC not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS, Matrix Spike Recovery within control limits.

N - Matrix Spike Recovery outside control limits

NC - Not Calculated for duplicate results less than 5 times MDC

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

Inorganics:

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).

U or ND - Indicates that the compound was analyzed for but not detected.

E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.

M - Duplicate injection precision was not met.

N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.

Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.

* - Duplicate analysis (relative percent difference) not within control limits.

S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

Organics:

U or ND - Indicates that the compound was analyzed for but not detected.

B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.

E - Analyte concentration exceeds the upper level of the calibration range.

J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).

A - A tentatively identified compound is a suspected aldol-condensation product.

X - The analyte was diluted below an accurate quantitation level.

* - The spike recovery is equal to or outside the control criteria used.

+ - The relative percent difference (RPD) equals or exceeds the control criteria.

G - A pattern resembling gasoline was detected in this sample.

D - A pattern resembling diesel was detected in this sample.

M - A pattern resembling motor oil was detected in this sample.

C - A pattern resembling crude oil was detected in this sample.

4 - A pattern resembling JP-4 was detected in this sample.

5 - A pattern resembling JP-5 was detected in this sample.

H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.

L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.

Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
- gasoline
- JP-8
- diesel
- mineral spirits
- motor oil
- Stoddard solvent
- bunker C

Batch ID: **RE190710-2-1** Instrument ID **Alpha Scin** Method: **Radium-226 by Radon Emanation**

LCS Sample ID: **RE190710-2** Units: **BQ/l** Analysis Date: **7/19/2019 13:33**
Client ID: Run ID: **RE190710-2A** Prep Date: **7/10/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.99 (+/- 0.496)	0.0282	1.771		112	67-120					P,M3
Carr: BARIUM	15600		16500		94.3	40-110					

LCSD Sample ID: **RE190710-2** Units: **BQ/l** Analysis Date: **7/19/2019 13:33**
Client ID: Run ID: **RE190710-2A** Prep Date: **7/10/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.98 (+/- 0.493)	0.0249	1.771		112	67-120		1.99	0.01	2.1	P,M3
Carr: BARIUM	15500		16410		94.4	40-110		15600			

MB Sample ID: **RE190710-2** Units: **BQ/l** Analysis Date: **7/19/2019 13:00**
Client ID: Run ID: **RE190710-2A** Prep Date: **7/10/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	0.00059 (+/- 0.0052)	0.0099									U
Carr: BARIUM	15900		16370		97.3	40-110					

The following samples were analyzed in this batch: 1907109-1 1907109-2

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 15 -

Report To	Contact and company name below will appear on the final report
Company:	Baffinland Iron Mines Corp.
Contact:	Wiliam Bowden and Connor Devereaux
Phone:	647-253-0596 EXT 6016
	Company address below will appear on the final report
Street:	2275 Upper Middle Rd. E., Suite #300
City/Province:	Oakville, ON
Postal Code:	L6H 0C3

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)

Quality Control (QC) Report with Report ☑ YES ☐ NO

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax bimcore@alsglobal.com

Email 2 bimww@alsglobal.com

Email 3

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☐ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): **4 day [P4]** ☐ | **3 day [P3]** ☐ | **2 day [P2]** ☐

EMERGENCY: **1 Business day [E1]** ☐ | **Same Day, Weekend or Statutory holiday [E0]** ☑

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	
Contact:	

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax ap@baffinland.com

Email 2 commercial@baffinland.com

Project Information

ALS Account # / Quote #:	23642 /Q42455
Job #:	MS-08 DEL
PO / AFE:	4500057496
LSD:	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only)

ALS Contact:

Sampler: OM

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	MMER-DEL	Number of Containers
	MS-08	30-Jun-19	9:00	Water	E0	8
	MS-0801	30-Jun-19	9:00	Water	E0	8

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human drinking water use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES ºC			FINAL COOLER TEMPERATURES ºC		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Stephanie Sawchuk	Date: 30-Jun-19	Time: 18:20	Received by:	Date:	Time:	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

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 specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2301638-COFC

COC Number: 15 -

Report To	Contact and company name below will appear on the final report
Company:	Baffinland Iron Mines Corp.
Contact:	Wiliam Bowden and Connor Devereaux
Phone:	647-253-0596 EXT 6016
	Company address below will appear on the final report
Street:	2275 Upper Middle Rd. E., Suite #300
City/Province:	Oakville, ON
Postal Code:	L6H 0C3
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	
Contact:	

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	bimcore@alsglobal.com
Email 2	bimww@alsglobal.com
Email 3	

Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	ap@baffinland.com
Email 2	commercial@baffinland.com

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	23642 /Q42455	AFE/Cost Center:	PO#
Job #:	MS-08	Major/Minor Code:	Routing Code:
PO / AFE:	4500057496	Requisitioner:	
LSD:		Location:	

ALS Lab Work Order # (lab use only)	L2301638	ALS Contact:	Sampler: OM

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☐ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
4 day [P4]	☐	1 Business day [E1]	☐
3 day [P3]	☐	Same Day, Weekend or Statutory holiday [E0]	☑
2 day [P2]	☐		

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	MMER-DEL	Number of Containers
	MS-08	30-Jun-19	9:00	Water	E0	8
	MS-0801	30-Jun-19	9:00	Water	E0	8

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☑ NO	
Are samples for human drinking water use? ☐ YES ☑ NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen	☐	SIF Observations	Yes ☐	No ☐	
Ice Packs ☐	Ice Cubes ☒	Custody seal intact	Yes ☐	No ☐	
Cooling Initiated ☐					

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			18.1		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Stephanie Sawchuk	Date: 30-Jun-19	Time: 18:20	Received by:	Date:	Time:	Received by: AP	Date: 3-JUL-19	Time: 09:30

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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 specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Baffinland Iron Mine's Corporation (Oakville)
ATTN: William Bowden/Connor Devereaux
2275 Upper Middle Rd. E.
Suite #300
Oakville ON L6H 0C3

Date Received: 09-JUL-19
Report Date: 29-JUL-19 13:26 (MT)
Version: FINAL

Client Phone: 647-253-0596

Certificate of Analysis

Lab Work Order #: L2305882

Project P.O. #: 4500057496
Job Reference: MS-08 WT TOX
C of C Numbers:
Legal Site Desc:

Rick Hawthorne
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2305882-1 MS-08 Sampled By: KB/BC on 08-JUL-19 @ 14:50 Matrix: WATER							
Physical Tests							
Conductivity	4440		3.0	umhos/cm		09-JUL-19	R4702724
Hardness (as CaCO3)	3150		1.3	mg/L		09-JUL-19	
pH	7.50		0.10	pH units		09-JUL-19	R4701528
Total Suspended Solids	12.0		2.0	mg/L		08-JUL-19	R4701468
Total Dissolved Solids	4670		20	mg/L		09-JUL-19	R4701789
Turbidity	14.1		0.10	NTU		09-JUL-19	R4701569
Anions and Nutrients							
Acidity (as CaCO3)	9.3		5.0	mg/L		11-JUL-19	R4708064
Alkalinity, Total (as CaCO3)	18		10	mg/L		09-JUL-19	R4702724
Ammonia, Total (as N)	7.4	DLHC	1.0	mg/L		10-JUL-19	R4704649
Chloride (Cl)	9.5	DLDS	2.5	mg/L		09-JUL-19	R4702730
Fluoride (F)	0.11	DLDS	0.10	mg/L		09-JUL-19	R4702730
Nitrate (as N)	14.2	DLDS	0.10	mg/L		09-JUL-19	R4702730
Total Kjeldahl Nitrogen	3.75	RRV	0.15	mg/L	09-JUL-19	10-JUL-19	R4704933
Phosphorus, Total	<0.0030		0.0030	mg/L	09-JUL-19	10-JUL-19	R4703451
Sulfate (SO4)	3130	DLDS	1.5	mg/L		09-JUL-19	R4702730
Cyanides							
Cyanide, Total	0.021	DLM	0.020	mg/L		10-JUL-19	R4704470
Organic / Inorganic Carbon							
Dissolved Carbon Filtration Location	LAB					09-JUL-19	R4700868
Dissolved Organic Carbon	3.05		0.50	mg/L	09-JUL-19	10-JUL-19	R4703168
Total Organic Carbon	3.65		0.50	mg/L		10-JUL-19	R4703169
Total Metals							
Aluminum (Al)-Total	<0.050	DLHC	0.050	mg/L	09-JUL-19	09-JUL-19	R4701850
Antimony (Sb)-Total	<0.0010	DLHC	0.0010	mg/L	09-JUL-19	09-JUL-19	R4701850
Arsenic (As)-Total	<0.0010	DLHC	0.0010	mg/L	09-JUL-19	09-JUL-19	R4701850
Barium (Ba)-Total	0.0337	DLHC	0.0010	mg/L	09-JUL-19	09-JUL-19	R4701850
Beryllium (Be)-Total	<0.0010	DLHC	0.0010	mg/L	09-JUL-19	09-JUL-19	R4701850
Bismuth (Bi)-Total	<0.00050	DLHC	0.00050	mg/L	09-JUL-19	09-JUL-19	R4701850
Boron (B)-Total	<0.10	DLHC	0.10	mg/L	09-JUL-19	09-JUL-19	R4701850
Cadmium (Cd)-Total	<0.000050	DLHC	0.000050	mg/L	09-JUL-19	09-JUL-19	R4701850
Calcium (Ca)-Total	305	DLHC	0.50	mg/L	09-JUL-19	09-JUL-19	R4701850
Cesium (Cs)-Total	<0.00010	DLHC	0.00010	mg/L	09-JUL-19	09-JUL-19	R4701850
Chromium (Cr)-Total	<0.0050	DLHC	0.0050	mg/L	09-JUL-19	09-JUL-19	R4701850
Cobalt (Co)-Total	0.0271	DLHC	0.0010	mg/L	09-JUL-19	09-JUL-19	R4701850
Copper (Cu)-Total	<0.010	DLHC	0.010	mg/L	09-JUL-19	09-JUL-19	R4701850
Iron (Fe)-Total	4.50	DLHC	0.10	mg/L	09-JUL-19	09-JUL-19	R4701850
Lead (Pb)-Total	<0.00050	DLHC	0.00050	mg/L	09-JUL-19	09-JUL-19	R4701850
Lithium (Li)-Total	0.050	DLHC	0.010	mg/L	09-JUL-19	09-JUL-19	R4701850
Magnesium (Mg)-Total	646	DLHC	0.050	mg/L	09-JUL-19	09-JUL-19	R4701850
Manganese (Mn)-Total	14.7	DLHC	0.0050	mg/L	09-JUL-19	09-JUL-19	R4701850
Mercury (Hg)-Total	<0.000010		0.000010	mg/L		10-JUL-19	R4703589

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2305882-1 MS-08 Sampled By: KB/BC on 08-JUL-19 @ 14:50 Matrix: WATER							
Total Metals							
Molybdenum (Mo)-Total	<0.00050	DLHC	0.00050	mg/L	09-JUL-19	09-JUL-19	R4701850
Nickel (Ni)-Total	0.0252	DLHC	0.0050	mg/L	09-JUL-19	09-JUL-19	R4701850
Phosphorus (P)-Total	<0.50	DLHC	0.50	mg/L	09-JUL-19	09-JUL-19	R4701850
Potassium (K)-Total	6.18	DLHC	0.50	mg/L	09-JUL-19	09-JUL-19	R4701850
Rubidium (Rb)-Total	0.0104	DLHC	0.0020	mg/L	09-JUL-19	09-JUL-19	R4701850
Selenium (Se)-Total	0.00622	DLHC	0.00050	mg/L	09-JUL-19	09-JUL-19	R4701850
Silicon (Si)-Total	<1.0	DLHC	1.0	mg/L	09-JUL-19	09-JUL-19	R4701850
Silver (Ag)-Total	<0.00050	DLHC	0.00050	mg/L	09-JUL-19	09-JUL-19	R4701850
Sodium (Na)-Total	4.51	DLHC	0.50	mg/L	09-JUL-19	09-JUL-19	R4701850
Strontium (Sr)-Total	0.663	DLHC	0.010	mg/L	09-JUL-19	09-JUL-19	R4701850
Sulfur (S)-Total	1180	DLHC	5.0	mg/L	09-JUL-19	09-JUL-19	R4701850
Tellurium (Te)-Total	<0.0020	DLHC	0.0020	mg/L	09-JUL-19	09-JUL-19	R4701850
Thallium (Tl)-Total	0.00014	DLHC	0.00010	mg/L	09-JUL-19	09-JUL-19	R4701850
Thorium (Th)-Total	<0.0010	DLHC	0.0010	mg/L	09-JUL-19	09-JUL-19	R4701850
Tin (Sn)-Total	<0.0010	DLHC	0.0010	mg/L	09-JUL-19	09-JUL-19	R4701850
Titanium (Ti)-Total	<0.0030	DLHC	0.0030	mg/L	09-JUL-19	09-JUL-19	R4701850
Tungsten (W)-Total	<0.0010	DLHC	0.0010	mg/L	09-JUL-19	09-JUL-19	R4701850
Uranium (U)-Total	0.00032	DLHC	0.00010	mg/L	09-JUL-19	09-JUL-19	R4701850
Vanadium (V)-Total	<0.0050	DLHC	0.0050	mg/L	09-JUL-19	09-JUL-19	R4701850
Zinc (Zn)-Total	<0.030	DLHC	0.030	mg/L	09-JUL-19	09-JUL-19	R4701850
Zirconium (Zr)-Total	<0.0020	DLHC	0.0020	mg/L	09-JUL-19	09-JUL-19	R4701850
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					10-JUL-19	R4702349
Dissolved Metals Filtration Location	LAB					09-JUL-19	R4700212
Aluminum (Al)-Dissolved	<0.050	DLHC	0.050	mg/L	09-JUL-19	09-JUL-19	R4701774
Antimony (Sb)-Dissolved	<0.0010	DLHC	0.0010	mg/L	09-JUL-19	09-JUL-19	R4701774
Arsenic (As)-Dissolved	<0.0010	DLHC	0.0010	mg/L	09-JUL-19	09-JUL-19	R4701774
Barium (Ba)-Dissolved	0.0310	DLHC	0.0010	mg/L	09-JUL-19	09-JUL-19	R4701774
Beryllium (Be)-Dissolved	<0.0010	DLHC	0.0010	mg/L	09-JUL-19	09-JUL-19	R4701774
Bismuth (Bi)-Dissolved	<0.00050	DLHC	0.00050	mg/L	09-JUL-19	09-JUL-19	R4701774
Boron (B)-Dissolved	<0.10	DLHC	0.10	mg/L	09-JUL-19	09-JUL-19	R4701774
Cadmium (Cd)-Dissolved	<0.000050	DLHC	0.000050	mg/L	09-JUL-19	09-JUL-19	R4701774
Calcium (Ca)-Dissolved	290	DLHC	0.50	mg/L	09-JUL-19	09-JUL-19	R4701774
Cesium (Cs)-Dissolved	<0.00010	DLHC	0.00010	mg/L	09-JUL-19	09-JUL-19	R4701774
Chromium (Cr)-Dissolved	<0.0050	DLHC	0.0050	mg/L	09-JUL-19	09-JUL-19	R4701774
Cobalt (Co)-Dissolved	0.0207	DLHC	0.0010	mg/L	09-JUL-19	09-JUL-19	R4701774
Copper (Cu)-Dissolved	0.0064	DLHC	0.0020	mg/L	09-JUL-19	09-JUL-19	R4701774
Iron (Fe)-Dissolved	<0.10	DLHC	0.10	mg/L	09-JUL-19	09-JUL-19	R4701774
Lead (Pb)-Dissolved	<0.00050	DLHC	0.00050	mg/L	09-JUL-19	09-JUL-19	R4701774
Lithium (Li)-Dissolved	0.048	DLHC	0.010	mg/L	09-JUL-19	09-JUL-19	R4701774
Magnesium (Mg)-Dissolved	589	DLHC	0.050	mg/L	09-JUL-19	09-JUL-19	R4701774

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2305882-1 MS-08 Sampled By: KB/BC on 08-JUL-19 @ 14:50 Matrix: WATER							
Dissolved Metals							
Manganese (Mn)-Dissolved	13.0	DLHC	0.0050	mg/L	09-JUL-19	09-JUL-19	R4701774
Mercury (Hg)-Dissolved	<0.000010		0.000010	mg/L	10-JUL-19	10-JUL-19	R4703592
Molybdenum (Mo)-Dissolved	<0.00050	DLHC	0.00050	mg/L	09-JUL-19	09-JUL-19	R4701774
Nickel (Ni)-Dissolved	0.0192	DLHC	0.0050	mg/L	09-JUL-19	09-JUL-19	R4701774
Phosphorus (P)-Dissolved	<0.50	DLHC	0.50	mg/L	09-JUL-19	09-JUL-19	R4701774
Potassium (K)-Dissolved	5.56	DLHC	0.50	mg/L	09-JUL-19	09-JUL-19	R4701774
Rubidium (Rb)-Dissolved	0.0092	DLHC	0.0020	mg/L	09-JUL-19	09-JUL-19	R4701774
Selenium (Se)-Dissolved	0.00581	DLHC	0.00050	mg/L	09-JUL-19	09-JUL-19	R4701774
Silicon (Si)-Dissolved	<0.50	DLHC	0.50	mg/L	09-JUL-19	09-JUL-19	R4701774
Silver (Ag)-Dissolved	<0.00050	DLHC	0.00050	mg/L	09-JUL-19	09-JUL-19	R4701774
Sodium (Na)-Dissolved	3.93	DLHC	0.50	mg/L	09-JUL-19	09-JUL-19	R4701774
Strontium (Sr)-Dissolved	0.612	DLHC	0.010	mg/L	09-JUL-19	09-JUL-19	R4701774
Sulfur (S)-Dissolved	1060	DLHC	5.0	mg/L	09-JUL-19	09-JUL-19	R4701774
Tellurium (Te)-Dissolved	<0.0020	DLHC	0.0020	mg/L	09-JUL-19	09-JUL-19	R4701774
Thallium (Tl)-Dissolved	0.00013	DLHC	0.00010	mg/L	09-JUL-19	09-JUL-19	R4701774
Thorium (Th)-Dissolved	<0.0010	DLHC	0.0010	mg/L	09-JUL-19	09-JUL-19	R4701774
Tin (Sn)-Dissolved	<0.0010	DLHC	0.0010	mg/L	09-JUL-19	09-JUL-19	R4701774
Titanium (Ti)-Dissolved	<0.0030	DLHC	0.0030	mg/L	09-JUL-19	09-JUL-19	R4701774
Tungsten (W)-Dissolved	<0.0010	DLHC	0.0010	mg/L	09-JUL-19	09-JUL-19	R4701774
Uranium (U)-Dissolved	0.00018	DLHC	0.00010	mg/L	09-JUL-19	09-JUL-19	R4701774
Vanadium (V)-Dissolved	<0.0050	DLHC	0.0050	mg/L	09-JUL-19	09-JUL-19	R4701774
Zinc (Zn)-Dissolved	<0.010	DLHC	0.010	mg/L	09-JUL-19	09-JUL-19	R4701774
Zirconium (Zr)-Dissolved	<0.0020	DLHC	0.0020	mg/L	09-JUL-19	09-JUL-19	R4701774
Radiological Parameters							
Ra-226	0.041		0.0049	Bq/L	16-JUL-19	26-JUL-19	R4692536
L2305882-2 MS-0803 Sampled By: KB/BC on 08-JUL-19 @ 14:50 Matrix: WATER							
Physical Tests							
Conductivity	<3.0		3.0	umhos/cm		09-JUL-19	R4702724
Hardness (as CaCO3)	<0.50		0.50	mg/L		09-JUL-19	
pH	5.71		0.10	pH units		09-JUL-19	R4701528
Total Suspended Solids	<2.0		2.0	mg/L		08-JUL-19	R4701468
Total Dissolved Solids	<20		20	mg/L		09-JUL-19	R4701789
Turbidity	<0.10		0.10	NTU		09-JUL-19	R4701569
Anions and Nutrients							
Acidity (as CaCO3)	<5.0	DLM	5.0	mg/L		11-JUL-19	R4708064
Alkalinity, Total (as CaCO3)	<10		10	mg/L		09-JUL-19	R4702724
Ammonia, Total (as N)	0.22	DLHC	0.10	mg/L		10-JUL-19	R4704649
Chloride (Cl)	<0.50		0.50	mg/L		09-JUL-19	R4702730
Fluoride (F)	<0.020		0.020	mg/L		09-JUL-19	R4702730
Nitrate (as N)	<0.020		0.020	mg/L		09-JUL-19	R4702730

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2305882-2 MS-0803 Sampled By: KB/BC on 08-JUL-19 @ 14:50 Matrix: WATER							
Anions and Nutrients							
Total Kjeldahl Nitrogen	<0.15		0.15	mg/L	09-JUL-19	10-JUL-19	R4704933
Phosphorus, Total	0.0037		0.0030	mg/L	09-JUL-19	10-JUL-19	R4703451
Sulfate (SO4)	<0.30		0.30	mg/L		09-JUL-19	R4702730
Cyanides							
Cyanide, Total	<0.0020		0.0020	mg/L		09-JUL-19	R4699634
Organic / Inorganic Carbon							
Dissolved Carbon Filtration Location	LAB					09-JUL-19	R4700868
Dissolved Organic Carbon	0.53		0.50	mg/L	09-JUL-19	10-JUL-19	R4703168
Total Organic Carbon	0.83		0.50	mg/L		10-JUL-19	R4703169
Total Metals							
Aluminum (Al)-Total	<0.0050		0.0050	mg/L	09-JUL-19	09-JUL-19	R4701850
Antimony (Sb)-Total	<0.00010		0.00010	mg/L	09-JUL-19	09-JUL-19	R4701850
Arsenic (As)-Total	<0.00010		0.00010	mg/L	09-JUL-19	09-JUL-19	R4701850
Barium (Ba)-Total	<0.00010		0.00010	mg/L	09-JUL-19	09-JUL-19	R4701850
Beryllium (Be)-Total	<0.00010		0.00010	mg/L	09-JUL-19	09-JUL-19	R4701850
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L	09-JUL-19	09-JUL-19	R4701850
Boron (B)-Total	<0.010		0.010	mg/L	09-JUL-19	09-JUL-19	R4701850
Cadmium (Cd)-Total	<0.0000050		0.0000050	mg/L	09-JUL-19	09-JUL-19	R4701850
Calcium (Ca)-Total	<0.050		0.050	mg/L	09-JUL-19	09-JUL-19	R4701850
Cesium (Cs)-Total	<0.000010		0.000010	mg/L	09-JUL-19	09-JUL-19	R4701850
Chromium (Cr)-Total	<0.00050		0.00050	mg/L	09-JUL-19	09-JUL-19	R4701850
Cobalt (Co)-Total	<0.00010		0.00010	mg/L	09-JUL-19	09-JUL-19	R4701850
Copper (Cu)-Total	<0.0010		0.0010	mg/L	09-JUL-19	09-JUL-19	R4701850
Iron (Fe)-Total	<0.010		0.010	mg/L	09-JUL-19	09-JUL-19	R4701850
Lead (Pb)-Total	<0.000050		0.000050	mg/L	09-JUL-19	09-JUL-19	R4701850
Lithium (Li)-Total	<0.0010		0.0010	mg/L	09-JUL-19	09-JUL-19	R4701850
Magnesium (Mg)-Total	<0.0050		0.0050	mg/L	09-JUL-19	09-JUL-19	R4701850
Manganese (Mn)-Total	<0.00050		0.00050	mg/L	09-JUL-19	09-JUL-19	R4701850
Mercury (Hg)-Total	<0.000010		0.000010	mg/L		10-JUL-19	R4703589
Molybdenum (Mo)-Total	<0.000050		0.000050	mg/L	09-JUL-19	09-JUL-19	R4701850
Nickel (Ni)-Total	<0.00050		0.00050	mg/L	09-JUL-19	09-JUL-19	R4701850
Phosphorus (P)-Total	<0.050		0.050	mg/L	09-JUL-19	09-JUL-19	R4701850
Potassium (K)-Total	<0.050		0.050	mg/L	09-JUL-19	09-JUL-19	R4701850
Rubidium (Rb)-Total	<0.00020		0.00020	mg/L	09-JUL-19	09-JUL-19	R4701850
Selenium (Se)-Total	<0.000050		0.000050	mg/L	09-JUL-19	09-JUL-19	R4701850
Silicon (Si)-Total	<0.10		0.10	mg/L	09-JUL-19	09-JUL-19	R4701850
Silver (Ag)-Total	<0.000050		0.000050	mg/L	09-JUL-19	09-JUL-19	R4701850
Sodium (Na)-Total	<0.050		0.050	mg/L	09-JUL-19	09-JUL-19	R4701850
Strontium (Sr)-Total	<0.0010		0.0010	mg/L	09-JUL-19	09-JUL-19	R4701850
Sulfur (S)-Total	<0.50		0.50	mg/L	09-JUL-19	09-JUL-19	R4701850
Tellurium (Te)-Total	<0.00020		0.00020	mg/L	09-JUL-19	09-JUL-19	R4701850
Thallium (Tl)-Total	<0.000010		0.000010	mg/L	09-JUL-19	09-JUL-19	R4701850

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2305882-2 MS-0803 Sampled By: KB/BC on 08-JUL-19 @ 14:50 Matrix: WATER							
Total Metals							
Thorium (Th)-Total	<0.00010		0.00010	mg/L	09-JUL-19	09-JUL-19	R4701850
Tin (Sn)-Total	<0.00010		0.00010	mg/L	09-JUL-19	09-JUL-19	R4701850
Titanium (Ti)-Total	<0.00030		0.00030	mg/L	09-JUL-19	09-JUL-19	R4701850
Tungsten (W)-Total	<0.00010		0.00010	mg/L	09-JUL-19	09-JUL-19	R4701850
Uranium (U)-Total	<0.000010		0.000010	mg/L	09-JUL-19	09-JUL-19	R4701850
Vanadium (V)-Total	<0.00050		0.00050	mg/L	09-JUL-19	09-JUL-19	R4701850
Zinc (Zn)-Total	<0.0030		0.0030	mg/L	09-JUL-19	09-JUL-19	R4701850
Zirconium (Zr)-Total	<0.00020		0.00020	mg/L	09-JUL-19	09-JUL-19	R4701850
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					10-JUL-19	R4702349
Dissolved Metals Filtration Location	LAB					09-JUL-19	R4700212
Aluminum (Al)-Dissolved	<0.0050		0.0050	mg/L	09-JUL-19	09-JUL-19	R4701774
Antimony (Sb)-Dissolved	<0.00010		0.00010	mg/L	09-JUL-19	09-JUL-19	R4701774
Arsenic (As)-Dissolved	<0.00010		0.00010	mg/L	09-JUL-19	09-JUL-19	R4701774
Barium (Ba)-Dissolved	<0.00010		0.00010	mg/L	09-JUL-19	09-JUL-19	R4701774
Beryllium (Be)-Dissolved	<0.00010		0.00010	mg/L	09-JUL-19	09-JUL-19	R4701774
Bismuth (Bi)-Dissolved	<0.000050		0.000050	mg/L	09-JUL-19	09-JUL-19	R4701774
Boron (B)-Dissolved	<0.010		0.010	mg/L	09-JUL-19	09-JUL-19	R4701774
Cadmium (Cd)-Dissolved	<0.0000050		0.0000050	mg/L	09-JUL-19	09-JUL-19	R4701774
Calcium (Ca)-Dissolved	<0.050		0.050	mg/L	09-JUL-19	09-JUL-19	R4701774
Cesium (Cs)-Dissolved	<0.000010		0.000010	mg/L	09-JUL-19	09-JUL-19	R4701774
Chromium (Cr)-Dissolved	<0.00050		0.00050	mg/L	09-JUL-19	09-JUL-19	R4701774
Cobalt (Co)-Dissolved	<0.00010		0.00010	mg/L	09-JUL-19	09-JUL-19	R4701774
Copper (Cu)-Dissolved	<0.00020		0.00020	mg/L	09-JUL-19	09-JUL-19	R4701774
Iron (Fe)-Dissolved	<0.010		0.010	mg/L	09-JUL-19	09-JUL-19	R4701774
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L	09-JUL-19	09-JUL-19	R4701774
Lithium (Li)-Dissolved	<0.0010		0.0010	mg/L	09-JUL-19	09-JUL-19	R4701774
Magnesium (Mg)-Dissolved	<0.0050		0.0050	mg/L	09-JUL-19	09-JUL-19	R4701774
Manganese (Mn)-Dissolved	<0.00050		0.00050	mg/L	09-JUL-19	09-JUL-19	R4701774
Mercury (Hg)-Dissolved	<0.000010		0.000010	mg/L	10-JUL-19	10-JUL-19	R4703592
Molybdenum (Mo)-Dissolved	<0.000050		0.000050	mg/L	09-JUL-19	09-JUL-19	R4701774
Nickel (Ni)-Dissolved	<0.00050		0.00050	mg/L	09-JUL-19	09-JUL-19	R4701774
Phosphorus (P)-Dissolved	<0.050		0.050	mg/L	09-JUL-19	09-JUL-19	R4701774
Potassium (K)-Dissolved	<0.050		0.050	mg/L	09-JUL-19	09-JUL-19	R4701774
Rubidium (Rb)-Dissolved	<0.00020		0.00020	mg/L	09-JUL-19	09-JUL-19	R4701774
Selenium (Se)-Dissolved	<0.000050		0.000050	mg/L	09-JUL-19	09-JUL-19	R4701774
Silicon (Si)-Dissolved	<0.050		0.050	mg/L	09-JUL-19	09-JUL-19	R4701774
Silver (Ag)-Dissolved	<0.000050		0.000050	mg/L	09-JUL-19	09-JUL-19	R4701774
Sodium (Na)-Dissolved	<0.050		0.050	mg/L	09-JUL-19	09-JUL-19	R4701774
Strontium (Sr)-Dissolved	<0.0010		0.0010	mg/L	09-JUL-19	09-JUL-19	R4701774
Sulfur (S)-Dissolved	<0.50		0.50	mg/L	09-JUL-19	09-JUL-19	R4701774

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2305882-2 MS-0803 Sampled By: KB/BC on 08-JUL-19 @ 14:50 Matrix: WATER							
Dissolved Metals							
Tellurium (Te)-Dissolved	<0.00020		0.00020	mg/L	09-JUL-19	09-JUL-19	R4701774
Thallium (Tl)-Dissolved	<0.000010		0.000010	mg/L	09-JUL-19	09-JUL-19	R4701774
Thorium (Th)-Dissolved	<0.00010		0.00010	mg/L	09-JUL-19	09-JUL-19	R4701774
Tin (Sn)-Dissolved	<0.00010		0.00010	mg/L	09-JUL-19	09-JUL-19	R4701774
Titanium (Ti)-Dissolved	<0.00030		0.00030	mg/L	09-JUL-19	09-JUL-19	R4701774
Tungsten (W)-Dissolved	<0.00010		0.00010	mg/L	09-JUL-19	09-JUL-19	R4701774
Uranium (U)-Dissolved	<0.000010		0.000010	mg/L	09-JUL-19	09-JUL-19	R4701774
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L	09-JUL-19	09-JUL-19	R4701774
Zinc (Zn)-Dissolved	<0.0010		0.0010	mg/L	09-JUL-19	09-JUL-19	R4701774
Zirconium (Zr)-Dissolved	<0.00020		0.00020	mg/L	09-JUL-19	09-JUL-19	R4701774
Radiological Parameters							
Ra-226	<0.0071		0.0071	Bq/L	16-JUL-19	26-JUL-19	R4692536

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

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Tin (Sn)-Total	B	L2305882-1, -2
Matrix Spike	Calcium (Ca)-Total	MS-B	L2305882-1, -2
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2305882-1, -2
Matrix Spike	Potassium (K)-Total	MS-B	L2305882-1, -2
Matrix Spike	Silicon (Si)-Total	MS-B	L2305882-1, -2
Matrix Spike	Sodium (Na)-Total	MS-B	L2305882-1, -2
Matrix Spike	Strontium (Sr)-Total	MS-B	L2305882-1, -2
Matrix Spike	Sulfur (S)-Total	MS-B	L2305882-1, -2
Matrix Spike	Ammonia, Total (as N)	MS-B	L2305882-1, -2

Sample Parameter Qualifier key listed:

Qualifier	Description
B	Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRV	Reported Result Verified By Repeat Analysis

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACY-TITR-TB	Water	Acidity	APHA 2310 B modified

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

ALK-WT	Water	Alkalinity, Total (as CaCO3)	EPA 310.2

This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.

CL-IC-N-WT	Water	Chloride by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

CN-TOT-WT	Water	Cyanide, Total	ISO 14403-2

Total cyanide is determined by the combination of UV digestion and distillation. Cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

When using this method, high levels of thiocyanate in samples can cause false positives at ~1-2% of the thiocyanate concentration. For samples with detectable cyanide analyzed by this method, ALS recommends analysis for thiocyanate to check for this potential interference

DOC-WT	Water	Dissolved Organic Carbon	APHA 5310B

Sample is filtered through a 0.45um filter, then injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic carbon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.

EC-SCREEN-WT	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

EC-WT	Water	Conductivity	APHA 2510 B

Water samples can be measured directly by immersing the conductivity cell into the sample.

F-IC-N-WT	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-WT	Water	Hardness	APHA 2340 B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-WT	Water	Dissolved Mercury in Water by CVAAS	EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental

Reference Information

Protection Act (July 1, 2011).

HG-T-CVAA-WT	Water	Total Mercury in Water by CVAAS	EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

MET-D-CCMS-WT	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

MET-T-CCMS-WT	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

NH3-F-WT	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO3-IC-WT	Water	Nitrate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-COL-WT	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is deteremined colourimetrically after persulphate digestion of the sample.

PH-BF	Water	pH	APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

RA226-MMER-FC	Water	Ra226 by Alpha Scint, MDC=0.01 Bq/L	EPA 903.1
SO4-IC-N-WT	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-BF	Water	Total Dissolved Solids	APHA 2540C

A well-mixed sample is filtered though glass fibres filter. A known volume of the filtrate is evaporated and dried at 180 +/- 2C for 1hr.

SOLIDS-TSS-BF	Water	Suspended solids	APHA 2540 D-Gravimetric

A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104 +/- 1C for a minimum of four hours or until a constant weight is achieved.

TKN-WT	Water	Total Kjeldahl Nitrogen	APHA 4500-Norg D

This analysis is carried out using procedures adapted from APHA Method 4500-Norg "Nitrogen (Organic)". Total Kjeldahl Nitrogen is determined by sample digestion at 380 Celsius with analysis using an automated colorimetric method.

TOC-WT	Water	Total Organic Carbon	APHA 5310B

Sample is injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic cabon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.

TURBIDITY-BF	Water	Turbidity	APHA 2130 B

Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.

** 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
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA
	ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA

Reference Information

FC	TB
	ALS ENVIRONMENTAL - THUNDER BAY, ONTARIO, CANADA
BF	ALS ENVIRONMENTAL - BAFFIN ISLAND, NUNAVUT, 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 weight of sample
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

Workorder: L2305882 Report Date: 29-JUL-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3

Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACY-TITR-TB	**Water**							
Batch R4708064								
WG3101858-2 LCS								
Acidity (as CaCO3)			96.5		%		85-115	11-JUL-19
WG3101858-1 MB								
Acidity (as CaCO3)			<2.0		mg/L		2	11-JUL-19
ALK-WT	**Water**							
Batch R4702724								
WG3099946-4 DUP		**WG3099946-3**						
Alkalinity, Total (as CaCO3)		25	25		mg/L	0.2	20	09-JUL-19
WG3099946-2 LCS								
Alkalinity, Total (as CaCO3)			103.6		%		85-115	09-JUL-19
WG3099946-1 MB								
Alkalinity, Total (as CaCO3)			<10		mg/L		10	09-JUL-19
CL-IC-N-WT	**Water**							
Batch R4702730								
WG3099831-10 DUP		**WG3099831-8**						
Chloride (Cl)		20.4	20.4		mg/L	0.3	20	09-JUL-19
WG3099831-7 LCS								
Chloride (Cl)			101.9		%		90-110	09-JUL-19
WG3099831-6 MB								
Chloride (Cl)			<0.50		mg/L		0.5	09-JUL-19
WG3099831-9 MS		**WG3099831-8**						
Chloride (Cl)			99.4		%		75-125	09-JUL-19
CN-TOT-WT	**Water**							
Batch R4699634								
WG3099686-3 DUP		**L2305454-1**						
Cyanide, Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	09-JUL-19
WG3099686-2 LCS								
Cyanide, Total			91.6		%		80-120	09-JUL-19
WG3099686-1 MB								
Cyanide, Total			<0.0020		mg/L		0.002	09-JUL-19
WG3099686-4 MS		**L2305454-1**						
Cyanide, Total			91.4		%		70-130	09-JUL-19
Batch R4704470								
WG3100914-3 DUP		**L2305882-1**						
Cyanide, Total		0.021	0.020		mg/L	5.9	20	10-JUL-19
WG3100914-2 LCS								
Cyanide, Total			86.3		%		80-120	10-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CN-TOT-WT	**Water**							
Batch R4704470								
WG3100914-1 MB								
Cyanide, Total			<0.0020		mg/L		0.002	10-JUL-19
WG3100914-4 MS		**L2305882-1**						
Cyanide, Total			82.6		%		70-130	10-JUL-19
DOC-WT	**Water**							
Batch R4703168								
WG3100247-3 DUP		**L2305271-1**						
Dissolved Organic Carbon		2.04	2.11		mg/L	3.4	25	10-JUL-19
WG3100247-2 LCS								
Dissolved Organic Carbon			110.4		%		70-130	10-JUL-19
WG3100247-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	10-JUL-19
WG3100247-4 MS		**L2305271-1**						
Dissolved Organic Carbon			113.6		%		70-130	10-JUL-19
EC-WT	**Water**							
Batch R4702724								
WG3099946-4 DUP		**WG3099946-3**						
Conductivity		51.6	51.3		umhos/cm	0.6	10	09-JUL-19
WG3099946-2 LCS								
Conductivity			101.8		%		90-110	09-JUL-19
WG3099946-1 MB								
Conductivity			<3.0		umhos/cm		3	09-JUL-19
F-IC-N-WT	**Water**							
Batch R4702730								
WG3099831-10 DUP		**WG3099831-8**						
Fluoride (F)		0.038	0.038		mg/L	0.4	20	09-JUL-19
WG3099831-7 LCS								
Fluoride (F)			105.3		%		90-110	09-JUL-19
WG3099831-6 MB								
Fluoride (F)			<0.020		mg/L		0.02	09-JUL-19
WG3099831-9 MS		**WG3099831-8**						
Fluoride (F)			95.4		%		75-125	09-JUL-19
HG-D-CVAA-WT	**Water**							
Batch R4703592								
WG3100701-4 DUP		**WG3100701-3**						
Mercury (Hg)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	10-JUL-19
WG3100701-2 LCS								

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-D-CVAA-WT	**Water**							
Batch R4703592								
WG3100701-2 LCS								
Mercury (Hg)-Dissolved			99.9		%		80-120	10-JUL-19
WG3100701-1 MB								
Mercury (Hg)-Dissolved			<0.000010		mg/L		0.00001	10-JUL-19
WG3100701-6 MS		**WG3100701-5**						
Mercury (Hg)-Dissolved			97.1		%		70-130	10-JUL-19
HG-T-CVAA-WT	**Water**							
Batch R4703589								
WG3100694-6 DUP		**WG3100694-5**						
Mercury (Hg)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	10-JUL-19
WG3100694-2 LCS								
Mercury (Hg)-Total			101.0		%		80-120	10-JUL-19
WG3100694-1 MB								
Mercury (Hg)-Total			<0.000010		mg/L		0.00001	10-JUL-19
WG3100694-8 MS		**WG3100694-7**						
Mercury (Hg)-Total			91.7		%		70-130	10-JUL-19
MET-D-CCMS-WT	**Water**							
Batch R4701774								
WG3100068-4 DUP		**WG3100068-3**						
Aluminum (Al)-Dissolved		<0.050	<0.050	RPD-NA	mg/L	N/A	20	09-JUL-19
Antimony (Sb)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	09-JUL-19
Arsenic (As)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	09-JUL-19
Barium (Ba)-Dissolved		0.0310	0.0284		mg/L	8.9	20	09-JUL-19
Beryllium (Be)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	09-JUL-19
Bismuth (Bi)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	09-JUL-19
Boron (B)-Dissolved		<0.10	<0.10	RPD-NA	mg/L	N/A	20	09-JUL-19
Cadmium (Cd)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	09-JUL-19
Calcium (Ca)-Dissolved		290	251		mg/L	14	20	09-JUL-19
Cesium (Cs)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	09-JUL-19
Chromium (Cr)-Dissolved		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	09-JUL-19
Cobalt (Co)-Dissolved		0.0207	0.0190		mg/L	8.5	20	09-JUL-19
Copper (Cu)-Dissolved		0.0064	0.0054		mg/L	17	20	09-JUL-19
Iron (Fe)-Dissolved		<0.10	<0.10	RPD-NA	mg/L	N/A	20	09-JUL-19
Lead (Pb)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	09-JUL-19
Lithium (Li)-Dissolved		0.048	0.033	J	mg/L	0.014	0.02	09-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4701774								
WG3100068-4 DUP		**WG3100068-3**						
Magnesium (Mg)-Dissolved		589	556		mg/L	5.7	20	09-JUL-19
Manganese (Mn)-Dissolved		13.0	12.4		mg/L	4.9	20	09-JUL-19
Molybdenum (Mo)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	09-JUL-19
Nickel (Ni)-Dissolved		0.0192	0.0189		mg/L	1.4	20	09-JUL-19
Phosphorus (P)-Dissolved		<0.50	<0.50	RPD-NA	mg/L	N/A	20	09-JUL-19
Potassium (K)-Dissolved		5.56	4.80		mg/L	15	20	09-JUL-19
Rubidium (Rb)-Dissolved		0.0092	0.0081		mg/L	13	20	09-JUL-19
Selenium (Se)-Dissolved		0.00581	0.00552		mg/L	5.3	20	09-JUL-19
Silicon (Si)-Dissolved		<0.50	<0.50	RPD-NA	mg/L	N/A	20	09-JUL-19
Silver (Ag)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	09-JUL-19
Sodium (Na)-Dissolved		3.93	3.43		mg/L	14	20	09-JUL-19
Strontium (Sr)-Dissolved		0.612	0.569		mg/L	7.3	20	09-JUL-19
Sulfur (S)-Dissolved		1060	958		mg/L	10	20	09-JUL-19
Tellurium (Te)-Dissolved		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	09-JUL-19
Thallium (Tl)-Dissolved		0.00013	0.00013		mg/L	3.5	20	09-JUL-19
Thorium (Th)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	09-JUL-19
Tin (Sn)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	09-JUL-19
Titanium (Ti)-Dissolved		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	09-JUL-19
Tungsten (W)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	09-JUL-19
Uranium (U)-Dissolved		0.00018	0.00018		mg/L	2.6	20	09-JUL-19
Vanadium (V)-Dissolved		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	09-JUL-19
Zinc (Zn)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	09-JUL-19
Zirconium (Zr)-Dissolved		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	09-JUL-19
WG3100068-2 LCS								
Aluminum (Al)-Dissolved			101.4		%		80-120	09-JUL-19
Antimony (Sb)-Dissolved			97.4		%		80-120	09-JUL-19
Arsenic (As)-Dissolved			100.7		%		80-120	09-JUL-19
Barium (Ba)-Dissolved			102.3		%		80-120	09-JUL-19
Beryllium (Be)-Dissolved			94.7		%		80-120	09-JUL-19
Bismuth (Bi)-Dissolved			97.6		%		80-120	09-JUL-19
Boron (B)-Dissolved			95.0		%		80-120	09-JUL-19
Cadmium (Cd)-Dissolved			101.2		%		80-120	09-JUL-19
Calcium (Ca)-Dissolved			98.0		%		80-120	09-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4701774								
WG3100068-2 LCS								
Cesium (Cs)-Dissolved			100.6		%		80-120	09-JUL-19
Chromium (Cr)-Dissolved			99.96		%		80-120	09-JUL-19
Cobalt (Co)-Dissolved			98.5		%		80-120	09-JUL-19
Copper (Cu)-Dissolved			96.7		%		80-120	09-JUL-19
Iron (Fe)-Dissolved			97.2		%		80-120	09-JUL-19
Lead (Pb)-Dissolved			100.5		%		80-120	09-JUL-19
Lithium (Li)-Dissolved			91.0		%		80-120	09-JUL-19
Magnesium (Mg)-Dissolved			98.7		%		80-120	09-JUL-19
Manganese (Mn)-Dissolved			100.6		%		80-120	09-JUL-19
Molybdenum (Mo)-Dissolved			100.9		%		80-120	09-JUL-19
Nickel (Ni)-Dissolved			98.7		%		80-120	09-JUL-19
Phosphorus (P)-Dissolved			95.6		%		80-120	09-JUL-19
Potassium (K)-Dissolved			94.6		%		80-120	09-JUL-19
Rubidium (Rb)-Dissolved			103.3		%		80-120	09-JUL-19
Selenium (Se)-Dissolved			101.5		%		80-120	09-JUL-19
Silicon (Si)-Dissolved			103.2		%		60-140	09-JUL-19
Silver (Ag)-Dissolved			102.2		%		80-120	09-JUL-19
Sodium (Na)-Dissolved			103.5		%		80-120	09-JUL-19
Strontium (Sr)-Dissolved			99.3		%		80-120	09-JUL-19
Sulfur (S)-Dissolved			101.8		%		80-120	09-JUL-19
Tellurium (Te)-Dissolved			94.6		%		80-120	09-JUL-19
Thallium (Tl)-Dissolved			101.3		%		80-120	09-JUL-19
Thorium (Th)-Dissolved			96.5		%		80-120	09-JUL-19
Tin (Sn)-Dissolved			101.7		%		80-120	09-JUL-19
Titanium (Ti)-Dissolved			96.3		%		80-120	09-JUL-19
Tungsten (W)-Dissolved			97.6		%		80-120	09-JUL-19
Uranium (U)-Dissolved			100.2		%		80-120	09-JUL-19
Vanadium (V)-Dissolved			100.5		%		80-120	09-JUL-19
Zinc (Zn)-Dissolved			101.4		%		80-120	09-JUL-19
Zirconium (Zr)-Dissolved			97.8		%		80-120	09-JUL-19
WG3100068-1 MB								
Aluminum (Al)-Dissolved			<0.0050		mg/L		0.005	09-JUL-19
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	09-JUL-19
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	09-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4701774								
WG3100068-1 MB								
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	09-JUL-19
Beryllium (Be)-Dissolved			<0.00010		mg/L		0.0001	09-JUL-19
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	09-JUL-19
Boron (B)-Dissolved			<0.010		mg/L		0.01	09-JUL-19
Cadmium (Cd)-Dissolved			<0.000005(		mg/L		0.000005	09-JUL-19
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	09-JUL-19
Cesium (Cs)-Dissolved			<0.000010		mg/L		0.00001	09-JUL-19
Chromium (Cr)-Dissolved			<0.00050		mg/L		0.0005	09-JUL-19
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	09-JUL-19
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	09-JUL-19
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	09-JUL-19
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	09-JUL-19
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	09-JUL-19
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	09-JUL-19
Manganese (Mn)-Dissolved			<0.00050		mg/L		0.0005	09-JUL-19
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	09-JUL-19
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	09-JUL-19
Phosphorus (P)-Dissolved			<0.050		mg/L		0.05	09-JUL-19
Potassium (K)-Dissolved			<0.050		mg/L		0.05	09-JUL-19
Rubidium (Rb)-Dissolved			<0.00020		mg/L		0.0002	09-JUL-19
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	09-JUL-19
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	09-JUL-19
Silver (Ag)-Dissolved			<0.000050		mg/L		0.00005	09-JUL-19
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	09-JUL-19
Strontium (Sr)-Dissolved			<0.0010		mg/L		0.001	09-JUL-19
Sulfur (S)-Dissolved			<0.50		mg/L		0.5	09-JUL-19
Tellurium (Te)-Dissolved			<0.00020		mg/L		0.0002	09-JUL-19
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	09-JUL-19
Thorium (Th)-Dissolved			<0.00010		mg/L		0.0001	09-JUL-19
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	09-JUL-19
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	09-JUL-19
Tungsten (W)-Dissolved			<0.00010		mg/L		0.0001	09-JUL-19
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	09-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4701774								
WG3100068-1 MB								
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	09-JUL-19
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	09-JUL-19
Zirconium (Zr)-Dissolved			<0.00020		mg/L		0.0002	09-JUL-19
WG3100068-5 MS		**WG3100068-6**						
Aluminum (Al)-Dissolved			95.6		%		70-130	09-JUL-19
Antimony (Sb)-Dissolved			94.9		%		70-130	09-JUL-19
Arsenic (As)-Dissolved			97.9		%		70-130	09-JUL-19
Barium (Ba)-Dissolved			100.4		%		70-130	09-JUL-19
Beryllium (Be)-Dissolved			93.7		%		70-130	09-JUL-19
Bismuth (Bi)-Dissolved			96.5		%		70-130	09-JUL-19
Boron (B)-Dissolved			91.4		%		70-130	09-JUL-19
Cadmium (Cd)-Dissolved			99.4		%		70-130	09-JUL-19
Calcium (Ca)-Dissolved			96.1		%		70-130	09-JUL-19
Cesium (Cs)-Dissolved			97.6		%		70-130	09-JUL-19
Chromium (Cr)-Dissolved			95.6		%		70-130	09-JUL-19
Cobalt (Co)-Dissolved			95.2		%		70-130	09-JUL-19
Copper (Cu)-Dissolved			95.3		%		70-130	09-JUL-19
Iron (Fe)-Dissolved			93.2		%		70-130	09-JUL-19
Lead (Pb)-Dissolved			97.2		%		70-130	09-JUL-19
Lithium (Li)-Dissolved			87.3		%		70-130	09-JUL-19
Magnesium (Mg)-Dissolved			94.2		%		70-130	09-JUL-19
Manganese (Mn)-Dissolved			96.8		%		70-130	09-JUL-19
Molybdenum (Mo)-Dissolved			98.5		%		70-130	09-JUL-19
Nickel (Ni)-Dissolved			93.7		%		70-130	09-JUL-19
Phosphorus (P)-Dissolved			93.3		%		70-130	09-JUL-19
Potassium (K)-Dissolved			90.9		%		70-130	09-JUL-19
Rubidium (Rb)-Dissolved			98.5		%		70-130	09-JUL-19
Selenium (Se)-Dissolved			97.6		%		70-130	09-JUL-19
Silicon (Si)-Dissolved			94.1		%		70-130	09-JUL-19
Silver (Ag)-Dissolved			97.8		%		70-130	09-JUL-19
Sodium (Na)-Dissolved			96.6		%		70-130	09-JUL-19
Strontium (Sr)-Dissolved			95.1		%		70-130	09-JUL-19
Sulfur (S)-Dissolved			99.99		%		70-130	09-JUL-19
Tellurium (Te)-Dissolved			93.9		%		70-130	09-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4701774								
WG3100068-5 MS		**WG3100068-6**						
Thallium (Tl)-Dissolved			94.0		%		70-130	09-JUL-19
Thorium (Th)-Dissolved			92.6		%		70-130	09-JUL-19
Tin (Sn)-Dissolved			98.7		%		70-130	09-JUL-19
Titanium (Ti)-Dissolved			95.6		%		70-130	09-JUL-19
Tungsten (W)-Dissolved			94.0		%		70-130	09-JUL-19
Uranium (U)-Dissolved			96.4		%		70-130	09-JUL-19
Vanadium (V)-Dissolved			97.2		%		70-130	09-JUL-19
Zinc (Zn)-Dissolved			96.7		%		70-130	09-JUL-19
Zirconium (Zr)-Dissolved			92.5		%		70-130	09-JUL-19
MET-T-CCMS-WT	**Water**							
Batch R4701850								
WG3100205-4 DUP		**WG3100205-3**						
Aluminum (Al)-Total		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	09-JUL-19
Antimony (Sb)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	09-JUL-19
Arsenic (As)-Total		0.00012	0.00013		mg/L	5.5	20	09-JUL-19
Barium (Ba)-Total		0.0157	0.0146		mg/L	7.2	20	09-JUL-19
Beryllium (Be)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	09-JUL-19
Bismuth (Bi)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	09-JUL-19
Boron (B)-Total		0.054	0.055		mg/L	1.8	20	09-JUL-19
Cadmium (Cd)-Total		0.0000396	0.0000404		mg/L	2.0	20	09-JUL-19
Calcium (Ca)-Total		109	108		mg/L	0.8	20	09-JUL-19
Chromium (Cr)-Total		0.0618	0.0595		mg/L	3.8	20	09-JUL-19
Cesium (Cs)-Total		0.000011	0.000012		mg/L	3.5	20	09-JUL-19
Cobalt (Co)-Total		0.00014	0.00013		mg/L	5.4	20	09-JUL-19
Copper (Cu)-Total		0.0014	0.0014		mg/L	3.8	20	09-JUL-19
Iron (Fe)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	09-JUL-19
Lead (Pb)-Total		0.000179	0.000175		mg/L	2.1	20	09-JUL-19
Lithium (Li)-Total		0.0017	0.0019		mg/L	8.3	20	09-JUL-19
Magnesium (Mg)-Total		20.2	19.5		mg/L	3.2	20	09-JUL-19
Manganese (Mn)-Total		0.00101	0.00104		mg/L	2.3	20	09-JUL-19
Molybdenum (Mo)-Total		0.000069	0.000066		mg/L	4.0	20	09-JUL-19
Nickel (Ni)-Total		0.0101	0.00965		mg/L	4.4	20	09-JUL-19
Phosphorus (P)-Total		<0.050	<0.050	RPD-NA	mg/L	N/A	20	09-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4701850								
WG3100205-4 DUP		**WG3100205-3**						
Potassium (K)-Total		3.59	3.45		mg/L	4.1	20	09-JUL-19
Rubidium (Rb)-Total		0.00114	0.00118		mg/L	3.3	20	09-JUL-19
Selenium (Se)-Total		0.000340	0.000363		mg/L	6.5	20	09-JUL-19
Silicon (Si)-Total		3.37	3.33		mg/L	1.3	20	09-JUL-19
Silver (Ag)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	09-JUL-19
Sodium (Na)-Total		101	98.4		mg/L	2.7	20	09-JUL-19
Strontium (Sr)-Total		0.180	0.181		mg/L	0.6	20	09-JUL-19
Sulfur (S)-Total		14.4	14.0		mg/L	2.5	25	09-JUL-19
Thallium (Tl)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	09-JUL-19
Tellurium (Te)-Total		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	09-JUL-19
Thorium (Th)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	25	09-JUL-19
Tin (Sn)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	09-JUL-19
Titanium (Ti)-Total		<0.00030	<0.00030	RPD-NA	mg/L	N/A	20	09-JUL-19
Tungsten (W)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	09-JUL-19
Uranium (U)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	09-JUL-19
Vanadium (V)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	09-JUL-19
Zinc (Zn)-Total		0.0056	0.0052		mg/L	7.8	20	09-JUL-19
Zirconium (Zr)-Total		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	09-JUL-19
WG3100205-2 LCS								
Aluminum (Al)-Total			97.8		%		80-120	09-JUL-19
Antimony (Sb)-Total			102.6		%		80-120	09-JUL-19
Arsenic (As)-Total			100.6		%		80-120	09-JUL-19
Barium (Ba)-Total			104.6		%		80-120	09-JUL-19
Beryllium (Be)-Total			97.0		%		80-120	09-JUL-19
Bismuth (Bi)-Total			99.9		%		80-120	09-JUL-19
Boron (B)-Total			96.8		%		80-120	09-JUL-19
Cadmium (Cd)-Total			97.7		%		80-120	09-JUL-19
Calcium (Ca)-Total			99.0		%		80-120	09-JUL-19
Chromium (Cr)-Total			98.9		%		80-120	09-JUL-19
Cesium (Cs)-Total			102.7		%		80-120	09-JUL-19
Cobalt (Co)-Total			97.2		%		80-120	09-JUL-19
Copper (Cu)-Total			96.9		%		80-120	09-JUL-19
Iron (Fe)-Total			95.5		%		80-120	09-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4701850								
WG3100205-2 LCS								
Lead (Pb)-Total			99.5		%		80-120	09-JUL-19
Lithium (Li)-Total			93.3		%		80-120	09-JUL-19
Magnesium (Mg)-Total			98.7		%		80-120	09-JUL-19
Manganese (Mn)-Total			99.8		%		80-120	09-JUL-19
Molybdenum (Mo)-Total			102.6		%		80-120	09-JUL-19
Nickel (Ni)-Total			97.1		%		80-120	09-JUL-19
Phosphorus (P)-Total			105.7		%		70-130	09-JUL-19
Potassium (K)-Total			94.7		%		80-120	09-JUL-19
Rubidium (Rb)-Total			99.8		%		80-120	09-JUL-19
Selenium (Se)-Total			97.9		%		80-120	09-JUL-19
Silicon (Si)-Total			100.9		%		60-140	09-JUL-19
Silver (Ag)-Total			104.6		%		80-120	09-JUL-19
Sodium (Na)-Total			103.6		%		80-120	09-JUL-19
Strontium (Sr)-Total			101.5		%		80-120	09-JUL-19
Sulfur (S)-Total			101.6		%		80-120	09-JUL-19
Thallium (Tl)-Total			95.1		%		80-120	09-JUL-19
Tellurium (Te)-Total			102.6		%		80-120	09-JUL-19
Thorium (Th)-Total			94.8		%		70-130	09-JUL-19
Tin (Sn)-Total			99.7		%		80-120	09-JUL-19
Titanium (Ti)-Total			95.7		%		80-120	09-JUL-19
Tungsten (W)-Total			97.1		%		80-120	09-JUL-19
Uranium (U)-Total			99.5		%		80-120	09-JUL-19
Vanadium (V)-Total			100.8		%		80-120	09-JUL-19
Zinc (Zn)-Total			99.9		%		80-120	09-JUL-19
Zirconium (Zr)-Total			100.0		%		80-120	09-JUL-19
WG3100205-1 MB								
Aluminum (Al)-Total			<0.0050		mg/L		0.005	09-JUL-19
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	09-JUL-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	09-JUL-19
Barium (Ba)-Total			<0.00010		mg/L		0.0001	09-JUL-19
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	09-JUL-19
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	09-JUL-19
Boron (B)-Total			<0.010		mg/L		0.01	09-JUL-19
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	09-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4701850								
WG3100205-1 MB								
Calcium (Ca)-Total			<0.050		mg/L		0.05	09-JUL-19
Chromium (Cr)-Total			<0.00050		mg/L		0.0005	09-JUL-19
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	09-JUL-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	09-JUL-19
Copper (Cu)-Total			<0.0010		mg/L		0.001	09-JUL-19
Iron (Fe)-Total			<0.010		mg/L		0.01	09-JUL-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	09-JUL-19
Lithium (Li)-Total			<0.0010		mg/L		0.001	09-JUL-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	09-JUL-19
Manganese (Mn)-Total			<0.00050		mg/L		0.0005	09-JUL-19
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	09-JUL-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	09-JUL-19
Phosphorus (P)-Total			<0.050		mg/L		0.05	09-JUL-19
Potassium (K)-Total			<0.050		mg/L		0.05	09-JUL-19
Rubidium (Rb)-Total			<0.00020		mg/L		0.0002	09-JUL-19
Selenium (Se)-Total			<0.000050		mg/L		0.00005	09-JUL-19
Silicon (Si)-Total			<0.10		mg/L		0.1	09-JUL-19
Silver (Ag)-Total			<0.000050		mg/L		0.00005	09-JUL-19
Sodium (Na)-Total			<0.050		mg/L		0.05	09-JUL-19
Strontium (Sr)-Total			<0.0010		mg/L		0.001	09-JUL-19
Sulfur (S)-Total			<0.50		mg/L		0.5	09-JUL-19
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	09-JUL-19
Tellurium (Te)-Total			<0.00020		mg/L		0.0002	09-JUL-19
Thorium (Th)-Total			<0.00010		mg/L		0.0001	09-JUL-19
Tin (Sn)-Total			0.00011	B	mg/L		0.0001	09-JUL-19
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	09-JUL-19
Tungsten (W)-Total			<0.00010		mg/L		0.0001	09-JUL-19
Uranium (U)-Total			<0.000010		mg/L		0.00001	09-JUL-19
Vanadium (V)-Total			<0.00050		mg/L		0.0005	09-JUL-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	09-JUL-19
Zirconium (Zr)-Total			<0.00020		mg/L		0.0002	09-JUL-19
WG3100205-5 MS		**WG3100205-6**						
Aluminum (Al)-Total			93.7		%		70-130	09-JUL-19
Antimony (Sb)-Total			99.0		%		70-130	09-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4701850								
WG3100205-5 MS		**WG3100205-6**						
Arsenic (As)-Total			97.5		%		70-130	09-JUL-19
Barium (Ba)-Total			95.2		%		70-130	09-JUL-19
Beryllium (Be)-Total			95.9		%		70-130	09-JUL-19
Bismuth (Bi)-Total			89.9		%		70-130	09-JUL-19
Boron (B)-Total			92.6		%		70-130	09-JUL-19
Cadmium (Cd)-Total			96.7		%		70-130	09-JUL-19
Calcium (Ca)-Total			N/A	MS-B	%		-	09-JUL-19
Chromium (Cr)-Total			94.2		%		70-130	09-JUL-19
Cesium (Cs)-Total			100.1		%		70-130	09-JUL-19
Cobalt (Co)-Total			93.5		%		70-130	09-JUL-19
Copper (Cu)-Total			88.8		%		70-130	09-JUL-19
Iron (Fe)-Total			92.4		%		70-130	09-JUL-19
Lead (Pb)-Total			92.0		%		70-130	09-JUL-19
Lithium (Li)-Total			94.3		%		70-130	09-JUL-19
Magnesium (Mg)-Total			N/A	MS-B	%		-	09-JUL-19
Manganese (Mn)-Total			95.4		%		70-130	09-JUL-19
Molybdenum (Mo)-Total			102.9		%		70-130	09-JUL-19
Nickel (Ni)-Total			88.6		%		70-130	09-JUL-19
Phosphorus (P)-Total			99.1		%		70-130	09-JUL-19
Potassium (K)-Total			N/A	MS-B	%		-	09-JUL-19
Rubidium (Rb)-Total			98.3		%		70-130	09-JUL-19
Selenium (Se)-Total			96.7		%		70-130	09-JUL-19
Silicon (Si)-Total			N/A	MS-B	%		-	09-JUL-19
Silver (Ag)-Total			94.2		%		70-130	09-JUL-19
Sodium (Na)-Total			N/A	MS-B	%		-	09-JUL-19
Strontium (Sr)-Total			N/A	MS-B	%		-	09-JUL-19
Sulfur (S)-Total			N/A	MS-B	%		-	09-JUL-19
Thallium (Tl)-Total			89.5		%		70-130	09-JUL-19
Tellurium (Te)-Total			89.1		%		70-130	09-JUL-19
Thorium (Th)-Total			95.7		%		70-130	09-JUL-19
Tin (Sn)-Total			100.2		%		70-130	09-JUL-19
Titanium (Ti)-Total			98.3		%		70-130	09-JUL-19
Tungsten (W)-Total			95.0		%		70-130	09-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4701850								
WG3100205-5 MS		**WG3100205-6**						
Uranium (U)-Total			99.2		%		70-130	09-JUL-19
Vanadium (V)-Total			100.7		%		70-130	09-JUL-19
Zinc (Zn)-Total			87.6		%		70-130	09-JUL-19
Zirconium (Zr)-Total			100.6		%		70-130	09-JUL-19
NH3-F-WT	**Water**							
Batch R4704649								
WG3100763-11 DUP		**L2303372-1**						
Ammonia, Total (as N)		3.75	3.76		mg/L	0.3	20	10-JUL-19
WG3100763-10 LCS								
Ammonia, Total (as N)			105.1		%		85-115	10-JUL-19
WG3100763-9 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	10-JUL-19
WG3100763-12 MS		**L2303372-1**						
Ammonia, Total (as N)			N/A	MS-B	%		-	10-JUL-19
NO3-IC-WT	**Water**							
Batch R4702730								
WG3099831-10 DUP		**WG3099831-8**						
Nitrate (as N)		0.208	0.192		mg/L	8.1	20	09-JUL-19
WG3099831-7 LCS								
Nitrate (as N)			102.1		%		90-110	09-JUL-19
WG3099831-6 MB								
Nitrate (as N)			<0.020		mg/L		0.02	09-JUL-19
WG3099831-9 MS		**WG3099831-8**						
Nitrate (as N)			94.3		%		75-125	09-JUL-19
P-T-COL-WT	**Water**							
Batch R4703451								
WG3100370-3 DUP		**L2305882-1**						
Phosphorus, Total		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	10-JUL-19
WG3100370-2 LCS								
Phosphorus, Total			102.0		%		80-120	10-JUL-19
WG3100370-1 MB								
Phosphorus, Total			<0.0030		mg/L		0.003	10-JUL-19
WG3100370-4 MS		**L2305882-1**						
Phosphorus, Total			93.8		%		70-130	10-JUL-19
PH-BF	**Water**							

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PH-BF	**Water**							
Batch R4701528								
WG3100337-2 DUP		**L2305805-1**						
pH		6.58	6.59	J	pH units	0.01	0.2	09-JUL-19
WG3100337-1 LCS								
pH			7.01		pH units		6.9-7.1	09-JUL-19
SO4-IC-N-WT	**Water**							
Batch R4702730								
WG3099831-10 DUP		**WG3099831-8**						
Sulfate (SO4)		32.6	32.7		mg/L	0.5	20	09-JUL-19
WG3099831-7 LCS								
Sulfate (SO4)			102.4		%		90-110	09-JUL-19
WG3099831-6 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	09-JUL-19
WG3099831-9 MS		**WG3099831-8**						
Sulfate (SO4)			98.0		%		75-125	09-JUL-19
SOLIDS-TDS-BF	**Water**							
Batch R4701789								
WG3099304-3 DUP		**L2305805-1**						
Total Dissolved Solids		2360	2440		mg/L	3.4	20	09-JUL-19
WG3099304-2 LCS								
Total Dissolved Solids			103.2		%		85-115	09-JUL-19
WG3099304-1 MB								
Total Dissolved Solids			<20		mg/L		20	09-JUL-19
SOLIDS-TSS-BF	**Water**							
Batch R4701468								
WG3099303-3 DUP		**L2305805-1**						
Total Suspended Solids		52.0	58.4		mg/L	12	25	08-JUL-19
WG3099303-2 LCS								
Total Suspended Solids			99.4		%		85-115	08-JUL-19
WG3099303-1 MB								
Total Suspended Solids			<2.0		mg/L		2	08-JUL-19
TKN-WT	**Water**							
Batch R4704933								
WG3100183-3 DUP		**L2300071-1**						
Total Kjeldahl Nitrogen		0.41	0.36		mg/L	13	20	10-JUL-19
WG3100183-2 LCS								
Total Kjeldahl Nitrogen			95.7		%		75-125	10-JUL-19
WG3100183-1 MB								

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TKN-WT	**Water**							
Batch R4704933								
WG3100183-1 MB								
Total Kjeldahl Nitrogen			<0.15		mg/L		0.15	10-JUL-19
WG3100183-4 MS		**L2300071-1**						
Total Kjeldahl Nitrogen			92.0		%		70-130	10-JUL-19
TOC-WT	**Water**							
Batch R4703169								
WG3100605-3 DUP		**L2305882-1**						
Total Organic Carbon		3.65	3.68		mg/L	0.8	20	10-JUL-19
WG3100605-2 LCS								
Total Organic Carbon			102.7		%		80-120	10-JUL-19
WG3100605-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	10-JUL-19
WG3100605-4 MS		**L2305882-1**						
Total Organic Carbon			112.4		%		70-130	10-JUL-19
TURBIDITY-BF	**Water**							
Batch R4701569								
WG3100347-3 DUP		**L2305805-1**						
Turbidity		125	124		NTU	0.8	15	09-JUL-19
WG3100347-2 LCS								
Turbidity			101.0		%		85-115	09-JUL-19
WG3100347-1 MB								
Turbidity			<0.10		NTU		0.1	09-JUL-19

Quality Control Report

Workorder: L2305882 Report Date: 29-JUL-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

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

Sample Parameter Qualifier Definitions:

Qualifier	Description
B	Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

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.

Sunday, July 28, 2019

Rick Hawthorne
ALS Environmental
60 Northland Rd, Unit 1
Waterloo Canada, ON N2V 2B8

Re: ALS Workorder: 1907200
Project Name:
Project Number: L2305882

Dear Mr. Hawthorne:

Two water samples were received from ALS Environmental, on 7/10/2019. The samples were scheduled for the following analysis:

Radium-226

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,

ALS Environmental
Katie M. OBrien
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
AIHA	214884
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280

1907200

Radium-226:

The samples were prepared and analyzed according to the current revision of SOP 783.

All acceptance criteria were met.

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1907200
Client Name: ALS Environmental
Client Project Name:
Client Project Number: L2305882
Client PO Number: L2305882

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
L2305882-1	1907200-1		WATER	08-Jul-19	
L2305882-2	1907200-2		WATER	08-Jul-19	

ALS Environmental

L2305882

WATERLOO

1907200

Subcontract Request Form

Subcontract To:

ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA 2x 1L HDPE

225 COMMERCE DRIVE
FORT COLLINS,CO 80524

NOTES: Please reference on final report and invoice: PO# *L2305882*
ALS requires QC data to be provided with your final results.

Please see enclosed 2 sample(s) in 2 Container(s)

SAMPLE NUMBER	ANALYTICAL REQUIRED	DATE SAMPLED / DUE DATE	Priority Flag
L2305882-1 MS-08		7/ 8/ 2019	E
	Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	7/26/2019	
L2305882-2 MS-0803		7/ 8/ 2019	E
	Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	7/26/2019	

Subcontract Info Contact: Mary-Lynn Pike (519) 886-6910
Analysis and reporting info contact: Rick Hawthorne
60 NORTHLAND ROAD, UNIT 1
WATERLOO,ON N2V 2B8
Phone: (519) 886-6910 Email: Rick.Hawthorne@alsglobal.com

Please email confirmation of receipt to: Rick.Hawthorne@alsglobal.com

Shipped By: _____ Date Shipped: _____

Received By: EWE Date Received: 7/10/19 1445

Verified By: _____ Date Verified: _____

Temperature: _____

Sample Integrity Issues: _____

ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: ALS Waterloo Workorder No: 1907200

Project Manager: KMO Initials: EE Date: 7/10/19

1.	Are airbills / shipping documents present and/or removable?	DROP OFF	YES	NO
2.	Are custody seals on **shipping** containers intact?	NONE	YES	NO *
3.	Are custody seals on **sample** containers intact?	NONE	YES	NO *
4.	Is there a COC (chain-of-custody) present?		YES	NO *
5.	Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)		YES	NO *
6.	Are short-hold samples present?		YES	NO
7.	Are all samples within holding times for the requested analyses?		YES	NO *
8.	Were all sample containers received intact? (not broken or leaking)		YES	NO *
9.	Is there sufficient sample for the requested analyses?		YES	NO *
10.	Are all samples in the proper containers for the requested analyses?		YES	NO *
11.	Are all aqueous samples preserved correctly, if required? (excluding volatiles)	N/A	YES	NO *
12.	Are all aqueous non-preserved samples pH 4-9?	N/A	YES	NO *
13.	Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm (1/4 inch) diameter? (i.e. size of green pea)	N/A	YES	NO
14.	Were the samples shipped on ice?		YES	NO
15.	Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: #1 #3 #4	RAD ONLY	YES	NO

Cooler #:	1							
Temperature (°C):	18.8							
No. of custody seals on cooler:	0							
DOT Survey/ Acceptance Information — External µR/hr reading:	8							
Background µR/hr reading:	10							

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? YES / NO / NA (If no, see Form 008.)

*** Please provide details here for NO responses to gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.**

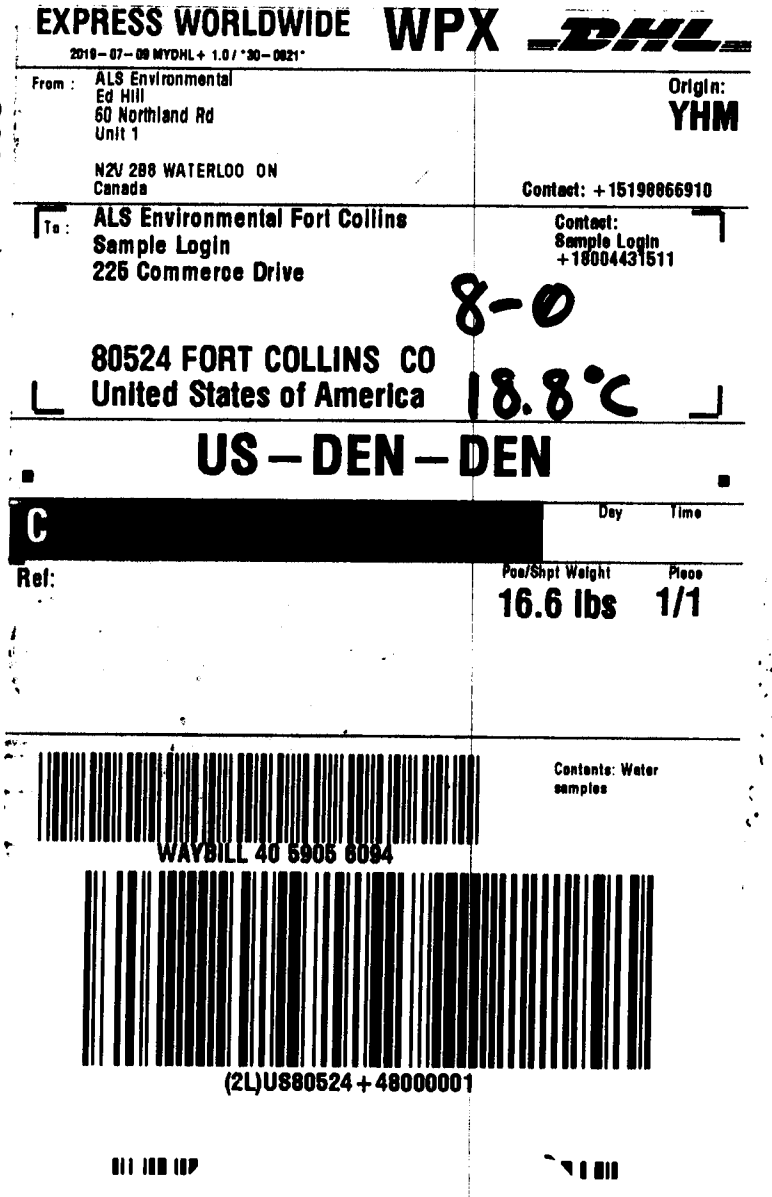
All client bottle ID's vs ALS lab ID's double-checked by: EE

If applicable, was the client contacted? **YES / NO / NA** Contact: _____ Date/Time: _____

Project Manager Signature / Date: 7/11/19

Form 201r27.xls
(02/11/2019)

*IR Gun #1, VWR SN 170560549
*IR Gun #3, VWR SN 170647571
*IR Gun #4, Oakton, SN 2372220101-0002



EXPRESS WORLDWIDE WPX DHL

2019-07-09 MYDHL+ 1.0 / *30-0821*

1907200

From : ALS Environmental
Ed Hill
60 Northland Rd
Unit 1

N2V 2B8 WATERLOO ON
Canada

Origin:
YHM

Contact: +15198666910

To : ALS Environmental Fort Collins
Sample Login
225 Commerce Drive

Contact:
Sample Login
+18004431511

8-0

80524 FORT COLLINS CO
United States of America

18.8°C

US-DEN-DEN

C [redacted] Day Time

Ref:

Pce/Shpt Weight 16.6 lbs

Piece 1/1

Contents: Water samples

WAYBILL 40 5905 6094

(2L)US80524+48000001

Client:	ALS Environmental	**Date:**	*28-Jul-19*
Project:	L2305882	**Work Order:**	1907200
Sample ID:	L2305882-1	**Lab ID:**	1907200-1
Legal Location:		**Matrix:**	WATER
Collection Date:	7/8/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **7/16/2019**		PrepBy: **JXH**
Ra-226	**0.041 (+/- 0.013)**		**0.0049**	**BQ/l**	NA	7/26/2019 13:56
Carr: BARIUM	*98.7*		*40-110*	*%REC*	DL = NA	7/26/2019 13:56

Client:	ALS Environmental	**Date:**	*28-Jul-19*
Project:	L2305882	**Work Order:**	1907200
Sample ID:	L2305882-2	**Lab ID:**	1907200-2
Legal Location:		**Matrix:**	WATER
Collection Date:	7/8/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1			**SOP 783**		Prep Date: **7/16/2019**	PrepBy: **JXH**
Ra-226	0.0032 (+/- 0.0044)	U	0.0071	BQ/l	NA	7/26/2019 13:56
Carr: BARIUM	*97.5*		*40-110*	*%REC*	DL = NA	7/26/2019 13:56

Client:	ALS Environmental	**Date:**	*28-Jul-19*
Project:	L2305882	**Work Order:**	1907200
Sample ID:	L2305882-2	**Lab ID:**	1907200-2
Legal Location:		**Matrix:**	WATER
Collection Date:	7/8/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed

Explanation of Qualifiers

Radiochemistry:

- "Report Limit" is the MDC

U or ND - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

Y2 - Chemical Yield outside default limits.

W - DER is greater than Warning Limit of 1.42

* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.
# - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.
G - Sample density differs by more than 15% of LCS density.
D - DER is greater than Control Limit

M - Requested MDC not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS, Matrix Spike Recovery within control limits.

N - Matrix Spike Recovery outside control limits

NC - Not Calculated for duplicate results less than 5 times MDC

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

Inorganics:

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).

U or ND - Indicates that the compound was analyzed for but not detected.

E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.

M - Duplicate injection precision was not met.

N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.

Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.

* - Duplicate analysis (relative percent difference) not within control limits.

S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

Organics:

U or ND - Indicates that the compound was analyzed for but not detected.

B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.

E - Analyte concentration exceeds the upper level of the calibration range.

J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).

A - A tentatively identified compound is a suspected aldol-condensation product.

X - The analyte was diluted below an accurate quantitation level.

* - The spike recovery is equal to or outside the control criteria used.

+ - The relative percent difference (RPD) equals or exceeds the control criteria.

G - A pattern resembling gasoline was detected in this sample.

D - A pattern resembling diesel was detected in this sample.

M - A pattern resembling motor oil was detected in this sample.

C - A pattern resembling crude oil was detected in this sample.

4 - A pattern resembling JP-4 was detected in this sample.

5 - A pattern resembling JP-5 was detected in this sample.

H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.

L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.

Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
- gasoline
- JP-8
- diesel
- mineral spirits
- motor oil
- Stoddard solvent
- bunker C

QC BATCH REPORT

Batch ID: **RE190716-1-1** Instrument ID **Alpha Scin** Method: **Radium-226 by Radon Emanation**

LCS Sample ID: **RE190716-1** Units: **BQ/l** Analysis Date: **7/26/2019 14:28**

Client ID: Run ID: **RE190716-1A** Prep Date: **7/16/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.79 (+/- 0.446)	0.0221	1.771		101	67-120					P,M3
Carr: BARIUM	16200		16550		98.1	40-110					

LCSD Sample ID: **RE190716-1** Units: **BQ/l** Analysis Date: **7/26/2019 14:28**

Client ID: Run ID: **RE190716-1A** Prep Date: **7/16/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.94 (+/- 0.481)	0.0136	1.771		109	67-120		1.79	0.2	2.1	P,M3
Carr: BARIUM	15900		16550		96.2	40-110		16200			

MB Sample ID: **RE190716-1** Units: **BQ/l** Analysis Date: **7/26/2019 13:56**

Client ID: Run ID: **RE190716-1A** Prep Date: **7/16/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	0.0050 (+/- 0.0055)	0.0083									U
Carr: BARIUM	16300		16550		98.4	40-110					

The following samples were analyzed in this batch: 1907200-1 1907200-2

AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

TOXICITY TEST REPORT

Daphnia magna
EPS 1/RM/14

Work Order : 239668
Sample Number : 59794

SAMPLE IDENTIFICATION

Company :	ALS Laboratory Group, Waterloo	Date Collected :	2019-07-08
Location :	Waterloo ON	Time Collected :	14:50
Job Number :	L2305882	Date Received :	2019-07-09
Substance :	MS-08 (L2305882)	Time Received :	12:15
Sampling Method :	Grab	Temperature on Receipt :	12.0 °C
Sampled By :	KB/BC	Date Tested :	2019-07-09
Sample Description :	Clear, yellow, odourless		

Test Method : Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna* . Environment Canada EPS 1/RM/14 (Second Edition, December 2000, with February 2016 amendments).

48-HOUR TEST RESULTS

Substance	Effect	Value
Control	Mean Immobility	0.0 %
	Mean Mortality	0.0 %
100%	Mean Immobility	0.0 %
	Mean Mortality	0.0 %

The results reported relate only to the sample tested and as received.

TEST ORGANISM

Species :	*Daphnia magna*	Time to First Brood :	7 days
Organism Batch :	Dm19-13	Average Brood Size :	31.1 young
Culture Mortality :	1.5% (previous 7 days)		

TEST CONDITIONS

Sample Treatment :	None	Number of Replicates :	3
pH Adjustment :	None	Organisms / Replicate :	10
Pre-aeration Rate :	~30 mL/min/L	Organisms / Test Level :	30
Pre-aeration Time :	0 minutes	Organism Loading Rate :	15.0 mL/organism
Test Aeration :	None	Impaired Control Organisms :	0.0%
Hardness Adjustment :	None	Test Method Deviation(s) :	None

REFERENCE TOXICANT DATA

Toxicant :	Sodium Chloride	Historical Mean LC50 :	6.3 g/L
Date Tested :	2019-07-09	Warning Limits (± 2SD) :	5.7 - 7.0 g/L
LC50 :	6.5 g/L	Organism Batch :	Dm19-13
95% Confidence Limits :	6.1 - 7.2 g/L	Analyst(s) :	SV, KP
Statistical Method :	Linear Regression (MLE)		

COMMENTS

All test validity criteria as specified in the test method were satisfied.

Date : 2019-07-15
yyyy-mm-dd

Approved By : *Project Manager*

AQUATOX

TOXICITY TEST REPORT

Daphnia magna

EPS 1/RM/14

Work Order : 239668
Sample Number : 59794

TEST DATA

	pH	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	Temperature (°C)	O_2 Saturation (%)*	Hardness (as $CaCO_3$)
Initial Water Chemistry (100%) :	7.7	7.5	4470	20.0	88	70 mg/L

0 HOURS

Date & Time 2019-07-09 13:25
Analyst(s) : SV/NM (SV)

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O_2	Conductivity	Temperature	O_2 Saturation (%)*	Hardness
100	A	0	0	7.7	7.5	4470	20.0	88	70
100	B	0	0	7.7	7.5	4470	20.0	88	70
100	C	0	0	7.7	7.5	4470	20.0	88	70
Control	A	0	0	8.6	8.7	813	20.0	100	220
Control	B	0	0	8.6	8.7	813	20.0	100	220
Control	C	0	0	8.6	8.7	813	20.0	100	220

Notes:

24 HOURS

Date & Time 2019-07-10 13:25
Analyst(s) : KP

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O_2	Conductivity	Temperature
100	A	–	**	–	–	–	20.0
100	B	–	**	–	–	–	20.0
100	C	–	**	–	–	–	20.0
Control	A	–	0	–	–	–	20.0
Control	B	–	0	–	–	–	20.0
Control	C	–	0	–	–	–	20.0

Notes: **Test organisms in the 100% concentration were not all visible due to settled solids. KP

48 HOURS

Date & Time 2019-07-11 13:25
Analyst(s) : NM (SV)/NK

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O_2	Conductivity	Temperature
100	A	0	0	7.4	8.0	4440	20.0
100	B	0	0	7.4	7.9	4430	20.0
100	C	0	0	7.3	8.1	4470	20.0
Control	A	0	0	8.4	8.2	824	20.0
Control	B	0	0	8.5	8.2	823	20.0
Control	C	0	0	8.5	8.3	823	20.0

Notes:

Number immobile does not include number dead.

– = not measured/not required
* adjusted for temperature and barometric pressure

Test Data Reviewed By : JL
Date : 2019-07-12

AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

TOXICITY TEST REPORT

Rainbow Trout
EPS 1/RM/13

Work Order : 239668
Sample Number : 59794

SAMPLE IDENTIFICATION

Company :	ALS Laboratory Group, Waterloo	Date Collected :	2019-07-08
Location :	Waterloo ON	Time Collected :	14:50
Job Number :	L2305882	Date Received :	2019-07-09
Substance :	MS-08 (L2305882)	Time Received :	12:15
Sampling Method :	Grab	Temperature on Receipt :	12.0 °C
Sampled By :	KB/BC	Date Tested :	2019-07-09
Sample Description :	Clear, yellow, odourless		

Test Method(s) : Reference Method for Determining Acute Lethality of Liquid Effluents to Rainbow Trout. Environment Canada, EPS 1/RM/13 (2nd Edition, December 2000, with May 2007 and February 2016 amendments).

96-HOUR TEST RESULTS

Substance	Effect	Value
Control	Mean Impairment	0.0 %
	Mean Mortality	0.0 %
100%	Mean Impairment	0.0 %
	Mean Mortality	0.0 %

The results reported relate only to the sample tested and as received.

TEST ORGANISM

Test Organism :	*Oncorhynchus mykiss*	Average Fork Length (± 2 SD) :	38.9 mm (±5.1)
Organism Batch :	T19-12	Range of Fork Lengths :	35 - 42 mm
Control Sample Size :	10	Average Wet Weight (± 2 SD) :	0.53 g (±0.22)
Cumulative stock tank mortality rate :	0% (previous 7 days)	Range of Wet Weights :	0.38 - 0.70 g
Control organisms showing stress :	0 (at test completion)	Organism Loading Rate :	0.3 g/L

TEST CONDITIONS

Sample Treatment :	None	Volume Tested (L) :	21
pH Adjustment :	None	Number of Replicates :	1
Test Aeration :	Yes	Organisms Per Replicate :	10
Pre-aeration/Aeration Rate :	6.5 ± 1 mL/min/L	Organisms Per Test Level :	10
Total Pre-Aeration Time :	30 minutes	Test Method Deviation(s) :	None

REFERENCE TOXICANT DATA

Toxicant :	Potassium Chloride	Date Tested :	2019-07-02
Organism Batch :	T19-12	Historical Mean LC50 :	3795 mg/L
LC50 :	3200 mg/L *	Warning Limits (± 2SD) :	3242 - 4442 mg/L
95% Confidence Limits :	2672 - 3581 mg/L	Analyst(s) :	KP, ALC, MDH
Statistical Method :	Linear Regression (MLE)		

COMMENTS

*Note: The reference toxicant test result exceeded the 95% warning limits for historical data. Approximately 5% of the test results would be expected to fall outside the warning limits. No other unusual circumstances were observed and therefore the test result is considered acceptable.

•All test validity criteria as specified in the test method were satisfied.

Date : 2019-07-15
yyyy-mm-dd

Approved By : *Project Manager*

Work Order : 239668
Sample Number : 59794

TEST DATA

	pH	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	Temperature (°C)	O_2 Saturation (%)*
Initial Water Chemistry (100%) :	7.6	7.6	4537	15.5	–
After 30 min pre-aeration :	7.6	9.1	4533	15.5	86

0 HOURS

Date & Time 2019-07-09 14:00
Analyst(s) : TA

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature	O_2 Saturation*
100%	0	0	7.6	9.1	4533	15.5	86
Control	0	0	8.2	9.7	912	14.5	100

Notes:

24 HOURS

Date & Time 2019-07-10 14:00
Analyst(s) : FS

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	7.6	8.5	–	15.0
Control	0	0	–	–	–	15.0

Notes:

48 HOURS

Date & Time 2019-07-11 14:00
Analyst(s) : TA

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	7.4	9.0	–	15.0
Control	0	0	–	–	–	15.0

Notes:

72 HOURS

Date & Time 2019-07-12 14:00
Analyst(s) : TA

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	7.3	9.2	–	15.0
Control	0	0	–	–	–	15.0

Notes:

96 HOURS

Date & Time 2019-07-13 14:00
Analyst(s) : TA

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	7.3	9.3	4559	14.5
Control	0	0	8.2	9.4	856	14.5

Notes:

"–" = not measured/not required
Number impaired does not include number dead.
* adjusted for temperature and barometric pressure

Test Data Reviewed By : FS
Date : 2019-07-15

CHAIN OF CUSTODY RECORD

AQUATOX

AquaTox Work Order No: 239668

Shipping Address: AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, Ontario Canada N0B 2J0

Voice: (519) 763-4412 **Fax:** (519) 763-4419

P.O. Number: 4500057496

Field Sampler Name (print): KB/BC

Signature:

Affiliation: Baffinland Iron Mine / ALS Environmental

Sample Storage (prior to shipping):

Custody Relinquished by: Kendra Button

Date/Time Shipped: 8-Jul-19/ 20:00

Client: ALS Environmental c/o Baffinland Iron Mine

Quote # (2019): 162705399-19

Phone: (519) 886-6910

Fax: (519) 886-9047

Contact: Rick Hawthorne (ALS) / Martina Rendas (Aquatox)

Sample Identification					Analyses Requested									Sample Method and Volume		
Date Collected (yyyy-mm-dd)	Time Collected (e.g. 14:30, 24 hr clock)	Sample Name	AquaTox Sample Number	Temp. on arrival	Rainbow Trout Single Concentration	Rainbow Trout LC50	*Daphnia magna* Single Concentration	*Daphnia magna* LC50	Fathead Minnow Survival & Growth	*Ceriodaphnia dubia* Survival & Reproduction	*Lemna minor* Growth	*Pseudokirchneriella subcapitata* Growth	Other (please specify below)	Grab	Composite	# of Containers and Volume (eg. 2 x 1L, 3 x 10L, etc.)
2019-07-08	14:50	MS-08 (L2305882)	59794	12.0	✓		✓							✓		2 x 10LCarboy

For Lab Use Only

Received By: MV/MJT

Date: 2019-07-09

Time: 12:15

Storage Location:

Storage Temp.(°C)

Please list any special requests or instructions:

Rush TAT w/ Daily updates. PH required.

Report Distribution: bimcore@alsglobal.com, rick.hawthorne@alsglobal.com

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2305882-COFC

COC Number: 15 -

Report To	Contact and company name below will appear on the final report
Company:	Baffinland Iron Mines Corp.
Contact:	Wiliam Bowden and Connor Devereaux
Phone:	647-253-0596 EXT 6016
	Company address below will appear on the final report
Street:	2275 Upper Middle Rd. E., Suite #300
City/Province:	Oakville, ON
Postal Code:	L6H 0C3

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	bimcore@alsglobal.com
Email 2	bimww@alsglobal.com
Email 3	

Confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☐ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
4 day [P4]	☐	1 Business day [E1]	☑
3 day [P3]	☐	Same Day, Weekend or Statutory holiday [E0]	☑
2 day [P2]	☐		

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	
Contact:	

Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	ap@baffinland.com
Email 2	commercial@baffinland.com

Project Information	
ALS Account # / Quote #:	23642 /Q42455
Job #:	MS-08 WT TOX
PO / AFE:	4500057496
LSD:	

Oil and Gas Required Fields (client use)	
AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only): L2305882 AP

ALS Contact: Sampler: KB/BC

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	F/P	BIM-MMER-WT	Group 3	Number of Containers
	MS-08	8-Jul-19	14:50	Water		E0	E1	11
	MS-0803	8-Jul-19	14:50	Water		E0		9

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☑ NO	
Are samples for human drinking water use? ☐ YES ☑ NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			13.3		

SHIPMENT RELEASE (client use)		
Released by: Kendra Button	Date: 8-Jul-19	Time: 3:55

INITIAL SHIPMENT RECEPTION (lab use only)		
Received by:	Date:	Time:

FINAL SHIPMENT RECEPTION (lab use only)		
Received by: AP	Date: 9-7-19	Time: 10:00

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

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 specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Baffinland Iron Mine's Corporation (Oakville)
ATTN: William Bowden/Connor Devereaux
2275 Upper Middle Rd. E.
Suite #300
Oakville ON L6H 0C3

Date Received: 15-JUL-19
Report Date: 01-AUG-19 10:43 (MT)
Version: FINAL

Client Phone: 647-253-0596

Certificate of Analysis

Lab Work Order #: L2310127

Project P.O. #: 4500057496
Job Reference: MS-08 DEL
C of C Numbers:
Legal Site Desc:

Rick Hawthorne
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2310127-1 MS-08 Sampled By: KB/RH/VP on 15-JUL-19 @ 10:30 Matrix: Water							
Physical Tests							
Conductivity	3340		3.0	umhos/cm		17-JUL-19	R4714307
pH	7.00		0.10	pH units		15-JUL-19	R4712194
Total Suspended Solids	11.1		2.0	mg/L		16-JUL-19	R4712251
Total Dissolved Solids	3480		20	mg/L		16-JUL-19	R4714052
Turbidity	24.3		0.10	NTU		15-JUL-19	R4712200
Anions and Nutrients							
Ammonia, Total (as N)	3.7	DLHC	1.0	mg/L		17-JUL-19	R4713817
Cyanides							
Cyanide, Total	0.0273		0.0020	mg/L		18-JUL-19	R4714741
Total Metals							
Aluminum (Al)-Total	<0.050	DLHC	0.050	mg/L	17-JUL-19	17-JUL-19	R4713288
Antimony (Sb)-Total	<0.0010	DLHC	0.0010	mg/L	17-JUL-19	17-JUL-19	R4713288
Arsenic (As)-Total	<0.0010	DLHC	0.0010	mg/L	17-JUL-19	17-JUL-19	R4713288
Barium (Ba)-Total	0.0232	DLHC	0.0010	mg/L	17-JUL-19	17-JUL-19	R4713288
Beryllium (Be)-Total	<0.0010	DLHC	0.0010	mg/L	17-JUL-19	17-JUL-19	R4713288
Bismuth (Bi)-Total	<0.00050	DLHC	0.00050	mg/L	17-JUL-19	17-JUL-19	R4713288
Boron (B)-Total	<0.10	DLHC	0.10	mg/L	17-JUL-19	17-JUL-19	R4713288
Cadmium (Cd)-Total	<0.000050	DLHC	0.000050	mg/L	17-JUL-19	17-JUL-19	R4713288
Calcium (Ca)-Total	214	DLHC	0.50	mg/L	17-JUL-19	17-JUL-19	R4713288
Cesium (Cs)-Total	<0.00010	DLHC	0.00010	mg/L	17-JUL-19	17-JUL-19	R4713288
Chromium (Cr)-Total	<0.0050	DLHC	0.0050	mg/L	17-JUL-19	17-JUL-19	R4713288
Cobalt (Co)-Total	0.0384	DLHC	0.0010	mg/L	17-JUL-19	17-JUL-19	R4713288
Copper (Cu)-Total	<0.010	DLHC	0.010	mg/L	17-JUL-19	17-JUL-19	R4713288
Iron (Fe)-Total	7.69	DLHC	0.10	mg/L	17-JUL-19	17-JUL-19	R4713288
Lead (Pb)-Total	<0.00050	DLHC	0.00050	mg/L	17-JUL-19	17-JUL-19	R4713288
Lithium (Li)-Total	0.036	DLHC	0.010	mg/L	17-JUL-19	17-JUL-19	R4713288
Magnesium (Mg)-Total	455	DLHC	0.050	mg/L	17-JUL-19	17-JUL-19	R4713288
Manganese (Mn)-Total	7.40	DLHC	0.0050	mg/L	17-JUL-19	17-JUL-19	R4713288
Molybdenum (Mo)-Total	<0.00050	DLHC	0.00050	mg/L	17-JUL-19	17-JUL-19	R4713288
Nickel (Ni)-Total	0.0394	DLHC	0.0050	mg/L	17-JUL-19	17-JUL-19	R4713288
Phosphorus (P)-Total	<0.50	DLHC	0.50	mg/L	17-JUL-19	17-JUL-19	R4713288
Potassium (K)-Total	5.51	DLHC	0.50	mg/L	17-JUL-19	17-JUL-19	R4713288
Rubidium (Rb)-Total	0.0079	DLHC	0.0020	mg/L	17-JUL-19	17-JUL-19	R4713288
Selenium (Se)-Total	0.00465	DLHC	0.00050	mg/L	17-JUL-19	17-JUL-19	R4713288
Silicon (Si)-Total	<1.0	DLHC	1.0	mg/L	17-JUL-19	17-JUL-19	R4713288
Silver (Ag)-Total	<0.00050	DLHC	0.00050	mg/L	17-JUL-19	17-JUL-19	R4713288
Sodium (Na)-Total	3.33	DLHC	0.50	mg/L	17-JUL-19	17-JUL-19	R4713288
Strontium (Sr)-Total	0.426	DLHC	0.010	mg/L	17-JUL-19	17-JUL-19	R4713288
Sulfur (S)-Total	861	DLHC	5.0	mg/L	17-JUL-19	17-JUL-19	R4713288
Tellurium (Te)-Total	<0.0020	DLHC	0.0020	mg/L	17-JUL-19	17-JUL-19	R4713288
Thallium (Tl)-Total	0.00011	DLHC	0.00010	mg/L	17-JUL-19	17-JUL-19	R4713288
Thorium (Th)-Total	<0.0010	DLHC	0.0010	mg/L	17-JUL-19	17-JUL-19	R4713288

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2310127-1 MS-08 Sampled By: KB/RH/VP on 15-JUL-19 @ 10:30 Matrix: Water							
Total Metals							
Tin (Sn)-Total	<0.0010	DLHC	0.0010	mg/L	17-JUL-19	17-JUL-19	R4713288
Titanium (Ti)-Total	<0.0030	DLHC	0.0030	mg/L	17-JUL-19	17-JUL-19	R4713288
Tungsten (W)-Total	<0.0010	DLHC	0.0010	mg/L	17-JUL-19	17-JUL-19	R4713288
Uranium (U)-Total	0.00034	DLHC	0.00010	mg/L	17-JUL-19	17-JUL-19	R4713288
Vanadium (V)-Total	<0.0050	DLHC	0.0050	mg/L	17-JUL-19	17-JUL-19	R4713288
Zinc (Zn)-Total	<0.030	DLHC	0.030	mg/L	17-JUL-19	17-JUL-19	R4713288
Zirconium (Zr)-Total	<0.0020	DLHC	0.0020	mg/L	17-JUL-19	17-JUL-19	R4713288
Radiological Parameters							
Ra-226	0.036		0.0070	Bq/L	24-JUL-19	31-JUL-19	R4734319

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

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Aluminum (Al)-Total	MS-B	L2310127-1
Matrix Spike	Barium (Ba)-Total	MS-B	L2310127-1
Matrix Spike	Boron (B)-Total	MS-B	L2310127-1
Matrix Spike	Calcium (Ca)-Total	MS-B	L2310127-1
Matrix Spike	Iron (Fe)-Total	MS-B	L2310127-1
Matrix Spike	Lithium (Li)-Total	MS-B	L2310127-1
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2310127-1
Matrix Spike	Manganese (Mn)-Total	MS-B	L2310127-1
Matrix Spike	Molybdenum (Mo)-Total	MS-B	L2310127-1
Matrix Spike	Potassium (K)-Total	MS-B	L2310127-1
Matrix Spike	Rubidium (Rb)-Total	MS-B	L2310127-1
Matrix Spike	Silicon (Si)-Total	MS-B	L2310127-1
Matrix Spike	Sodium (Na)-Total	MS-B	L2310127-1
Matrix Spike	Strontium (Sr)-Total	MS-B	L2310127-1
Matrix Spike	Sulfur (S)-Total	MS-B	L2310127-1
Matrix Spike	Titanium (Ti)-Total	MS-B	L2310127-1
Matrix Spike	Uranium (U)-Total	MS-B	L2310127-1
Matrix Spike	Zinc (Zn)-Total	MS-B	L2310127-1

Sample Parameter Qualifier key listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
CN-TOT-WT	Water	Cyanide, Total	ISO 14403-2

Total cyanide is determined by the combination of UV digestion and distillation. Cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

When using this method, high levels of thiocyanate in samples can cause false positives at ~1-2% of the thiocyanate concentration. For samples with detectable cyanide analyzed by this method, ALS recommends analysis for thiocyanate to check for this potential interference

EC-SCREEN-WT	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

EC-WT	Water	Conductivity	APHA 2510 B

Water samples can be measured directly by immersing the conductivity cell into the sample.

MET-T-CCMS-WT	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

NH3-F-WT	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

PH-BF	Water	pH	APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

RA226-MMER-FC	Water	Ra226 by Alpha Scint, MDC=0.01 Bq/L	EPA 903.1
SOLIDS-TDS-BF	Water	Total Dissolved Solids	APHA 2540C

A well-mixed sample is filtered though glass fibres filter. A known volume of the filtrate is evaporated and dried at 180 +/- 2C for 1hr.

SOLIDS-TSS-BF	Water	Suspended solids	APHA 2540 D-Gravimetric

Reference Information

A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104 +/- 1C for a minimum of four hours or until a constant weight is achieved.

TURBIDITY-BF Water Turbidity APHA 2130 B

Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.

** 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
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA
FC	ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
BF	ALS ENVIRONMENTAL - BAFFIN ISLAND, NUNAVUT, 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 weight of sample
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: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CN-TOT-WT	**Water**							
Batch R4714741								
WG3108857-3 DUP		**L2308851-1**						
Cyanide, Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	18-JUL-19
WG3108857-2 LCS								
Cyanide, Total			95.3		%		80-120	18-JUL-19
WG3108857-1 MB								
Cyanide, Total			<0.0020		mg/L		0.002	18-JUL-19
WG3108857-4 MS		**L2308851-1**						
Cyanide, Total			81.8		%		70-130	18-JUL-19
EC-WT	**Water**							
Batch R4714307								
WG3107794-4 DUP		**WG3107794-3**						
Conductivity		2390	2390		umhos/cm	0.0	10	17-JUL-19
WG3107794-2 LCS								
Conductivity			99.9		%		90-110	17-JUL-19
WG3107794-1 MB								
Conductivity			<3.0		umhos/cm		3	17-JUL-19
MET-T-CCMS-WT	**Water**							
Batch R4713288								
WG3107777-4 DUP		**WG3107777-3**						
Aluminum (Al)-Total		<0.050	<0.050	RPD-NA	mg/L	N/A	20	17-JUL-19
Antimony (Sb)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	17-JUL-19
Arsenic (As)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	17-JUL-19
Barium (Ba)-Total		0.0232	0.0229		mg/L	1.0	20	17-JUL-19
Beryllium (Be)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	17-JUL-19
Bismuth (Bi)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	17-JUL-19
Boron (B)-Total		<0.10	<0.10	RPD-NA	mg/L	N/A	20	17-JUL-19
Cadmium (Cd)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	17-JUL-19
Calcium (Ca)-Total		214	213		mg/L	0.4	20	17-JUL-19
Chromium (Cr)-Total		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	17-JUL-19
Cesium (Cs)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	17-JUL-19
Cobalt (Co)-Total		0.0384	0.0383		mg/L	0.4	20	17-JUL-19
Copper (Cu)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	17-JUL-19
Iron (Fe)-Total		7.69	7.57		mg/L	1.6	20	17-JUL-19
Lead (Pb)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	17-JUL-19
Lithium (Li)-Total		0.036	0.036		mg/L	0.0	20	17-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
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Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4713288								
WG3107777-4 DUP		**WG3107777-3**						
Magnesium (Mg)-Total		455	447		mg/L	1.7	20	17-JUL-19
Manganese (Mn)-Total		7.40	7.34		mg/L	0.9	20	17-JUL-19
Molybdenum (Mo)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	17-JUL-19
Nickel (Ni)-Total		0.0394	0.0392		mg/L	0.6	20	17-JUL-19
Phosphorus (P)-Total		<0.50	<0.50	RPD-NA	mg/L	N/A	20	17-JUL-19
Potassium (K)-Total		5.51	5.41		mg/L	1.8	20	17-JUL-19
Rubidium (Rb)-Total		0.0079	0.0077		mg/L	2.2	20	17-JUL-19
Selenium (Se)-Total		0.00465	0.00478		mg/L	2.9	20	17-JUL-19
Silicon (Si)-Total		<1.0	<1.0	RPD-NA	mg/L	N/A	20	17-JUL-19
Silver (Ag)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	17-JUL-19
Sodium (Na)-Total		3.33	3.28		mg/L	1.5	20	17-JUL-19
Strontium (Sr)-Total		0.426	0.430		mg/L	1.0	20	17-JUL-19
Sulfur (S)-Total		861	842		mg/L	2.2	25	17-JUL-19
Thallium (Tl)-Total		0.00011	0.00010		mg/L	6.9	20	17-JUL-19
Tellurium (Te)-Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	17-JUL-19
Thorium (Th)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	25	17-JUL-19
Tin (Sn)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	17-JUL-19
Titanium (Ti)-Total		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	17-JUL-19
Tungsten (W)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	17-JUL-19
Uranium (U)-Total		0.00034	0.00032		mg/L	4.5	20	17-JUL-19
Vanadium (V)-Total		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	17-JUL-19
Zinc (Zn)-Total		<0.030	<0.030	RPD-NA	mg/L	N/A	20	17-JUL-19
Zirconium (Zr)-Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	17-JUL-19
WG3107777-2 LCS								
Aluminum (Al)-Total			97.8		%		80-120	17-JUL-19
Antimony (Sb)-Total			97.9		%		80-120	17-JUL-19
Arsenic (As)-Total			94.0		%		80-120	17-JUL-19
Barium (Ba)-Total			95.0		%		80-120	17-JUL-19
Beryllium (Be)-Total			94.6		%		80-120	17-JUL-19
Bismuth (Bi)-Total			95.4		%		80-120	17-JUL-19
Boron (B)-Total			95.8		%		80-120	17-JUL-19
Cadmium (Cd)-Total			96.0		%		80-120	17-JUL-19
Calcium (Ca)-Total			94.7		%		80-120	17-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4713288								
WG3107777-2 LCS								
Chromium (Cr)-Total			95.0		%		80-120	17-JUL-19
Cesium (Cs)-Total			96.0		%		80-120	17-JUL-19
Cobalt (Co)-Total			92.8		%		80-120	17-JUL-19
Copper (Cu)-Total			93.1		%		80-120	17-JUL-19
Iron (Fe)-Total			96.4		%		80-120	17-JUL-19
Lead (Pb)-Total			96.4		%		80-120	17-JUL-19
Lithium (Li)-Total			92.3		%		80-120	17-JUL-19
Magnesium (Mg)-Total			96.7		%		80-120	17-JUL-19
Manganese (Mn)-Total			97.8		%		80-120	17-JUL-19
Molybdenum (Mo)-Total			93.2		%		80-120	17-JUL-19
Nickel (Ni)-Total			93.8		%		80-120	17-JUL-19
Phosphorus (P)-Total			96.4		%		70-130	17-JUL-19
Potassium (K)-Total			96.5		%		80-120	17-JUL-19
Rubidium (Rb)-Total			100.1		%		80-120	17-JUL-19
Selenium (Se)-Total			94.6		%		80-120	17-JUL-19
Silicon (Si)-Total			100.4		%		60-140	17-JUL-19
Silver (Ag)-Total			94.4		%		80-120	17-JUL-19
Sodium (Na)-Total			95.8		%		80-120	17-JUL-19
Strontium (Sr)-Total			95.1		%		80-120	17-JUL-19
Sulfur (S)-Total			96.7		%		80-120	17-JUL-19
Thallium (Tl)-Total			96.7		%		80-120	17-JUL-19
Tellurium (Te)-Total			92.9		%		80-120	17-JUL-19
Thorium (Th)-Total			96.1		%		70-130	17-JUL-19
Tin (Sn)-Total			95.0		%		80-120	17-JUL-19
Titanium (Ti)-Total			95.8		%		80-120	17-JUL-19
Tungsten (W)-Total			95.6		%		80-120	17-JUL-19
Uranium (U)-Total			95.2		%		80-120	17-JUL-19
Vanadium (V)-Total			95.9		%		80-120	17-JUL-19
Zinc (Zn)-Total			94.4		%		80-120	17-JUL-19
Zirconium (Zr)-Total			90.2		%		80-120	17-JUL-19
WG3107777-1 MB								
Aluminum (Al)-Total			<0.0050		mg/L		0.005	17-JUL-19
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	17-JUL-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	17-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4713288								
WG3107777-1 MB								
Barium (Ba)-Total			<0.00010		mg/L		0.0001	17-JUL-19
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	17-JUL-19
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	17-JUL-19
Boron (B)-Total			<0.010		mg/L		0.01	17-JUL-19
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	17-JUL-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	17-JUL-19
Chromium (Cr)-Total			<0.00050		mg/L		0.0005	17-JUL-19
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	17-JUL-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	17-JUL-19
Copper (Cu)-Total			<0.0010		mg/L		0.001	17-JUL-19
Iron (Fe)-Total			<0.010		mg/L		0.01	17-JUL-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	17-JUL-19
Lithium (Li)-Total			<0.0010		mg/L		0.001	17-JUL-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	17-JUL-19
Manganese (Mn)-Total			<0.00050		mg/L		0.0005	17-JUL-19
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	17-JUL-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	17-JUL-19
Phosphorus (P)-Total			<0.050		mg/L		0.05	17-JUL-19
Potassium (K)-Total			<0.050		mg/L		0.05	17-JUL-19
Rubidium (Rb)-Total			<0.00020		mg/L		0.0002	17-JUL-19
Selenium (Se)-Total			<0.000050		mg/L		0.00005	17-JUL-19
Silicon (Si)-Total			<0.10		mg/L		0.1	17-JUL-19
Silver (Ag)-Total			<0.000050		mg/L		0.00005	17-JUL-19
Sodium (Na)-Total			<0.050		mg/L		0.05	17-JUL-19
Strontium (Sr)-Total			<0.0010		mg/L		0.001	17-JUL-19
Sulfur (S)-Total			<0.50		mg/L		0.5	17-JUL-19
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	17-JUL-19
Tellurium (Te)-Total			<0.00020		mg/L		0.0002	17-JUL-19
Thorium (Th)-Total			<0.00010		mg/L		0.0001	17-JUL-19
Tin (Sn)-Total			<0.00010		mg/L		0.0001	17-JUL-19
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	17-JUL-19
Tungsten (W)-Total			<0.00010		mg/L		0.0001	17-JUL-19
Uranium (U)-Total			<0.000010		mg/L		0.00001	17-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
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Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4713288								
WG3107777-1 MB								
Vanadium (V)-Total			<0.00050		mg/L		0.0005	17-JUL-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	17-JUL-19
Zirconium (Zr)-Total			<0.00020		mg/L		0.0002	17-JUL-19
WG3107777-5 MS		**WG3107777-6**						
Aluminum (Al)-Total			N/A	MS-B	%		-	17-JUL-19
Antimony (Sb)-Total			98.4		%		70-130	17-JUL-19
Arsenic (As)-Total			96.2		%		70-130	17-JUL-19
Barium (Ba)-Total			N/A	MS-B	%		-	17-JUL-19
Beryllium (Be)-Total			93.5		%		70-130	17-JUL-19
Bismuth (Bi)-Total			91.6		%		70-130	17-JUL-19
Boron (B)-Total			N/A	MS-B	%		-	17-JUL-19
Cadmium (Cd)-Total			94.2		%		70-130	17-JUL-19
Calcium (Ca)-Total			N/A	MS-B	%		-	17-JUL-19
Chromium (Cr)-Total			96.3		%		70-130	17-JUL-19
Cesium (Cs)-Total			98.9		%		70-130	17-JUL-19
Cobalt (Co)-Total			94.2		%		70-130	17-JUL-19
Copper (Cu)-Total			90.2		%		70-130	17-JUL-19
Iron (Fe)-Total			N/A	MS-B	%		-	17-JUL-19
Lead (Pb)-Total			93.3		%		70-130	17-JUL-19
Lithium (Li)-Total			N/A	MS-B	%		-	17-JUL-19
Magnesium (Mg)-Total			N/A	MS-B	%		-	17-JUL-19
Manganese (Mn)-Total			N/A	MS-B	%		-	17-JUL-19
Molybdenum (Mo)-Total			N/A	MS-B	%		-	17-JUL-19
Nickel (Ni)-Total			93.2		%		70-130	17-JUL-19
Phosphorus (P)-Total			106.9		%		70-130	17-JUL-19
Potassium (K)-Total			N/A	MS-B	%		-	17-JUL-19
Rubidium (Rb)-Total			N/A	MS-B	%		-	17-JUL-19
Selenium (Se)-Total			99.1		%		70-130	17-JUL-19
Silicon (Si)-Total			N/A	MS-B	%		-	17-JUL-19
Silver (Ag)-Total			92.4		%		70-130	17-JUL-19
Sodium (Na)-Total			N/A	MS-B	%		-	17-JUL-19
Strontium (Sr)-Total			N/A	MS-B	%		-	17-JUL-19
Sulfur (S)-Total			N/A	MS-B	%		-	17-JUL-19
Thallium (Tl)-Total			94.4		%		70-130	17-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4713288								
WG3107777-5 MS		**WG3107777-6**						
Tellurium (Te)-Total			87.7		%		70-130	17-JUL-19
Thorium (Th)-Total			97.3		%		70-130	17-JUL-19
Tin (Sn)-Total			96.0		%		70-130	17-JUL-19
Titanium (Ti)-Total			N/A	MS-B	%		-	17-JUL-19
Tungsten (W)-Total			94.5		%		70-130	17-JUL-19
Uranium (U)-Total			N/A	MS-B	%		-	17-JUL-19
Vanadium (V)-Total			99.0		%		70-130	17-JUL-19
Zinc (Zn)-Total			N/A	MS-B	%		-	17-JUL-19
Zirconium (Zr)-Total			95.6		%		70-130	17-JUL-19
NH3-F-WT	**Water**							
Batch R4713817								
WG3107468-20 DUP		**L2308451-1**						
Ammonia, Total (as N)		0.026	0.026		mg/L	2.3	20	17-JUL-19
WG3107468-18 LCS								
Ammonia, Total (as N)			104.2		%		85-115	17-JUL-19
WG3107468-17 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	17-JUL-19
WG3107468-19 MS		**L2308451-1**						
Ammonia, Total (as N)			97.3		%		75-125	17-JUL-19
PH-BF	**Water**							
Batch R4712194								
WG3105838-2 DUP		**L2310127-1**						
pH		7.00	7.01	J	pH units	0.01	0.2	15-JUL-19
WG3105838-1 LCS								
pH			7.03		pH units		6.9-7.1	15-JUL-19
SOLIDS-TDS-BF	**Water**							
Batch R4714052								
WG3105892-3 DUP		**L2311062-1**						
Total Dissolved Solids		387	394		mg/L	1.9	20	16-JUL-19
WG3105892-2 LCS								
Total Dissolved Solids			103.8		%		85-115	16-JUL-19
WG3105892-1 MB								
Total Dissolved Solids			<20		mg/L		20	16-JUL-19
SOLIDS-TSS-BF	**Water**							

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SOLIDS-TSS-BF	**Water**							
Batch R4712251								
WG3105881-3 DUP		**L2310127-1**						
Total Suspended Solids		11.1	11.1		mg/L	0.0	25	16-JUL-19
WG3105881-2 LCS								
Total Suspended Solids			98.6		%		85-115	16-JUL-19
WG3105881-1 MB								
Total Suspended Solids			<2.0		mg/L		2	16-JUL-19
TURBIDITY-BF	**Water**							
Batch R4712200								
WG3105843-3 DUP		**L2310139-4**						
Turbidity		0.31	0.27		NTU	14	15	15-JUL-19
WG3105843-2 LCS								
Turbidity			106.0		%		85-115	15-JUL-19
WG3105843-1 MB								
Turbidity			<0.10		NTU		0.1	15-JUL-19

Quality Control Report

Workorder: L2310127 Report Date: 01-AUG-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

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

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

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.

Wednesday, July 31, 2019

Rick Hawthorne
ALS Environmental
60 Northland Rd, Unit 1
Waterloo Canada, ON N2V 2B8

Re: ALS Workorder: 1907376
Project Name:
Project Number: L2310127

Dear Mr. Hawthorne:

One water sample was received from ALS Environmental, on 7/18/2019. The sample was scheduled for the following analysis:

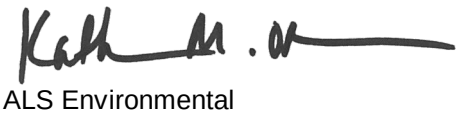
Radium-226

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,



ALS Environmental
Katie M. OBrien
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
AIHA	214884
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280

1907376

Radium-226:

The sample was prepared and analyzed according to the current revision of SOP 783.

All acceptance criteria were met.

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1907376
Client Name: ALS Environmental
Client Project Name:
Client Project Number: L2310127
Client PO Number: L2310127

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
L2310127-1	1907376-1		WATER	15-Jul-19	

ALS Environmental

L2310127

1907376

WATERLOO

Subcontract Request Form

Subcontract To:

ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
225 COMMERCE DRIVE
FORT COLLINS,CO 80524

NOTES: Please reference on final report and invoice: PO# *L2310127*
ALS requires QC data to be provided with your final results.

Please see enclosed 1 **sample(s) in** 1 **Container(s)**

SAMPLE NUMBER	ANALYTICAL REQUIRED	DATE SAMPLED / DUE DATE	Priority Flag
L2310127-1 MS-08		7/ 15/ 2019	E
	Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	8/2/2019	

Subcontract Info Contact: Mary-Lynn Pike (519) 886-6910
Analysis and reporting info contact: Rick Hawthorne
60 NORTHLAND ROAD, UNIT 1
WATERLOO,ON N2V 2B8
Phone: (519) 886-6910 Email: Rick.Hawthorne@alsglobal.com

Please email confirmation of receipt to: **Rick.Hawthorne@alsglobal.com**

Shipped By: _____ Date Shipped: _____
Received By: Emily Lyons Date Received: 07.18.19 1340
Verified By: _____ Date Verified: _____
Temperature: _____

Sample Integrity Issues: _____

ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: ALS Waterloo Workorder No: 1907376

Project Manager: KMO Initials: EE Date: 7/19/19

1.	Are airbills / shipping documents present and/or removable?	DROP OFF	(YES)	NO
2.	Are custody seals on **shipping** containers intact?	(NONE)	YES	NO *
3.	Are custody seals on **sample** containers intact?	(NONE)	YES	NO *
4.	Is there a COC (chain-of-custody) present?		(YES)	NO *
5.	Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)		(YES)	NO *
6.	Are short-hold samples present?		YES	(NO)
7.	Are all samples within holding times for the requested analyses?		(YES)	NO *
8.	Were all sample containers received intact? (not broken or leaking)		(YES)	NO *
9.	Is there sufficient sample for the requested analyses?		(YES)	NO *
10.	Are all samples in the proper containers for the requested analyses?		(YES)	NO *
11.	Are all aqueous samples preserved correctly, if required? (excluding volatiles)	N/A	(YES)	NO *
12.	Are all aqueous non-preserved samples pH 4-9?	(N/A)	YES	NO *
13.	Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm (1/4 inch) diameter? (i.e. size of green pea)	(N/A)	YES	NO
14.	Were the samples shipped on ice?		(YES)	NO
15.	Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: #1 #3 #4	RAD ONLY	YES	(NO)

Cooler #:	1							
Temperature (°C):	9.2							
No. of custody seals on cooler:	6							
DOT Survey/ Acceptance Information — External µR/hr reading:	8							
Background µR/hr reading:	9							

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? (YES) / NO / NA (If no, see Form 008.)

*** Please provide details here for NO responses to gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.**

All client bottle ID's vs ALS lab ID's double-checked by: EE

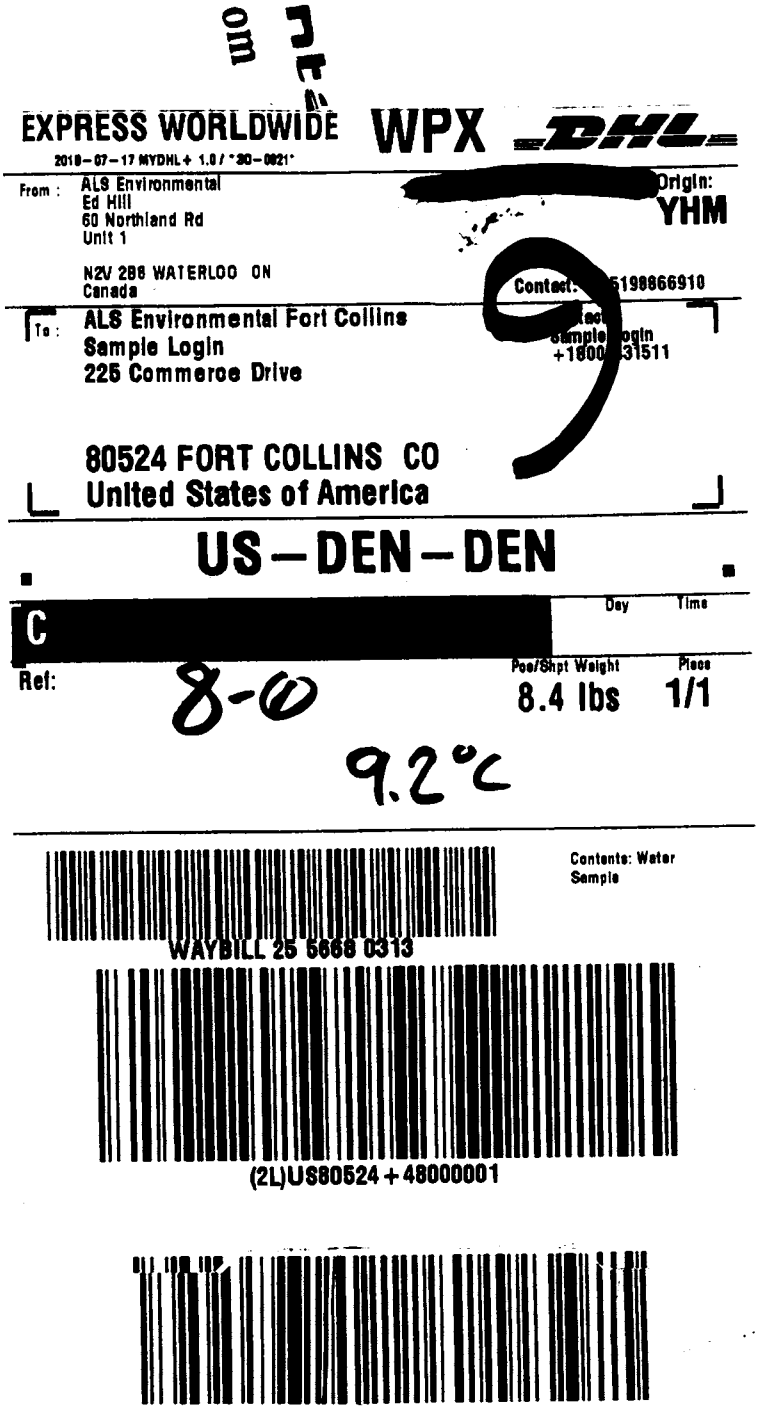
If applicable, was the client contacted? **YES / NO / NA** Contact: _____ Date/Time: _____

Project Manager Signature / Date: 7/19/19

Form 201r27.xls
(02/11/2019)

*IR Gun #1, VWR SN 170560549
*IR Gun #3, VWR SN 170647571
*IR Gun #4, Oakton, SN 2372220101-0002

1907376


EXPRESS WORLDWIDE
WPX
DHL
2018-07-17 MYDHL+ 1.0 / *3G-0021*
From : ALS Environmental
Ed Hill
60 Northland Rd
Unit 1
N2V 2B8 WATERLOO ON
Canada
Origin:
YHM
Contact: 5198866910
To : ALS Environmental Fort Collins
Sample Login
225 Commerce Drive
80524 FORT COLLINS CO
United States of America
US-DEN-DEN
C
Day
Time
Ref:
8-0
Pce/Shpt Weight
8.4 lbs
Piece
1/1
9.2°C
Contents: Water Sample
WAYBILL 25 5668 0313
(2L)US80524+48000001

Client:	ALS Environmental	**Date:**	*31-Jul-19*
Project:	L2310127	**Work Order:**	1907376
Sample ID:	L2310127-1	**Lab ID:**	1907376-1
Legal Location:		**Matrix:**	WATER
Collection Date:	7/15/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **7/24/2019**		PrepBy: **JXH**
Ra-226	**0.036 (+/- 0.013)**		**0.007**	**BQ/l**	NA	7/31/2019 12:07
Carr: BARIUM	*99.3*		*40-110*	*%REC*	DL = NA	7/31/2019 12:07

Client:	ALS Environmental	**Date:**	*31-Jul-19*
Project:	L2310127	**Work Order:**	1907376
Sample ID:	L2310127-1	**Lab ID:**	1907376-1
Legal Location:		**Matrix:**	WATER
Collection Date:	7/15/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed

Explanation of Qualifiers

Radiochemistry:

- "Report Limit" is the MDC

U or ND - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

Y2 - Chemical Yield outside default limits.

W - DER is greater than Warning Limit of 1.42

* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.
# - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.
G - Sample density differs by more than 15% of LCS density.
D - DER is greater than Control Limit

M - Requested MDC not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS, Matrix Spike Recovery within control limits.

N - Matrix Spike Recovery outside control limits

NC - Not Calculated for duplicate results less than 5 times MDC

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

Inorganics:

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).

U or ND - Indicates that the compound was analyzed for but not detected.

E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.

M - Duplicate injection precision was not met.

N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.

Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.

* - Duplicate analysis (relative percent difference) not within control limits.

S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

Organics:

U or ND - Indicates that the compound was analyzed for but not detected.

B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.

E - Analyte concentration exceeds the upper level of the calibration range.

J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).

A - A tentatively identified compound is a suspected aldol-condensation product.

X - The analyte was diluted below an accurate quantitation level.

* - The spike recovery is equal to or outside the control criteria used.

+ - The relative percent difference (RPD) equals or exceeds the control criteria.

G - A pattern resembling gasoline was detected in this sample.

D - A pattern resembling diesel was detected in this sample.

M - A pattern resembling motor oil was detected in this sample.

C - A pattern resembling crude oil was detected in this sample.

4 - A pattern resembling JP-4 was detected in this sample.

5 - A pattern resembling JP-5 was detected in this sample.

H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.

L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.

Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
- gasoline
- JP-8
- diesel
- mineral spirits
- motor oil
- Stoddard solvent
- bunker C

QC BATCH REPORT

Batch ID: **RE190724-1-1** Instrument ID **Alpha Scin** Method: **Radium-226 by Radon Emanation**

LCS Sample ID: **RE190724-1** Units: **BQ/l** Analysis Date: **7/31/2019 13:28**

Client ID: Run ID: **RE190724-1A** Prep Date: **7/24/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.83 (+/- 0.457)	0.0116	1.771		103	67-120					P,M3
Carr: BARIUM	16100		16310		98.5	40-110					

LCSD Sample ID: **RE190724-1** Units: **BQ/l** Analysis Date: **7/31/2019 13:28**

Client ID: Run ID: **RE190724-1A** Prep Date: **7/24/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.84 (+/- 0.458)	0.0166	1.771		104	67-120		1.83	0.008	2.1	P,M3
Carr: BARIUM	16100		16310		98.7	40-110		16100			

MB Sample ID: **RE190724-1** Units: **BQ/l** Analysis Date: **7/31/2019 12:52**

Client ID: Run ID: **RE190724-1A** Prep Date: **7/24/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	0.0029 (+/- 0.0043)	0.0072									U
Carr: BARIUM	15900		16310		97.5	40-110					

The following samples were analyzed in this batch: 1907376-1

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2310127-COFC

COC Number: 15 -

Report To	Contact and company name below will appear on the final report
Company:	Baffinland Iron Mines Corp.
Contact:	Wiliam Bowden and Connor Devereaux
Phone:	647-253-0596 EXT 6016
	Company address below will appear on the final report
Street:	2275 Upper Middle Rd. E., Suite #300
City/Province:	Oakville, ON
Postal Code:	L6H 0C3
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	
Contact:	

Report For	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	bimcore@alsglobal.com
Email 2	
Email 3	

Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	ap@baffinland.com
Email 2	commercial@baffinland.com

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	23642 /Q42455	AFE/Cost Center:	PO#
Job #:	MS-08 DEL	Major/Minor Code:	Routing Code:
PO / AFE:	4500057496	Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (lab use only)	L2310127	ALS Contact:	Sampler: KB/RH/VP

Please select the service level below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☐ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
4 day [P4]	☐	1 Business day [E1]	☐
3 day [P3]	☐	Same Day, Weekend or Statutory holiday [E0]	☑
2 day [P2]	☐		

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	BIM-MMER-DEL	Number of Containers
1	MS-08	15-Jul-19	10:30	Water	E0	6

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human drinking water use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C		FINAL COOLER TEMPERATURES °C	
	4C	12.6	

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released By: Kendra Button	Date: 15-Jul-19	Time: 11:50	Received by: AJ	Date: July 15, 2019	Time: 12pm	Received by: AP	Date: 17-7-19	Time: 13:15

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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 specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Baffinland Iron Mine's Corporation (Oakville)
ATTN: William Bowden/Connor Devereaux
2275 Upper Middle Rd. E.
Suite #300
Oakville ON L6H 0C3

Date Received: 22-JUL-19
Report Date: 14-AUG-19 10:40 (MT)
Version: FINAL

Client Phone: 647-253-0596

Certificate of Analysis

Lab Work Order #: L2314517

Project P.O. #: 4500057496
Job Reference: MS-08 EFF CHARACTERIZATION - REFERENCE AND EXPOSURE
C of C Numbers:
Legal Site Desc:

Rick Hawthorne
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2314517-1 MS-08-DS Sampled By: AM/JB on 22-JUL-19 @ 11:40 Matrix: Water							
Physical Tests							
Conductivity	134		3.0	umhos/cm		24-JUL-19	R4723718
Hardness (as CaCO3)	65.7	HTC	0.50	mg/L		23-JUL-19	
pH	7.92		0.10	pH units		24-JUL-19	R4723718
Total Suspended Solids	3.6		2.0	mg/L	23-JUL-19	24-JUL-19	R4723029
Anions and Nutrients							
Alkalinity, Total (as CaCO3)	58		10	mg/L		24-JUL-19	R4723718
Ammonia, Total (as N)	<0.010		0.010	mg/L		23-JUL-19	R4722609
Chloride (Cl)	3.67		0.50	mg/L		23-JUL-19	R4722912
Fluoride (F)	0.028		0.020	mg/L		23-JUL-19	R4722912
Nitrate (as N)	0.048		0.020	mg/L		23-JUL-19	R4722912
Total Kjeldahl Nitrogen	0.16		0.15	mg/L	23-JUL-19	24-JUL-19	R4723722
Phosphorus, Total	0.0128		0.0030	mg/L	23-JUL-19	24-JUL-19	R4723250
Sulfate (SO4)	9.04		0.30	mg/L		23-JUL-19	R4722912
Organic / Inorganic Carbon							
Dissolved Carbon Filtration Location	LAB					23-JUL-19	R4720855
Dissolved Organic Carbon	2.26		0.50	mg/L	23-JUL-19	23-JUL-19	R4722416
Total Organic Carbon	2.21		0.50	mg/L		23-JUL-19	R4722415
Total Metals							
Aluminum (Al)-Total	0.662		0.0050	mg/L	23-JUL-19	23-JUL-19	R4720938
Antimony (Sb)-Total	<0.00010		0.00010	mg/L	23-JUL-19	23-JUL-19	R4720938
Arsenic (As)-Total	0.00013		0.00010	mg/L	23-JUL-19	23-JUL-19	R4720938
Barium (Ba)-Total	0.0120		0.00010	mg/L	23-JUL-19	23-JUL-19	R4720938
Beryllium (Be)-Total	<0.00010		0.00010	mg/L	23-JUL-19	23-JUL-19	R4720938
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L	23-JUL-19	23-JUL-19	R4720938
Boron (B)-Total	<0.010		0.010	mg/L	23-JUL-19	23-JUL-19	R4720938
Cadmium (Cd)-Total	<0.0000050		0.0000050	mg/L	23-JUL-19	23-JUL-19	R4720938
Calcium (Ca)-Total	13.5		0.050	mg/L	23-JUL-19	23-JUL-19	R4720938
Cesium (Cs)-Total	0.000094		0.000010	mg/L	23-JUL-19	23-JUL-19	R4720938
Chromium (Cr)-Total	0.00138		0.00050	mg/L	23-JUL-19	23-JUL-19	R4720938
Cobalt (Co)-Total	0.00027		0.00010	mg/L	23-JUL-19	23-JUL-19	R4720938
Copper (Cu)-Total	0.0017		0.0010	mg/L	23-JUL-19	23-JUL-19	R4720938
Iron (Fe)-Total	0.591		0.010	mg/L	23-JUL-19	23-JUL-19	R4720938
Lead (Pb)-Total	0.000497		0.000050	mg/L	23-JUL-19	23-JUL-19	R4720938
Lithium (Li)-Total	0.0018		0.0010	mg/L	23-JUL-19	23-JUL-19	R4720938
Magnesium (Mg)-Total	7.76		0.0050	mg/L	23-JUL-19	23-JUL-19	R4720938
Manganese (Mn)-Total	0.00691		0.00050	mg/L	23-JUL-19	23-JUL-19	R4720938
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		24-JUL-19	R4723511
Molybdenum (Mo)-Total	0.000301		0.000050	mg/L	23-JUL-19	23-JUL-19	R4720938
Nickel (Ni)-Total	0.00116		0.00050	mg/L	23-JUL-19	23-JUL-19	R4720938
Phosphorus (P)-Total	<0.050		0.050	mg/L	23-JUL-19	23-JUL-19	R4720938
Potassium (K)-Total	1.21		0.050	mg/L	23-JUL-19	23-JUL-19	R4720938
Rubidium (Rb)-Total	0.00351		0.00020	mg/L	23-JUL-19	23-JUL-19	R4720938

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2314517-1 MS-08-DS Sampled By: AM/JB on 22-JUL-19 @ 11:40 Matrix: Water							
Total Metals							
Selenium (Se)-Total	<0.000050		0.000050	mg/L	23-JUL-19	23-JUL-19	R4720938
Silicon (Si)-Total	2.07		0.10	mg/L	23-JUL-19	23-JUL-19	R4720938
Silver (Ag)-Total	<0.000050		0.000050	mg/L	23-JUL-19	23-JUL-19	R4720938
Sodium (Na)-Total	1.78		0.050	mg/L	23-JUL-19	23-JUL-19	R4720938
Strontium (Sr)-Total	0.0191		0.0010	mg/L	23-JUL-19	23-JUL-19	R4720938
Sulfur (S)-Total	3.21		0.50	mg/L	23-JUL-19	23-JUL-19	R4720938
Tellurium (Te)-Total	<0.00020		0.00020	mg/L	23-JUL-19	23-JUL-19	R4720938
Thallium (Tl)-Total	0.000017		0.000010	mg/L	23-JUL-19	23-JUL-19	R4720938
Thorium (Th)-Total	0.00072		0.00010	mg/L	23-JUL-19	23-JUL-19	R4720938
Tin (Sn)-Total	<0.00010		0.00010	mg/L	23-JUL-19	23-JUL-19	R4720938
Titanium (Ti)-Total	0.0357		0.00030	mg/L	23-JUL-19	23-JUL-19	R4720938
Tungsten (W)-Total	<0.00010		0.00010	mg/L	23-JUL-19	23-JUL-19	R4720938
Uranium (U)-Total	0.00192		0.000010	mg/L	23-JUL-19	23-JUL-19	R4720938
Vanadium (V)-Total	0.00143		0.00050	mg/L	23-JUL-19	23-JUL-19	R4720938
Zinc (Zn)-Total	<0.0030		0.0030	mg/L	23-JUL-19	23-JUL-19	R4720938
Zirconium (Zr)-Total	0.00104		0.00020	mg/L	23-JUL-19	23-JUL-19	R4720938
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					24-JUL-19	R4722248
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	24-JUL-19	24-JUL-19	R4723491
Radiological Parameters							
Ra-226	<0.012	DLRC	0.012	Bq/L	03-AUG-19	13-AUG-19	R4740889
L2314517-2 MS-08-US Sampled By: AM/JB on 22-JUL-19 @ 12:35 Matrix: Water							
Physical Tests							
Conductivity	114		3.0	umhos/cm		24-JUL-19	R4723718
Hardness (as CaCO3)	55.7	HTC	0.50	mg/L		23-JUL-19	
pH	8.00		0.10	pH units		24-JUL-19	R4723718
Total Suspended Solids	2.6		2.0	mg/L	23-JUL-19	24-JUL-19	R4723029
Anions and Nutrients							
Alkalinity, Total (as CaCO3)	57		10	mg/L		24-JUL-19	R4723718
Ammonia, Total (as N)	<0.010		0.010	mg/L		23-JUL-19	R4722609
Chloride (Cl)	2.92		0.50	mg/L		23-JUL-19	R4722912
Fluoride (F)	0.027		0.020	mg/L		23-JUL-19	R4722912
Nitrate (as N)	<0.020		0.020	mg/L		23-JUL-19	R4722912
Total Kjeldahl Nitrogen	0.17		0.15	mg/L	23-JUL-19	24-JUL-19	R4723722
Phosphorus, Total	0.0112		0.0030	mg/L	23-JUL-19	24-JUL-19	R4723250
Sulfate (SO4)	1.42		0.30	mg/L		23-JUL-19	R4722912
Organic / Inorganic Carbon							
Dissolved Carbon Filtration Location	LAB					23-JUL-19	R4720855
Dissolved Organic Carbon	2.30		0.50	mg/L	23-JUL-19	23-JUL-19	R4722416
Total Organic Carbon	4.88		0.50	mg/L		23-JUL-19	R4722415

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2314517-2 MS-08-US Sampled By: AM/JB on 22-JUL-19 @ 12:35 Matrix: Water							
Organic / Inorganic Carbon							
Total Metals							
Aluminum (Al)-Total	0.697		0.0050	mg/L	23-JUL-19	23-JUL-19	R4720938
Antimony (Sb)-Total	<0.00010		0.00010	mg/L	23-JUL-19	23-JUL-19	R4720938
Arsenic (As)-Total	0.00012		0.00010	mg/L	23-JUL-19	23-JUL-19	R4720938
Barium (Ba)-Total	0.0117		0.00010	mg/L	23-JUL-19	23-JUL-19	R4720938
Beryllium (Be)-Total	<0.00010		0.00010	mg/L	23-JUL-19	23-JUL-19	R4720938
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L	23-JUL-19	23-JUL-19	R4720938
Boron (B)-Total	<0.010		0.010	mg/L	23-JUL-19	23-JUL-19	R4720938
Cadmium (Cd)-Total	<0.0000050		0.0000050	mg/L	23-JUL-19	23-JUL-19	R4720938
Calcium (Ca)-Total	11.7		0.050	mg/L	23-JUL-19	23-JUL-19	R4720938
Cesium (Cs)-Total	0.000091		0.000010	mg/L	23-JUL-19	23-JUL-19	R4720938
Chromium (Cr)-Total	0.00127		0.00050	mg/L	23-JUL-19	23-JUL-19	R4720938
Cobalt (Co)-Total	0.00025		0.00010	mg/L	23-JUL-19	23-JUL-19	R4720938
Copper (Cu)-Total	0.0016		0.0010	mg/L	23-JUL-19	23-JUL-19	R4720938
Iron (Fe)-Total	0.567		0.010	mg/L	23-JUL-19	23-JUL-19	R4720938
Lead (Pb)-Total	0.000439		0.000050	mg/L	23-JUL-19	23-JUL-19	R4720938
Lithium (Li)-Total	0.0013		0.0010	mg/L	23-JUL-19	23-JUL-19	R4720938
Magnesium (Mg)-Total	6.43		0.0050	mg/L	23-JUL-19	23-JUL-19	R4720938
Manganese (Mn)-Total	0.00641		0.00050	mg/L	23-JUL-19	23-JUL-19	R4720938
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		24-JUL-19	R4723511
Molybdenum (Mo)-Total	0.000324		0.000050	mg/L	23-JUL-19	23-JUL-19	R4720938
Nickel (Ni)-Total	0.00106		0.00050	mg/L	23-JUL-19	23-JUL-19	R4720938
Phosphorus (P)-Total	<0.050		0.050	mg/L	23-JUL-19	23-JUL-19	R4720938
Potassium (K)-Total	1.20		0.050	mg/L	23-JUL-19	23-JUL-19	R4720938
Rubidium (Rb)-Total	0.00341		0.00020	mg/L	23-JUL-19	23-JUL-19	R4720938
Selenium (Se)-Total	<0.000050		0.000050	mg/L	23-JUL-19	23-JUL-19	R4720938
Silicon (Si)-Total	2.16		0.10	mg/L	23-JUL-19	23-JUL-19	R4720938
Silver (Ag)-Total	<0.000050		0.000050	mg/L	23-JUL-19	23-JUL-19	R4720938
Sodium (Na)-Total	1.76		0.050	mg/L	23-JUL-19	23-JUL-19	R4720938
Strontium (Sr)-Total	0.0130		0.0010	mg/L	23-JUL-19	23-JUL-19	R4720938
Sulfur (S)-Total	<0.50		0.50	mg/L	23-JUL-19	23-JUL-19	R4720938
Tellurium (Te)-Total	<0.00020		0.00020	mg/L	23-JUL-19	23-JUL-19	R4720938
Thallium (Tl)-Total	0.000017		0.000010	mg/L	23-JUL-19	23-JUL-19	R4720938
Thorium (Th)-Total	0.00069		0.00010	mg/L	23-JUL-19	23-JUL-19	R4720938
Tin (Sn)-Total	<0.00010		0.00010	mg/L	23-JUL-19	23-JUL-19	R4720938
Titanium (Ti)-Total	0.0341		0.00030	mg/L	23-JUL-19	23-JUL-19	R4720938
Tungsten (W)-Total	<0.00010		0.00010	mg/L	23-JUL-19	23-JUL-19	R4720938
Uranium (U)-Total	0.00187		0.000010	mg/L	23-JUL-19	23-JUL-19	R4720938
Vanadium (V)-Total	0.00139		0.00050	mg/L	23-JUL-19	23-JUL-19	R4720938
Zinc (Zn)-Total	<0.0030		0.0030	mg/L	23-JUL-19	23-JUL-19	R4720938
Zirconium (Zr)-Total	0.00114		0.00020	mg/L	23-JUL-19	23-JUL-19	R4720938

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2314517-2 MS-08-US Sampled By: AM/JB on 22-JUL-19 @ 12:35 Matrix: Water							
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					24-JUL-19	R4722248
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	24-JUL-19	24-JUL-19	R4723491
Radiological Parameters							
Ra-226	<0.011	DLRC	0.011	Bq/L	03-AUG-19	13-AUG-19	R4740889

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

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Barium (Ba)-Total	MS-B	L2314517-1, -2
Matrix Spike	Calcium (Ca)-Total	MS-B	L2314517-1, -2
Matrix Spike	Iron (Fe)-Total	MS-B	L2314517-1, -2
Matrix Spike	Lithium (Li)-Total	MS-B	L2314517-1, -2
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2314517-1, -2
Matrix Spike	Manganese (Mn)-Total	MS-B	L2314517-1, -2
Matrix Spike	Potassium (K)-Total	MS-B	L2314517-1, -2
Matrix Spike	Rubidium (Rb)-Total	MS-B	L2314517-1, -2
Matrix Spike	Silicon (Si)-Total	MS-B	L2314517-1, -2
Matrix Spike	Sodium (Na)-Total	MS-B	L2314517-1, -2
Matrix Spike	Strontium (Sr)-Total	MS-B	L2314517-1, -2
Matrix Spike	Sulfur (S)-Total	MS-B	L2314517-1, -2

Sample Parameter Qualifier key listed:

Qualifier	Description
DLRC	Detection Limit Raised for RadioChemistry test due to sample matrix (e.g. high TDS) or instrument detector conditions.
HTC	Hardness was calculated from Total Ca and/or Mg concentrations and may be biased high (dissolved Ca/Mg results unavailable).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-WT	Water	Alkalinity, Total (as CaCO3)	EPA 310.2

This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.

CL-IC-N-WT	Water	Chloride by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

DOC-WT	Water	Dissolved Organic Carbon	APHA 5310B

Sample is filtered through a 0.45um filter, then injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic carbon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.

EC-SCREEN-WT	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

EC-WT	Water	Conductivity	APHA 2510 B

Water samples can be measured directly by immersing the conductivity cell into the sample.

F-IC-N-WT	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-WT	Water	Hardness	APHA 2340 B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-WT	Water	Dissolved Mercury in Water by CVAAS	EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

HG-T-CVAA-WT	Water	Total Mercury in Water by CVAAS	EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

MET-T-CCMS-WT	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Reference Information

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

NH3-F-WT	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO3-IC-WT	Water	Nitrate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-COL-WT	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is deteremined colourimetrically after persulphate digestion of the sample.

PH-WT	Water	pH	APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011). Holdtime for samples under this regulation is 28 days

RA226-MMER-FC	Water	Ra226 by Alpha Scint, MDC=0.01 Bq/L	EPA 903.1
SO4-IC-N-WT	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TSS-WT	Water	Suspended solids	APHA 2540 D-Gravimetric

A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104–1°C for a minimum of four hours or until a constant weight is achieved.

TKN-WT	Water	Total Kjeldahl Nitrogen	APHA 4500-Norg D

This analysis is carried out using procedures adapted from APHA Method 4500-Norg "Nitrogen (Organic)". Total Kjeldahl Nitrogen is determined by sample digestion at 380 Celsius with analysis using an automated colorimetric method.

TOC-WT	Water	Total Organic Carbon	APHA 5310B

Sample is injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic cabon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.

** 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
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA
FC	ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA

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 weight of sample
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

Workorder: L2314517 Report Date: 14-AUG-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ALK-WT	**Water**							
Batch R4723718								
WG3113649-4 DUP		**WG3113649-3**						
Alkalinity, Total (as CaCO3)		58	58		mg/L	0.3	20	24-JUL-19
WG3113649-2 LCS								
Alkalinity, Total (as CaCO3)			102.9		%		85-115	24-JUL-19
WG3113649-1 MB								
Alkalinity, Total (as CaCO3)			<10		mg/L		10	24-JUL-19
CL-IC-N-WT	**Water**							
Batch R4722912								
WG3112976-20 DUP		**WG3112976-18**						
Chloride (Cl)		27.8	27.8		mg/L	0.1	20	23-JUL-19
WG3112976-17 LCS								
Chloride (Cl)			101.7		%		90-110	23-JUL-19
WG3112976-16 MB								
Chloride (Cl)			<0.50		mg/L		0.5	23-JUL-19
WG3112976-19 MS		**WG3112976-18**						
Chloride (Cl)			98.7		%		75-125	23-JUL-19
DOC-WT	**Water**							
Batch R4722416								
WG3113001-3 DUP		**L2314517-1**						
Dissolved Organic Carbon		2.26	2.17		mg/L	4.3	25	23-JUL-19
WG3113001-2 LCS								
Dissolved Organic Carbon			107.0		%		70-130	23-JUL-19
WG3113001-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	23-JUL-19
WG3113001-4 MS		**L2314517-1**						
Dissolved Organic Carbon			105.7		%		70-130	23-JUL-19
EC-WT	**Water**							
Batch R4723718								
WG3113649-4 DUP		**WG3113649-3**						
Conductivity		134	134		umhos/cm	0.0	10	24-JUL-19
WG3113649-2 LCS								
Conductivity			99.1		%		90-110	24-JUL-19
WG3113649-1 MB								
Conductivity			<3.0		umhos/cm		3	24-JUL-19
F-IC-N-WT	**Water**							

Quality Control Report

Workorder: L2314517 Report Date: 14-AUG-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F-IC-N-WT	**Water**							
Batch R4722912								
WG3112976-20 DUP		**WG3112976-18**						
Fluoride (F)		0.050	0.045		mg/L	9.7	20	23-JUL-19
WG3112976-17 LCS								
Fluoride (F)			104.9		%		90-110	23-JUL-19
WG3112976-16 MB								
Fluoride (F)			<0.020		mg/L		0.02	23-JUL-19
WG3112976-19 MS		**WG3112976-18**						
Fluoride (F)			101.6		%		75-125	23-JUL-19
HG-D-CVAA-WT	**Water**							
Batch R4723491								
WG3113648-4 DUP		**WG3113648-3**						
Mercury (Hg)-Dissolved		<0.0000050	<0.000005C	RPD-NA	mg/L	N/A	20	24-JUL-19
WG3113648-2 LCS								
Mercury (Hg)-Dissolved			105.0		%		80-120	24-JUL-19
WG3113648-1 MB								
Mercury (Hg)-Dissolved			<0.000005C		mg/L		0.000005	24-JUL-19
WG3113648-6 MS		**WG3113648-5**						
Mercury (Hg)-Dissolved			100.0		%		70-130	24-JUL-19
HG-T-CVAA-WT	**Water**							
Batch R4723511								
WG3113654-4 DUP		**WG3113654-3**						
Mercury (Hg)-Total		<0.0000050	<0.000005C	RPD-NA	mg/L	N/A	20	24-JUL-19
WG3113654-2 LCS								
Mercury (Hg)-Total			105.0		%		80-120	24-JUL-19
WG3113654-1 MB								
Mercury (Hg)-Total			<0.000005C		mg/L		0.000005	24-JUL-19
WG3113654-6 MS		**WG3113654-5**						
Mercury (Hg)-Total			105.0		%		70-130	24-JUL-19
MET-T-CCMS-WT	**Water**							
Batch R4720938								
WG3112558-4 DUP		**WG3112558-3**						
Aluminum (Al)-Total		<0.050	<0.050	RPD-NA	mg/L	N/A	20	23-JUL-19
Antimony (Sb)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	23-JUL-19
Arsenic (As)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	23-JUL-19
Barium (Ba)-Total		0.0356	0.0348		mg/L	2.4	20	23-JUL-19
Beryllium (Be)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	23-JUL-19
Bismuth (Bi)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	23-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4720938								
WG3112558-4 DUP		**WG3112558-3**						
Boron (B)-Total		<0.10	<0.10	RPD-NA	mg/L	N/A	20	23-JUL-19
Cadmium (Cd)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	23-JUL-19
Calcium (Ca)-Total		362	363		mg/L	0.5	20	23-JUL-19
Chromium (Cr)-Total		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	23-JUL-19
Cesium (Cs)-Total		0.00010	0.00011		mg/L	5.8	20	23-JUL-19
Cobalt (Co)-Total		0.0097	0.0098		mg/L	1.4	20	23-JUL-19
Copper (Cu)-Total		0.012	0.012		mg/L	0.8	20	23-JUL-19
Iron (Fe)-Total		1.56	1.60		mg/L	2.5	20	23-JUL-19
Lead (Pb)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	23-JUL-19
Lithium (Li)-Total		0.071	0.072		mg/L	1.4	20	23-JUL-19
Magnesium (Mg)-Total		551	563		mg/L	2.2	20	23-JUL-19
Manganese (Mn)-Total		8.57	8.43		mg/L	1.7	20	23-JUL-19
Molybdenum (Mo)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	23-JUL-19
Nickel (Ni)-Total		0.0098	0.0100		mg/L	2.3	20	23-JUL-19
Phosphorus (P)-Total		<0.50	<0.50	RPD-NA	mg/L	N/A	20	23-JUL-19
Potassium (K)-Total		7.48	7.58		mg/L	1.3	20	23-JUL-19
Rubidium (Rb)-Total		0.0122	0.0130		mg/L	6.2	20	23-JUL-19
Selenium (Se)-Total		0.00674	0.00667		mg/L	1.0	20	23-JUL-19
Silicon (Si)-Total		<1.0	<1.0	RPD-NA	mg/L	N/A	20	23-JUL-19
Silver (Ag)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	23-JUL-19
Sodium (Na)-Total		5.46	5.54		mg/L	1.5	20	23-JUL-19
Strontium (Sr)-Total		0.974	0.930		mg/L	4.7	20	23-JUL-19
Sulfur (S)-Total		1080	1080		mg/L	0.1	25	23-JUL-19
Thallium (Tl)-Total		0.00026	0.00028		mg/L	8.0	20	23-JUL-19
Tellurium (Te)-Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	23-JUL-19
Thorium (Th)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	25	23-JUL-19
Tin (Sn)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	23-JUL-19
Titanium (Ti)-Total		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	23-JUL-19
Tungsten (W)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	23-JUL-19
Uranium (U)-Total		0.00019	0.00020		mg/L	6.4	20	23-JUL-19
Vanadium (V)-Total		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	23-JUL-19
Zinc (Zn)-Total		<0.030	<0.030	RPD-NA	mg/L	N/A	20	23-JUL-19
Zirconium (Zr)-Total		<0.0020	<0.0020		mg/L			23-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4720938								
WG3112558-4 DUP		**WG3112558-3**						
Zirconium (Zr)-Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	23-JUL-19
WG3112558-2 LCS								
Aluminum (Al)-Total			95.2		%		80-120	23-JUL-19
Antimony (Sb)-Total			98.7		%		80-120	23-JUL-19
Arsenic (As)-Total			92.1		%		80-120	23-JUL-19
Barium (Ba)-Total			90.0		%		80-120	23-JUL-19
Beryllium (Be)-Total			94.4		%		80-120	23-JUL-19
Bismuth (Bi)-Total			89.7		%		80-120	23-JUL-19
Boron (B)-Total			94.6		%		80-120	23-JUL-19
Cadmium (Cd)-Total			92.2		%		80-120	23-JUL-19
Calcium (Ca)-Total			95.3		%		80-120	23-JUL-19
Chromium (Cr)-Total			93.8		%		80-120	23-JUL-19
Cesium (Cs)-Total			98.1		%		80-120	23-JUL-19
Cobalt (Co)-Total			92.8		%		80-120	23-JUL-19
Copper (Cu)-Total			91.5		%		80-120	23-JUL-19
Iron (Fe)-Total			92.7		%		80-120	23-JUL-19
Lead (Pb)-Total			91.7		%		80-120	23-JUL-19
Lithium (Li)-Total			96.7		%		80-120	23-JUL-19
Magnesium (Mg)-Total			93.5		%		80-120	23-JUL-19
Manganese (Mn)-Total			93.7		%		80-120	23-JUL-19
Molybdenum (Mo)-Total			96.8		%		80-120	23-JUL-19
Nickel (Ni)-Total			92.1		%		80-120	23-JUL-19
Phosphorus (P)-Total			94.4		%		70-130	23-JUL-19
Potassium (K)-Total			92.6		%		80-120	23-JUL-19
Rubidium (Rb)-Total			94.6		%		80-120	23-JUL-19
Selenium (Se)-Total			92.8		%		80-120	23-JUL-19
Silicon (Si)-Total			96.7		%		60-140	23-JUL-19
Silver (Ag)-Total			91.8		%		80-120	23-JUL-19
Sodium (Na)-Total			99.5		%		80-120	23-JUL-19
Strontium (Sr)-Total			95.9		%		80-120	23-JUL-19
Sulfur (S)-Total			90.7		%		80-120	23-JUL-19
Thallium (Tl)-Total			91.1		%		80-120	23-JUL-19
Tellurium (Te)-Total			91.7		%		80-120	23-JUL-19
Thorium (Th)-Total			87.9		%		70-130	23-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4720938								
WG3112558-2 LCS								
Tin (Sn)-Total			93.4		%		80-120	23-JUL-19
Titanium (Ti)-Total			89.4		%		80-120	23-JUL-19
Tungsten (W)-Total			89.4		%		80-120	23-JUL-19
Uranium (U)-Total			90.7		%		80-120	23-JUL-19
Vanadium (V)-Total			95.4		%		80-120	23-JUL-19
Zinc (Zn)-Total			90.4		%		80-120	23-JUL-19
Zirconium (Zr)-Total			95.4		%		80-120	23-JUL-19
WG3112558-1 MB								
Aluminum (Al)-Total			<0.0050		mg/L		0.005	23-JUL-19
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	23-JUL-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	23-JUL-19
Barium (Ba)-Total			<0.00010		mg/L		0.0001	23-JUL-19
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	23-JUL-19
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	23-JUL-19
Boron (B)-Total			<0.010		mg/L		0.01	23-JUL-19
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	23-JUL-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	23-JUL-19
Chromium (Cr)-Total			<0.00050		mg/L		0.0005	23-JUL-19
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	23-JUL-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	23-JUL-19
Copper (Cu)-Total			<0.0010		mg/L		0.001	23-JUL-19
Iron (Fe)-Total			<0.010		mg/L		0.01	23-JUL-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	23-JUL-19
Lithium (Li)-Total			<0.0010		mg/L		0.001	23-JUL-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	23-JUL-19
Manganese (Mn)-Total			<0.00050		mg/L		0.0005	23-JUL-19
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	23-JUL-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	23-JUL-19
Phosphorus (P)-Total			<0.050		mg/L		0.05	23-JUL-19
Potassium (K)-Total			<0.050		mg/L		0.05	23-JUL-19
Rubidium (Rb)-Total			<0.00020		mg/L		0.0002	23-JUL-19
Selenium (Se)-Total			<0.000050		mg/L		0.00005	23-JUL-19
Silicon (Si)-Total			<0.10		mg/L		0.1	23-JUL-19
Silver (Ag)-Total			<0.000050		mg/L		0.00005	23-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4720938								
WG3112558-1 MB								
Sodium (Na)-Total			<0.050		mg/L		0.05	23-JUL-19
Strontium (Sr)-Total			<0.0010		mg/L		0.001	23-JUL-19
Sulfur (S)-Total			<0.50		mg/L		0.5	23-JUL-19
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	23-JUL-19
Tellurium (Te)-Total			<0.00020		mg/L		0.0002	23-JUL-19
Thorium (Th)-Total			<0.00010		mg/L		0.0001	23-JUL-19
Tin (Sn)-Total			<0.00010		mg/L		0.0001	23-JUL-19
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	23-JUL-19
Tungsten (W)-Total			<0.00010		mg/L		0.0001	23-JUL-19
Uranium (U)-Total			<0.000010		mg/L		0.00001	23-JUL-19
Vanadium (V)-Total			<0.00050		mg/L		0.0005	23-JUL-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	23-JUL-19
Zirconium (Zr)-Total			<0.00020		mg/L		0.0002	23-JUL-19
WG3112558-5 MS		**WG3112558-3**						
Aluminum (Al)-Total			104.7		%		70-130	23-JUL-19
Antimony (Sb)-Total			100.5		%		70-130	23-JUL-19
Arsenic (As)-Total			100.0		%		70-130	23-JUL-19
Barium (Ba)-Total			N/A	MS-B	%		-	23-JUL-19
Beryllium (Be)-Total			93.7		%		70-130	23-JUL-19
Bismuth (Bi)-Total			93.7		%		70-130	23-JUL-19
Boron (B)-Total			89.8		%		70-130	23-JUL-19
Cadmium (Cd)-Total			97.4		%		70-130	23-JUL-19
Calcium (Ca)-Total			N/A	MS-B	%		-	23-JUL-19
Chromium (Cr)-Total			99.4		%		70-130	23-JUL-19
Cesium (Cs)-Total			103.3		%		70-130	23-JUL-19
Cobalt (Co)-Total			100.6		%		70-130	23-JUL-19
Copper (Cu)-Total			95.5		%		70-130	23-JUL-19
Iron (Fe)-Total			N/A	MS-B	%		-	23-JUL-19
Lead (Pb)-Total			96.5		%		70-130	23-JUL-19
Lithium (Li)-Total			N/A	MS-B	%		-	23-JUL-19
Magnesium (Mg)-Total			N/A	MS-B	%		-	23-JUL-19
Manganese (Mn)-Total			N/A	MS-B	%		-	23-JUL-19
Molybdenum (Mo)-Total			106.1		%		70-130	23-JUL-19
Nickel (Ni)-Total			98.3		%		70-130	23-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4720938								
WG3112558-5 MS		**WG3112558-3**						
Phosphorus (P)-Total			109.0		%		70-130	23-JUL-19
Potassium (K)-Total			N/A	MS-B	%		-	23-JUL-19
Rubidium (Rb)-Total			N/A	MS-B	%		-	23-JUL-19
Selenium (Se)-Total			99.4		%		70-130	23-JUL-19
Silicon (Si)-Total			N/A	MS-B	%		-	23-JUL-19
Silver (Ag)-Total			92.2		%		70-130	23-JUL-19
Sodium (Na)-Total			N/A	MS-B	%		-	23-JUL-19
Strontium (Sr)-Total			N/A	MS-B	%		-	23-JUL-19
Sulfur (S)-Total			N/A	MS-B	%		-	23-JUL-19
Thallium (Tl)-Total			95.3		%		70-130	23-JUL-19
Tellurium (Te)-Total			89.6		%		70-130	23-JUL-19
Thorium (Th)-Total			85.4		%		70-130	23-JUL-19
Tin (Sn)-Total			98.1		%		70-130	23-JUL-19
Titanium (Ti)-Total			96.6		%		70-130	23-JUL-19
Tungsten (W)-Total			95.7		%		70-130	23-JUL-19
Uranium (U)-Total			100.7		%		70-130	23-JUL-19
Vanadium (V)-Total			102.2		%		70-130	23-JUL-19
Zinc (Zn)-Total			100.1		%		70-130	23-JUL-19
Zirconium (Zr)-Total			94.9		%		70-130	23-JUL-19
NH3-F-WT	**Water**							
Batch R4722609								
WG3112577-31 DUP		**L2314517-1**						
Ammonia, Total (as N)		<0.010	<0.010	RPD-NA	mg/L	N/A	20	23-JUL-19
WG3112577-30 LCS								
Ammonia, Total (as N)			102.6		%		85-115	23-JUL-19
WG3112577-29 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	23-JUL-19
WG3112577-32 MS		**L2314517-1**						
Ammonia, Total (as N)			103.4		%		75-125	23-JUL-19
NO3-IC-WT	**Water**							
Batch R4722912								
WG3112976-20 DUP		**WG3112976-18**						
Nitrate (as N)		<0.020	<0.020	RPD-NA	mg/L	N/A	20	23-JUL-19
WG3112976-17 LCS								
Nitrate (as N)			101.4				90-110	

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO3-IC-WT	**Water**							
Batch R4722912								
WG3112976-17 LCS								
Nitrate (as N)			101.4		%		90-110	23-JUL-19
WG3112976-16 MB								
Nitrate (as N)			<0.020		mg/L		0.02	23-JUL-19
WG3112976-19 MS		**WG3112976-18**						
Nitrate (as N)			97.4		%		75-125	23-JUL-19
P-T-COL-WT	**Water**							
Batch R4723250								
WG3113044-3 DUP		**L2314517-1**						
Phosphorus, Total		0.0128	0.0138		mg/L	7.2	20	24-JUL-19
WG3113044-2 LCS								
Phosphorus, Total			94.6		%		80-120	24-JUL-19
WG3113044-1 MB								
Phosphorus, Total			<0.0030		mg/L		0.003	24-JUL-19
WG3113044-4 MS		**L2314517-1**						
Phosphorus, Total			95.5		%		70-130	24-JUL-19
PH-WT	**Water**							
Batch R4723718								
WG3113649-4 DUP		**WG3113649-3**						
pH		7.92	7.95	J	pH units	0.03	0.2	24-JUL-19
WG3113649-2 LCS								
pH			7.02		pH units		6.9-7.1	24-JUL-19
SO4-IC-N-WT	**Water**							
Batch R4722912								
WG3112976-20 DUP		**WG3112976-18**						
Sulfate (SO4)		26.3	26.0		mg/L	1.4	20	23-JUL-19
WG3112976-17 LCS								
Sulfate (SO4)			102.2		%		90-110	23-JUL-19
WG3112976-16 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	23-JUL-19
WG3112976-19 MS		**WG3112976-18**						
Sulfate (SO4)			98.2		%		75-125	23-JUL-19
SOLIDS-TSS-WT	**Water**							
Batch R4723029								
WG3113304-3 DUP		**L2313201-1**						
Total Suspended Solids		263	251		mg/L	4.7	20	24-JUL-19
WG3113304-2 LCS								

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SOLIDS-TSS-WT	**Water**							
Batch R4723029								
WG3113304-2 LCS								
Total Suspended Solids			101.6		%		85-115	24-JUL-19
WG3113304-1 MB								
Total Suspended Solids			<2.0		mg/L		2	24-JUL-19
TKN-WT	**Water**							
Batch R4723722								
WG3113042-3 DUP		**L2313348-1**						
Total Kjeldahl Nitrogen		0.38	0.44		mg/L	15	20	24-JUL-19
WG3113042-2 LCS								
Total Kjeldahl Nitrogen			97.8		%		75-125	24-JUL-19
WG3113042-1 MB								
Total Kjeldahl Nitrogen			<0.15		mg/L		0.15	24-JUL-19
WG3113042-4 MS		**L2313348-1**						
Total Kjeldahl Nitrogen			92.0		%		70-130	24-JUL-19
TOC-WT	**Water**							
Batch R4722415								
WG3113015-3 DUP		**L2314517-1**						
Total Organic Carbon		2.21	2.07		mg/L	6.6	20	23-JUL-19
WG3113015-2 LCS								
Total Organic Carbon			106.6		%		80-120	23-JUL-19
WG3113015-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	23-JUL-19
WG3113015-4 MS		**L2314517-1**						
Total Organic Carbon			104.6		%		70-130	23-JUL-19

Quality Control Report

Workorder: L2314517 Report Date: 14-AUG-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

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

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

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.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2314517-COFC

COC Number: 15 -

Report To	Contact and company name below will appear on the final report
Company:	Baffinland Iron Mines Corp.
Contact:	Wiliam Bowden and Connor Devereaux
Phone:	647-253-0596 EXT 6016
	Company address below will appear on the final report
Street:	2275 Upper Middle Rd. E., Suite #300
City/Province:	Oakville, ON
Postal Code:	L6H 0C3
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)

Quality Control (QC) Report with Report ☑ YES ☐ NO

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax bimcore@alsglobal.com

Email 2 bimww@alsglobal.com

Email 3

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax ap@baffinland.com

Email 2 commercial@baffinland.com

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☐ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
4 day [P4]	☐	1 Business day [E1]	☐
3 day [P3]	☐	Same Day, Weekend or Statutory holiday [E0]	☑
2 day [P2]	☐		

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information

ALS Account # / Quote #:	23642 /Q42455
Job #:	MS-08 Eff Characterization - Reference and Exposure
PO / AFE:	4500057496
LSD:	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#:
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only): L2314517

ALS Contact: Sampler: AM/JB

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	F/P	BIM-MMER-EFF	Number of Containers
	MS-08-DS	22-Jul-19	11:40	Water	E0		7
	MS-08-US	22-Jul-19	12:35	Water	E0		7

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human drinking water use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			9.6		

SHIPMENT RELEASE (client use)		
Released by: Ben Widdowson	Release Date: 22-Jul-19	Time: 15:05

INITIAL SHIPMENT RECEPTION (lab use only)		
Received by:	Date:	Time:

FINAL SHIPMENT RECEPTION (lab use only)		
Received by: AP	Date: 23-7-19	Time: 9:30

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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 specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Baffinland Iron Mine's Corporation (Oakville)
ATTN: William Bowden/Connor Devereaux
2275 Upper Middle Rd. E.
Suite #300
Oakville ON L6H 0C3

Date Received: 22-JUL-19
Report Date: 28-AUG-19 09:26 (MT)
Version: FINAL

Client Phone: 647-253-0596

Certificate of Analysis

Lab Work Order #: L2314529

Project P.O. #: 4500057496
Job Reference: MS-08
C of C Numbers:
Legal Site Desc:

Rick Hawthorne
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2314529-1 MS-08 Sampled By: BW/RH on 22-JUL-19 @ 10:30 Matrix: Water							
Physical Tests							
Conductivity	4180		3.0	umhos/cm		24-JUL-19	R4723718
Hardness (as CaCO3)	3260		1.3	mg/L		23-JUL-19	
pH	8.78		0.10	pH units		22-JUL-19	R4720327
Total Suspended Solids	6.0		2.0	mg/L		22-JUL-19	R4720360
Total Dissolved Solids	4720		20	mg/L		23-JUL-19	R4721749
Turbidity	8.55		0.10	NTU		22-JUL-19	R4720333
Anions and Nutrients							
Acidity (as CaCO3)	<5.0	DLM	5.0	mg/L		24-JUL-19	R4724346
Alkalinity, Total (as CaCO3)	15		10	mg/L		24-JUL-19	R4723718
Ammonia, Total (as N)	6.98	DLHC	0.20	mg/L		23-JUL-19	R4722609
Chloride (Cl)	14.0	DLDS	2.5	mg/L		23-JUL-19	R4722912
Fluoride (F)	0.16	DLDS	0.10	mg/L		23-JUL-19	R4722912
Nitrate (as N)	21.2	DLDS	0.10	mg/L		23-JUL-19	R4722912
Total Kjeldahl Nitrogen	8.4	DLM	1.5	mg/L	24-JUL-19	25-JUL-19	R4725369
Phosphorus, Total	<0.0030		0.0030	mg/L	23-JUL-19	24-JUL-19	R4723250
Sulfate (SO4)	3070	DLDS	1.5	mg/L		23-JUL-19	R4722912
Cyanides							
Cyanide, Total	0.0149		0.0020	mg/L		24-JUL-19	R4724450
Organic / Inorganic Carbon							
Dissolved Carbon Filtration Location	LAB					23-JUL-19	R4720855
Dissolved Organic Carbon	3.39		0.50	mg/L	23-JUL-19	23-JUL-19	R4722416
Total Organic Carbon	3.99		0.50	mg/L		23-JUL-19	R4722415
Total Metals							
Aluminum (Al)-Total	<0.050	DLHC	0.050	mg/L	23-JUL-19	23-JUL-19	R4720938
Antimony (Sb)-Total	<0.0010	DLHC	0.0010	mg/L	23-JUL-19	23-JUL-19	R4720938
Arsenic (As)-Total	<0.0010	DLHC	0.0010	mg/L	23-JUL-19	23-JUL-19	R4720938
Barium (Ba)-Total	0.0356	DLHC	0.0010	mg/L	23-JUL-19	23-JUL-19	R4720938
Beryllium (Be)-Total	<0.0010	DLHC	0.0010	mg/L	23-JUL-19	23-JUL-19	R4720938
Bismuth (Bi)-Total	<0.00050	DLHC	0.00050	mg/L	23-JUL-19	23-JUL-19	R4720938
Boron (B)-Total	<0.10	DLHC	0.10	mg/L	23-JUL-19	23-JUL-19	R4720938
Cadmium (Cd)-Total	<0.000050	DLHC	0.000050	mg/L	23-JUL-19	23-JUL-19	R4720938
Calcium (Ca)-Total	362	DLHC	0.50	mg/L	23-JUL-19	23-JUL-19	R4720938
Cesium (Cs)-Total	0.00010	DLHC	0.00010	mg/L	23-JUL-19	23-JUL-19	R4720938
Chromium (Cr)-Total	<0.0050	DLHC	0.0050	mg/L	23-JUL-19	23-JUL-19	R4720938
Cobalt (Co)-Total	0.0097	DLHC	0.0010	mg/L	23-JUL-19	23-JUL-19	R4720938
Copper (Cu)-Total	0.012	DLHC	0.010	mg/L	23-JUL-19	23-JUL-19	R4720938
Iron (Fe)-Total	1.56	DLHC	0.10	mg/L	23-JUL-19	23-JUL-19	R4720938
Lead (Pb)-Total	<0.00050	DLHC	0.00050	mg/L	23-JUL-19	23-JUL-19	R4720938
Lithium (Li)-Total	0.071	DLHC	0.010	mg/L	23-JUL-19	23-JUL-19	R4720938
Magnesium (Mg)-Total	551	DLHC	0.050	mg/L	23-JUL-19	23-JUL-19	R4720938
Manganese (Mn)-Total	8.57	DLHC	0.0050	mg/L	23-JUL-19	23-JUL-19	R4720938
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		24-JUL-19	R4723511

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2314529-1 MS-08 Sampled By: BW/RH on 22-JUL-19 @ 10:30 Matrix: Water							
Total Metals							
Molybdenum (Mo)-Total	<0.00050	DLHC	0.00050	mg/L	23-JUL-19	23-JUL-19	R4720938
Nickel (Ni)-Total	0.0098	DLHC	0.0050	mg/L	23-JUL-19	23-JUL-19	R4720938
Phosphorus (P)-Total	<0.50	DLHC	0.50	mg/L	23-JUL-19	23-JUL-19	R4720938
Potassium (K)-Total	7.48	DLHC	0.50	mg/L	23-JUL-19	23-JUL-19	R4720938
Rubidium (Rb)-Total	0.0122	DLHC	0.0020	mg/L	23-JUL-19	23-JUL-19	R4720938
Selenium (Se)-Total	0.00674	DLHC	0.00050	mg/L	23-JUL-19	23-JUL-19	R4720938
Silicon (Si)-Total	<1.0	DLHC	1.0	mg/L	23-JUL-19	23-JUL-19	R4720938
Silver (Ag)-Total	<0.00050	DLHC	0.00050	mg/L	23-JUL-19	23-JUL-19	R4720938
Sodium (Na)-Total	5.46	DLHC	0.50	mg/L	23-JUL-19	23-JUL-19	R4720938
Strontium (Sr)-Total	0.974	DLHC	0.010	mg/L	23-JUL-19	23-JUL-19	R4720938
Sulfur (S)-Total	1080	DLHC	5.0	mg/L	23-JUL-19	23-JUL-19	R4720938
Tellurium (Te)-Total	<0.0020	DLHC	0.0020	mg/L	23-JUL-19	23-JUL-19	R4720938
Thallium (Tl)-Total	0.00026	DLHC	0.00010	mg/L	23-JUL-19	23-JUL-19	R4720938
Thorium (Th)-Total	<0.0010	DLHC	0.0010	mg/L	23-JUL-19	23-JUL-19	R4720938
Tin (Sn)-Total	<0.0010	DLHC	0.0010	mg/L	23-JUL-19	23-JUL-19	R4720938
Titanium (Ti)-Total	<0.0030	DLHC	0.0030	mg/L	23-JUL-19	23-JUL-19	R4720938
Tungsten (W)-Total	<0.0010	DLHC	0.0010	mg/L	23-JUL-19	23-JUL-19	R4720938
Uranium (U)-Total	0.00019	DLHC	0.00010	mg/L	23-JUL-19	23-JUL-19	R4720938
Vanadium (V)-Total	<0.0050	DLHC	0.0050	mg/L	23-JUL-19	23-JUL-19	R4720938
Zinc (Zn)-Total	<0.030	DLHC	0.030	mg/L	23-JUL-19	23-JUL-19	R4720938
Zirconium (Zr)-Total	<0.0020	DLHC	0.0020	mg/L	23-JUL-19	23-JUL-19	R4720938
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					24-JUL-19	R4722248
Dissolved Metals Filtration Location	FIELD					23-JUL-19	R4720905
Aluminum (Al)-Dissolved	<0.050	DLHC	0.050	mg/L	23-JUL-19	23-JUL-19	R4721036
Antimony (Sb)-Dissolved	<0.0010	DLHC	0.0010	mg/L	23-JUL-19	23-JUL-19	R4721036
Arsenic (As)-Dissolved	<0.0010	DLHC	0.0010	mg/L	23-JUL-19	23-JUL-19	R4721036
Barium (Ba)-Dissolved	0.0336	DLHC	0.0010	mg/L	23-JUL-19	23-JUL-19	R4721036
Beryllium (Be)-Dissolved	<0.0010	DLHC	0.0010	mg/L	23-JUL-19	23-JUL-19	R4721036
Bismuth (Bi)-Dissolved	<0.00050	DLHC	0.00050	mg/L	23-JUL-19	23-JUL-19	R4721036
Boron (B)-Dissolved	<0.10	DLHC	0.10	mg/L	23-JUL-19	23-JUL-19	R4721036
Cadmium (Cd)-Dissolved	<0.000050	DLHC	0.000050	mg/L	23-JUL-19	23-JUL-19	R4721036
Calcium (Ca)-Dissolved	363	DLHC	0.50	mg/L	23-JUL-19	23-JUL-19	R4721036
Cesium (Cs)-Dissolved	0.00011	DLHC	0.00010	mg/L	23-JUL-19	23-JUL-19	R4721036
Chromium (Cr)-Dissolved	<0.0050	DLHC	0.0050	mg/L	23-JUL-19	23-JUL-19	R4721036
Cobalt (Co)-Dissolved	0.0045	DLHC	0.0010	mg/L	23-JUL-19	23-JUL-19	R4721036
Copper (Cu)-Dissolved	0.0114	DLHC	0.0020	mg/L	23-JUL-19	23-JUL-19	R4721036
Iron (Fe)-Dissolved	<0.10	DLHC	0.10	mg/L	23-JUL-19	23-JUL-19	R4721036
Lead (Pb)-Dissolved	<0.00050	DLHC	0.00050	mg/L	23-JUL-19	23-JUL-19	R4721036
Lithium (Li)-Dissolved	0.073	DLHC	0.010	mg/L	23-JUL-19	23-JUL-19	R4721036
Magnesium (Mg)-Dissolved	572	DLHC	0.050	mg/L	23-JUL-19	23-JUL-19	R4721036

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2314529-1 MS-08 Sampled By: BW/RH on 22-JUL-19 @ 10:30 Matrix: Water							
Dissolved Metals							
Manganese (Mn)-Dissolved	7.91	DLHC	0.0050	mg/L	23-JUL-19	23-JUL-19	R4721036
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	24-JUL-19	24-JUL-19	R4723491
Molybdenum (Mo)-Dissolved	<0.00050	DLHC	0.00050	mg/L	23-JUL-19	23-JUL-19	R4721036
Nickel (Ni)-Dissolved	0.0063	DLHC	0.0050	mg/L	23-JUL-19	23-JUL-19	R4721036
Phosphorus (P)-Dissolved	<0.50	DLHC	0.50	mg/L	23-JUL-19	23-JUL-19	R4721036
Potassium (K)-Dissolved	7.62	DLHC	0.50	mg/L	23-JUL-19	23-JUL-19	R4721036
Rubidium (Rb)-Dissolved	0.0121	DLHC	0.0020	mg/L	23-JUL-19	23-JUL-19	R4721036
Selenium (Se)-Dissolved	0.00645	DLHC	0.00050	mg/L	23-JUL-19	23-JUL-19	R4721036
Silicon (Si)-Dissolved	0.71	DLHC	0.50	mg/L	23-JUL-19	23-JUL-19	R4721036
Silver (Ag)-Dissolved	<0.00050	DLHC	0.00050	mg/L	23-JUL-19	23-JUL-19	R4721036
Sodium (Na)-Dissolved	5.54	DLHC	0.50	mg/L	23-JUL-19	23-JUL-19	R4721036
Strontium (Sr)-Dissolved	0.957	DLHC	0.010	mg/L	23-JUL-19	23-JUL-19	R4721036
Sulfur (S)-Dissolved	1070	DLHC	5.0	mg/L	23-JUL-19	23-JUL-19	R4721036
Tellurium (Te)-Dissolved	<0.0020	DLHC	0.0020	mg/L	23-JUL-19	23-JUL-19	R4721036
Thallium (Tl)-Dissolved	0.00027	DLHC	0.00010	mg/L	23-JUL-19	23-JUL-19	R4721036
Thorium (Th)-Dissolved	<0.0010	DLHC	0.0010	mg/L	23-JUL-19	23-JUL-19	R4721036
Tin (Sn)-Dissolved	<0.0010	DLHC	0.0010	mg/L	23-JUL-19	23-JUL-19	R4721036
Titanium (Ti)-Dissolved	<0.0030	DLHC	0.0030	mg/L	23-JUL-19	23-JUL-19	R4721036
Tungsten (W)-Dissolved	<0.0010	DLHC	0.0010	mg/L	23-JUL-19	23-JUL-19	R4721036
Uranium (U)-Dissolved	<0.00010	DLHC	0.00010	mg/L	23-JUL-19	23-JUL-19	R4721036
Vanadium (V)-Dissolved	<0.0050	DLHC	0.0050	mg/L	23-JUL-19	23-JUL-19	R4721036
Zinc (Zn)-Dissolved	<0.010	DLHC	0.010	mg/L	23-JUL-19	23-JUL-19	R4721036
Zirconium (Zr)-Dissolved	<0.0020	DLHC	0.0020	mg/L	23-JUL-19	23-JUL-19	R4721036
Radiological Parameters							
Ra-226	0.060		0.0086	Bq/L	31-JUL-19	07-AUG-19	R4742852

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

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2314529-1
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2314529-1
Matrix Spike	Lithium (Li)-Dissolved	MS-B	L2314529-1
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2314529-1
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L2314529-1
Matrix Spike	Potassium (K)-Dissolved	MS-B	L2314529-1
Matrix Spike	Rubidium (Rb)-Dissolved	MS-B	L2314529-1
Matrix Spike	Silicon (Si)-Dissolved	MS-B	L2314529-1
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2314529-1
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2314529-1
Matrix Spike	Sulfur (S)-Dissolved	MS-B	L2314529-1
Matrix Spike	Barium (Ba)-Total	MS-B	L2314529-1
Matrix Spike	Calcium (Ca)-Total	MS-B	L2314529-1
Matrix Spike	Iron (Fe)-Total	MS-B	L2314529-1
Matrix Spike	Lithium (Li)-Total	MS-B	L2314529-1
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2314529-1
Matrix Spike	Manganese (Mn)-Total	MS-B	L2314529-1
Matrix Spike	Potassium (K)-Total	MS-B	L2314529-1
Matrix Spike	Rubidium (Rb)-Total	MS-B	L2314529-1
Matrix Spike	Silicon (Si)-Total	MS-B	L2314529-1
Matrix Spike	Sodium (Na)-Total	MS-B	L2314529-1
Matrix Spike	Strontium (Sr)-Total	MS-B	L2314529-1
Matrix Spike	Sulfur (S)-Total	MS-B	L2314529-1

Sample Parameter Qualifier key listed:

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACY-TITR-TB	Water	Acidity	APHA 2310 B modified

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

ALK-WT	Water	Alkalinity, Total (as CaCO3)	EPA 310.2

This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.

CL-IC-N-WT	Water	Chloride by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

CN-TOT-WT	Water	Cyanide, Total	ISO 14403-2

Total cyanide is determined by the combination of UV digestion and distillation. Cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

When using this method, high levels of thiocyanate in samples can cause false positives at ~1-2% of the thiocyanate concentration. For samples with detectable cyanide analyzed by this method, ALS recommends analysis for thiocyanate to check for this potential interference

DOC-WT	Water	Dissolved Organic Carbon	APHA 5310B

Sample is filtered through a 0.45um filter, then injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic carbon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.

EC-SCREEN-WT	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

Reference Information

EC-WT	Water	Conductivity	APHA 2510 B

Water samples can be measured directly by immersing the conductivity cell into the sample.

F-IC-N-WT	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-WT	Water	Hardness	APHA 2340 B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-WT	Water	Dissolved Mercury in Water by CVAAS	EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

HG-T-CVAA-WT	Water	Total Mercury in Water by CVAAS	EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

MET-D-CCMS-WT	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

MET-T-CCMS-WT	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

NH3-F-WT	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO3-IC-WT	Water	Nitrate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-COL-WT	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is deteremined colourimetrically after persulphate digestion of the sample.

PH-BF	Water	pH	APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

RA226-MMER-FC	Water	Ra226 by Alpha Scint, MDC=0.01 Bq/L	EPA 903.1
SO4-IC-N-WT	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-BF	Water	Total Dissolved Solids	APHA 2540C

A well-mixed sample is filtered though glass fibres filter. A known volume of the filtrate is evaporated and dried at 180 +/- 2C for 1hr.

SOLIDS-TSS-BF	Water	Suspended solids	APHA 2540 D-Gravimetric

A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104 +/- 1C for a minimum of four hours or until a constant weight is achieved.

TKN-WT	Water	Total Kjeldahl Nitrogen	APHA 4500-Norg D

This analysis is carried out using procedures adapted from APHA Method 4500-Norg "Nitrogen (Organic)". Total Kjeldahl Nitrogen is determined by sample digestion at 380 Celsius with analysis using an automated colorimetric method.

TOC-WT	Water	Total Organic Carbon	APHA 5310B

Reference Information

Sample is injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic cabon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.

TURBIDITY-BF Water Turbidity APHA 2130 B

Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.

** 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
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA
FC	ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
TB	ALS ENVIRONMENTAL - THUNDER BAY, ONTARIO, CANADA
BF	ALS ENVIRONMENTAL - BAFFIN ISLAND, NUNAVUT, 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 weight of sample
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

Workorder: L2314529 Report Date: 28-AUG-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACY-TITR-TB	**Water**							
Batch R4724346								
WG3114247-2 LCS								
Acidity (as CaCO3)			93.1		%		85-115	24-JUL-19
WG3114247-1 MB								
Acidity (as CaCO3)			<2.0		mg/L		2	24-JUL-19
ALK-WT	**Water**							
Batch R4723718								
WG3113649-4 DUP		**WG3113649-3**						
Alkalinity, Total (as CaCO3)		58	58		mg/L	0.3	20	24-JUL-19
WG3113649-2 LCS								
Alkalinity, Total (as CaCO3)			102.9		%		85-115	24-JUL-19
WG3113649-1 MB								
Alkalinity, Total (as CaCO3)			<10		mg/L		10	24-JUL-19
CL-IC-N-WT	**Water**							
Batch R4722912								
WG3112976-20 DUP		**WG3112976-18**						
Chloride (Cl)		27.8	27.8		mg/L	0.1	20	23-JUL-19
WG3112976-17 LCS								
Chloride (Cl)			101.7		%		90-110	23-JUL-19
WG3112976-16 MB								
Chloride (Cl)			<0.50		mg/L		0.5	23-JUL-19
WG3112976-19 MS		**WG3112976-18**						
Chloride (Cl)			98.7		%		75-125	23-JUL-19
CN-TOT-WT	**Water**							
Batch R4724450								
WG3113677-3 DUP		**L2312399-1**						
Cyanide, Total		<0.020	<0.020	RPD-NA	mg/L	N/A	20	24-JUL-19
WG3113677-2 LCS								
Cyanide, Total			89.5		%		80-120	24-JUL-19
WG3113677-1 MB								
Cyanide, Total			<0.0020		mg/L		0.002	24-JUL-19
WG3113677-4 MS		**L2312399-1**						
Cyanide, Total			82.3		%		70-130	24-JUL-19
DOC-WT	**Water**							
Batch R4722416								
WG3113001-3 DUP		**L2314517-1**						
Dissolved Organic Carbon		2.26	2.17		mg/L	4.3	25	23-JUL-19
WG3113001-2 LCS								

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
DOC-WT	**Water**							
Batch R4722416								
WG3113001-2 LCS								
Dissolved Organic Carbon			107.0		%		70-130	23-JUL-19
WG3113001-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	23-JUL-19
WG3113001-4 MS		**L2314517-1**						
Dissolved Organic Carbon			105.7		%		70-130	23-JUL-19
EC-WT	**Water**							
Batch R4723718								
WG3113649-4 DUP		**WG3113649-3**						
Conductivity		134	134		umhos/cm	0.0	10	24-JUL-19
WG3113649-2 LCS								
Conductivity			99.1		%		90-110	24-JUL-19
WG3113649-1 MB								
Conductivity			<3.0		umhos/cm		3	24-JUL-19
F-IC-N-WT	**Water**							
Batch R4722912								
WG3112976-20 DUP		**WG3112976-18**						
Fluoride (F)		0.050	0.045		mg/L	9.7	20	23-JUL-19
WG3112976-17 LCS								
Fluoride (F)			104.9		%		90-110	23-JUL-19
WG3112976-16 MB								
Fluoride (F)			<0.020		mg/L		0.02	23-JUL-19
WG3112976-19 MS		**WG3112976-18**						
Fluoride (F)			101.6		%		75-125	23-JUL-19
HG-D-CVAA-WT	**Water**							
Batch R4723491								
WG3113648-4 DUP		**WG3113648-3**						
Mercury (Hg)-Dissolved		<0.0000050	<0.000005(	RPD-NA	mg/L	N/A	20	24-JUL-19
WG3113648-2 LCS								
Mercury (Hg)-Dissolved			105.0		%		80-120	24-JUL-19
WG3113648-1 MB								
Mercury (Hg)-Dissolved			<0.000005(		mg/L		0.000005	24-JUL-19
WG3113648-6 MS		**WG3113648-5**						
Mercury (Hg)-Dissolved			100.0		%		70-130	24-JUL-19
HG-T-CVAA-WT	**Water**							

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-T-CVAA-WT	**Water**							
Batch R4723511								
WG3113654-4 DUP		**WG3113654-3**						
Mercury (Hg)-Total		<0.0000050	<0.000005C	RPD-NA	mg/L	N/A	20	24-JUL-19
WG3113654-2 LCS								
Mercury (Hg)-Total			105.0		%		80-120	24-JUL-19
WG3113654-1 MB								
Mercury (Hg)-Total			<0.000005C		mg/L		0.000005	24-JUL-19
WG3113654-6 MS		**WG3113654-5**						
Mercury (Hg)-Total			105.0		%		70-130	24-JUL-19
MET-D-CCMS-WT	**Water**							
Batch R4721036								
WG3113050-4 DUP		**WG3113050-3**						
Aluminum (Al)-Dissolved		<0.050	<0.050	RPD-NA	mg/L	N/A	20	23-JUL-19
Antimony (Sb)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	23-JUL-19
Arsenic (As)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	23-JUL-19
Barium (Ba)-Dissolved		0.0336	0.0340		mg/L	1.2	20	23-JUL-19
Beryllium (Be)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	23-JUL-19
Bismuth (Bi)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	23-JUL-19
Boron (B)-Dissolved		<0.10	<0.10	RPD-NA	mg/L	N/A	20	23-JUL-19
Cadmium (Cd)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	23-JUL-19
Calcium (Ca)-Dissolved		363	355		mg/L	2.3	20	23-JUL-19
Cesium (Cs)-Dissolved		0.00011	0.00010		mg/L	10	20	23-JUL-19
Chromium (Cr)-Dissolved		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	23-JUL-19
Cobalt (Co)-Dissolved		0.0045	0.0043		mg/L	4.5	20	23-JUL-19
Copper (Cu)-Dissolved		0.0114	0.0113		mg/L	0.6	20	23-JUL-19
Iron (Fe)-Dissolved		<0.10	<0.10	RPD-NA	mg/L	N/A	20	23-JUL-19
Lead (Pb)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	23-JUL-19
Lithium (Li)-Dissolved		0.073	0.069		mg/L	6.6	20	23-JUL-19
Magnesium (Mg)-Dissolved		572	549		mg/L	4.2	20	23-JUL-19
Manganese (Mn)-Dissolved		7.91	7.75		mg/L	2.1	20	23-JUL-19
Molybdenum (Mo)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	23-JUL-19
Nickel (Ni)-Dissolved		0.0063	0.0062		mg/L	0.9	20	23-JUL-19
Phosphorus (P)-Dissolved		<0.50	<0.50	RPD-NA	mg/L	N/A	20	23-JUL-19
Potassium (K)-Dissolved		7.62	7.36		mg/L	3.6	20	23-JUL-19
Rubidium (Rb)-Dissolved		0.0121	0.0119		mg/L	1.6	20	23-JUL-19
Selenium (Se)-Dissolved		0.00645	0.00640		mg/L	0.7	20	23-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4721036								
WG3113050-4 DUP		**WG3113050-3**						
Silicon (Si)-Dissolved		0.71	0.72		mg/L	1.2	20	23-JUL-19
Silver (Ag)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	23-JUL-19
Sodium (Na)-Dissolved		5.54	5.37		mg/L	3.1	20	23-JUL-19
Strontium (Sr)-Dissolved		0.957	0.970		mg/L	1.4	20	23-JUL-19
Sulfur (S)-Dissolved		1070	1050		mg/L	1.6	20	23-JUL-19
Tellurium (Te)-Dissolved		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	23-JUL-19
Thallium (Tl)-Dissolved		0.00027	0.00027		mg/L	1.4	20	23-JUL-19
Thorium (Th)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	23-JUL-19
Tin (Sn)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	23-JUL-19
Titanium (Ti)-Dissolved		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	23-JUL-19
Tungsten (W)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	23-JUL-19
Uranium (U)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	23-JUL-19
Vanadium (V)-Dissolved		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	23-JUL-19
Zinc (Zn)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	23-JUL-19
Zirconium (Zr)-Dissolved		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	23-JUL-19
WG3113050-2 LCS								
Aluminum (Al)-Dissolved			105.5		%		80-120	23-JUL-19
Antimony (Sb)-Dissolved			99.9		%		80-120	23-JUL-19
Arsenic (As)-Dissolved			102.4		%		80-120	23-JUL-19
Barium (Ba)-Dissolved			103.2		%		80-120	23-JUL-19
Beryllium (Be)-Dissolved			99.2		%		80-120	23-JUL-19
Bismuth (Bi)-Dissolved			100.4		%		80-120	23-JUL-19
Boron (B)-Dissolved			98.1		%		80-120	23-JUL-19
Cadmium (Cd)-Dissolved			101.4		%		80-120	23-JUL-19
Calcium (Ca)-Dissolved			100.4		%		80-120	23-JUL-19
Cesium (Cs)-Dissolved			105.8		%		80-120	23-JUL-19
Chromium (Cr)-Dissolved			102.8		%		80-120	23-JUL-19
Cobalt (Co)-Dissolved			102.2		%		80-120	23-JUL-19
Copper (Cu)-Dissolved			101.1		%		80-120	23-JUL-19
Iron (Fe)-Dissolved			100.4		%		80-120	23-JUL-19
Lead (Pb)-Dissolved			102.1		%		80-120	23-JUL-19
Lithium (Li)-Dissolved			98.5		%		80-120	23-JUL-19
Magnesium (Mg)-Dissolved			105.2		%		80-120	23-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4721036								
WG3113050-2 LCS								
Manganese (Mn)-Dissolved			101.6		%		80-120	23-JUL-19
Molybdenum (Mo)-Dissolved			104.5		%		80-120	23-JUL-19
Nickel (Ni)-Dissolved			99.9		%		80-120	23-JUL-19
Phosphorus (P)-Dissolved			104.2		%		80-120	23-JUL-19
Potassium (K)-Dissolved			98.5		%		80-120	23-JUL-19
Rubidium (Rb)-Dissolved			101.3		%		80-120	23-JUL-19
Selenium (Se)-Dissolved			98.4		%		80-120	23-JUL-19
Silicon (Si)-Dissolved			103.3		%		60-140	23-JUL-19
Silver (Ag)-Dissolved			99.2		%		80-120	23-JUL-19
Sodium (Na)-Dissolved			107.0		%		80-120	23-JUL-19
Strontium (Sr)-Dissolved			106.0		%		80-120	23-JUL-19
Sulfur (S)-Dissolved			108.6		%		80-120	23-JUL-19
Tellurium (Te)-Dissolved			103.3		%		80-120	23-JUL-19
Thallium (Tl)-Dissolved			102.3		%		80-120	23-JUL-19
Thorium (Th)-Dissolved			97.2		%		80-120	23-JUL-19
Tin (Sn)-Dissolved			102.6		%		80-120	23-JUL-19
Titanium (Ti)-Dissolved			100.0		%		80-120	23-JUL-19
Tungsten (W)-Dissolved			99.1		%		80-120	23-JUL-19
Uranium (U)-Dissolved			102.1		%		80-120	23-JUL-19
Vanadium (V)-Dissolved			104.3		%		80-120	23-JUL-19
Zinc (Zn)-Dissolved			101.9		%		80-120	23-JUL-19
Zirconium (Zr)-Dissolved			104.8		%		80-120	23-JUL-19
WG3113050-1 MB								
Aluminum (Al)-Dissolved			<0.0050		mg/L		0.005	23-JUL-19
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	23-JUL-19
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	23-JUL-19
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	23-JUL-19
Beryllium (Be)-Dissolved			<0.00010		mg/L		0.0001	23-JUL-19
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	23-JUL-19
Boron (B)-Dissolved			<0.010		mg/L		0.01	23-JUL-19
Cadmium (Cd)-Dissolved			<0.000005(		mg/L		0.000005	23-JUL-19
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	23-JUL-19
Cesium (Cs)-Dissolved			<0.000010		mg/L		0.00001	23-JUL-19
Chromium (Cr)-Dissolved			<0.00050		mg/L		0.0005	23-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4721036								
WG3113050-1 MB								
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	23-JUL-19
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	23-JUL-19
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	23-JUL-19
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	23-JUL-19
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	23-JUL-19
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	23-JUL-19
Manganese (Mn)-Dissolved			<0.00050		mg/L		0.0005	23-JUL-19
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	23-JUL-19
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	23-JUL-19
Phosphorus (P)-Dissolved			<0.050		mg/L		0.05	23-JUL-19
Potassium (K)-Dissolved			<0.050		mg/L		0.05	23-JUL-19
Rubidium (Rb)-Dissolved			<0.00020		mg/L		0.0002	23-JUL-19
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	23-JUL-19
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	23-JUL-19
Silver (Ag)-Dissolved			<0.000050		mg/L		0.00005	23-JUL-19
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	23-JUL-19
Strontium (Sr)-Dissolved			<0.0010		mg/L		0.001	23-JUL-19
Sulfur (S)-Dissolved			<0.50		mg/L		0.5	23-JUL-19
Tellurium (Te)-Dissolved			<0.00020		mg/L		0.0002	23-JUL-19
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	23-JUL-19
Thorium (Th)-Dissolved			<0.00010		mg/L		0.0001	23-JUL-19
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	23-JUL-19
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	23-JUL-19
Tungsten (W)-Dissolved			<0.00010		mg/L		0.0001	23-JUL-19
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	23-JUL-19
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	23-JUL-19
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	23-JUL-19
Zirconium (Zr)-Dissolved			<0.00020		mg/L		0.0002	23-JUL-19
WG3113050-5 MS		**WG3113050-3**						
Aluminum (Al)-Dissolved			100.9		%		70-130	23-JUL-19
Antimony (Sb)-Dissolved			101.2		%		70-130	23-JUL-19
Arsenic (As)-Dissolved			105.0		%		70-130	23-JUL-19
Barium (Ba)-Dissolved			N/A	MS-B	%		-	23-JUL-19
Beryllium (Be)-Dissolved			101.2		%		70-130	23-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4721036								
WG3113050-5 MS		**WG3113050-3**						
Bismuth (Bi)-Dissolved			93.0		%		70-130	23-JUL-19
Cadmium (Cd)-Dissolved			103.5		%		70-130	23-JUL-19
Calcium (Ca)-Dissolved			N/A	MS-B	%		-	23-JUL-19
Cesium (Cs)-Dissolved			105.7		%		70-130	23-JUL-19
Chromium (Cr)-Dissolved			104.1		%		70-130	23-JUL-19
Cobalt (Co)-Dissolved			71.4		%		70-130	23-JUL-19
Iron (Fe)-Dissolved			85.8		%		70-130	23-JUL-19
Lead (Pb)-Dissolved			96.9		%		70-130	23-JUL-19
Lithium (Li)-Dissolved			N/A	MS-B	%		-	23-JUL-19
Magnesium (Mg)-Dissolved			N/A	MS-B	%		-	23-JUL-19
Manganese (Mn)-Dissolved			N/A	MS-B	%		-	23-JUL-19
Molybdenum (Mo)-Dissolved			109.3		%		70-130	23-JUL-19
Nickel (Ni)-Dissolved			80.4		%		70-130	23-JUL-19
Phosphorus (P)-Dissolved			110.5		%		70-130	23-JUL-19
Potassium (K)-Dissolved			N/A	MS-B	%		-	23-JUL-19
Rubidium (Rb)-Dissolved			N/A	MS-B	%		-	23-JUL-19
Selenium (Se)-Dissolved			92.9		%		70-130	23-JUL-19
Silicon (Si)-Dissolved			N/A	MS-B	%		-	23-JUL-19
Silver (Ag)-Dissolved			101.7		%		70-130	23-JUL-19
Sodium (Na)-Dissolved			N/A	MS-B	%		-	23-JUL-19
Strontium (Sr)-Dissolved			N/A	MS-B	%		-	23-JUL-19
Sulfur (S)-Dissolved			N/A	MS-B	%		-	23-JUL-19
Tellurium (Te)-Dissolved			104.4		%		70-130	23-JUL-19
Thallium (Tl)-Dissolved			96.6		%		70-130	23-JUL-19
Thorium (Th)-Dissolved			92.5		%		70-130	23-JUL-19
Tin (Sn)-Dissolved			106.1		%		70-130	23-JUL-19
Titanium (Ti)-Dissolved			100.4		%		70-130	23-JUL-19
Tungsten (W)-Dissolved			96.1		%		70-130	23-JUL-19
Vanadium (V)-Dissolved			108.6		%		70-130	23-JUL-19
Zinc (Zn)-Dissolved			97.1		%		70-130	23-JUL-19
Zirconium (Zr)-Dissolved			110.4		%		70-130	23-JUL-19
MET-T-CCMS-WT	**Water**							

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4720938								
WG3112558-4 DUP		**WG3112558-3**						
Aluminum (Al)-Total		<0.050	<0.050	RPD-NA	mg/L	N/A	20	23-JUL-19
Antimony (Sb)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	23-JUL-19
Arsenic (As)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	23-JUL-19
Barium (Ba)-Total		0.0356	0.0348		mg/L	2.4	20	23-JUL-19
Beryllium (Be)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	23-JUL-19
Bismuth (Bi)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	23-JUL-19
Boron (B)-Total		<0.10	<0.10	RPD-NA	mg/L	N/A	20	23-JUL-19
Cadmium (Cd)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	23-JUL-19
Calcium (Ca)-Total		362	363		mg/L	0.5	20	23-JUL-19
Chromium (Cr)-Total		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	23-JUL-19
Cesium (Cs)-Total		0.00010	0.00011		mg/L	5.8	20	23-JUL-19
Cobalt (Co)-Total		0.0097	0.0098		mg/L	1.4	20	23-JUL-19
Copper (Cu)-Total		0.012	0.012		mg/L	0.8	20	23-JUL-19
Iron (Fe)-Total		1.56	1.60		mg/L	2.5	20	23-JUL-19
Lead (Pb)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	23-JUL-19
Lithium (Li)-Total		0.071	0.072		mg/L	1.4	20	23-JUL-19
Magnesium (Mg)-Total		551	563		mg/L	2.2	20	23-JUL-19
Manganese (Mn)-Total		8.57	8.43		mg/L	1.7	20	23-JUL-19
Molybdenum (Mo)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	23-JUL-19
Nickel (Ni)-Total		0.0098	0.0100		mg/L	2.3	20	23-JUL-19
Phosphorus (P)-Total		<0.50	<0.50	RPD-NA	mg/L	N/A	20	23-JUL-19
Potassium (K)-Total		7.48	7.58		mg/L	1.3	20	23-JUL-19
Rubidium (Rb)-Total		0.0122	0.0130		mg/L	6.2	20	23-JUL-19
Selenium (Se)-Total		0.00674	0.00667		mg/L	1.0	20	23-JUL-19
Silicon (Si)-Total		<1.0	<1.0	RPD-NA	mg/L	N/A	20	23-JUL-19
Silver (Ag)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	23-JUL-19
Sodium (Na)-Total		5.46	5.54		mg/L	1.5	20	23-JUL-19
Strontium (Sr)-Total		0.974	0.930		mg/L	4.7	20	23-JUL-19
Sulfur (S)-Total		1080	1080		mg/L	0.1	25	23-JUL-19
Thallium (Tl)-Total		0.00026	0.00028		mg/L	8.0	20	23-JUL-19
Tellurium (Te)-Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	23-JUL-19
Thorium (Th)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	25	23-JUL-19
Tin (Sn)-Total		<0.0010	<0.0010		mg/L			23-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4720938								
WG3112558-4 DUP		**WG3112558-3**						
Tin (Sn)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	23-JUL-19
Titanium (Ti)-Total		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	23-JUL-19
Tungsten (W)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	23-JUL-19
Uranium (U)-Total		0.00019	0.00020		mg/L	6.4	20	23-JUL-19
Vanadium (V)-Total		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	23-JUL-19
Zinc (Zn)-Total		<0.030	<0.030	RPD-NA	mg/L	N/A	20	23-JUL-19
Zirconium (Zr)-Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	23-JUL-19
WG3112558-2 LCS								
Aluminum (Al)-Total			95.2		%		80-120	23-JUL-19
Antimony (Sb)-Total			98.7		%		80-120	23-JUL-19
Arsenic (As)-Total			92.1		%		80-120	23-JUL-19
Barium (Ba)-Total			90.0		%		80-120	23-JUL-19
Beryllium (Be)-Total			94.4		%		80-120	23-JUL-19
Bismuth (Bi)-Total			89.7		%		80-120	23-JUL-19
Boron (B)-Total			94.6		%		80-120	23-JUL-19
Cadmium (Cd)-Total			92.2		%		80-120	23-JUL-19
Calcium (Ca)-Total			95.3		%		80-120	23-JUL-19
Chromium (Cr)-Total			93.8		%		80-120	23-JUL-19
Cesium (Cs)-Total			98.1		%		80-120	23-JUL-19
Cobalt (Co)-Total			92.8		%		80-120	23-JUL-19
Copper (Cu)-Total			91.5		%		80-120	23-JUL-19
Iron (Fe)-Total			92.7		%		80-120	23-JUL-19
Lead (Pb)-Total			91.7		%		80-120	23-JUL-19
Lithium (Li)-Total			96.7		%		80-120	23-JUL-19
Magnesium (Mg)-Total			93.5		%		80-120	23-JUL-19
Manganese (Mn)-Total			93.7		%		80-120	23-JUL-19
Molybdenum (Mo)-Total			96.8		%		80-120	23-JUL-19
Nickel (Ni)-Total			92.1		%		80-120	23-JUL-19
Phosphorus (P)-Total			94.4		%		70-130	23-JUL-19
Potassium (K)-Total			92.6		%		80-120	23-JUL-19
Rubidium (Rb)-Total			94.6		%		80-120	23-JUL-19
Selenium (Se)-Total			92.8		%		80-120	23-JUL-19
Silicon (Si)-Total			96.7		%		60-140	23-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4720938								
WG3112558-2 LCS								
Silver (Ag)-Total			91.8		%		80-120	23-JUL-19
Sodium (Na)-Total			99.5		%		80-120	23-JUL-19
Strontium (Sr)-Total			95.9		%		80-120	23-JUL-19
Sulfur (S)-Total			90.7		%		80-120	23-JUL-19
Thallium (Tl)-Total			91.1		%		80-120	23-JUL-19
Tellurium (Te)-Total			91.7		%		80-120	23-JUL-19
Thorium (Th)-Total			87.9		%		70-130	23-JUL-19
Tin (Sn)-Total			93.4		%		80-120	23-JUL-19
Titanium (Ti)-Total			89.4		%		80-120	23-JUL-19
Tungsten (W)-Total			89.4		%		80-120	23-JUL-19
Uranium (U)-Total			90.7		%		80-120	23-JUL-19
Vanadium (V)-Total			95.4		%		80-120	23-JUL-19
Zinc (Zn)-Total			90.4		%		80-120	23-JUL-19
Zirconium (Zr)-Total			95.4		%		80-120	23-JUL-19
WG3112558-1 MB								
Aluminum (Al)-Total			<0.0050		mg/L		0.005	23-JUL-19
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	23-JUL-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	23-JUL-19
Barium (Ba)-Total			<0.00010		mg/L		0.0001	23-JUL-19
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	23-JUL-19
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	23-JUL-19
Boron (B)-Total			<0.010		mg/L		0.01	23-JUL-19
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	23-JUL-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	23-JUL-19
Chromium (Cr)-Total			<0.00050		mg/L		0.0005	23-JUL-19
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	23-JUL-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	23-JUL-19
Copper (Cu)-Total			<0.0010		mg/L		0.001	23-JUL-19
Iron (Fe)-Total			<0.010		mg/L		0.01	23-JUL-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	23-JUL-19
Lithium (Li)-Total			<0.0010		mg/L		0.001	23-JUL-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	23-JUL-19
Manganese (Mn)-Total			<0.00050		mg/L		0.0005	23-JUL-19
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	23-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4720938								
WG3112558-1 MB								
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	23-JUL-19
Phosphorus (P)-Total			<0.050		mg/L		0.05	23-JUL-19
Potassium (K)-Total			<0.050		mg/L		0.05	23-JUL-19
Rubidium (Rb)-Total			<0.00020		mg/L		0.0002	23-JUL-19
Selenium (Se)-Total			<0.000050		mg/L		0.00005	23-JUL-19
Silicon (Si)-Total			<0.10		mg/L		0.1	23-JUL-19
Silver (Ag)-Total			<0.000050		mg/L		0.00005	23-JUL-19
Sodium (Na)-Total			<0.050		mg/L		0.05	23-JUL-19
Strontium (Sr)-Total			<0.0010		mg/L		0.001	23-JUL-19
Sulfur (S)-Total			<0.50		mg/L		0.5	23-JUL-19
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	23-JUL-19
Tellurium (Te)-Total			<0.00020		mg/L		0.0002	23-JUL-19
Thorium (Th)-Total			<0.00010		mg/L		0.0001	23-JUL-19
Tin (Sn)-Total			<0.00010		mg/L		0.0001	23-JUL-19
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	23-JUL-19
Tungsten (W)-Total			<0.00010		mg/L		0.0001	23-JUL-19
Uranium (U)-Total			<0.000010		mg/L		0.00001	23-JUL-19
Vanadium (V)-Total			<0.00050		mg/L		0.0005	23-JUL-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	23-JUL-19
Zirconium (Zr)-Total			<0.00020		mg/L		0.0002	23-JUL-19
WG3112558-5 MS		**WG3112558-3**						
Aluminum (Al)-Total			104.7		%		70-130	23-JUL-19
Antimony (Sb)-Total			100.5		%		70-130	23-JUL-19
Arsenic (As)-Total			100.0		%		70-130	23-JUL-19
Barium (Ba)-Total			N/A	MS-B	%		-	23-JUL-19
Beryllium (Be)-Total			93.7		%		70-130	23-JUL-19
Bismuth (Bi)-Total			93.7		%		70-130	23-JUL-19
Boron (B)-Total			89.8		%		70-130	23-JUL-19
Cadmium (Cd)-Total			97.4		%		70-130	23-JUL-19
Calcium (Ca)-Total			N/A	MS-B	%		-	23-JUL-19
Chromium (Cr)-Total			99.4		%		70-130	23-JUL-19
Cesium (Cs)-Total			103.3		%		70-130	23-JUL-19
Cobalt (Co)-Total			100.6		%		70-130	23-JUL-19
Copper (Cu)-Total			95.5		%		70-130	23-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4720938								
WG3112558-5 MS		**WG3112558-3**						
Iron (Fe)-Total			N/A	MS-B	%		-	23-JUL-19
Lead (Pb)-Total			96.5		%		70-130	23-JUL-19
Lithium (Li)-Total			N/A	MS-B	%		-	23-JUL-19
Magnesium (Mg)-Total			N/A	MS-B	%		-	23-JUL-19
Manganese (Mn)-Total			N/A	MS-B	%		-	23-JUL-19
Molybdenum (Mo)-Total			106.1		%		70-130	23-JUL-19
Nickel (Ni)-Total			98.3		%		70-130	23-JUL-19
Phosphorus (P)-Total			109.0		%		70-130	23-JUL-19
Potassium (K)-Total			N/A	MS-B	%		-	23-JUL-19
Rubidium (Rb)-Total			N/A	MS-B	%		-	23-JUL-19
Selenium (Se)-Total			99.4		%		70-130	23-JUL-19
Silicon (Si)-Total			N/A	MS-B	%		-	23-JUL-19
Silver (Ag)-Total			92.2		%		70-130	23-JUL-19
Sodium (Na)-Total			N/A	MS-B	%		-	23-JUL-19
Strontium (Sr)-Total			N/A	MS-B	%		-	23-JUL-19
Sulfur (S)-Total			N/A	MS-B	%		-	23-JUL-19
Thallium (Tl)-Total			95.3		%		70-130	23-JUL-19
Tellurium (Te)-Total			89.6		%		70-130	23-JUL-19
Thorium (Th)-Total			85.4		%		70-130	23-JUL-19
Tin (Sn)-Total			98.1		%		70-130	23-JUL-19
Titanium (Ti)-Total			96.6		%		70-130	23-JUL-19
Tungsten (W)-Total			95.7		%		70-130	23-JUL-19
Uranium (U)-Total			100.7		%		70-130	23-JUL-19
Vanadium (V)-Total			102.2		%		70-130	23-JUL-19
Zinc (Zn)-Total			100.1		%		70-130	23-JUL-19
Zirconium (Zr)-Total			94.9		%		70-130	23-JUL-19
NH3-F-WT	**Water**							
Batch R4722609								
WG3112577-31 DUP		**L2314517-1**						
Ammonia, Total (as N)		<0.010	<0.010	RPD-NA	mg/L	N/A	20	23-JUL-19
WG3112577-30 LCS								
Ammonia, Total (as N)			102.6		%		85-115	23-JUL-19
WG3112577-29 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	23-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NH3-F-WT	**Water**							
Batch R4722609								
WG3112577-32 MS		**L2314517-1**						
Ammonia, Total (as N)			103.4		%		75-125	23-JUL-19
NO3-IC-WT	**Water**							
Batch R4722912								
WG3112976-20 DUP		**WG3112976-18**						
Nitrate (as N)		<0.020	<0.020	RPD-NA	mg/L	N/A	20	23-JUL-19
WG3112976-17 LCS								
Nitrate (as N)			101.4		%		90-110	23-JUL-19
WG3112976-16 MB								
Nitrate (as N)			<0.020		mg/L		0.02	23-JUL-19
WG3112976-19 MS		**WG3112976-18**						
Nitrate (as N)			97.4		%		75-125	23-JUL-19
P-T-COL-WT	**Water**							
Batch R4723250								
WG3113044-3 DUP		**L2314517-1**						
Phosphorus, Total		0.0128	0.0138		mg/L	7.2	20	24-JUL-19
WG3113044-2 LCS								
Phosphorus, Total			94.6		%		80-120	24-JUL-19
WG3113044-1 MB								
Phosphorus, Total			<0.0030		mg/L		0.003	24-JUL-19
WG3113044-4 MS		**L2314517-1**						
Phosphorus, Total			95.5		%		70-130	24-JUL-19
PH-BF	**Water**							
Batch R4720327								
WG3112229-2 DUP		**L2314529-1**						
pH		8.78	8.80	J	pH units	0.02	0.2	22-JUL-19
WG3112229-1 LCS								
pH			7.02		pH units		6.9-7.1	22-JUL-19
SO4-IC-N-WT	**Water**							
Batch R4722912								
WG3112976-20 DUP		**WG3112976-18**						
Sulfate (SO4)		26.3	26.0		mg/L	1.4	20	23-JUL-19
WG3112976-17 LCS								
Sulfate (SO4)			102.2		%		90-110	23-JUL-19
WG3112976-16 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	23-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SO4-IC-N-WT	**Water**							
Batch R4722912								
WG3112976-19 MS		**WG3112976-18**						
Sulfate (SO4)			98.2		%		75-125	23-JUL-19
SOLIDS-TDS-BF	**Water**							
Batch R4721749								
WG3112265-3 DUP		**L2314537-15**						
Total Dissolved Solids		94	98		mg/L	4.3	20	23-JUL-19
WG3112265-2 LCS								
Total Dissolved Solids			101.5		%		85-115	23-JUL-19
WG3112265-1 MB								
Total Dissolved Solids			<20		mg/L		20	23-JUL-19
SOLIDS-TSS-BF	**Water**							
Batch R4720360								
WG3112200-3 DUP		**L2314529-1**						
Total Suspended Solids		6.0	7.0		mg/L	15	25	22-JUL-19
WG3112200-2 LCS								
Total Suspended Solids			100.4		%		85-115	22-JUL-19
WG3112200-1 MB								
Total Suspended Solids			<2.0		mg/L		2	22-JUL-19
TKN-WT	**Water**							
Batch R4725369								
WG3114407-3 DUP		**L2313202-10**						
Total Kjeldahl Nitrogen		0.22	0.23		mg/L	5.8	20	25-JUL-19
WG3114407-2 LCS								
Total Kjeldahl Nitrogen			98.2		%		75-125	25-JUL-19
WG3114407-1 MB								
Total Kjeldahl Nitrogen			<0.15		mg/L		0.15	25-JUL-19
WG3114407-4 MS		**L2313202-10**						
Total Kjeldahl Nitrogen			100.9		%		70-130	25-JUL-19
TOC-WT	**Water**							
Batch R4722415								
WG3113015-3 DUP		**L2314517-1**						
Total Organic Carbon		2.21	2.07		mg/L	6.6	20	23-JUL-19
WG3113015-2 LCS								
Total Organic Carbon			106.6		%		80-120	23-JUL-19
WG3113015-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	23-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TOC-WT	**Water**							
Batch R4722415								
WG3113015-4 MS		**L2314517-1**						
Total Organic Carbon			104.6		%		70-130	23-JUL-19
TURBIDITY-BF	**Water**							
Batch R4720333								
WG3112231-3 DUP		**L2314507-1**						
Turbidity		1.26	1.19		NTU	5.7	15	22-JUL-19
WG3112231-2 LCS								
Turbidity			103.0		%		85-115	22-JUL-19
WG3112231-1 MB								
Turbidity			<0.10		NTU		0.1	22-JUL-19

Quality Control Report

Workorder: L2314529 Report Date: 28-AUG-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

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

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

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.

Wednesday, August 07, 2019

Rick Hawthorne
ALS Environmental
60 Northland Rd, Unit 1
Waterloo Canada, ON N2V 2B8

Re: ALS Workorder: 1907480
Project Name:
Project Number: L2314529

Dear Mr. Hawthorne:

One water sample was received from ALS Environmental, on 7/24/2019. The sample was scheduled for the following analysis:

Radium-226

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,

ALS Environmental
Katie M. OBrien
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
AIHA	214884
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280

1907480

Radium-226:
The sample was prepared and analyzed according to the current revision of SOP 783.

Due to a high background count and low efficiency calibration for the cell and detector used to analyze the method blank, the requested MDC was not met for the method blank. Results are submitted without further qualification.

All remaining acceptance criteria were met.

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1907480
Client Name: ALS Environmental
Client Project Name:
Client Project Number: L2314529
Client PO Number: L2314529

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
L2314529-1	1907480-1		WATER	22-Jul-19	

ALS Environmental

L2314529

WATERLOO

1907480

Subcontract Request Form

Subcontract To:

ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
225 COMMERCE DRIVE
FORT COLLINS,CO 80524

NOTES: Please reference on final report and invoice: PO# *L2314529*
ALS requires QC data to be provided with your final results.

Please see enclosed 1 **sample(s) in** 1 **Container(s)**

SAMPLE NUMBER	ANALYTICAL REQUIRED	DATE SAMPLED / DUE DATE	Priority Flag
L2314529-1 MS-08		7/22/2019	**E**
	Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	8/14/2019	

Subcontract Info Contact: Mary-Lynn Pike (519) 886-6910
Analysis and reporting info contact: Rick Hawthorne
60 NORTHLAND ROAD, UNIT 1
WATERLOO,ON N2V 2B8
Phone: (519) 886-6910 Email: Rick.Hawthorne@alsglobal.com

Please email confirmation of receipt to: **Rick.Hawthorne@alsglobal.com**

Shipped By: _____ Date Shipped: _____

Received By: Ent E Date Received: 7/24/19 1600

Verified By: _____ Date Verified: _____

Temperature: _____

Sample Integrity Issues: _____

ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: ALS Waterloo Workorder No: 1907480

Project Manager: KMO Initials: EE Date: 7/24/19

1.	Are airbills / shipping documents present and/or removable?	DROP OFF	YES	NO
2.	Are custody seals on **shipping** containers intact?	NONE	YES	NO *
3.	Are custody seals on **sample** containers intact?	NONE	YES	NO *
4.	Is there a COC (chain-of-custody) present?		YES	NO *
5.	Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)		YES	NO *
6.	Are short-hold samples present?		YES	NO
7.	Are all samples within holding times for the requested analyses?		YES	NO *
8.	Were all sample containers received intact? (not broken or leaking)		YES	NO *
9.	Is there sufficient sample for the requested analyses?		YES	NO *
10.	Are all samples in the proper containers for the requested analyses?		YES	NO *
11.	Are all aqueous samples preserved correctly, if required? (excluding volatiles)	N/A	YES	NO *
12.	Are all aqueous non-preserved samples pH 4-9?	N/A	YES	NO *
13.	Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm (1/4 inch) diameter? (i.e. size of green pea)	N/A	YES	NO
14.	Were the samples shipped on ice?		YES	NO
15.	Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: #1 #3 #4	RAD ONLY	YES	NO

Cooler #:	1							
Temperature (°C):	9.3							
No. of custody seals on cooler:	0							
DOT Survey/ Acceptance Information — External µR/hr reading:	7							
Background µR/hr reading:	9							

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? **YES / NO / NA** (If no, see Form 008.)

*** Please provide details here for NO responses to gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.**

All client bottle ID's vs ALS lab ID's double-checked by: EE

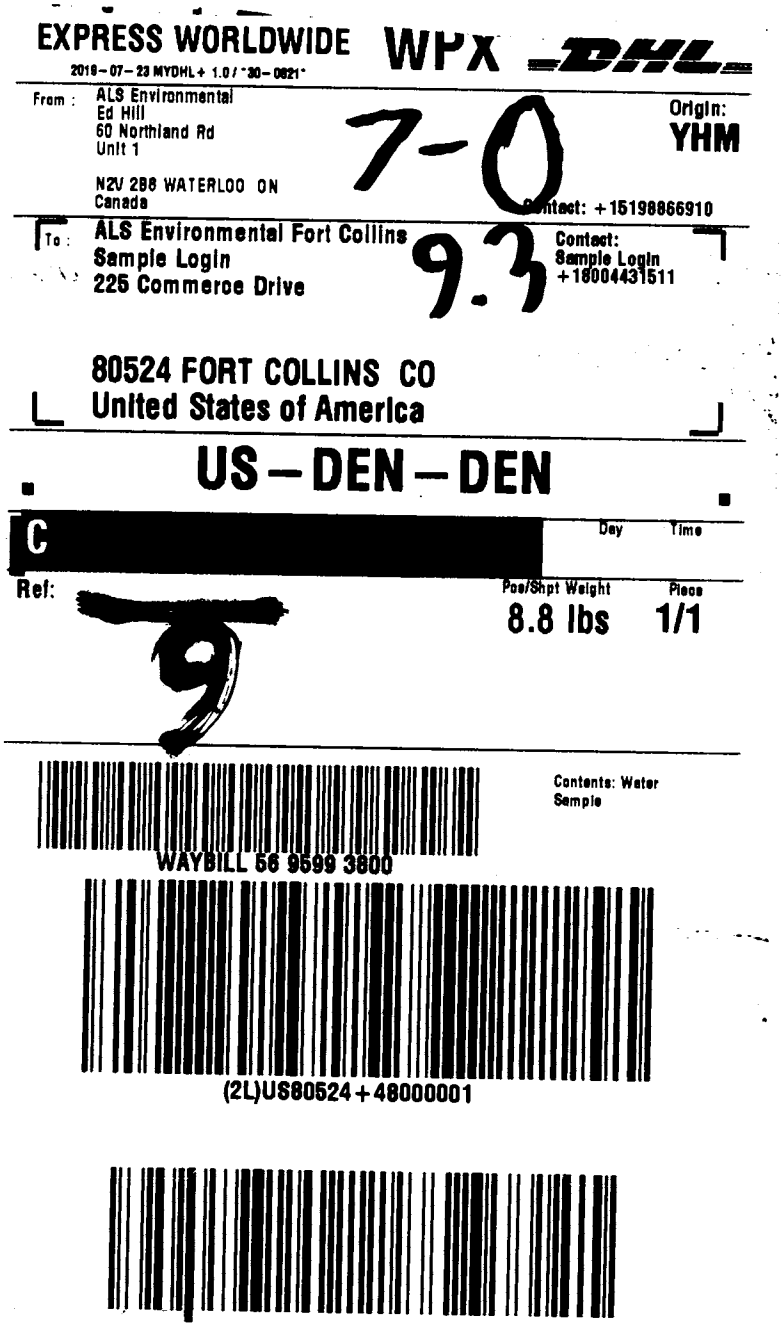
If applicable, was the client contacted? **YES / NO / NA** Contact: _____ Date/Time: _____

Project Manager Signature / Date: 7/25/19

Form 201r27.xls
(02/11/2019)

*IR Gun #1, VWR SN 170560549
*IR Gun #3, VWR SN 170647571
*IR Gun #4, Oakton, SN 2372220101-0002

KO 7480


EXPRESS WORLDWIDE
WPX
DHL
2018-07-23 MYDHL+ 1.0 / *30-0621*
From :
ALS Environmental
Ed Hill
60 Northland Rd
Unit 1
N2V 2B8 WATERLOO ON
Canada
7-0
Origin:
YHM
Contact: +15198866910
To :
ALS Environmental Fort Collins
Sample Login
225 Commerce Drive
9.3
Contact:
Sample Login
+18004431511
80524 FORT COLLINS CO
United States of America
US-DEN-DEN
C
Dey
Time
Ref:
9
Pce/Shpt Weight
8.8 lbs
Piece
1/1
Contents: Water Sample
WAYBILL 56 9599 3800
(2L)US80524+48000001

Client:	ALS Environmental	**Date:**	*07-Aug-19*
Project:	L2314529	**Work Order:**	1907480
Sample ID:	L2314529-1	**Lab ID:**	1907480-1
Legal Location:		**Matrix:**	WATER
Collection Date:	7/22/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **7/31/2019**		PrepBy: **JXH**
Ra-226	**0.060 (+/- 0.019)**		**0.0086**	**BQ/l**	NA	8/7/2019 11:38
Carr: BARIUM	*96.8*		*40-110*	*%REC*	DL = NA	8/7/2019 11:38

Client:	ALS Environmental	**Date:**	*07-Aug-19*
Project:	L2314529	**Work Order:**	1907480
Sample ID:	L2314529-1	**Lab ID:**	1907480-1
Legal Location:		**Matrix:**	WATER
Collection Date:	7/22/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed

Explanation of Qualifiers

Radiochemistry:

- "Report Limit" is the MDC

U or ND - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

Y2 - Chemical Yield outside default limits.

W - DER is greater than Warning Limit of 1.42

* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.
# - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.
G - Sample density differs by more than 15% of LCS density.
D - DER is greater than Control Limit

M - Requested MDC not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS, Matrix Spike Recovery within control limits.

N - Matrix Spike Recovery outside control limits

NC - Not Calculated for duplicate results less than 5 times MDC

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

Inorganics:

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).

U or ND - Indicates that the compound was analyzed for but not detected.

E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.

M - Duplicate injection precision was not met.

N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.

Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.

* - Duplicate analysis (relative percent difference) not within control limits.

S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

Organics:

U or ND - Indicates that the compound was analyzed for but not detected.

B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.

E - Analyte concentration exceeds the upper level of the calibration range.

J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).

A - A tentatively identified compound is a suspected aldol-condensation product.

X - The analyte was diluted below an accurate quantitation level.

* - The spike recovery is equal to or outside the control criteria used.

+ - The relative percent difference (RPD) equals or exceeds the control criteria.

G - A pattern resembling gasoline was detected in this sample.

D - A pattern resembling diesel was detected in this sample.

M - A pattern resembling motor oil was detected in this sample.

C - A pattern resembling crude oil was detected in this sample.

4 - A pattern resembling JP-4 was detected in this sample.

5 - A pattern resembling JP-5 was detected in this sample.

H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.

L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.

Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
- gasoline
- JP-8
- diesel
- mineral spirits
- motor oil
- Stoddard solvent
- bunker C

QC BATCH REPORT

Batch ID: **RE190731-1-1** Instrument ID **Alpha Scin** Method: **Radium-226 by Radon Emanation**

LCS Sample ID: **RE190731-1** Units: **BQ/l** Analysis Date: **8/7/2019 12:50**

Client ID: Run ID: **RE190731-1A** Prep Date: **7/31/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.72 (+/- 0.433)	0.0128	1.72		100	67-120					P,M3
Carr: BARIUM	15200		16400		92.9	40-110					

LCSD Sample ID: **RE190731-1** Units: **BQ/l** Analysis Date: **8/7/2019 12:50**

Client ID: Run ID: **RE190731-1A** Prep Date: **7/31/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.71 (+/- 0.429)	0.0254	1.72		99.6	67-120		1.72	0.01	2.1	P,M3
Carr: BARIUM	15400		16400		93.6	40-110		15200			

MB Sample ID: **RE190731-1** Units: **BQ/l** Analysis Date: **8/7/2019 12:14**

Client ID: Run ID: **RE190731-1A** Prep Date: **7/31/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	-0.00058 (+/- 0.0053)	0.011									U,M
Carr: BARIUM	15600		16400		95	40-110					

The following samples were analyzed in this batch: 1907480-1

AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

August 23, 2019

Rick Hawthorne
ALS Laboratory Group, Waterloo
60 Northland Road, Unit #1
Waterloo ON
N2V 2B8

Dear Rick,

Re: Report on Sublethal Toxicity Analysis of Wastewater for MDMER - July 2019

Enclosed are the reports for sublethal testing conducted on the sample of MS-08 L2314529-1 collected 2019-07-22 . Data are presented in electronic format.

You have previously provided us with an 'ECCC Key' to access MERS (Mining Effluent Reporting System). We would be pleased to enter this sublethal toxicity information on your behalf via MERS. In order for us to do so, you must first create the report 'Information related to effluent and water quality monitoring studies' in MERS. Once created, please indicate this in an email to reporter@aquatox.ca. We will enter the test data, and will notify you by email once data entry has been completed, however you are responsible for final submission of the data, as we do not have permissions to release the report.

If you have any questions about the results, do not hesitate to contact me.

Sincerely,

AQUATOX TESTING & CONSULTING INC.

Martina Rendas

Project Manager

MR/jl

AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

TOXICITY TEST REPORT

Fathead minnow
EPS 1/RM/22

Work Order : 239827
Sample Number : 59990

SAMPLE IDENTIFICATION

Company :	ALS Laboratory Group, Waterloo	Sampled By :	BW/RH
Location :	Waterloo ON	Date Collected :	2019-07-22
Job Number :	L2314529-1	Time Collected :	10:30
Substance :	MS-08 L2314529-1	Date Received :	2019-07-23
Sampling Method :	Grab	Time Received :	10:45
Temp. on arrival :	12.0°C	Date Tested :	2019-07-24
Sample Description :	Clear, yellow, odourless		
Test Method :	Test of Larval Growth and Survival Using Fathead Minnows. Environment Canada, Conservation and Protection. Ottawa, Ontario. Report EPS 1/RM/22 , 2nd ed. (February 2011).		

TEST RESULTS

Effect	Value	95% Confidence Limits	Statistical Method
IC25 (Growth from Biomass)	>100%	-	-
LC50	>100%	-	-

The results reported relate only to the sample tested and as received.

POTASSIUM CHLORIDE REFERENCE TOXICANT DATA

Date Tested :	2019-07-23		
Test Duration :	7 days	Analyst(s) :	MDH, KJW, TL
IC25 (Growth from Biomass):	1.01 g/L	LC50 :	1.23 g/L
95% Confidence Limits :	0.91 - 1.09 g/L	95% Confidence Limits :	1.15 - 1.31 g/L
Statistical Method :	Non-Linear Regression (CETIS)[a]	Statistical Method :	Linear Regression (MLE) (CETIS)[a]
Historical Mean IC25 :	0.93 g/L	Historical Mean LC50 :	1.07 g/L
Warning Limits (± 2SD) :	0.70 - 1.22 g/L	Warning Limits (± 2SD) :	0.92 - 1.25 g/L

The reference toxicity test was performed under the same experimental conditions as those used with the test sample.

TEST CONDITIONS

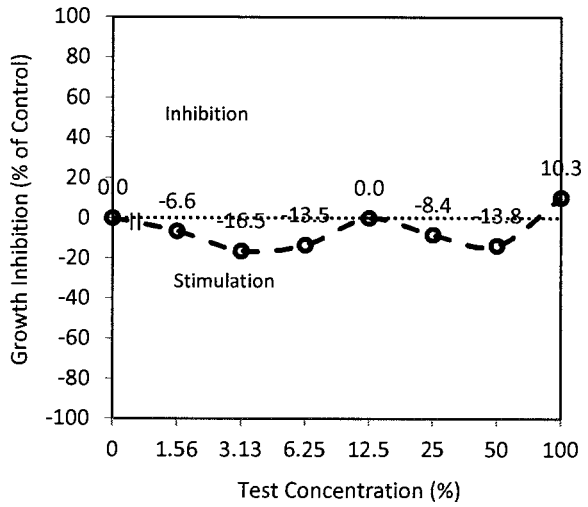
Test Organism :	*Pimephales promelas*	Test Type :	Static Renewal
Organism Batch :	Fm19-07	Control/Dilution Water :	Well water (no chemicals added)
Organism Age :	~07:00 - 20:10 h at start of test	Test Volume / Replicate :	300 mL
Source :	In-house culture	Test Vessel :	420 mL polystyrene beaker
Culture Mortality/Diseased :	0.77 % (previous 7 days)	Depth of Test Solution :	8 cm
pH Adjustment :	None	Organisms per Replicate :	10
Sample Filtration :	None	Number of Replicates :	3
Hardness Adjustment :	None	Daily Renewal Method :	80-85% syphoned and replaced
Test Aeration :	None	Test Method Deviation(s):	None

COMMENTS

- All test validity criteria as specified in the test method cited above were satisfied.
- No organisms exhibiting unusual appearance, behaviour, or undergoing unusual treatment were used in the test.
- Inflated swim bladders were confirmed in all test organisms used in this test.

Work Order : 239827
Sample Number : 59990

Fathead Minnow Growth Inhibition (based on Biomass)



REFERENCES

[a] CETIS™, © 2000-2018. V.1.9.4.7. Comprehensive Environmental Toxicity Information System. Tidepool Scientific Software, LLC, McKinleyville, CA 95519 [Program on disk and printed User's Guide].

[b]Grubbs, F.E., 1969. Procedures for detecting outlying observations in samples. *Technometrics, 11*:1-21.

Date : 2019-08-23
yyyy-mm-dd

Approved By : _____
Project Manager

Work Order : 239827
Sample Number : 59990

CUMULATIVE DAILY CONTROL MORTALITY AND IMPAIRMENT (±SD)

Date :	2019-07-24	2019-07-25	2019-07-26	2019-07-27	2019-07-28	2019-07-29	2019-07-30	2019-07-31
	0.00% (±0.0)	0.00% (±0.0)	0.00% (±0.0)	0.00% (±0.0)	0.00% (±0.0)	0.00% (±0.0)	0.00% (±0.0)	0.00% (±0.0)

FATHEAD MINNOW CUMULATIVE DAILY MORTALITY

Initiation Time : 12:00
Initiation Date : 2019-07-24
Completion Date : 2019-07-31

		Day 0		Day 1		Day 2		Day 3		Day 4		Day 5		Day 6		Day 7		Treatment Mean Mortality (± SD)
Date :		2019-07-24		2019-07-25		2019-07-26		2019-07-27		2019-07-28		2019-07-29		2019-07-30		2019-07-31		
Analyst(s):		XD		MW		MJT		JL		AW		MJT		SEW		KJW(SEW)		
Concentration		Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	Number	%	%
(%)	**Replicate**	Dead	**Dead**	Dead	**Dead**	Dead	**Dead**	Dead	**Dead**	Dead	**Dead**	Dead	**Dead**	Dead	**Dead**	Dead	**Dead**	
	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
Control	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**0.00 (±0.00)**
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
1.56	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**3.33 (±5.77)**
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	1	**10**	
	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
3.13	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**0.00 (±0.00)**
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
6.25	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**0.00 (±0.00)**
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
12.5	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**0.00 (±0.00)**
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
25	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**0.00 (±0.00)**
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
50	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**0.00 (±0.00)**
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
	A	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	
100	B	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	**0.00 (±0.00)**
	C	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	0	**0**	

Aberrant behaviour or swimming impairment : None

Test Data Reviewed By: JL
Date : 2019-08-16

Work Order : 239827
Sample Number : 59990

FATHEAD MINNOW DRY WEIGHT AND BIOMASS DATA

Concentration (%)	Replicate	Number of Larvae Exposed	Replicate Mean Dry Weight (mg)	Treatment Mean Biomass (mg)	Standard Deviation
Control	A	10	0.752	0.817	0.066
	B	10	0.883		
	C	10	0.816		
1.56	A	10	0.897	0.871	0.023
	B	10	0.859		
	C	10	0.856		
3.13	A	10	0.891	0.952	0.116
	B	10	1.085		
	C	10	0.879		
6.25	A	10	0.899	0.927	0.029
	B	10	0.956		
	C	10	0.927		
12.5	A	10	0.675	0.817	0.130
	B	10	0.847		
	C	10	0.930		
25	A	10	0.910	0.886	0.066
	B	10	0.811		
	C	10	0.937		
50	A	10	0.946	0.930	0.026
	B	10	0.943		
	C	10	0.900		
100	A	10	0.652	0.733	0.086
	B	10	0.722		
	C	10	0.824		

NOTES :
- No outlying data points were detected according to Grubbs Test [b].
- Control average dry weight per surviving organism = 0.817 mg

Test Data Reviewed By: JC
Date : 2019-08-16

Work Order : 239827
Sample Number: 59990

WATER CHEMISTRY DATA

Initial Chemistry:	Temp. (°C)	DO (mg/L)	pH	Conductivity (µmhos/cm)	Hardness (mg/L as $CaCO_3$)
	25.0	7.9	8.5	4520	1460

		Day 0 - 1 2019-07-24	Day 1 - 2 2019-07-25	Day 2 - 3 2019-07-26	Day 3 - 4 2019-07-27	Day 4 - 5 2019-07-28	Day 5 - 6 2019-07-29	Day 6 - 7 2019-07-30
Sub-sample Used		1	1	1	2	2	3	3
Temperature (°C)		25.0	24.0	24.5	24.0	25.0	24.0	25.0
Dissolved Oxygen (mg/L)		7.9	9.0	9.2	8.7	8.4	8.6	8.9
Dissolved Oxygen % Sat.[2]		95	105	110	103	106	103	108
pH		8.5	8.5	8.4	8.5	8.4	8.4	8.4
Pre-aeration Time (min)[3]		0	20	20	20	20	20	20
Analyst(s) :	Initial	MJT	RK	KJW(SEW)	RK	RK	MV	MV
	Final	MJT	MJT	AW	JL	MJT	SEW	KJW(SEW)
Control (0%)								
Temp.(°C)	Initial	24.0	25.0	25.0	25.0	24.0	24.0	25.0
	Final	24.0	24.5	25.0	25.0	24.0	25.0	24.0
DO % Sat.	Initial	98	99	100	98	99	101	100
DO (mg/L)	Initial	8.1	8.1	8.2	8.1	8.2	8.4	8.1
	Final	8.0	7.5	7.4	6.4	6.9	7.1	7.2
pH	Initial	8.3	8.4	8.4	8.4	8.4	8.4	8.4
	Final	8.2	8.2	8.2	8.0	8.1	8.1	8.0
Cond. (µmhos/cm)	Initial	782	749	745	736	754	753	808
1.56 %								
Temp.(°C)	Initial	24.0	25.0	25.0	25.0	24.0	24.0	25.0
	Final	24.0	24.5	25.0	25.0	24.0	25.0	24.0
DO (mg/L)	Initial	8.2	8.1	8.2	8.1	8.3	8.3	8.1
	Final	8.1	7.5	7.6	6.0	6.9	6.5	7.2
pH	Initial	8.4	8.3	8.4	8.5	8.4	8.4	8.4
	Final	8.2	8.2	8.2	7.9	8.0	8.0	8.0
Cond. (µmhos/cm)	Initial	826	829	830	823	840	849	897
25 %								
Temp.(°C)	Initial	24.0	25.0	25.0	25.0	24.0	24.0	25.0
	Final	24.0	24.5	25.0	25.0	24.0	25.0	24.0
DO (mg/L)	Initial	8.2	8.2	8.3	8.2	8.2	8.3	8.2
	Final	7.9	7.5	7.7	6.4	6.9	6.5	7.0
pH	Initial	8.2	8.2	8.2	8.3	8.3	8.2	8.2
	Final	8.0	8.0	8.0	7.9	7.9	7.7	7.8
Cond. (µmhos/cm)	Initial	1895	1901	1900	1886	1919	1940	1957
100 %								
Temp.(°C)	Initial	24.0	25.0	25.0	25.0	24.0	24.0	25.0
	Final	24.0	24.5	25.0	25.0	24.0	25.0	24.0
DO (mg/L)	Initial	8.0	8.5	8.5	8.4	8.6	8.3	8.6
	Final	8.0	7.5	7.3	6.2	6.8	6.5	7.4
pH	Initial	8.4	8.3	8.1	8.4	8.4	8.2	8.1
	Final	7.3	7.5	7.2	7.0	7.2	7.1	7.0
Cond. (µmhos/cm)	Initial	4540	4540	4560	4540	4530	4540	4550

"--" = not measured

[2] % saturation (adjusted for actual temperature and barometric pressure)

[3] ≤100 bubbles/minute

Test Data Reviewed By: _____
Date: 2019-08-16

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Tel. (519) 763-4412
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TOXICITY TEST REPORT

Ceriodaphnia dubia
EPS 1/RM/21

Work Order : 239827
Sample Number : 59990

SAMPLE IDENTIFICATION

Company :	ALS Laboratory Group, Waterloo		
Location :	Waterloo ON	Date Collected :	2019-07-22
Substance :	MS-08 L2314529-1	Time Collected :	10:30
Sampling Method :	Grab	Date Received :	2019-07-23
Sampled By :	BW/RH	Time Received :	10:45
Temp. on arrival :	12.0°C	Date Tested :	2019-07-24
Sample Description :	Clear, yellow, odourless		

Test Method : Test of Reproduction and Survival using the Cladoceran *Ceriodaphnia dubia*. Environment Canada, Conservation and Protection. Ottawa, Ontario. Report EPS 1/RM/21, 2nd ed. (February 2007).

TEST RESULTS

Effect	Value	95% Confidence Limits	Statistical Method
LC50	>100%	-	-
IC25 (Reproduction)	26.8%	13.8-30.2	Linear Interpolation (CETIS) a

The results reported relate only to the sample tested and as received.

SODIUM CHLORIDE REFERENCE TOXICANT DATA

Date Tested :	2019-07-23		
Test Duration :	6 days	Analyst(s) :	RK
IC25 Reproduction :	1.36 g/L	LC50 :	2.32 g/L
95% Confidence Limits :	0.88 - 1.51 g/L	95% Confidence Limits :	1.88 - 2.87 g/L
Statistical Method :	Linear Interpolation (CETIS)[a]	Statistical Method :	Linear Regression (MLE) (CETIS)[a]
Historical Mean IC25 :	1.26 g/L	Historical Mean LC50 :	2.19 g/L
Warning Limits (± 2SD) :	0.76 - 2.11 g/L	Warning Limits (± 2SD) :	1.55 - 3.09 g/L

The reference toxicity test was performed under the same experimental conditions as those used with the test sample.

TEST CONDITIONS

Sample Filtration :	None	Test Volume per Replicate :	15 mL
Test Aeration :	None	Test Vessel :	19 mL polystyrene vial
pH Adjustment :	None	Depth of Test Solution :	4.8 cm
Hardness Adjustment :	None	Organisms per Replicate :	1
Daily Renewal Method :	Transferred to fresh solutions	Number of Replicates :	10
Control/Dilution Water :	Well water (no chemicals added)	Test Method Deviation(s) :	None

COMMENTS

•All test validity criteria as specified in the test method cited above were satisfied.
•Statistical analysis could not be performed using non linear regression, since a suitable model could not be found. Therefore, test results were calculated using Linear Interpolation (CETIS)[a].

Work Order : 239827
Sample Number : 59990

TEST ORGANISMS

Test Organism :	*Ceriodaphnia dubia*	Range of Age (at start of test) :	07:40 h - 19:40 h
Organism Batch :	Cd19-07	Mean Brood Organism Mortality :	5%
Organism Origin :	Single in-house mass culture	Ephippia in Culture :	No
Test Organism Origin :	Individual in-house cultures		

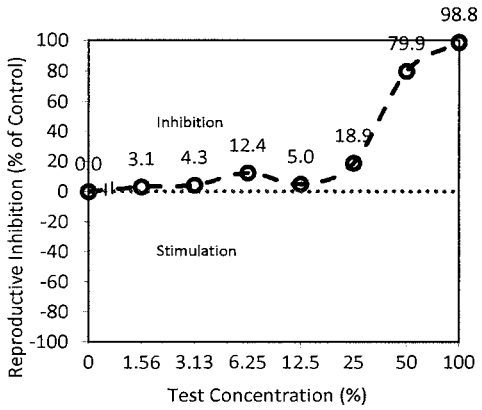
Brood Organism Neonate Production

Replicate :	1	2	3	4	5	6	7	8	9	10	Mean
Total (third or subsequent brood):	17	19	20	17	15	17	19	22	21	19	18.6
Total (first three broods):	25	29	24	23	24	27	25	26	25	28	25.6

No organisms exhibiting unusual appearance, behaviour, or undergoing unusual treatment were used in the test.

TEST DATA

***Ceriodaphnia dubia* Reproductive Inhibition**



Cumulative Daily Test Organism Mortality (%)

		Test Concentration (%)							
Date	**Test Day**	Control	1.56	3.13	6.25	12.5	25	50	100
2019-07-25	1	0	0	0	0	0	0	0	0
2019-07-26	2	0	0	0	0	0	0	0	0
2019-07-27	3	0	0	0	0	0	0	0	0
2019-07-28	4	0	0	0	0	0	0	10	10
2019-07-29	5	0	0	0	0	0	0	20	30
2019-07-30	6	0	0	0	0	0	0	20	30
Total Mortality (%)		0	0	0	0	0	0	20	30

REFERENCES

[a] CETIS™, © 2000-2018. V.1.9.4.7. Comprehensive Environmental Toxicity Information System. Tidepool Scientific Software, LLC, McKinleyville, CA 95519 [Program on disk and printed User's Guide].

Date : 2019-08-23
yyyy-mm-dd

Approved By : *Project Manager*

Work Order : 239827
Sample Number : 59990

Ceriodaphnia dubia Survival and Reproduction

Test Initiation Date : 2019-07-24
Initiation Time : 13:40
Test Completion Date : 2019-07-30

Concentration (%)		Replicate										Mean Young	Analyst(s)
Control	**Day**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**(±SD)**	
2019-07-25	1	0	0	0	0	0	0	0	0	0	0	0	XD
2019-07-26	2	0	0	0	0	0	0	0	0	0	0	0	MW
2019-07-27	3	0	0	0	7	0	0	0	0	0	0	0.7	AS
2019-07-28	4	4	7	0	0	6	4	7	2	2	4	3.6	BZ
2019-07-29	5	12	14	16	11	14	15	12	11	11	14	13	RK
2019-07-30	6	15	18	20	17	16	14	14	0	15	21	15	MJT
Total		**31**	**39**	**36**	**35**	**36**	**33**	**33**	**13**	**28**	**39**	**32.3 (±7.6)**	

Concentration (%)		Replicate										Mean Young
12.5	**Day**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**(±SD)**
2019-07-25	1	0	0	0	0	0	0	0	0	0	0	0
2019-07-26	2	0	0	0	0	0	0	0	0	0	0	0
2019-07-27	3	0	0	0	4	0	0	0	0	0	0	0.4
2019-07-28	4	3	7	3	0	6	0	5	0	6	8	3.8
2019-07-29	5	14	15	15	12	14	16	12	10	13	15	13.6
2019-07-30	6	15	17	12	18	17	15	17	0	1	17	12.9
Total		**32**	**39**	**30**	**34**	**37**	**31**	**34**	**10**	**20**	**40**	**30.7 (±9.2)**

Concentration (%)		Replicate										Mean Young
1.56	**Day**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**(±SD)**
2019-07-25	1	0	0	0	0	0	0	0	0	0	0	0
2019-07-26	2	0	0	0	0	0	0	0	0	0	0	0
2019-07-27	3	0	0	0	0	0	0	0	0	0	0	0
2019-07-28	4	5	6	1	4	6	7	4	6	6	8	5.3
2019-07-29	5	11	11	0	14	15	16	13	10	16	14	12
2019-07-30	6	18	19	3	17	20	16	14	0	16	17	14
Total		**34**	**36**	**4[1]**	**35**	**41**	**39**	**31**	**16**	**38**	**39**	**31.3 (±11.9)**

Concentration (%)		Replicate										Mean Young
25	**Day**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**(±SD)**
2019-07-25	1	0	0	0	0	0	0	0	0	0	0	0
2019-07-26	2	0	0	0	0	0	0	0	0	0	0	0
2019-07-27	3	0	0	0	0	0	0	0	0	0	0	0
2019-07-28	4	3	4	5	2	7	7	6	2	0	5	4.1
2019-07-29	5	11	14	16	9	12	13	13	11	6	14	11.9
2019-07-30	6	16	15	16	13	16	0	0	0	10	16	10.2
Total		**30**	**33**	**37**	**24**	**35**	**20**	**19**	**13**	**16**	**35**	**26.2 (±8.9)**

Concentration (%)		Replicate										Mean Young
3.13	**Day**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**(±SD)**
2019-07-25	1	0	0	0	0	0	0	0	0	0	0	0
2019-07-26	2	0	0	0	0	0	0	0	0	0	0	0
2019-07-27	3	0	0	7	0	0	0	0	0	0	0	0.7
2019-07-28	4	6	4	0	4	6	1	5	7	2	8	4.3
2019-07-29	5	14	13	14	14	13	7	12	12	12	12	12.3
2019-07-30	6	17	18	13	15	18	11	17	0	9	18	13.6
Total		**37**	**35**	**34**	**33**	**37**	**19**	**34**	**19**	**23**	**38**	**30.9 (±7.5)**

Concentration (%)		Replicate										Mean Young
50	**Day**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**(±SD)**
2019-07-25	1	0	0	0	0	0	0	0	0	0	0	0
2019-07-26	2	0	0	0	0	0	0	0	0	0	0	0
2019-07-27	3	0	0	0	0	0	0	0	0	0	0	0
2019-07-28	4	0	0	0	1	0	x 1	0	0	0	0	0.2
2019-07-29	5	8	1	0	x 6	0	10	6	0	0	7	3.8
2019-07-30	6	7	0	0	0	0	0	0	9	1	8	2.5
Total		**15**	**1**	**0**	**7**	**0**	**11**	**6**	**9**	**1**	**15**	**6.5 (±5.9)**

Concentration (%)		Replicate										Mean Young
6.25	**Day**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**(±SD)**
2019-07-25	1	0	0	0	0	0	0	0	0	0	0	0
2019-07-26	2	0	0	0	0	0	0	0	0	0	0	0
2019-07-27	3	0	0	0	5	0	0	0	0	0	0	0.5
2019-07-28	4	3	4	0	0	6	7	6	5	2	8	4.1
2019-07-29	5	12	15	15	11	5	15	11	14	10	14	12.2
2019-07-30	6	10	8	20	15	17	14	14	14	3	0	11.5
Total		**25**	**27**	**35**	**31**	**28**	**36**	**31**	**33**	**15**	**22**	**28.3 (±6.4)**

Concentration (%)		Replicate										Meau Young
100	**Day**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**(±SD)**
2019-07-25	1	0	0	0	0	0	0	0	0	0	0	0
2019-07-26	2	0	0	0	0	0	0	0	0	0	0	0
2019-07-27	3	0	0	0	0	0	0	0	0	0	0	0
2019-07-28	4	0	0	0	0	0	0	0 x	0	0	0	0
2019-07-29	5	0	0	0	0	0	0	0	0 x	0	0 x	0
2019-07-30	6	0	0	1	0	0	0	0	0	3	0	0.4
Total		**0**	**0**	**1**	**0**	**0**	**0**	**0**	**0**	**3**	**0**	**0.4 (±1.0)**

NOTES : •All young produced by a test organism during its fourth and subsequent broods were discarded and not included in the above counts. The presence of two or more neonates in any test chamber, during any given day of the test, constitutes a brood.
•[1] Outlier according to Grubbs Test (CETIS)[a]. Outlying data points were not excluded from statistical analysis, since they could not be attributed to error.

"x"= test organism mortality
"*"= accidental test organism mortality
"–"=4th brood (see 'NOTES')

Data Reviewed By : JL
Date : 2019-08-19

Work Order : 239827
Sample Number: 59990

Ceriodaphnia dubia Water Chemistry Data

Initial Chemistry:	Temp. (°C)	DO (mg/L)	pH	Conductivity (µmhos/cm)	Hardness (mg/L as $CaCO_3$)
	25.0	7.9	8.5	4520	1460

Date :		Day 0 - 1 2019-07-24	Day 1 - 2 2019-07-25	Day 2 - 3 2019-07-26	Day 3 - 4 2019-07-27	Day 4 - 5 2019-07-28	Day 5 - 6 2019-07-29
Sub-sample Used		1	1	1	2	2	3
Temperature (°C)		25.0	24.0	24.5	24.0	25.0	24.0
Dissolved Oxygen (mg/L)		7.9	9.0	9.2	8.7	8.4	8.6
Dissolved Oxygen % Sat.[3]		95	105	110	103	106	103
pH		8.5	8.5	8.4	8.5	8.4	8.4
Pre-aeration Time (min)[4]		0	20	20	20	20	20
Analyst(s)	Initial	MJT	RK	KJW(SEW)	RK	RK	MV
	Final	XD	MW	RK	RK	RK	MJT
Control (0%)							
Temp. (°C)	Initial	24.0	25.0	25.0	25.0	24.0	24.0
	Final	24.0	24.0	24.5	24.5	24.0	25.0
DO % Sat.[3]	Initial	98	99	100	98	99	101
DO (mg/L)	Initial	8.1	8.1	8.2	8.1	8.2	8.4
	Final	7.3	7.5	7.3	7.3	7.5	7.0
pH	Initial	8.3	8.4	8.4	8.4	8.4	8.4
	Final	8.1	8.2	8.2	8.1	8.2	8.1
Cond. (µmhos/cm)	Initial	782	749	745	736	754	753
1.56 %							
Temp. (°C)	Initial	24.0	25.0	25.0	25.0	24.0	24.0
	Final	24.0	24.0	24.5	24.5	24.0	25.0
DO (mg/L)	Initial	8.2	8.1	8.2	8.1	8.3	8.3
	Final	7.3	7.6	7.3	7.4	7.6	7.3
pH	Initial	8.4	8.3	8.4	8.5	8.4	8.4
	Final	8.1	8.2	8.2	8.1	8.1	8.1
Cond. (µmhos/cm)	Initial	826	829	830	823	840	849
25 %							
Temp. (°C)	Initial	24.0	25.0	25.0	25.0	24.0	24.0
	Final	24.0	24.0	24.5	24.5	24.0	25.0
DO (mg/L)	Initial	8.2	8.2	8.3	8.2	8.2	8.3
	Final	7.2	7.5	7.1	7.0	7.6	7.2
pH	Initial	8.2	8.2	8.2	8.3	8.3	8.2
	Final	8.0	8.0	8.0	7.9	8.0	7.9
Cond. (µmhos/cm)	Initial	1895	1901	1900	1886	1919	1940
100 %							
Temp. (°C)	Initial	24.0	25.0	25.0	25.0	24.0	24.0
	Final	24.0	24.0	24.5	24.5	24.0	25.0
DO (mg/L)	Initial	8.0	8.5	8.5	8.4	8.6	8.3
	Final	7.2	7.4	7.4	7.4	7.8	7.4
pH	Initial	8.4	8.3	8.1	8.4	8.4	8.2
	Final	7.4	7.4	7.3	7.3	7.3	7.2
Cond. (µmhos/cm)	Initial	4540	4540	4560	4540	4530	4540

"–" = not measured

[3] % saturation (adjusted for actual temperature and barometric pressure)

[4] ≤100 bubbles/minute

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TOXICITY TEST REPORT

Pseudokirchneriella subcapitata
EPS 1/RM/25

Work Order : 239827
Sample Number : 59990

SAMPLE IDENTIFICATION

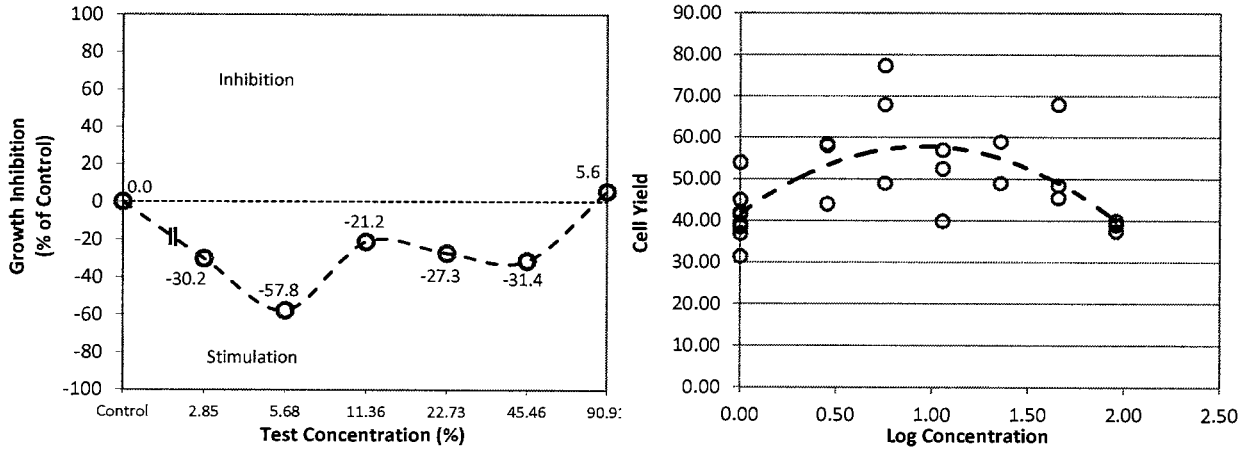
Company :	ALS Laboratory Group, Waterloo	Date Collected :	2019-07-22
Location :	Waterloo ON	Time Collected :	10:30
Job Number :	L2314529-1	Date Received :	2019-07-23
Substance :	MS-08 L2314529-1	Time Received :	10:45
Sampling Method :	Grab	Temperature on Receipt :	12.0 °C
Sampled By :	BW/RH	Date Tested :	2019-07-25
Sample Description :	Clear, yellow, odourless		

Test Method : Growth Inhibition Test Using a Freshwater Alga. Environment Canada, Conservation and Protection. Ottawa, Ontario. Report EPS 1/RM/25, 2nd ed. (March 2007).

72-HOUR TEST RESULTS

Effect	Value	95% Confidence Limits	Statistical Method
IC25 (Growth)	>90.91%	–	–

The results reported relate only to the sample tested and as received.



REFERENCE TOXICANT DATA

Toxicant :	Zinc (as Zinc Sulfate)		
Date Tested :	2019-07-23	Historical Mean IC25 :	8.0 µg/L
IC25 Growth :	14.7 µg/L	Warning Limits (± 2SD) :	3.8 - 17.1 µg/L
95% Confidence Limits :	13.1 - 15.6 µg/L	Analyst(s) :	AS
Statistical Method :	Linear Interpolation (CETIS)[a]	Test Duration :	72 hours

The reference toxicity test was performed under the same experimental conditions as those used with the test sample.

COMMENTS

•All test validity criteria as specified in the test method cited above were satisfied.

Date : 2019-08-23
yyyy-mm-dd

Approved By : *Project Manager*

Work Order : 239827
Sample Number : 59990

TEST ORGANISM

Test Organism :	*Pseudokirchneriella subcapitata*	Organism Batch :	Ps19-07
Culture Origin :	University of Waterloo, Waterloo ON	Cell Density at 0-h :	11000 cells/mL
Strain Number :	CPCC 37	Inoculum Prepared :	20 min. prior to test initiation
Inoculum Source :	In-house culture	Age (at start of test) :	3 days (in exponential growth)

•Algal growth curve is determined at least twice per year as required by the test method cited above.
•No unusual appearance or treatment of culture prior to testing.

TEST CONDITIONS

Test Type :	Static	Volume per Replicate :	220 µL
Test Duration :	72 hours	Control Replicates :	10
Mean Temperature (± SD):	25.0°C (± 0.0)	Test Replicates :	4
Sample Pre-aeration :	None	Concentrations Tested :	10 + Control
Sample Filtration :	0.45 µm preconditioned filter	Photoperiod :	Continuous light
Volume Filtered:	≥10 mL	Light Intensity :	4070-4360 lux
Control/Dilution Water :	Millipore Milli-Q (no chemicals added)	Initial pH (100% sample) :	8.7
Enrichment Medium :	Stock 2B: EDTA reduced to 25%	pH Adjustment :	None
Test Vessel :	U-shaped polystyrene microplate	Hardness Adjustment :	None
Enumeration Method :	Manual (haemocytometer)	Test Method Deviation(s) :	None

CELL COUNTS AT 72-HOURS

Initiated By :	AS	Control pH (at 0 hours) :	6.5
Date Counted :	2019-07-28	Control pH (at 72 hours) :	7.0
Counted By :	AS	Control Increase Factor :	38.3 times growth

Concentration	Cell Concentration (x 10000 cells/mL) Replicate								Cell Yield (x 10000 cells/mL)				
%	1	2	3	4	7	8	9	10	Mean	Standard Deviation	CV (%)	Stimulation (% of control)	
Control	42.5	32.5	43.0	40.5	38.0	46.0	39.5	55.0	41.03	6.56	16.0	–	
0.18	–	–	–	–	–	–	–	–	–	–	–	–	
0.35	–	–	–	–	–	–	–	–	–	–	–	–	
0.71	–	–	–	–	–	–	–	–	–	–	–	–	
1.42	58.0	58.5	57.5	–	–	–	–	–	56.90	0.50	0.9	38.7	*
2.85	59.5	59.0	45.0	–	–	–	–	–	53.40	8.23	15.4	30.2	
5.68	69.0	50.0	78.5	–	–	–	–	–	64.73	14.51	22.4	57.8	*
11.36	58.0	53.5	41.0	–	–	–	–	–	49.73	8.81	17.7	21.2	
22.73	60.0	50.0	50.0	–	–	–	–	–	52.23	5.77	11.1	27.3	
45.46	49.5	69.0	46.5	–	–	–	–	–	53.90	12.22	22.7	31.4	
90.91	40.0	41.0	38.5	–	–	–	–	–	38.73	1.26	3.2	-5.6	

NOTES : *Statistically significant stimulation, according to ANOVA/Dunnett Multiple Comparison Test (CETIS)a, (α=0.05) .

- Control replicates 5 and 6 used for pH measurement.
- The Mann-Kendall test shows that there is no inhibitory gradient (α=0.05).
- No outlying data points were detected according to Grubbs Test (CETIS)[a].

"–" = not counted/not required

Test Data Reviewed By : AW
Date : 2019-08-15

REFERENCES

[a] CETIS™, © 2000-2018. V.1.9.4.7. Comprehensive Environmental Toxicity Information System. Tidepool Scientific Software, LLC, McKinleyville, CA 95519 [Program on disk and printed User's Guide].

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TOXICITY TEST REPORT

Lemna minor
EPS 1/RM/37

Work Order : 239827
Sample Number : 59990

SAMPLE IDENTIFICATION

Company :	ALS Laboratory Group, Waterloo	Sampled By :	BW/RH
Location :	Waterloo ON	Date Collected :	2019-07-22
Job Number :	L2314529-1	Time Collected :	10:30
Substance :	MS-08 L2314529-1	Date Received :	2019-07-23
Sampling Method :	Grab	Time Received :	10:45
Temp. on arrival :	12.0°C	Date Tested :	2019-07-25
Sample Description :	Clear, yellow, odourless		

Test Method : Test for Measuring the Inhibition of Growth using the Freshwater Macrophyte, *Lemna minor*. Method Development and Application Section, Environmental Technology Centre, Environment Canada. Ottawa, Ontario. Report EPS 1/RM/37, 2nd ed. (January 2007).

TEST RESULTS

Effect	Value	95% Confidence Limits	Statistical Method
IC25 (Weight)	70.2%	45.5-97.6	Nonlinear Regression (CETIS) a
IC25 (Frond Production)	30.8%	22.1-40.2	Nonlinear Regression (CETIS) a

The results reported relate only to the sample tested and as received.

POTASSIUM CHLORIDE REFERENCE TOXICANT DATA

Date Tested :	2019-07-24	Statistical Method :	Non-Linear Regression (CETIS)[a]
Analyst(s) :	RK	Historical Mean IC25 :	2.23 g/L
Test Duration :	7 days	Warning Limits (± 2SD) :	1.59 - 3.13 g/L
IC25 (Frond Production) :	2.61 g/L	Growth Medium :	Modified APHA
95% Confidence Limits :	2.20 - 3.01 g/L		

The reference toxicant test was performed under the same experimental conditions as those used with the test sample.

TEST CONDITIONS

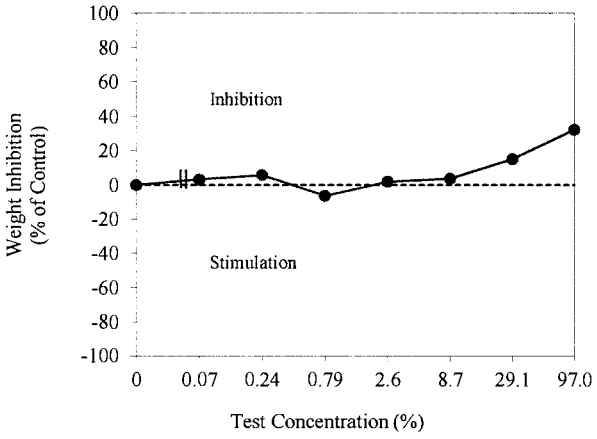
Test Organism :	*Lemna minor* L., Strain 7730	Test Type :	Static (no sub-samples required)
Organism Batch :	Lm19-07	Control/Dilution Medium :	Modified APHA
Culture Origin :	UTCC 492	Medium Preparation Water :	Distilled Water
Test Organism Source :	Axenic in-house culture	Source of Water :	Morning Mist
Culture Medium :	Modified Hoaglands E+	Medium Preparation Chemicals :	Modified APHA stocks A, B, C (10 mL/L)
Age (on Test Day 0) :	9 days	Nutrient Spiking of Sample :	Modified APHA stocks A, B, C (10 mL/L)
Health Criteria (in APHA) :	21.5-fold frond increase in 7 days	Replicates per Concentration :	4
Organism Acclimation :	21:00 h in APHA medium	Test Volume per Replicate :	100 mL
Inoculum (Test Day 0) :	2 plants (3 fronds per plant)	Test Vessel :	210 mL glass jar
Sample Filtration :	1 µm (Whatman GF/C)	Depth of Test Solution :	4.0 cm
Sample Pre-aeration :	20 min. at ≤100 bubbles/min.	Photoperiod/Light Intensity :	Continuous, 4250 - 5210 lux
pH Adjustment :	None	Test Method Deviation(s) :	None
Hardness Adjustment :	None		

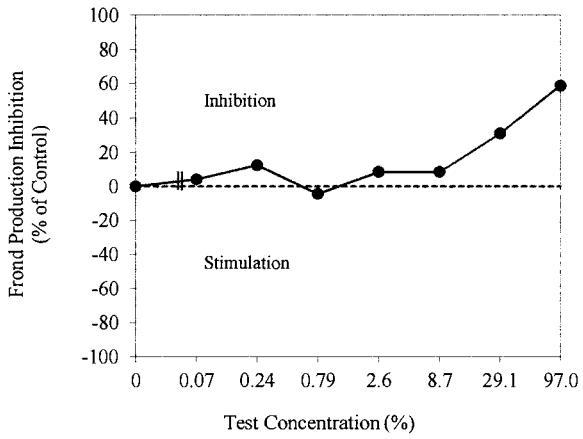
COMMENTS

•All test validity criteria as specified in the test method cited above were satisfied.

Work Order : 239827
Sample Number : 59990

Lemna minor Growth Inhibition





TEST MONITORING

Initiation Date : 2019-07-25
Intitiation Time : 12:40
Initiated By : AS

Termination Date : 2019-08-01
Termination Time : 11:45
Terminated By : CG

Temperature Monitoring

Test Day	Date	Temperature (°C)
0 (unmodified sample)	2019-07-25	25.0
0	2019-07-25	25.5
1	2019-07-26	25.5
2	2019-07-27	25.5
3	2019-07-28	25.5
4	2019-07-29	25.5
5	2019-07-30	25.5
6	2019-07-31	25.5
7	2019-08-01	25.5

pH Monitoring

Concentration (%)	Day 0	Day 7
100 (unmodified sample)	8.7	–
Control	8.3	8.5
0.07	8.3	8.6
0.24	-	-
0.79	-	-
2.6	8.3	8.5
8.7	-	-
29.1	-	-
97.0	8.0	8.2

"–" = not required

REFERENCES

[a] CETIS™, © 2000-2018. V.1.9.4.7. Comprehensive Environmental Toxicity Information System. Tidepool Scientific Software, LLC, McKinleyville, CA 95519 [Program on disk and printed User's Guide].

Date : 2019-08-23
yyyy-mm-dd

Approved By:
Project Manager

Work Order : 239827
Sample Number : 59990

Lemna minor Frond Increase

Test Concentration (%)	Replicate	Frond Count Day 0*	Frond Count Day 7	Frond Increase	Mean Frond Increase	Standard Deviation	CV (%)	Frond/Root Appearance (Day 7)
Control	A	6	127	121	124.25	8.34	6.7	Fronds healthy, appearance normal in all replicates.
	B	6	138	132				
	C	6	136	130				
	D	6	120	114				
0.07	A	6	124	118	119.25	2.06	1.7	Fronds healthy, appearance normal in all replicates.
	B	6	127	121				
	C	6	123	117				
	D	6	127	121				
0.24	A	6	136	130	108.75	16.24	14.9	Fronds healthy, appearance normal in all replicates.
	B	6	116	110				
	C	6	110	104				
	D	6	97	91				
0.79	A	6	149	143	129.75	17.91	13.8	Fronds healthy, appearance normal in all replicates.
	B	6	124	118				
	C	6	153	147				
	D	6	117	111				
2.6	A	6	137	131	113.75	12.28	10.8	Fronds healthy, appearance normal in all replicates.
	B	6	120	114				
	C	6	112	106				
	D	6	110	104				
8.7	A	6	140	134	113.75	14.38	12.6	Fronds healthy, appearance normal in all replicates.
	B	6	110	104				
	C	6	109	103				
	D	6	120	114				
29.1	A	6	126	120	85.75	24.10	28.1	Fronds healthy, appearance normal in all replicates.
	B	6	91	85				
	C	6	77	71				
	D	6	73	67				
97.0	A	6	55	49	51.00	8.83	17.3	Fronds healthy, appearance normal in all replicates.
	B	6	67	61				
	C	6	60	54				
	D	6	46	40				

NOTES: *No unusual appearance or treatment of culture prior to testing. Test inoculated with healthy plants.

•No significant stimulation (α=0.05) of frond increase was detected by ANOVA-Dunnett Multiple Comparison Test (CETIS)[a] at any test level compared to the control.

•A 21.7-fold increase in frond number was observed in the control over the testing period.

•No outlying data points were detected according to Grubbs Test (CETIS)[a].

"–" = not available/not required

Test Data Reviewed By : AW
Date : 2019-08-16

Work Order : 239827
Sample Number : 59990

Lemna minor Frond Weight Data

Test Concentration (%)	Replicate	Dry Weight of Fronds (mg)	Treatment Mean Dry Weight (mg)	Standard Deviation
Control	A	10.38	10.87	0.54
	B	11.52		
	C	11.09		
	D	10.47		
0.07	A	10.24	10.52	0.47
	B	10.28		
	C	10.32		
	D	11.22		
0.24	A	12.42	10.24	1.59
	B	10.42		
	C	9.17		
	D	8.95		
0.79	A	13.11	11.56	1.51
	B	11.46		
	C	12.12		
	D	9.53		
2.6	A	11.85	10.66	0.97
	B	11.03		
	C	9.73		
	D	10.04		
8.7	A	11.62	10.47	0.87
	B	9.87		
	C	9.72		
	D	10.66		
29.1	A	11.89	9.22	1.99
	B	9.57		
	C	7.95		
	D	7.47		
97.0	A	8.06	7.35	0.49
	B	7.08		
	C	7.31		
	D	6.96		

NOTES :

- No significant stimulation (α=0.05) of frond weight was detected by ANOVA-Dunnett Multiple Comparison Test (CETIS)[a] at any test level compared to the control.
- No outlying data points were detected according to Grubbs Test (CETIS)[a].

"–" = not available/not required

Test Data Reviewed By : AW
Date : 2019-08-16

CHAIN OF CUSTODY RECORD

AQUATOX

AquaTox Work Order No: 239827

Shipping Address: AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, Ontario Canada N0B 2J0

Voice: (519) 763-4412 **Fax:** (519) 763-4419

P.O. Number:	4500057496
Field Sampler Name (print):	BW/RH
Signature:	
Affiliation:	Baffinland/ALS Env
Sample Storage (prior to shipping):	
Custody Relinquished by:	BW
Date/Time Shipped:	22-Jul-19

Client:	ALS Enironmental Waterloo Q# 162705399-19
Phone:	(519) 886-6910
Fax:	(519) 886-9047
Contact:	Rick Hawthorne / Martina Rendas

Sample Identification					Analyses Requested										Sample Method and Volume		
Date Collected (yyyy-mm-dd)	Time Collected (e.g. 14:30, 24 hr clock)	Sample Name	AquaTox Sample Number	Temp. on arrival	Rainbow Trout Single Concentration	Rainbow Trout LC50	*Daphnia magna* Single Concentration	*Daphnia magna* LC50	Fathead Minnow Survival & Growth	*Ceriodaphnia dubia* Survival & Reproduction	*Lemna minor* Growth	*Pseudokirchneriella subcapitata* Growth	RISS Data Entry	Other (please specify below)	Grab	Composite	# of Containers and Volume (eg. 2 x 1L, 3 x 10L, etc.)
2019-07-22	10:30	MS-08 L2314529-1	59990	12.0					✓	✓	✓	✓	✓		✓		4 10L Bladder

For Lab Use Only
Received By: MN IALG
Date: 2019-07-23
Time: 10:45
Storage Location:
Storage Temp (°C):

CN

Please list any special requests or instructions:
Email Disturbution:

rick.hawthorne@alsglobal.com
bimcore@alsglobal.com MMER Toxicity for Sublethal W RISS Reporting

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2314529-COFC

COC Number: 15 -

Report To	Contact and company name below will appear on the final report
Company:	Baffinland Iron Mines Corp.
Contact:	Wiliam Bowden and Connor Devereaux
Phone:	647-253-0596 EXT 6016
	Company address below will appear on the final report
Street:	2275 Upper Middle Rd. E., Suite #300
City/Province:	Oakville, ON
Postal Code:	L6H 0C3
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	
Contact:	

Report Form	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	bimcore@alsglobal.com
Email 2	
Email 3	

Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	ap@baffinland.com
Email 2	commercial@baffinland.com

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	23642 /Q42455	AFE/Cost Center:	PO#
Job #:	MDMER	Major/Minor Code:	Routing Code:
PO / AFE:	4500057496	Requisitioner:	
LSD:		Location:	

ALS Lab Work Order # (lab use only): L2314529 AP

ALS Contact: | Sampler: BW/RH

Confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☐ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4] ☐ | 3 day [P3] ☐ | 2 day [P2] ☐

EMERGENCY: 1 Business day [E1] ☐ | Same Day, Weekend or Statutory holiday [E0] ☑

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	BIM-MMER-WT	Sublethal (Alt - as per client)	Number of Containers
	MS-08	22-Jul-19	10:30	Water	E0	X	10

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human drinking water use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

Sublethal to Aquatox.

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ | SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ | Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			9.6		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released By: Ben Widdowson	Date: 07-Jul-22	Time: 11:55	Received by:	Date:	Time:	Received by: AP	Date: 23-7-19	Time: 9:30

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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 specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Baffinland Iron Mine's Corporation (Oakville)
ATTN: William Bowden/Connor Devereaux
2275 Upper Middle Rd. E.
Suite #300
Oakville ON L6H 0C3

Date Received: 29-JUL-19
Report Date: 21-AUG-19 17:02 (MT)
Version: FINAL

Client Phone: 647-253-0596

Certificate of Analysis

Lab Work Order #: L2318962

Project P.O. #: 4500057496
Job Reference: MS-08 DEL
C of C Numbers:
Legal Site Desc:

Comments: ADDITIONAL 31-JUL-19 09:14

Rick Hawthorne
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2318962-1 MS-08 Sampled By: RH/BW/ML on 29-JUL-19 @ 09:25 Matrix: WATER							
Physical Tests							
Conductivity	3690		3.0	umhos/cm		01-AUG-19	R4734453
pH	8.92		0.10	pH units		30-JUL-19	R4731248
Total Suspended Solids	7.6		2.0	mg/L		30-JUL-19	R4731242
Total Dissolved Solids	4030		20	mg/L		30-JUL-19	R4731261
Turbidity	12.1		0.10	NTU		30-JUL-19	R4731255
Anions and Nutrients							
Ammonia, Total (as N)	5.7	DLHC	1.0	mg/L		01-AUG-19	R4734295
Cyanides							
Cyanide, Total	0.0147		0.0020	mg/L		01-AUG-19	R4734869
Total Metals							
Aluminum (Al)-Total	<0.050	DLHC	0.050	mg/L	31-JUL-19	31-JUL-19	R4733585
Antimony (Sb)-Total	<0.0010	DLHC	0.0010	mg/L	31-JUL-19	31-JUL-19	R4733585
Arsenic (As)-Total	<0.0010	DLHC	0.0010	mg/L	31-JUL-19	31-JUL-19	R4733585
Barium (Ba)-Total	0.0230	DLHC	0.0010	mg/L	31-JUL-19	31-JUL-19	R4733585
Beryllium (Be)-Total	<0.0010	DLHC	0.0010	mg/L	31-JUL-19	31-JUL-19	R4733585
Bismuth (Bi)-Total	<0.00050	DLHC	0.00050	mg/L	31-JUL-19	31-JUL-19	R4733585
Boron (B)-Total	<0.10	DLHC	0.10	mg/L	31-JUL-19	31-JUL-19	R4733585
Cadmium (Cd)-Total	<0.000050	DLHC	0.000050	mg/L	31-JUL-19	31-JUL-19	R4733585
Calcium (Ca)-Total	307	DLHC	0.50	mg/L	31-JUL-19	31-JUL-19	R4733585
Cesium (Cs)-Total	<0.00010	DLHC	0.00010	mg/L	31-JUL-19	31-JUL-19	R4733585
Chromium (Cr)-Total	<0.0050	DLHC	0.0050	mg/L	31-JUL-19	31-JUL-19	R4733585
Cobalt (Co)-Total	0.0105	DLHC	0.0010	mg/L	31-JUL-19	31-JUL-19	R4733585
Copper (Cu)-Total	<0.010	DLHC	0.010	mg/L	31-JUL-19	31-JUL-19	R4733585
Iron (Fe)-Total	1.19	DLHC	0.10	mg/L	31-JUL-19	31-JUL-19	R4733585
Lead (Pb)-Total	<0.00050	DLHC	0.00050	mg/L	31-JUL-19	31-JUL-19	R4733585
Lithium (Li)-Total	0.059	DLHC	0.010	mg/L	31-JUL-19	31-JUL-19	R4733585
Magnesium (Mg)-Total	521	DLHC	0.050	mg/L	31-JUL-19	31-JUL-19	R4733585
Manganese (Mn)-Total	6.33	DLHC	0.0050	mg/L	31-JUL-19	31-JUL-19	R4733585
Molybdenum (Mo)-Total	<0.00050	DLHC	0.00050	mg/L	31-JUL-19	31-JUL-19	R4733585
Nickel (Ni)-Total	0.0091	DLHC	0.0050	mg/L	31-JUL-19	31-JUL-19	R4733585
Phosphorus (P)-Total	<0.50	DLHC	0.50	mg/L	31-JUL-19	31-JUL-19	R4733585
Potassium (K)-Total	6.77	DLHC	0.50	mg/L	31-JUL-19	31-JUL-19	R4733585
Rubidium (Rb)-Total	0.0105	DLHC	0.0020	mg/L	31-JUL-19	31-JUL-19	R4733585
Selenium (Se)-Total	0.00548	DLHC	0.00050	mg/L	31-JUL-19	31-JUL-19	R4733585
Silicon (Si)-Total	<1.0	DLHC	1.0	mg/L	31-JUL-19	31-JUL-19	R4733585
Silver (Ag)-Total	<0.00050	DLHC	0.00050	mg/L	31-JUL-19	31-JUL-19	R4733585
Sodium (Na)-Total	4.94	DLHC	0.50	mg/L	31-JUL-19	31-JUL-19	R4733585
Strontium (Sr)-Total	0.655	DLHC	0.010	mg/L	31-JUL-19	31-JUL-19	R4733585
Sulfur (S)-Total	976	DLHC	5.0	mg/L	31-JUL-19	31-JUL-19	R4733585
Tellurium (Te)-Total	<0.0020	DLHC	0.0020	mg/L	31-JUL-19	31-JUL-19	R4733585
Thallium (Tl)-Total	0.00018	DLHC	0.00010	mg/L	31-JUL-19	31-JUL-19	R4733585
Thorium (Th)-Total	<0.0010	DLHC	0.0010	mg/L	31-JUL-19	31-JUL-19	R4733585

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2318962-1 MS-08 Sampled By: RH/BW/ML on 29-JUL-19 @ 09:25 Matrix: WATER							
Total Metals							
Tin (Sn)-Total	<0.0010	DLHC	0.0010	mg/L	31-JUL-19	31-JUL-19	R4733585
Titanium (Ti)-Total	<0.0030	DLHC	0.0030	mg/L	31-JUL-19	31-JUL-19	R4733585
Tungsten (W)-Total	<0.0010	DLHC	0.0010	mg/L	31-JUL-19	31-JUL-19	R4733585
Uranium (U)-Total	0.00033	DLHC	0.00010	mg/L	31-JUL-19	31-JUL-19	R4733585
Vanadium (V)-Total	<0.0050	DLHC	0.0050	mg/L	31-JUL-19	31-JUL-19	R4733585
Zinc (Zn)-Total	<0.030	DLHC	0.030	mg/L	31-JUL-19	31-JUL-19	R4733585
Zirconium (Zr)-Total	<0.0020	DLHC	0.0020	mg/L	31-JUL-19	31-JUL-19	R4733585
Radiological Parameters							
Ra-226	0.019		0.0069	Bq/L	07-AUG-19	19-AUG-19	R4734319
L2318962-2 MS-0801 Sampled By: RH/BW/ML on 29-JUL-19 @ 09:25 Matrix: WATER							
Physical Tests							
Conductivity	3700		3.0	umhos/cm		01-AUG-19	R4734453
pH	8.92		0.10	pH units		30-JUL-19	R4731248
Total Suspended Solids	8.0		2.0	mg/L		30-JUL-19	R4731242
Total Dissolved Solids	4110		20	mg/L		30-JUL-19	R4731261
Turbidity	12.7		0.10	NTU		30-JUL-19	R4731255
Anions and Nutrients							
Ammonia, Total (as N)	5.3	DLHC	1.0	mg/L		01-AUG-19	R4734295
Cyanides							
Cyanide, Total	<0.020	DLM	0.020	mg/L		01-AUG-19	R4734869
Total Metals							
Aluminum (Al)-Total	<0.050	DLHC	0.050	mg/L	31-JUL-19	31-JUL-19	R4733585
Antimony (Sb)-Total	<0.0010	DLHC	0.0010	mg/L	31-JUL-19	31-JUL-19	R4733585
Arsenic (As)-Total	<0.0010	DLHC	0.0010	mg/L	31-JUL-19	31-JUL-19	R4733585
Barium (Ba)-Total	0.0225	DLHC	0.0010	mg/L	31-JUL-19	31-JUL-19	R4733585
Beryllium (Be)-Total	<0.0010	DLHC	0.0010	mg/L	31-JUL-19	31-JUL-19	R4733585
Bismuth (Bi)-Total	<0.00050	DLHC	0.00050	mg/L	31-JUL-19	31-JUL-19	R4733585
Boron (B)-Total	<0.10	DLHC	0.10	mg/L	31-JUL-19	31-JUL-19	R4733585
Cadmium (Cd)-Total	<0.000050	DLHC	0.000050	mg/L	31-JUL-19	31-JUL-19	R4733585
Calcium (Ca)-Total	288	DLHC	0.50	mg/L	31-JUL-19	31-JUL-19	R4733585
Cesium (Cs)-Total	<0.00010	DLHC	0.00010	mg/L	31-JUL-19	31-JUL-19	R4733585
Chromium (Cr)-Total	<0.0050	DLHC	0.0050	mg/L	31-JUL-19	31-JUL-19	R4733585
Cobalt (Co)-Total	0.0107	DLHC	0.0010	mg/L	31-JUL-19	31-JUL-19	R4733585
Copper (Cu)-Total	<0.010	DLHC	0.010	mg/L	31-JUL-19	31-JUL-19	R4733585
Iron (Fe)-Total	1.18	DLHC	0.10	mg/L	31-JUL-19	31-JUL-19	R4733585
Lead (Pb)-Total	<0.00050	DLHC	0.00050	mg/L	31-JUL-19	31-JUL-19	R4733585
Lithium (Li)-Total	0.052	DLHC	0.010	mg/L	31-JUL-19	31-JUL-19	R4733585
Magnesium (Mg)-Total	530	DLHC	0.050	mg/L	31-JUL-19	31-JUL-19	R4733585
Manganese (Mn)-Total	6.38	DLHC	0.0050	mg/L	31-JUL-19	31-JUL-19	R4733585
Molybdenum (Mo)-Total	<0.00050	DLHC	0.00050	mg/L	31-JUL-19	31-JUL-19	R4733585

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2318962-2 MS-0801 Sampled By: RH/BW/ML on 29-JUL-19 @ 09:25 Matrix: WATER							
Total Metals							
Nickel (Ni)-Total	0.0095	DLHC	0.0050	mg/L	31-JUL-19	31-JUL-19	R4733585
Phosphorus (P)-Total	<0.50	DLHC	0.50	mg/L	31-JUL-19	31-JUL-19	R4733585
Potassium (K)-Total	6.84	DLHC	0.50	mg/L	31-JUL-19	31-JUL-19	R4733585
Rubidium (Rb)-Total	0.0101	DLHC	0.0020	mg/L	31-JUL-19	31-JUL-19	R4733585
Selenium (Se)-Total	0.00594	DLHC	0.00050	mg/L	31-JUL-19	31-JUL-19	R4733585
Silicon (Si)-Total	<1.0	DLHC	1.0	mg/L	31-JUL-19	31-JUL-19	R4733585
Silver (Ag)-Total	<0.00050	DLHC	0.00050	mg/L	31-JUL-19	31-JUL-19	R4733585
Sodium (Na)-Total	4.97	DLHC	0.50	mg/L	31-JUL-19	31-JUL-19	R4733585
Strontium (Sr)-Total	0.653	DLHC	0.010	mg/L	31-JUL-19	31-JUL-19	R4733585
Sulfur (S)-Total	993	DLHC	5.0	mg/L	31-JUL-19	31-JUL-19	R4733585
Tellurium (Te)-Total	<0.0020	DLHC	0.0020	mg/L	31-JUL-19	31-JUL-19	R4733585
Thallium (Tl)-Total	0.00018	DLHC	0.00010	mg/L	31-JUL-19	31-JUL-19	R4733585
Thorium (Th)-Total	<0.0010	DLHC	0.0010	mg/L	31-JUL-19	31-JUL-19	R4733585
Tin (Sn)-Total	<0.0010	DLHC	0.0010	mg/L	31-JUL-19	31-JUL-19	R4733585
Titanium (Ti)-Total	<0.0030	DLHC	0.0030	mg/L	31-JUL-19	31-JUL-19	R4733585
Tungsten (W)-Total	<0.0010	DLHC	0.0010	mg/L	31-JUL-19	31-JUL-19	R4733585
Uranium (U)-Total	0.00032	DLHC	0.00010	mg/L	31-JUL-19	31-JUL-19	R4733585
Vanadium (V)-Total	<0.0050	DLHC	0.0050	mg/L	31-JUL-19	31-JUL-19	R4733585
Zinc (Zn)-Total	<0.030	DLHC	0.030	mg/L	31-JUL-19	31-JUL-19	R4733585
Zirconium (Zr)-Total	<0.0020	DLHC	0.0020	mg/L	31-JUL-19	31-JUL-19	R4733585
Radiological Parameters							
Ra-226	0.050		0.0046	Bq/L	07-AUG-19	19-AUG-19	R4734319

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

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Barium (Ba)-Total	MS-B	L2318962-1, -2
Matrix Spike	Calcium (Ca)-Total	MS-B	L2318962-1, -2
Matrix Spike	Iron (Fe)-Total	MS-B	L2318962-1, -2
Matrix Spike	Lithium (Li)-Total	MS-B	L2318962-1, -2
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2318962-1, -2
Matrix Spike	Manganese (Mn)-Total	MS-B	L2318962-1, -2
Matrix Spike	Potassium (K)-Total	MS-B	L2318962-1, -2
Matrix Spike	Rubidium (Rb)-Total	MS-B	L2318962-1, -2
Matrix Spike	Sodium (Na)-Total	MS-B	L2318962-1, -2
Matrix Spike	Strontium (Sr)-Total	MS-B	L2318962-1, -2
Matrix Spike	Sulfur (S)-Total	MS-B	L2318962-1, -2
Matrix Spike	Uranium (U)-Total	MS-B	L2318962-1, -2

Sample Parameter Qualifier key listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
CN-TOT-WT	Water	Cyanide, Total	ISO 14403-2

Total cyanide is determined by the combination of UV digestion and distillation. Cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

When using this method, high levels of thiocyanate in samples can cause false positives at ~1-2% of the thiocyanate concentration. For samples with detectable cyanide analyzed by this method, ALS recommends analysis for thiocyanate to check for this potential interference

EC-SCREEN-WT	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

EC-WT	Water	Conductivity	APHA 2510 B

Water samples can be measured directly by immersing the conductivity cell into the sample.

MET-T-CCMS-WT	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

NH3-F-WT	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

PH-BF	Water	pH	APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

RA226-MMER-FC	Water	Ra226 by Alpha Scint, MDC=0.01 Bq/L	EPA 903.1
SOLIDS-TDS-BF	Water	Total Dissolved Solids	APHA 2540C

A well-mixed sample is filtered though glass fibres filter. A known volume of the filtrate is evaporated and dried at 180 +/- 2C for 1hr.

SOLIDS-TSS-BF	Water	Suspended solids	APHA 2540 D-Gravimetric

A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104 +/- 1C for a minimum of four hours or until a constant weight is achieved.

TURBIDITY-BF	Water	Turbidity	APHA 2130 B

Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.

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

Reference Information

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
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA
FC	ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
BF	ALS ENVIRONMENTAL - BAFFIN ISLAND, NUNAVUT, 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 weight of sample
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: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CN-TOT-WT	**Water**							
Batch R4734869								
WG3121513-3 DUP		**L2318962-2**						
Cyanide, Total		<0.020	<0.020	RPD-NA	mg/L	N/A	20	01-AUG-19
WG3121513-2 LCS								
Cyanide, Total			98.1		%		80-120	01-AUG-19
WG3121513-1 MB								
Cyanide, Total			<0.0020		mg/L		0.002	01-AUG-19
WG3121513-4 MS		**L2318962-2**						
Cyanide, Total			85.1		%		70-130	01-AUG-19
EC-WT	**Water**							
Batch R4734453								
WG3121588-4 DUP		**WG3121588-3**						
Conductivity		3830	3730		umhos/cm	2.6	10	01-AUG-19
WG3121588-2 LCS								
Conductivity			100.0		%		90-110	01-AUG-19
WG3121588-1 MB								
Conductivity			<3.0		umhos/cm		3	01-AUG-19
MET-T-CCMS-WT	**Water**							
Batch R4733585								
WG3120846-4 DUP		**WG3120846-3**						
Aluminum (Al)-Total		<0.050	<0.050	RPD-NA	mg/L	N/A	20	31-JUL-19
Antimony (Sb)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	31-JUL-19
Arsenic (As)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	31-JUL-19
Barium (Ba)-Total		0.0230	0.0228		mg/L	0.9	20	31-JUL-19
Beryllium (Be)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	31-JUL-19
Bismuth (Bi)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	31-JUL-19
Boron (B)-Total		<0.10	<0.10	RPD-NA	mg/L	N/A	20	31-JUL-19
Cadmium (Cd)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	31-JUL-19
Calcium (Ca)-Total		307	288		mg/L	6.6	20	31-JUL-19
Chromium (Cr)-Total		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	31-JUL-19
Cesium (Cs)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	31-JUL-19
Cobalt (Co)-Total		0.0105	0.0108		mg/L	2.3	20	31-JUL-19
Copper (Cu)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	31-JUL-19
Iron (Fe)-Total		1.19	1.20		mg/L	0.9	20	31-JUL-19
Lead (Pb)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	31-JUL-19
Lithium (Li)-Total		0.059	0.048		mg/L	20	20	31-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4733585								
WG3120846-4 DUP		**WG3120846-3**						
Magnesium (Mg)-Total		521	528		mg/L	1.4	20	31-JUL-19
Manganese (Mn)-Total		6.33	6.19		mg/L	2.3	20	31-JUL-19
Molybdenum (Mo)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	31-JUL-19
Nickel (Ni)-Total		0.0091	0.0095		mg/L	4.9	20	31-JUL-19
Phosphorus (P)-Total		<0.50	<0.50	RPD-NA	mg/L	N/A	20	31-JUL-19
Potassium (K)-Total		6.77	6.95		mg/L	2.6	20	31-JUL-19
Rubidium (Rb)-Total		0.0105	0.0104		mg/L	0.3	20	31-JUL-19
Selenium (Se)-Total		0.00548	0.00634		mg/L	14	20	31-JUL-19
Silicon (Si)-Total		<1.0	<1.0	RPD-NA	mg/L	N/A	20	31-JUL-19
Silver (Ag)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	31-JUL-19
Sodium (Na)-Total		4.94	4.99		mg/L	1.0	20	31-JUL-19
Strontium (Sr)-Total		0.655	0.687		mg/L	4.8	20	31-JUL-19
Sulfur (S)-Total		976	996		mg/L	2.0	25	31-JUL-19
Thallium (Tl)-Total		0.00018	0.00017		mg/L	9.3	20	31-JUL-19
Tellurium (Te)-Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	31-JUL-19
Thorium (Th)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	25	31-JUL-19
Tin (Sn)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	31-JUL-19
Titanium (Ti)-Total		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	31-JUL-19
Tungsten (W)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	31-JUL-19
Uranium (U)-Total		0.00033	0.00032		mg/L	3.2	20	31-JUL-19
Vanadium (V)-Total		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	31-JUL-19
Zinc (Zn)-Total		<0.030	<0.030	RPD-NA	mg/L	N/A	20	31-JUL-19
Zirconium (Zr)-Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	31-JUL-19
WG3120846-2 LCS								
Aluminum (Al)-Total			101.2		%		80-120	31-JUL-19
Antimony (Sb)-Total			96.9		%		80-120	31-JUL-19
Arsenic (As)-Total			95.0		%		80-120	31-JUL-19
Barium (Ba)-Total			92.3		%		80-120	31-JUL-19
Beryllium (Be)-Total			102.7		%		80-120	31-JUL-19
Bismuth (Bi)-Total			99.99		%		80-120	31-JUL-19
Boron (B)-Total			100.4		%		80-120	31-JUL-19
Cadmium (Cd)-Total			92.5		%		80-120	31-JUL-19
Calcium (Ca)-Total			99.6		%		80-120	31-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4733585								
WG3120846-2 LCS								
Chromium (Cr)-Total			97.7		%		80-120	31-JUL-19
Cesium (Cs)-Total			93.5		%		80-120	31-JUL-19
Cobalt (Co)-Total			95.2		%		80-120	31-JUL-19
Copper (Cu)-Total			94.3		%		80-120	31-JUL-19
Iron (Fe)-Total			91.9		%		80-120	31-JUL-19
Lead (Pb)-Total			90.5		%		80-120	31-JUL-19
Lithium (Li)-Total			106.5		%		80-120	31-JUL-19
Magnesium (Mg)-Total			98.2		%		80-120	31-JUL-19
Manganese (Mn)-Total			100.5		%		80-120	31-JUL-19
Molybdenum (Mo)-Total			94.4		%		80-120	31-JUL-19
Nickel (Ni)-Total			95.3		%		80-120	31-JUL-19
Phosphorus (P)-Total			98.4		%		70-130	31-JUL-19
Potassium (K)-Total			94.1		%		80-120	31-JUL-19
Rubidium (Rb)-Total			99.97		%		80-120	31-JUL-19
Selenium (Se)-Total			97.4		%		80-120	31-JUL-19
Silicon (Si)-Total			102.9		%		60-140	31-JUL-19
Silver (Ag)-Total			92.2		%		80-120	31-JUL-19
Sodium (Na)-Total			104.1		%		80-120	31-JUL-19
Strontium (Sr)-Total			88.2		%		80-120	31-JUL-19
Sulfur (S)-Total			99.3		%		80-120	31-JUL-19
Thallium (Tl)-Total			93.1		%		80-120	31-JUL-19
Tellurium (Te)-Total			92.6		%		80-120	31-JUL-19
Thorium (Th)-Total			90.4		%		70-130	31-JUL-19
Tin (Sn)-Total			93.7		%		80-120	31-JUL-19
Titanium (Ti)-Total			99.1		%		80-120	31-JUL-19
Tungsten (W)-Total			95.0		%		80-120	31-JUL-19
Uranium (U)-Total			89.8		%		80-120	31-JUL-19
Vanadium (V)-Total			98.4		%		80-120	31-JUL-19
Zinc (Zn)-Total			95.5		%		80-120	31-JUL-19
Zirconium (Zr)-Total			91.7		%		80-120	31-JUL-19
WG3120846-1 MB								
Aluminum (Al)-Total			<0.0050		mg/L		0.005	31-JUL-19
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	31-JUL-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	31-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4733585								
WG3120846-1 MB								
Barium (Ba)-Total			<0.00010		mg/L		0.0001	31-JUL-19
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	31-JUL-19
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	31-JUL-19
Boron (B)-Total			<0.010		mg/L		0.01	31-JUL-19
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	31-JUL-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	31-JUL-19
Chromium (Cr)-Total			<0.00050		mg/L		0.0005	31-JUL-19
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	31-JUL-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	31-JUL-19
Copper (Cu)-Total			<0.0010		mg/L		0.001	31-JUL-19
Iron (Fe)-Total			<0.010		mg/L		0.01	31-JUL-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	31-JUL-19
Lithium (Li)-Total			<0.0010		mg/L		0.001	31-JUL-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	31-JUL-19
Manganese (Mn)-Total			<0.00050		mg/L		0.0005	31-JUL-19
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	31-JUL-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	31-JUL-19
Phosphorus (P)-Total			<0.050		mg/L		0.05	31-JUL-19
Potassium (K)-Total			<0.050		mg/L		0.05	31-JUL-19
Rubidium (Rb)-Total			<0.00020		mg/L		0.0002	31-JUL-19
Selenium (Se)-Total			<0.000050		mg/L		0.00005	31-JUL-19
Silicon (Si)-Total			<0.10		mg/L		0.1	31-JUL-19
Silver (Ag)-Total			<0.000050		mg/L		0.00005	31-JUL-19
Sodium (Na)-Total			<0.050		mg/L		0.05	31-JUL-19
Strontium (Sr)-Total			<0.0010		mg/L		0.001	31-JUL-19
Sulfur (S)-Total			<0.50		mg/L		0.5	31-JUL-19
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	31-JUL-19
Tellurium (Te)-Total			<0.00020		mg/L		0.0002	31-JUL-19
Thorium (Th)-Total			<0.00010		mg/L		0.0001	31-JUL-19
Tin (Sn)-Total			<0.00010		mg/L		0.0001	31-JUL-19
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	31-JUL-19
Tungsten (W)-Total			<0.00010		mg/L		0.0001	31-JUL-19
Uranium (U)-Total			<0.000010		mg/L		0.00001	31-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4733585								
WG3120846-1 MB								
Vanadium (V)-Total			<0.00050		mg/L		0.0005	31-JUL-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	31-JUL-19
Zirconium (Zr)-Total			<0.00020		mg/L		0.0002	31-JUL-19
WG3120846-5 MS		**WG3120846-3**						
Aluminum (Al)-Total			102.6		%		70-130	31-JUL-19
Antimony (Sb)-Total			97.5		%		70-130	31-JUL-19
Arsenic (As)-Total			97.9		%		70-130	31-JUL-19
Barium (Ba)-Total			N/A	MS-B	%		-	31-JUL-19
Beryllium (Be)-Total			95.3		%		70-130	31-JUL-19
Bismuth (Bi)-Total			90.2		%		70-130	31-JUL-19
Boron (B)-Total			86.1		%		70-130	31-JUL-19
Cadmium (Cd)-Total			95.2		%		70-130	31-JUL-19
Calcium (Ca)-Total			N/A	MS-B	%		-	31-JUL-19
Chromium (Cr)-Total			96.9		%		70-130	31-JUL-19
Cesium (Cs)-Total			97.2		%		70-130	31-JUL-19
Cobalt (Co)-Total			93.5		%		70-130	31-JUL-19
Copper (Cu)-Total			95.6		%		70-130	31-JUL-19
Iron (Fe)-Total			N/A	MS-B	%		-	31-JUL-19
Lead (Pb)-Total			90.5		%		70-130	31-JUL-19
Lithium (Li)-Total			N/A	MS-B	%		-	31-JUL-19
Magnesium (Mg)-Total			N/A	MS-B	%		-	31-JUL-19
Manganese (Mn)-Total			N/A	MS-B	%		-	31-JUL-19
Molybdenum (Mo)-Total			95.3		%		70-130	31-JUL-19
Nickel (Ni)-Total			97.7		%		70-130	31-JUL-19
Phosphorus (P)-Total			108.4		%		70-130	31-JUL-19
Potassium (K)-Total			N/A	MS-B	%		-	31-JUL-19
Rubidium (Rb)-Total			N/A	MS-B	%		-	31-JUL-19
Selenium (Se)-Total			100.5		%		70-130	31-JUL-19
Silicon (Si)-Total			110.2		%		70-130	31-JUL-19
Silver (Ag)-Total			94.7		%		70-130	31-JUL-19
Sodium (Na)-Total			N/A	MS-B	%		-	31-JUL-19
Strontium (Sr)-Total			N/A	MS-B	%		-	31-JUL-19
Sulfur (S)-Total			N/A	MS-B	%		-	31-JUL-19
Thallium (Tl)-Total			88.2		%		70-130	31-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4733585								
WG3120846-5 MS		**WG3120846-3**						
Tellurium (Te)-Total			93.3		%		70-130	31-JUL-19
Thorium (Th)-Total			83.9		%		70-130	31-JUL-19
Tin (Sn)-Total			95.7		%		70-130	31-JUL-19
Titanium (Ti)-Total			109.8		%		70-130	31-JUL-19
Tungsten (W)-Total			96.5		%		70-130	31-JUL-19
Uranium (U)-Total			N/A	MS-B	%		-	31-JUL-19
Vanadium (V)-Total			103.9		%		70-130	31-JUL-19
Zinc (Zn)-Total			100.6		%		70-130	31-JUL-19
Zirconium (Zr)-Total			90.5		%		70-130	31-JUL-19
NH3-F-WT	**Water**							
Batch R4734295								
WG3121428-7 DUP		**L2320486-4**						
Ammonia, Total (as N)		<0.010	<0.010	RPD-NA	mg/L	N/A	20	01-AUG-19
WG3121428-6 LCS								
Ammonia, Total (as N)			101.3		%		85-115	01-AUG-19
WG3121428-5 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	01-AUG-19
WG3121428-8 MS		**L2320486-4**						
Ammonia, Total (as N)			94.9		%		75-125	01-AUG-19
PH-BF	**Water**							
Batch R4731248								
WG3119801-2 DUP		**L2318962-2**						
pH		8.92	8.90	J	pH units	0.02	0.2	30-JUL-19
WG3119801-1 LCS								
pH			7.01		pH units		6.9-7.1	30-JUL-19
SOLIDS-TDS-BF	**Water**							
Batch R4731261								
WG3118753-3 DUP		**L2318373-1**						
Total Dissolved Solids		75	70		mg/L	6.2	20	30-JUL-19
WG3118753-2 LCS								
Total Dissolved Solids			104.3		%		85-115	30-JUL-19
WG3118753-1 MB								
Total Dissolved Solids			<20		mg/L		20	30-JUL-19
SOLIDS-TSS-BF	**Water**							

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SOLIDS-TSS-BF	**Water**							
Batch R4731242								
WG3118700-3 DUP		**L2318373-1**						
Total Suspended Solids		2.4	2.8		mg/L	15	25	30-JUL-19
WG3118700-2 LCS								
Total Suspended Solids			97.0		%		85-115	30-JUL-19
WG3118700-1 MB								
Total Suspended Solids			<2.0		mg/L		2	30-JUL-19
TURBIDITY-BF	**Water**							
Batch R4731255								
WG3119803-3 DUP		**L2318373-1**						
Turbidity		5.09	5.10		NTU	0.2	15	30-JUL-19
WG3119803-2 LCS								
Turbidity			107.0		%		85-115	30-JUL-19
WG3119803-1 MB								
Turbidity			<0.10		NTU		0.1	30-JUL-19

Quality Control Report

Workorder: L2318962 Report Date: 21-AUG-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

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

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

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.

Monday, August 19, 2019

Rick Hawthorne
ALS Environmental
60 Northland Rd, Unit 1
Waterloo Canada, ON N2V 2B8

Re: ALS Workorder: 1908023
Project Name:
Project Number: L2318962

Dear Mr. Hawthorne:

Two water samples were received from ALS Environmental, on 8/1/2019. The samples were scheduled for the following analysis:

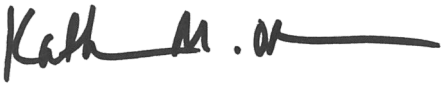
Radium-226

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,



ALS Environmental
Katie M. OBrien
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
AIHA	214884
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280

1908023

Radium-226:
The samples were prepared and analyzed according to the current revision of SOP 783.

All acceptance criteria were met.

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1908023
Client Name: ALS Environmental
Client Project Name:
Client Project Number: L2318962
Client PO Number: L2318962

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
L2318962-1	1908023-1		WATER	29-Jul-19	
L2318962-2	1908023-2		WATER	29-Jul-19	

ALS Environmental

1908023

Subcontract Request Form

Subcontract To:

ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
225 COMMERCE DRIVE
FORT COLLINS,CO 80524

NOTES: Please reference on final report and invoice: PO# *L2318962*
ALS requires QC data to be provided with your final results.

Please see enclosed 2 sample(s) in 2 Container(s)

	SAMPLE NUMBER	ANALYTICAL REQUIRED	DATE SAMPLED / DUE DATE	Priority Flag
(1)	L2318962-1 MS-08		7/29/2019	E
		Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	8/20/2019	
(2)	L2318962-2 MS-0801		7/29/2019	E
		Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	8/20/2019	

Subcontract Info Contact: Mary-Lynn Pike (519) 886-6910
Analysis and reporting info contact: Rick Hawthorne
60 NORTHLAND ROAD, UNIT 1
WATERLOO,ON N2V 2B8
Phone: (519) 886-6910 Email: Rick.Hawthorne@alsglobal.com

Please email confirmation of receipt to: Rick.Hawthorne@alsglobal.com

Shipped By: _____ Date Shipped: _____
Received By: [illegible] Date Received: 8·1·19 15:20
Verified By: _____ Date Verified: _____
Temperature: _____

Sample Integrity Issues: _____

ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: ALS Waterloo Workorder No: 1908023

Project Manager: KO Initials: NG Date: 8.1.19

1.	Are airbills / shipping documents present and/or removable?	DROP OFF	(YES)	NO
2.	Are custody seals on **shipping** containers intact?	NONE	(YES)	NO *
3.	Are custody seals on **sample** containers intact?	(NONE)	YES	NO *
4.	Is there a COC (chain-of-custody) present?		(YES)	NO *
5.	Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)		(YES)	NO *
6.	Are short-hold samples present?		YES	(NO)
7.	Are all samples within holding times for the requested analyses?		(YES)	NO *
8.	Were all sample containers received intact? (not broken or leaking)		(YES)	NO *
9.	Is there sufficient sample for the requested analyses?		(YES)	NO *
10.	Are all samples in the proper containers for the requested analyses?		(YES)	NO *
11.	Are all aqueous samples preserved correctly, if required? (excluding volatiles)	N/A	(YES)	NO *
12.	Are all aqueous non-preserved samples pH 4-9?	(N/A)	YES	NO *
13.	Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm (1/4 inch) diameter? (i.e. size of green pea)	(N/A)	YES	NO
14.	Were the samples shipped on ice?		(YES)	NO
15.	Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: #1 (#3) #4	RAD ONLY	YES	(NO)

Cooler #:	1							
Temperature (°C):	15.6							
No. of custody seals on cooler:	1							
DOT Survey/ Acceptance Information — External µR/hr reading:	10							
Background µR/hr reading:	11							

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? **YES / NO / NA** (If no, see Form 008.)

*** Please provide details here for NO responses to gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.**

All client bottle ID's vs ALS lab ID's double-checked by: NG

If applicable, was the client contacted? **YES / NO / NA** Contact: _____ Date/Time: _____

Project Manager Signature / Date: 8/2/19

Form 201r27.xls
(02/11/2019)

*IR Gun #1, VWR SN 170560549
*IR Gun #3, VWR SN 170647571
*IR Gun #4, Oakton, SN 2372220101-0002

1908023

EXPRESS WORLDWIDE WPX DHL

2019-07-31 MYDHL+ 1.0 / *30-0621*

From: ALS Environmental
Ed Hill
60 Northland Rd
Unit 1

N2V 2B8 WATERLOO ON
Canada

Origin:
YHM

Contact: +15198866910

To: ALS Environmental Fort Collins
Sample Login
225 Commerce Drive

Contact:
Sample Login
+18004431511

80524 FORT COLLINS CO
United States of America

10-1

US-DEN-DEN

C [redacted] Day Time

Ref:

Pce/Shpt Weight 14.8 lbs Piece 1/1

15.6°

Contents: Water Samples

WAYBILL 14 2302 6102

(2L)US80524+48000001

(ALS)

Client:	ALS Environmental	**Date:**	*19-Aug-19*
Project:	L2318962	**Work Order:**	1908023
Sample ID:	L2318962-1	**Lab ID:**	1908023-1
Legal Location:		**Matrix:**	WATER
Collection Date:	7/29/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1			**SOP 783**		Prep Date: **8/7/2019**	PrepBy: **JXH**
Ra-226	**0.019 (+/- 0.0081)**		**0.0069**	**BQ/l**	NA	8/19/2019 12:29
Carr: BARIUM	*97*		*40-110*	*%REC*	DL = NA	8/19/2019 12:29

Client:	ALS Environmental	**Date:**	*19-Aug-19*
Project:	L2318962	**Work Order:**	1908023
Sample ID:	L2318962-2	**Lab ID:**	1908023-2
Legal Location:		**Matrix:**	WATER
Collection Date:	7/29/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1			**SOP 783**		Prep Date: **8/7/2019**	PrepBy: **JXH**
Ra-226	**0.050 (+/- 0.015)**		**0.0046**	**BQ/l**	NA	8/19/2019 12:29
Carr: BARIUM	*97.8*		*40-110*	*%REC*	DL = NA	8/19/2019 12:29

Client:	ALS Environmental	**Date:**	*19-Aug-19*
Project:	L2318962	**Work Order:**	1908023
Sample ID:	L2318962-2	**Lab ID:**	1908023-2
Legal Location:		**Matrix:**	WATER
Collection Date:	7/29/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed

Explanation of Qualifiers

Radiochemistry:

- "Report Limit" is the MDC

U or ND - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

Y2 - Chemical Yield outside default limits.

W - DER is greater than Warning Limit of 1.42

* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.
# - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.
G - Sample density differs by more than 15% of LCS density.
D - DER is greater than Control Limit

M - Requested MDC not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS, Matrix Spike Recovery within control limits.

N - Matrix Spike Recovery outside control limits

NC - Not Calculated for duplicate results less than 5 times MDC

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

Inorganics:

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).

U or ND - Indicates that the compound was analyzed for but not detected.

E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.

M - Duplicate injection precision was not met.

N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.

Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.

* - Duplicate analysis (relative percent difference) not within control limits.

S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

Organics:

U or ND - Indicates that the compound was analyzed for but not detected.

B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.

E - Analyte concentration exceeds the upper level of the calibration range.

J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).

A - A tentatively identified compound is a suspected aldol-condensation product.

X - The analyte was diluted below an accurate quantitation level.

* - The spike recovery is equal to or outside the control criteria used.

+ - The relative percent difference (RPD) equals or exceeds the control criteria.

G - A pattern resembling gasoline was detected in this sample.

D - A pattern resembling diesel was detected in this sample.

M - A pattern resembling motor oil was detected in this sample.

C - A pattern resembling crude oil was detected in this sample.

4 - A pattern resembling JP-4 was detected in this sample.

5 - A pattern resembling JP-5 was detected in this sample.

H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.

L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.

Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
- gasoline
- JP-8
- diesel
- mineral spirits
- motor oil
- Stoddard solvent
- bunker C

Batch ID: **RE190807-1-1** Instrument ID **Alpha Scin** Method: **Radium-226 by Radon Emanation**

LCS Sample ID: **RE190807-1** Units: **BQ/l** Analysis Date: **8/19/2019 13:16**
Client ID: Run ID: **RE190807-1B** Prep Date: **8/7/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.41 (+/- 0.354)	0.0107	1.72		82.2	67-120					P,M3
Carr: BARIUM	15200		15720		96.5	40-110					

LCSD Sample ID: **RE190807-1** Units: **BQ/l** Analysis Date: **8/19/2019 13:16**
Client ID: Run ID: **RE190807-1B** Prep Date: **8/7/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.67 (+/- 0.415)	0.0139	1.72		96.8	67-120		1.41	0.5	2.1	P,M3
Carr: BARIUM	15300		15720		97.6	40-110		15200			

MB Sample ID: **RE190807-1** Units: **BQ/l** Analysis Date: **8/19/2019 11:52**
Client ID: Run ID: **RE190807-1B** Prep Date: **8/7/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	0.0012 (+/- 0.0029)	0.0052									U
Carr: BARIUM	15500		15720		98.8	40-110					

The following samples were analyzed in this batch: 1908023-1 1908023-2

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here
(lab use only)

COC Number: 15 -

Report To	Contact and company name below will appear on the final report
Company:	Baffinland Iron Mines Corp.
Contact:	Wiliam Bowden and Connor Devereaux
Phone:	647-253-0596 EXT 6016
	Company address below will appear on the final report
Street:	2275 Upper Middle Rd. E., Suite #300
City/Province:	Oakville, ON
Postal Code:	L6H 0C3

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report ☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax bimcore@alsglobal.com
Email 2
Email 3

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☐ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): **4 day [P4]** ☐ | **3 day [P3]** ☐ | **2 day [P2]** ☐

EMERGENCY: **1 Business day [E1]** ☐ | **Same Day, Weekend or Statutory holiday [E0]** ☑

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	
Contact:	

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax ap@baffinland.com
Email 2 commercial@baffinland.com

Project Information

ALS Account # / Quote #:	23642 /Q42455
Job #:	MS-08 DEL
PO / AFE:	4500057496
LSD:	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only) L2318962 | **ALS Contact:** | **Sampler:** RH/BW/ML

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	BIM-MMER-DEL	Number of Containers
	MS-08	29-Jul-19	9:25	Water	E0	6
	MS-0801	29-Jul-19	9:25	Water	E0	6

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System?
☐ YES ☑ NO

Are samples for human drinking water use?
☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐
Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INIITIAL COOLER TEMPERATURES ºC			FINAL COOLER TEMPERATURES ºC		
5.6					

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released By: Ben Widdowson	Date: 19-Jul-29	Time: 10:20	Received by:	Date:	Time:	Received by:J.STREETER	Date:JULY 29/19	Time:7:00PM

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION WHITE - LABORATORY COPY YELLOW - CLIENT COPY

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 specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Baffinland Iron Mine's Corporation (Oakville)
ATTN: William Bowden/Connor Devereaux
2275 Upper Middle Rd. E.
Suite #300
Oakville ON L6H 0C3

Date Received: 05-AUG-19
Report Date: 26-AUG-19 09:18 (MT)
Version: FINAL

Client Phone: 647-253-0596

Certificate of Analysis

Lab Work Order #: L2322602

Project P.O. #: 4500057496
Job Reference: MS-08 WT TOX
C of C Numbers:
Legal Site Desc:

Rick Hawthorne
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2322602-1 MS-08 Sampled By: KB/ML on 05-AUG-19 @ 16:50 Matrix: WATER							
Physical Tests							
Conductivity	6620		3.0	umhos/cm		06-AUG-19	R4742168
Hardness (as CaCO3)	5570		1.3	mg/L		07-AUG-19	
pH	8.07		0.10	pH units		06-AUG-19	R4741111
Total Suspended Solids	6.8		2.0	mg/L		06-AUG-19	R4741116
Total Dissolved Solids	7990		20	mg/L		06-AUG-19	R4741128
Turbidity	8.20		0.10	NTU		06-AUG-19	R4741112
Anions and Nutrients							
Acidity (as CaCO3)	6.2		1.0	mg/L		12-AUG-19	R4750458
Alkalinity, Total (as CaCO3)	10		10	mg/L		06-AUG-19	R4742168
Ammonia, Total (as N)	8.65	DLHC	0.20	mg/L		08-AUG-19	R4743713
Chloride (Cl)	20.1	DLDS	2.5	mg/L		07-AUG-19	R4744094
Fluoride (F)	0.12	DLDS	0.10	mg/L		07-AUG-19	R4744094
Nitrate (as N)	27.9	DLDS	0.10	mg/L		07-AUG-19	R4744094
Total Kjeldahl Nitrogen	8.73		0.15	mg/L	08-AUG-19	09-AUG-19	R4745346
Phosphorus, Total	<0.0030		0.0030	mg/L	06-AUG-19	07-AUG-19	R4742575
Sulfate (SO4)	5470	DLDS	1.5	mg/L		07-AUG-19	R4744094
Cyanides							
Cyanide, Total	0.0366		0.0020	mg/L		06-AUG-19	R4742208
Organic / Inorganic Carbon							
Dissolved Carbon Filtration Location	LAB					06-AUG-19	R4740969
Dissolved Organic Carbon	3.22		0.50	mg/L	06-AUG-19	07-AUG-19	R4743212
Total Organic Carbon	3.54		0.50	mg/L		07-AUG-19	R4743210
Total Metals							
Aluminum (Al)-Total	<0.050	DLHC	0.050	mg/L	06-AUG-19	06-AUG-19	R4741114
Antimony (Sb)-Total	<0.0010	DLHC	0.0010	mg/L	06-AUG-19	06-AUG-19	R4741114
Arsenic (As)-Total	<0.0010	DLHC	0.0010	mg/L	06-AUG-19	06-AUG-19	R4741114
Barium (Ba)-Total	0.0307	DLHC	0.0010	mg/L	06-AUG-19	06-AUG-19	R4741114
Beryllium (Be)-Total	<0.0010	DLHC	0.0010	mg/L	06-AUG-19	06-AUG-19	R4741114
Bismuth (Bi)-Total	<0.00050	DLHC	0.00050	mg/L	06-AUG-19	06-AUG-19	R4741114
Boron (B)-Total	<0.10	DLHC	0.10	mg/L	06-AUG-19	06-AUG-19	R4741114
Cadmium (Cd)-Total	<0.000050	DLHC	0.000050	mg/L	06-AUG-19	06-AUG-19	R4741114
Calcium (Ca)-Total	662	DLHC	0.50	mg/L	06-AUG-19	06-AUG-19	R4741114
Cesium (Cs)-Total	0.00013	DLHC	0.00010	mg/L	06-AUG-19	06-AUG-19	R4741114
Chromium (Cr)-Total	<0.0050	DLHC	0.0050	mg/L	06-AUG-19	06-AUG-19	R4741114
Cobalt (Co)-Total	0.0157	DLHC	0.0010	mg/L	06-AUG-19	06-AUG-19	R4741114
Copper (Cu)-Total	<0.010	DLHC	0.010	mg/L	06-AUG-19	06-AUG-19	R4741114
Iron (Fe)-Total	1.98	DLHC	0.10	mg/L	06-AUG-19	06-AUG-19	R4741114
Lead (Pb)-Total	<0.00050	DLHC	0.00050	mg/L	06-AUG-19	06-AUG-19	R4741114
Lithium (Li)-Total	0.094	DLHC	0.010	mg/L	06-AUG-19	06-AUG-19	R4741114
Magnesium (Mg)-Total	1030	DLHC	0.50	mg/L	06-AUG-19	06-AUG-19	R4741114
Manganese (Mn)-Total	16.3	DLHC	0.0050	mg/L	06-AUG-19	06-AUG-19	R4741114
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		07-AUG-19	R4742493

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2322602-1 MS-08 Sampled By: KB/ML on 05-AUG-19 @ 16:50 Matrix: WATER							
Total Metals							
Molybdenum (Mo)-Total	0.00059	DLHC	0.00050	mg/L	06-AUG-19	06-AUG-19	R4741114
Nickel (Ni)-Total	0.0139	DLHC	0.0050	mg/L	06-AUG-19	06-AUG-19	R4741114
Phosphorus (P)-Total	<0.50	DLHC	0.50	mg/L	06-AUG-19	06-AUG-19	R4741114
Potassium (K)-Total	7.98	DLHC	0.50	mg/L	06-AUG-19	06-AUG-19	R4741114
Rubidium (Rb)-Total	0.0152	DLHC	0.0020	mg/L	06-AUG-19	06-AUG-19	R4741114
Selenium (Se)-Total	0.00852	DLHC	0.00050	mg/L	06-AUG-19	06-AUG-19	R4741114
Silicon (Si)-Total	<1.0	DLHC	1.0	mg/L	06-AUG-19	06-AUG-19	R4741114
Silver (Ag)-Total	<0.00050	DLHC	0.00050	mg/L	06-AUG-19	06-AUG-19	R4741114
Sodium (Na)-Total	6.97	DLHC	0.50	mg/L	06-AUG-19	06-AUG-19	R4741114
Strontium (Sr)-Total	1.25	DLHC	0.010	mg/L	06-AUG-19	06-AUG-19	R4741114
Sulfur (S)-Total	1980	DLHC	5.0	mg/L	06-AUG-19	06-AUG-19	R4741114
Tellurium (Te)-Total	<0.0020	DLHC	0.0020	mg/L	06-AUG-19	06-AUG-19	R4741114
Thallium (Tl)-Total	0.00012	DLHC	0.00010	mg/L	06-AUG-19	06-AUG-19	R4741114
Thorium (Th)-Total	<0.0010	DLHC	0.0010	mg/L	06-AUG-19	06-AUG-19	R4741114
Tin (Sn)-Total	<0.0010	DLHC	0.0010	mg/L	06-AUG-19	06-AUG-19	R4741114
Titanium (Ti)-Total	<0.0030	DLHC	0.0030	mg/L	06-AUG-19	06-AUG-19	R4741114
Tungsten (W)-Total	<0.0010	DLHC	0.0010	mg/L	06-AUG-19	06-AUG-19	R4741114
Uranium (U)-Total	0.00037	DLHC	0.00010	mg/L	06-AUG-19	06-AUG-19	R4741114
Vanadium (V)-Total	<0.0050	DLHC	0.0050	mg/L	06-AUG-19	06-AUG-19	R4741114
Zinc (Zn)-Total	<0.030	DLHC	0.030	mg/L	06-AUG-19	06-AUG-19	R4741114
Zirconium (Zr)-Total	<0.0020	DLHC	0.0020	mg/L	06-AUG-19	06-AUG-19	R4741114
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					07-AUG-19	R4742052
Dissolved Metals Filtration Location	FIELD					06-AUG-19	R4740149
Aluminum (Al)-Dissolved	<0.050	DLHC	0.050	mg/L	06-AUG-19	06-AUG-19	R4740869
Antimony (Sb)-Dissolved	<0.0010	DLHC	0.0010	mg/L	06-AUG-19	06-AUG-19	R4740869
Arsenic (As)-Dissolved	<0.0010	DLHC	0.0010	mg/L	06-AUG-19	06-AUG-19	R4740869
Barium (Ba)-Dissolved	0.0295	DLHC	0.0010	mg/L	06-AUG-19	06-AUG-19	R4740869
Beryllium (Be)-Dissolved	<0.0010	DLHC	0.0010	mg/L	06-AUG-19	06-AUG-19	R4740869
Bismuth (Bi)-Dissolved	<0.00050	DLHC	0.00050	mg/L	06-AUG-19	06-AUG-19	R4740869
Boron (B)-Dissolved	<0.10	DLHC	0.10	mg/L	06-AUG-19	06-AUG-19	R4740869
Cadmium (Cd)-Dissolved	<0.000050	DLHC	0.000050	mg/L	06-AUG-19	06-AUG-19	R4740869
Calcium (Ca)-Dissolved	652	DLHC	0.50	mg/L	06-AUG-19	06-AUG-19	R4740869
Cesium (Cs)-Dissolved	0.00013	DLHC	0.00010	mg/L	06-AUG-19	06-AUG-19	R4740869
Chromium (Cr)-Dissolved	<0.0050	DLHC	0.0050	mg/L	06-AUG-19	06-AUG-19	R4740869
Cobalt (Co)-Dissolved	0.0143	DLHC	0.0010	mg/L	06-AUG-19	06-AUG-19	R4740869
Copper (Cu)-Dissolved	0.0061	DLHC	0.0020	mg/L	06-AUG-19	06-AUG-19	R4740869
Iron (Fe)-Dissolved	<0.10	DLHC	0.10	mg/L	06-AUG-19	06-AUG-19	R4740869
Lead (Pb)-Dissolved	<0.00050	DLHC	0.00050	mg/L	06-AUG-19	06-AUG-19	R4740869
Lithium (Li)-Dissolved	0.087	DLHC	0.010	mg/L	06-AUG-19	06-AUG-19	R4740869
Magnesium (Mg)-Dissolved	956	DLHC	0.050	mg/L	06-AUG-19	06-AUG-19	R4740869

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2322602-1 MS-08 Sampled By: KB/ML on 05-AUG-19 @ 16:50 Matrix: WATER							
Dissolved Metals							
Manganese (Mn)-Dissolved	16.0	DLHC	0.0050	mg/L	06-AUG-19	06-AUG-19	R4740869
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	07-AUG-19	07-AUG-19	R4742497
Molybdenum (Mo)-Dissolved	0.00054	DLHC	0.00050	mg/L	06-AUG-19	06-AUG-19	R4740869
Nickel (Ni)-Dissolved	0.0121	DLHC	0.0050	mg/L	06-AUG-19	06-AUG-19	R4740869
Phosphorus (P)-Dissolved	<0.50	DLHC	0.50	mg/L	06-AUG-19	06-AUG-19	R4740869
Potassium (K)-Dissolved	7.85	DLHC	0.50	mg/L	06-AUG-19	06-AUG-19	R4740869
Rubidium (Rb)-Dissolved	0.0145	DLHC	0.0020	mg/L	06-AUG-19	06-AUG-19	R4740869
Selenium (Se)-Dissolved	0.00812	DLHC	0.00050	mg/L	06-AUG-19	06-AUG-19	R4740869
Silicon (Si)-Dissolved	0.67	DLHC	0.50	mg/L	06-AUG-19	06-AUG-19	R4740869
Silver (Ag)-Dissolved	<0.00050	DLHC	0.00050	mg/L	06-AUG-19	06-AUG-19	R4740869
Sodium (Na)-Dissolved	6.30	DLHC	0.50	mg/L	06-AUG-19	06-AUG-19	R4740869
Strontium (Sr)-Dissolved	1.27	DLHC	0.010	mg/L	06-AUG-19	06-AUG-19	R4740869
Sulfur (S)-Dissolved	1820	DLHC	5.0	mg/L	06-AUG-19	06-AUG-19	R4740869
Tellurium (Te)-Dissolved	<0.0020	DLHC	0.0020	mg/L	06-AUG-19	06-AUG-19	R4740869
Thallium (Tl)-Dissolved	0.00012	DLHC	0.00010	mg/L	06-AUG-19	06-AUG-19	R4740869
Thorium (Th)-Dissolved	<0.0010	DLHC	0.0010	mg/L	06-AUG-19	06-AUG-19	R4740869
Tin (Sn)-Dissolved	<0.0010	DLHC	0.0010	mg/L	06-AUG-19	06-AUG-19	R4740869
Titanium (Ti)-Dissolved	<0.0030	DLHC	0.0030	mg/L	06-AUG-19	06-AUG-19	R4740869
Tungsten (W)-Dissolved	<0.0010	DLHC	0.0010	mg/L	06-AUG-19	06-AUG-19	R4740869
Uranium (U)-Dissolved	0.00033	DLHC	0.00010	mg/L	06-AUG-19	06-AUG-19	R4740869
Vanadium (V)-Dissolved	<0.0050	DLHC	0.0050	mg/L	06-AUG-19	06-AUG-19	R4740869
Zinc (Zn)-Dissolved	<0.010	DLHC	0.010	mg/L	06-AUG-19	06-AUG-19	R4740869
Zirconium (Zr)-Dissolved	<0.0020	DLHC	0.0020	mg/L	06-AUG-19	06-AUG-19	R4740869
Radiological Parameters							
Ra-226	0.091		0.0068	Bq/L	13-AUG-19	21-AUG-19	R4734319
L2322602-2 MS-0801 Sampled By: KB/ML on 05-AUG-19 @ 16:50 Matrix: WATER							
Physical Tests							
Conductivity	6610		3.0	umhos/cm		06-AUG-19	R4742168
Hardness (as CaCO3)	5530		1.3	mg/L		07-AUG-19	
pH	8.13		0.10	pH units		06-AUG-19	R4741111
Total Suspended Solids	6.4		2.0	mg/L		06-AUG-19	R4741116
Total Dissolved Solids	7940		20	mg/L		06-AUG-19	R4741128
Turbidity	8.35		0.10	NTU		06-AUG-19	R4741112
Anions and Nutrients							
Acidity (as CaCO3)	5.1		1.0	mg/L		12-AUG-19	R4750458
Alkalinity, Total (as CaCO3)	10		10	mg/L		06-AUG-19	R4742168
Ammonia, Total (as N)	9.14	DLHC	0.20	mg/L		08-AUG-19	R4743713
Chloride (Cl)	20.0	DLDS	2.5	mg/L		07-AUG-19	R4744094
Fluoride (F)	0.15	DLDS	0.10	mg/L		07-AUG-19	R4744094
Nitrate (as N)	27.6	DLDS	0.10	mg/L		07-AUG-19	R4744094

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2322602-2 MS-0801 Sampled By: KB/ML on 05-AUG-19 @ 16:50 Matrix: WATER							
Anions and Nutrients							
Total Kjeldahl Nitrogen	8.21		0.15	mg/L	08-AUG-19	09-AUG-19	R4745346
Phosphorus, Total	<0.0030		0.0030	mg/L	06-AUG-19	07-AUG-19	R4742575
Sulfate (SO4)	5400	DLDS	1.5	mg/L		07-AUG-19	R4744094
Cyanides							
Cyanide, Total	0.024	DLM	0.020	mg/L		07-AUG-19	R4742675
Organic / Inorganic Carbon							
Dissolved Carbon Filtration Location	LAB					06-AUG-19	R4740969
Dissolved Organic Carbon	3.37		0.50	mg/L	06-AUG-19	07-AUG-19	R4743212
Total Organic Carbon	3.87		0.50	mg/L		07-AUG-19	R4743210
Total Metals							
Aluminum (Al)-Total	0.193	DLHC	0.050	mg/L	06-AUG-19	06-AUG-19	R4741114
Antimony (Sb)-Total	<0.0010	DLHC	0.0010	mg/L	06-AUG-19	06-AUG-19	R4741114
Arsenic (As)-Total	<0.0010	DLHC	0.0010	mg/L	06-AUG-19	06-AUG-19	R4741114
Barium (Ba)-Total	0.0265	DLHC	0.0010	mg/L	06-AUG-19	06-AUG-19	R4741114
Beryllium (Be)-Total	<0.0010	DLHC	0.0010	mg/L	06-AUG-19	06-AUG-19	R4741114
Bismuth (Bi)-Total	<0.00050	DLHC	0.00050	mg/L	06-AUG-19	06-AUG-19	R4741114
Boron (B)-Total	<0.10	DLHC	0.10	mg/L	06-AUG-19	06-AUG-19	R4741114
Cadmium (Cd)-Total	<0.000050	DLHC	0.000050	mg/L	06-AUG-19	06-AUG-19	R4741114
Calcium (Ca)-Total	529	DLHC	0.50	mg/L	06-AUG-19	06-AUG-19	R4741114
Cesium (Cs)-Total	0.00011	DLHC	0.00010	mg/L	06-AUG-19	06-AUG-19	R4741114
Chromium (Cr)-Total	<0.0050	DLHC	0.0050	mg/L	06-AUG-19	06-AUG-19	R4741114
Cobalt (Co)-Total	0.0129	DLHC	0.0010	mg/L	06-AUG-19	06-AUG-19	R4741114
Copper (Cu)-Total	<0.010	DLHC	0.010	mg/L	06-AUG-19	06-AUG-19	R4741114
Iron (Fe)-Total	1.68	DLHC	0.10	mg/L	06-AUG-19	06-AUG-19	R4741114
Lead (Pb)-Total	0.00068	DLHC	0.00050	mg/L	06-AUG-19	06-AUG-19	R4741114
Lithium (Li)-Total	0.074	DLHC	0.010	mg/L	06-AUG-19	06-AUG-19	R4741114
Magnesium (Mg)-Total	792	DLHC	0.050	mg/L	06-AUG-19	06-AUG-19	R4741114
Manganese (Mn)-Total	12.6	DLHC	0.0050	mg/L	06-AUG-19	06-AUG-19	R4741114
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		07-AUG-19	R4742493
Molybdenum (Mo)-Total	0.00056	DLHC	0.00050	mg/L	06-AUG-19	06-AUG-19	R4741114
Nickel (Ni)-Total	0.0131	DLHC	0.0050	mg/L	06-AUG-19	06-AUG-19	R4741114
Phosphorus (P)-Total	<0.50	DLHC	0.50	mg/L	06-AUG-19	06-AUG-19	R4741114
Potassium (K)-Total	6.59	DLHC	0.50	mg/L	06-AUG-19	06-AUG-19	R4741114
Rubidium (Rb)-Total	0.0122	DLHC	0.0020	mg/L	06-AUG-19	06-AUG-19	R4741114
Selenium (Se)-Total	0.00613	DTC	0.00050	mg/L	06-AUG-19	06-AUG-19	R4741114
Silicon (Si)-Total	<1.0	DLHC	1.0	mg/L	06-AUG-19	06-AUG-19	R4741114
Silver (Ag)-Total	<0.00050	DLHC	0.00050	mg/L	06-AUG-19	06-AUG-19	R4741114
Sodium (Na)-Total	10.3	DLHC	0.50	mg/L	06-AUG-19	06-AUG-19	R4741114
Strontium (Sr)-Total	1.00	DLHC	0.010	mg/L	06-AUG-19	06-AUG-19	R4741114
Sulfur (S)-Total	1510	DLHC	5.0	mg/L	06-AUG-19	06-AUG-19	R4741114
Tellurium (Te)-Total	<0.0020	DLHC	0.0020	mg/L	06-AUG-19	06-AUG-19	R4741114
Thallium (Tl)-Total	<0.00010	DLHC	0.00010	mg/L	06-AUG-19	06-AUG-19	R4741114

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2322602-2 MS-0801 Sampled By: KB/ML on 05-AUG-19 @ 16:50 Matrix: WATER							
Total Metals							
Thorium (Th)-Total	<0.0010	DLHC	0.0010	mg/L	06-AUG-19	06-AUG-19	R4741114
Tin (Sn)-Total	0.0014	DLHC	0.0010	mg/L	06-AUG-19	06-AUG-19	R4741114
Titanium (Ti)-Total	<0.0030	DLHC	0.0030	mg/L	06-AUG-19	06-AUG-19	R4741114
Tungsten (W)-Total	<0.0010	DLHC	0.0010	mg/L	06-AUG-19	06-AUG-19	R4741114
Uranium (U)-Total	0.00047	DLHC	0.00010	mg/L	06-AUG-19	06-AUG-19	R4741114
Vanadium (V)-Total	<0.0050	DLHC	0.0050	mg/L	06-AUG-19	06-AUG-19	R4741114
Zinc (Zn)-Total	0.060	DLHC	0.030	mg/L	06-AUG-19	06-AUG-19	R4741114
Zirconium (Zr)-Total	<0.0020	DLHC	0.0020	mg/L	06-AUG-19	06-AUG-19	R4741114
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					07-AUG-19	R4742052
Dissolved Metals Filtration Location	FIELD					06-AUG-19	R4740149
Aluminum (Al)-Dissolved	<0.050	DLHC	0.050	mg/L	06-AUG-19	06-AUG-19	R4740869
Antimony (Sb)-Dissolved	<0.0010	DLHC	0.0010	mg/L	06-AUG-19	06-AUG-19	R4740869
Arsenic (As)-Dissolved	<0.0010	DLHC	0.0010	mg/L	06-AUG-19	06-AUG-19	R4740869
Barium (Ba)-Dissolved	0.0289	DLHC	0.0010	mg/L	06-AUG-19	06-AUG-19	R4740869
Beryllium (Be)-Dissolved	<0.0010	DLHC	0.0010	mg/L	06-AUG-19	06-AUG-19	R4740869
Bismuth (Bi)-Dissolved	<0.00050	DLHC	0.00050	mg/L	06-AUG-19	06-AUG-19	R4740869
Boron (B)-Dissolved	<0.10	DLHC	0.10	mg/L	06-AUG-19	06-AUG-19	R4740869
Cadmium (Cd)-Dissolved	<0.000050	DLHC	0.000050	mg/L	06-AUG-19	06-AUG-19	R4740869
Calcium (Ca)-Dissolved	656	DLHC	0.50	mg/L	06-AUG-19	06-AUG-19	R4740869
Cesium (Cs)-Dissolved	0.00014	DLHC	0.00010	mg/L	06-AUG-19	06-AUG-19	R4740869
Chromium (Cr)-Dissolved	<0.0050	DLHC	0.0050	mg/L	06-AUG-19	06-AUG-19	R4740869
Cobalt (Co)-Dissolved	0.0143	DLHC	0.0010	mg/L	06-AUG-19	06-AUG-19	R4740869
Copper (Cu)-Dissolved	0.0061	DLHC	0.0020	mg/L	06-AUG-19	06-AUG-19	R4740869
Iron (Fe)-Dissolved	<0.10	DLHC	0.10	mg/L	06-AUG-19	06-AUG-19	R4740869
Lead (Pb)-Dissolved	<0.00050	DLHC	0.00050	mg/L	06-AUG-19	06-AUG-19	R4740869
Lithium (Li)-Dissolved	0.087	DLHC	0.010	mg/L	06-AUG-19	06-AUG-19	R4740869
Magnesium (Mg)-Dissolved	944	DLHC	0.050	mg/L	06-AUG-19	06-AUG-19	R4740869
Manganese (Mn)-Dissolved	15.7	DLHC	0.0050	mg/L	06-AUG-19	06-AUG-19	R4740869
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	07-AUG-19	07-AUG-19	R4742497
Molybdenum (Mo)-Dissolved	0.00057	DLHC	0.00050	mg/L	06-AUG-19	06-AUG-19	R4740869
Nickel (Ni)-Dissolved	0.0123	DLHC	0.0050	mg/L	06-AUG-19	06-AUG-19	R4740869
Phosphorus (P)-Dissolved	<0.50	DLHC	0.50	mg/L	06-AUG-19	06-AUG-19	R4740869
Potassium (K)-Dissolved	7.81	DLHC	0.50	mg/L	06-AUG-19	06-AUG-19	R4740869
Rubidium (Rb)-Dissolved	0.0144	DLHC	0.0020	mg/L	06-AUG-19	06-AUG-19	R4740869
Selenium (Se)-Dissolved	0.00853	DLHC	0.00050	mg/L	06-AUG-19	06-AUG-19	R4740869
Silicon (Si)-Dissolved	0.68	DLHC	0.50	mg/L	06-AUG-19	06-AUG-19	R4740869
Silver (Ag)-Dissolved	<0.00050	DLHC	0.00050	mg/L	06-AUG-19	06-AUG-19	R4740869
Sodium (Na)-Dissolved	6.30	DLHC	0.50	mg/L	06-AUG-19	06-AUG-19	R4740869
Strontium (Sr)-Dissolved	1.30	DLHC	0.010	mg/L	06-AUG-19	06-AUG-19	R4740869
Sulfur (S)-Dissolved	1830	DLHC	5.0	mg/L	06-AUG-19	06-AUG-19	R4740869

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2322602-2 MS-0801 Sampled By: KB/ML on 05-AUG-19 @ 16:50 Matrix: WATER							
Dissolved Metals							
Tellurium (Te)-Dissolved	<0.0020	DLHC	0.0020	mg/L	06-AUG-19	06-AUG-19	R4740869
Thallium (Tl)-Dissolved	0.00012	DLHC	0.00010	mg/L	06-AUG-19	06-AUG-19	R4740869
Thorium (Th)-Dissolved	<0.0010	DLHC	0.0010	mg/L	06-AUG-19	06-AUG-19	R4740869
Tin (Sn)-Dissolved	<0.0010	DLHC	0.0010	mg/L	06-AUG-19	06-AUG-19	R4740869
Titanium (Ti)-Dissolved	<0.0030	DLHC	0.0030	mg/L	06-AUG-19	06-AUG-19	R4740869
Tungsten (W)-Dissolved	<0.0010	DLHC	0.0010	mg/L	06-AUG-19	06-AUG-19	R4740869
Uranium (U)-Dissolved	0.00035	DLHC	0.00010	mg/L	06-AUG-19	06-AUG-19	R4740869
Vanadium (V)-Dissolved	<0.0050	DLHC	0.0050	mg/L	06-AUG-19	06-AUG-19	R4740869
Zinc (Zn)-Dissolved	<0.010	DLHC	0.010	mg/L	06-AUG-19	06-AUG-19	R4740869
Zirconium (Zr)-Dissolved	<0.0020	DLHC	0.0020	mg/L	06-AUG-19	06-AUG-19	R4740869
Radiological Parameters							
Ra-226	0.076		0.0060	Bq/L	13-AUG-19	21-AUG-19	R4734319

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

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2322602-1, -2
Matrix Spike	Boron (B)-Dissolved	MS-B	L2322602-1, -2
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2322602-1, -2
Matrix Spike	Iron (Fe)-Dissolved	MS-B	L2322602-1, -2
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2322602-1, -2
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L2322602-1, -2
Matrix Spike	Potassium (K)-Dissolved	MS-B	L2322602-1, -2
Matrix Spike	Silicon (Si)-Dissolved	MS-B	L2322602-1, -2
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2322602-1, -2
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2322602-1, -2
Matrix Spike	Sulfur (S)-Dissolved	MS-B	L2322602-1, -2
Matrix Spike	Uranium (U)-Dissolved	MS-B	L2322602-1, -2
Matrix Spike	Calcium (Ca)-Total	MS-B	L2322602-1, -2
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2322602-1, -2
Matrix Spike	Rubidium (Rb)-Total	MS-B	L2322602-1, -2
Matrix Spike	Silicon (Si)-Total	MS-B	L2322602-1, -2
Matrix Spike	Uranium (U)-Total	MS-B	L2322602-1, -2
Matrix Spike	Ammonia, Total (as N)	MS-B	L2322602-1, -2
Matrix Spike	Nitrate (as N)	MS-B	L2322602-1, -2

Sample Parameter Qualifier key listed:

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
DTC	Dissolved concentration exceeds total. Results were confirmed by re-analysis.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACY-PCT-VA	Water	Acidity by Automatic Titration	APHA 2310 Acidity

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

Samples of industrial wastes, acid mine drainage, or other solutions that contain appreciable amounts of hydrolyzable metal ions such as aluminum, iron, and manganese may require hot peroxide treatment to ensure oxidation and hydrolysis of reduced forms of polyvalent cations. Acidity results may be highly variable if this procedure is not followed. Results in this report for 'Acidity (as CaCO3)' have not been peroxide treated.

ALK-WT	Water	Alkalinity, Total (as CaCO3)	EPA 310.2

This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.

CL-IC-N-WT	Water	Chloride by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

CN-TOT-WT	Water	Cyanide, Total	ISO 14403-2

Total cyanide is determined by the combination of UV digestion and distillation. Cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

When using this method, high levels of thiocyanate in samples can cause false positives at ~1-2% of the thiocyanate concentration. For samples with detectable cyanide analyzed by this method, ALS recommends analysis for thiocyanate to check for this potential interference

DOC-WT	Water	Dissolved Organic Carbon	APHA 5310B

Sample is filtered through a 0.45um filter, then injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic carbon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.

EC-SCREEN-VA	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

EC-SCREEN-WT	Water	Conductivity Screen (Internal Use	APHA 2510

Reference Information

Only)
Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

EC-WT	Water	Conductivity	APHA 2510 B

Water samples can be measured directly by immersing the conductivity cell into the sample.

F-IC-N-WT	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-WT	Water	Hardness	APHA 2340 B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-WT	Water	Dissolved Mercury in Water by CVAAS	EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

HG-T-CVAA-WT	Water	Total Mercury in Water by CVAAS	EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

MET-D-CCMS-WT	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

MET-T-CCMS-WT	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

NH3-F-WT	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO3-IC-WT	Water	Nitrate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-COL-WT	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is deteremined colourimetrically after persulphate digestion of the sample.

PH-BF	Water	pH	APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

RA226-MMER-FC	Water	Ra226 by Alpha Scint, MDC=0.01 Bq/L	EPA 903.1
SO4-IC-N-WT	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-BF	Water	Total Dissolved Solids	APHA 2540C

A well-mixed sample is filtered though glass fibres filter. A known volume of the filtrate is evaporated and dried at 180 +/- 2C for 1hr.

SOLIDS-TSS-BF	Water	Suspended solids	APHA 2540 D-Gravimetric

A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104 +/- 1C for a minimum of four hours or until a constant weight is achieved.

TKN-WT	Water	Total Kjeldahl Nitrogen	APHA 4500-Norg D

This analysis is carried out using procedures adapted from APHA Method 4500-Norg "Nitrogen (Organic)". Total Kjeldahl Nitrogen is determined by sample digestion at 380 Celsius with analysis using an automated colorimetric method.

Reference Information

TOC-WT	Water	Total Organic Carbon	APHA 5310B

Sample is injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic cabon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.

TURBIDITY-BF	Water	Turbidity	APHA 2130 B

Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.

** 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
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA
FC	ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA
BF	ALS ENVIRONMENTAL - BAFFIN ISLAND, NUNAVUT, 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 weight of sample
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

Workorder: L2322602 Report Date: 26-AUG-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACY-PCT-VA	**Water**							
Batch R4750458								
WG3130455-4 DUP		**L2322602-2**						
Acidity (as CaCO3)		5.1	5.1		mg/L	0.0	20	12-AUG-19
WG3130455-3 LCS								
Acidity (as CaCO3)			102.0		%		85-115	12-AUG-19
WG3130455-1 MB								
Acidity (as CaCO3)			1.6		mg/L		2	12-AUG-19
ALK-WT	**Water**							
Batch R4742168								
WG3125026-4 DUP		**WG3125026-3**						
Alkalinity, Total (as CaCO3)		256	256		mg/L	0.0	20	06-AUG-19
WG3125026-2 LCS								
Alkalinity, Total (as CaCO3)			102.3		%		85-115	06-AUG-19
WG3125026-1 MB								
Alkalinity, Total (as CaCO3)			<10		mg/L		10	06-AUG-19
CL-IC-N-WT	**Water**							
Batch R4744094								
WG3125528-10 DUP		**WG3125528-8**						
Chloride (Cl)		13.5	13.4		mg/L	0.1	20	07-AUG-19
WG3125528-7 LCS								
Chloride (Cl)			102.1		%		90-110	07-AUG-19
WG3125528-6 MB								
Chloride (Cl)			<0.50		mg/L		0.5	07-AUG-19
WG3125528-9 MS		**WG3125528-8**						
Chloride (Cl)			100.9		%		75-125	07-AUG-19
CN-TOT-WT	**Water**							
Batch R4742208								
WG3124827-3 DUP		**L2320136-1**						
Cyanide, Total		<0.10	<0.10	RPD-NA	mg/L	N/A	20	06-AUG-19
WG3124827-2 LCS								
Cyanide, Total			86.3		%		80-120	06-AUG-19
WG3124827-1 MB								
Cyanide, Total			<0.0020		mg/L		0.002	06-AUG-19
WG3124827-4 MS		**L2320136-1**						
Cyanide, Total			82.7		%		70-130	06-AUG-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CN-TOT-WT	**Water**							
Batch R4742675								
WG3125547-3 DUP		**L2322602-2**						
Cyanide, Total		0.024	0.021		mg/L	12	20	07-AUG-19
WG3125547-2 LCS								
Cyanide, Total			89.0		%		80-120	07-AUG-19
WG3125547-1 MB								
Cyanide, Total			<0.0020		mg/L		0.002	07-AUG-19
WG3125547-4 MS		**L2322602-2**						
Cyanide, Total			72.1		%		70-130	07-AUG-19
DOC-WT	**Water**							
Batch R4743212								
WG3125099-3 DUP		**L2322602-1**						
Dissolved Organic Carbon		3.22	3.34		mg/L	3.6	20	07-AUG-19
WG3125099-2 LCS								
Dissolved Organic Carbon			100.0		%		80-120	07-AUG-19
WG3125099-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	07-AUG-19
WG3125099-4 MS		**L2322602-1**						
Dissolved Organic Carbon			99.0		%		70-130	07-AUG-19
EC-WT	**Water**							
Batch R4742168								
WG3125026-4 DUP		**WG3125026-3**						
Conductivity		918	922		umhos/cm	0.4	10	06-AUG-19
WG3125026-2 LCS								
Conductivity			99.8		%		90-110	06-AUG-19
WG3125026-1 MB								
Conductivity			<3.0		umhos/cm		3	06-AUG-19
F-IC-N-WT	**Water**							
Batch R4744094								
WG3125528-10 DUP		**WG3125528-8**						
Fluoride (F)		<0.020	<0.020	RPD-NA	mg/L	N/A	20	07-AUG-19
WG3125528-7 LCS								
Fluoride (F)			103.8		%		90-110	07-AUG-19
WG3125528-6 MB								
Fluoride (F)			<0.020		mg/L		0.02	07-AUG-19
WG3125528-9 MS		**WG3125528-8**						
Fluoride (F)			102.0		%		75-125	07-AUG-19
HG-D-CVAA-WT	**Water**							

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-D-CVAA-WT	**Water**							
Batch R4742497								
WG3125506-3 DUP		**L2320845-1**						
Mercury (Hg)-Dissolved		<0.0000050	<0.000005C	RPD-NA	mg/L	N/A	20	07-AUG-19
WG3125506-2 LCS								
Mercury (Hg)-Dissolved			93.1		%		80-120	07-AUG-19
WG3125506-1 MB								
Mercury (Hg)-Dissolved			<0.000005C		mg/L		0.000005	07-AUG-19
WG3125506-4 MS		**L2320845-2**						
Mercury (Hg)-Dissolved			95.3		%		70-130	07-AUG-19
HG-T-CVAA-WT	**Water**							
Batch R4742493								
WG3125501-4 DUP		**WG3125501-3**						
Mercury (Hg)-Total		<0.0000050	<0.000005C	RPD-NA	mg/L	N/A	20	07-AUG-19
WG3125501-2 LCS								
Mercury (Hg)-Total			95.7		%		80-120	07-AUG-19
WG3125501-1 MB								
Mercury (Hg)-Total			<0.000005C		mg/L		0.000005	07-AUG-19
WG3125501-6 MS		**WG3125501-5**						
Mercury (Hg)-Total			91.8		%		70-130	07-AUG-19
MET-D-CCMS-WT	**Water**							
Batch R4740869								
WG3124853-4 DUP		**WG3124853-3**						
Aluminum (Al)-Dissolved		<0.050	<0.050	RPD-NA	mg/L	N/A	20	06-AUG-19
Antimony (Sb)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	06-AUG-19
Arsenic (As)-Dissolved		0.0017	0.0019		mg/L	9.8	20	06-AUG-19
Barium (Ba)-Dissolved		1.58	1.62		mg/L	2.1	20	06-AUG-19
Beryllium (Be)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	06-AUG-19
Bismuth (Bi)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	06-AUG-19
Boron (B)-Dissolved		<0.10	<0.10	RPD-NA	mg/L	N/A	20	06-AUG-19
Cadmium (Cd)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	06-AUG-19
Calcium (Ca)-Dissolved		180	187		mg/L	4.2	20	06-AUG-19
Cesium (Cs)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	06-AUG-19
Chromium (Cr)-Dissolved		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	06-AUG-19
Cobalt (Co)-Dissolved		0.0035	0.0035		mg/L	1.0	20	06-AUG-19
Copper (Cu)-Dissolved		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	06-AUG-19
Iron (Fe)-Dissolved		9.57	9.93		mg/L	3.7	20	06-AUG-19
Lead (Pb)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	06-AUG-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4740869								
WG3124853-4 DUP		**WG3124853-3**						
Lithium (Li)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	06-AUG-19
Magnesium (Mg)-Dissolved		37.1	38.6		mg/L	4.0	20	06-AUG-19
Manganese (Mn)-Dissolved		1.17	1.21		mg/L	3.7	20	06-AUG-19
Molybdenum (Mo)-Dissolved		0.00122	0.00126		mg/L	3.0	20	06-AUG-19
Nickel (Ni)-Dissolved		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	06-AUG-19
Phosphorus (P)-Dissolved		<0.50	<0.50	RPD-NA	mg/L	N/A	20	06-AUG-19
Potassium (K)-Dissolved		5.11	5.37		mg/L	4.9	20	06-AUG-19
Rubidium (Rb)-Dissolved		0.0042	0.0039		mg/L	9.4	20	06-AUG-19
Selenium (Se)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	06-AUG-19
Silicon (Si)-Dissolved		3.50	3.63		mg/L	3.6	20	06-AUG-19
Silver (Ag)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	06-AUG-19
Sodium (Na)-Dissolved		940	979		mg/L	4.1	20	06-AUG-19
Strontium (Sr)-Dissolved		1.35	1.39		mg/L	3.4	20	06-AUG-19
Sulfur (S)-Dissolved		5.7	5.5		mg/L	3.4	20	06-AUG-19
Tellurium (Te)-Dissolved		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	06-AUG-19
Thallium (Tl)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	06-AUG-19
Thorium (Th)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	06-AUG-19
Tin (Sn)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	06-AUG-19
Titanium (Ti)-Dissolved		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	06-AUG-19
Tungsten (W)-Dissolved		0.0057	0.0058		mg/L	1.2	20	06-AUG-19
Uranium (U)-Dissolved		0.00031	0.00032		mg/L	2.9	20	06-AUG-19
Vanadium (V)-Dissolved		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	06-AUG-19
Zinc (Zn)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	06-AUG-19
Zirconium (Zr)-Dissolved		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	06-AUG-19
WG3124853-2 LCS								
Aluminum (Al)-Dissolved			97.7		%		80-120	06-AUG-19
Antimony (Sb)-Dissolved			95.8		%		80-120	06-AUG-19
Arsenic (As)-Dissolved			94.3		%		80-120	06-AUG-19
Barium (Ba)-Dissolved			98.3		%		80-120	06-AUG-19
Beryllium (Be)-Dissolved			98.8		%		80-120	06-AUG-19
Bismuth (Bi)-Dissolved			98.9		%		80-120	06-AUG-19
Boron (B)-Dissolved			91.1		%		80-120	06-AUG-19
Cadmium (Cd)-Dissolved			93.7		%		80-120	06-AUG-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4740869								
WG3124853-2 LCS								
Calcium (Ca)-Dissolved			99.97		%		80-120	06-AUG-19
Cesium (Cs)-Dissolved			99.9		%		80-120	06-AUG-19
Chromium (Cr)-Dissolved			95.5		%		80-120	06-AUG-19
Cobalt (Co)-Dissolved			96.1		%		80-120	06-AUG-19
Copper (Cu)-Dissolved			94.7		%		80-120	06-AUG-19
Iron (Fe)-Dissolved			94.4		%		80-120	06-AUG-19
Lead (Pb)-Dissolved			99.1		%		80-120	06-AUG-19
Lithium (Li)-Dissolved			97.9		%		80-120	06-AUG-19
Magnesium (Mg)-Dissolved			97.0		%		80-120	06-AUG-19
Manganese (Mn)-Dissolved			92.6		%		80-120	06-AUG-19
Molybdenum (Mo)-Dissolved			98.8		%		80-120	06-AUG-19
Nickel (Ni)-Dissolved			96.0		%		80-120	06-AUG-19
Phosphorus (P)-Dissolved			97.4		%		80-120	06-AUG-19
Potassium (K)-Dissolved			93.7		%		80-120	06-AUG-19
Rubidium (Rb)-Dissolved			97.1		%		80-120	06-AUG-19
Selenium (Se)-Dissolved			98.6		%		80-120	06-AUG-19
Silicon (Si)-Dissolved			99.4		%		60-140	06-AUG-19
Silver (Ag)-Dissolved			95.4		%		80-120	06-AUG-19
Sodium (Na)-Dissolved			97.5		%		80-120	06-AUG-19
Strontium (Sr)-Dissolved			98.6		%		80-120	06-AUG-19
Sulfur (S)-Dissolved			84.7		%		80-120	06-AUG-19
Tellurium (Te)-Dissolved			94.0		%		80-120	06-AUG-19
Thallium (Tl)-Dissolved			98.7		%		80-120	06-AUG-19
Thorium (Th)-Dissolved			97.8		%		80-120	06-AUG-19
Tin (Sn)-Dissolved			97.6		%		80-120	06-AUG-19
Titanium (Ti)-Dissolved			90.8		%		80-120	06-AUG-19
Tungsten (W)-Dissolved			95.7		%		80-120	06-AUG-19
Uranium (U)-Dissolved			95.1		%		80-120	06-AUG-19
Vanadium (V)-Dissolved			97.2		%		80-120	06-AUG-19
Zinc (Zn)-Dissolved			92.3		%		80-120	06-AUG-19
Zirconium (Zr)-Dissolved			96.0		%		80-120	06-AUG-19
WG3124853-1 MB								
Aluminum (Al)-Dissolved			<0.0050		mg/L		0.005	06-AUG-19
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	06-AUG-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4740869								
WG3124853-1 MB								
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	06-AUG-19
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	06-AUG-19
Beryllium (Be)-Dissolved			<0.00010		mg/L		0.0001	06-AUG-19
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	06-AUG-19
Boron (B)-Dissolved			<0.010		mg/L		0.01	06-AUG-19
Cadmium (Cd)-Dissolved			<0.000005C		mg/L		0.000005	06-AUG-19
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	06-AUG-19
Cesium (Cs)-Dissolved			<0.000010		mg/L		0.00001	06-AUG-19
Chromium (Cr)-Dissolved			<0.00050		mg/L		0.0005	06-AUG-19
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	06-AUG-19
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	06-AUG-19
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	06-AUG-19
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	06-AUG-19
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	06-AUG-19
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	06-AUG-19
Manganese (Mn)-Dissolved			<0.00050		mg/L		0.0005	06-AUG-19
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	06-AUG-19
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	06-AUG-19
Phosphorus (P)-Dissolved			<0.050		mg/L		0.05	06-AUG-19
Potassium (K)-Dissolved			<0.050		mg/L		0.05	06-AUG-19
Rubidium (Rb)-Dissolved			<0.00020		mg/L		0.0002	06-AUG-19
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	06-AUG-19
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	06-AUG-19
Silver (Ag)-Dissolved			<0.000050		mg/L		0.00005	06-AUG-19
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	06-AUG-19
Strontium (Sr)-Dissolved			<0.0010		mg/L		0.001	06-AUG-19
Sulfur (S)-Dissolved			<0.50		mg/L		0.5	06-AUG-19
Tellurium (Te)-Dissolved			<0.00020		mg/L		0.0002	06-AUG-19
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	06-AUG-19
Thorium (Th)-Dissolved			<0.00010		mg/L		0.0001	06-AUG-19
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	06-AUG-19
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	06-AUG-19
Tungsten (W)-Dissolved			<0.00010		mg/L		0.0001	06-AUG-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4740869								
WG3124853-1 MB								
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	06-AUG-19
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	06-AUG-19
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	06-AUG-19
Zirconium (Zr)-Dissolved			<0.00020		mg/L		0.0002	06-AUG-19
WG3124853-5 MS		**WG3124853-6**						
Aluminum (Al)-Dissolved			88.1		%		70-130	06-AUG-19
Antimony (Sb)-Dissolved			88.5		%		70-130	06-AUG-19
Arsenic (As)-Dissolved			93.4		%		70-130	06-AUG-19
Barium (Ba)-Dissolved			N/A	MS-B	%		-	06-AUG-19
Beryllium (Be)-Dissolved			93.1		%		70-130	06-AUG-19
Bismuth (Bi)-Dissolved			93.2		%		70-130	06-AUG-19
Boron (B)-Dissolved			N/A	MS-B	%		-	06-AUG-19
Cadmium (Cd)-Dissolved			89.8		%		70-130	06-AUG-19
Calcium (Ca)-Dissolved			N/A	MS-B	%		-	06-AUG-19
Cesium (Cs)-Dissolved			95.3		%		70-130	06-AUG-19
Chromium (Cr)-Dissolved			84.7		%		70-130	06-AUG-19
Cobalt (Co)-Dissolved			91.3		%		70-130	06-AUG-19
Copper (Cu)-Dissolved			88.8		%		70-130	06-AUG-19
Iron (Fe)-Dissolved			N/A	MS-B	%		-	06-AUG-19
Lead (Pb)-Dissolved			93.2		%		70-130	06-AUG-19
Lithium (Li)-Dissolved			93.3		%		70-130	06-AUG-19
Magnesium (Mg)-Dissolved			N/A	MS-B	%		-	06-AUG-19
Manganese (Mn)-Dissolved			N/A	MS-B	%		-	06-AUG-19
Molybdenum (Mo)-Dissolved			96.2		%		70-130	06-AUG-19
Nickel (Ni)-Dissolved			86.9		%		70-130	06-AUG-19
Phosphorus (P)-Dissolved			87.9		%		70-130	06-AUG-19
Potassium (K)-Dissolved			N/A	MS-B	%		-	06-AUG-19
Selenium (Se)-Dissolved			92.7		%		70-130	06-AUG-19
Silicon (Si)-Dissolved			N/A	MS-B	%		-	06-AUG-19
Silver (Ag)-Dissolved			84.0		%		70-130	06-AUG-19
Sodium (Na)-Dissolved			N/A	MS-B	%		-	06-AUG-19
Strontium (Sr)-Dissolved			N/A	MS-B	%		-	06-AUG-19
Sulfur (S)-Dissolved			N/A	MS-B	%		-	06-AUG-19
Tellurium (Te)-Dissolved			73.3		%		70-130	06-AUG-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4740869								
WG3124853-5 MS		**WG3124853-6**						
Thallium (Tl)-Dissolved			92.6		%		70-130	06-AUG-19
Thorium (Th)-Dissolved			95.5		%		70-130	06-AUG-19
Tin (Sn)-Dissolved			95.0		%		70-130	06-AUG-19
Titanium (Ti)-Dissolved			90.9		%		70-130	06-AUG-19
Tungsten (W)-Dissolved			88.9		%		70-130	06-AUG-19
Uranium (U)-Dissolved			N/A	MS-B	%		-	06-AUG-19
Vanadium (V)-Dissolved			91.7		%		70-130	06-AUG-19
Zinc (Zn)-Dissolved			78.0		%		70-130	06-AUG-19
Zirconium (Zr)-Dissolved			70.2		%		70-130	06-AUG-19
MET-T-CCMS-WT	**Water**							
Batch R4741114								
WG3124978-4 DUP		**WG3124978-3**						
Aluminum (Al)-Total		0.0212	0.0214		mg/L	0.8	20	06-AUG-19
Antimony (Sb)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	06-AUG-19
Arsenic (As)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	06-AUG-19
Barium (Ba)-Total		0.00933	0.00939		mg/L	0.6	20	06-AUG-19
Beryllium (Be)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	06-AUG-19
Bismuth (Bi)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	06-AUG-19
Boron (B)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	06-AUG-19
Cadmium (Cd)-Total		0.0000052	<0.000005(	RPD-NA	mg/L	N/A	20	06-AUG-19
Calcium (Ca)-Total		14.0	14.1		mg/L	0.7	20	06-AUG-19
Chromium (Cr)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	06-AUG-19
Cesium (Cs)-Total		0.000013	0.000014		mg/L	2.5	20	06-AUG-19
Cobalt (Co)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	06-AUG-19
Copper (Cu)-Total		0.0024	0.0025		mg/L	4.1	20	06-AUG-19
Iron (Fe)-Total		0.024	0.020		mg/L	20	20	06-AUG-19
Lead (Pb)-Total		<0.000050	0.000056	RPD-NA	mg/L	N/A	20	06-AUG-19
Lithium (Li)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	06-AUG-19
Magnesium (Mg)-Total		8.32	8.30		mg/L	0.2	20	06-AUG-19
Manganese (Mn)-Total		0.00062	0.00059		mg/L	5.2	20	06-AUG-19
Molybdenum (Mo)-Total		0.000842	0.000825		mg/L	2.1	20	06-AUG-19
Nickel (Ni)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	06-AUG-19
Phosphorus (P)-Total		<0.050	<0.050	RPD-NA	mg/L	N/A	20	06-AUG-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4741114								
WG3124978-4 DUP		**WG3124978-3**						
Potassium (K)-Total		1.82	1.82		mg/L	0.3	20	06-AUG-19
Rubidium (Rb)-Total		0.00541	0.00534		mg/L	1.3	20	06-AUG-19
Selenium (Se)-Total		<0.000050	0.000056	RPD-NA	mg/L	N/A	20	06-AUG-19
Silicon (Si)-Total		0.87	0.87		mg/L	0.6	20	06-AUG-19
Silver (Ag)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	06-AUG-19
Sodium (Na)-Total		0.554	0.549		mg/L	0.9	20	06-AUG-19
Strontium (Sr)-Total		0.0091	0.0092		mg/L	1.3	20	06-AUG-19
Sulfur (S)-Total		1.68	1.57		mg/L	6.8	25	06-AUG-19
Thallium (Tl)-Total		0.000016	0.000013		mg/L	16	20	06-AUG-19
Tellurium (Te)-Total		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	06-AUG-19
Thorium (Th)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	25	06-AUG-19
Tin (Sn)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	06-AUG-19
Titanium (Ti)-Total		0.00092	0.00082		mg/L	12	20	06-AUG-19
Tungsten (W)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	06-AUG-19
Uranium (U)-Total		0.00296	0.00300		mg/L	1.3	20	06-AUG-19
Vanadium (V)-Total		0.00055	0.00056		mg/L	2.6	20	06-AUG-19
Zinc (Zn)-Total		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	06-AUG-19
Zirconium (Zr)-Total		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	06-AUG-19
WG3124978-2 LCS								
Aluminum (Al)-Total			102.7		%		80-120	06-AUG-19
Antimony (Sb)-Total			105.7		%		80-120	06-AUG-19
Arsenic (As)-Total			100.5		%		80-120	06-AUG-19
Barium (Ba)-Total			102.9		%		80-120	06-AUG-19
Beryllium (Be)-Total			99.2		%		80-120	06-AUG-19
Bismuth (Bi)-Total			99.5		%		80-120	06-AUG-19
Boron (B)-Total			89.3		%		80-120	06-AUG-19
Cadmium (Cd)-Total			99.6		%		80-120	06-AUG-19
Calcium (Ca)-Total			102.3		%		80-120	06-AUG-19
Chromium (Cr)-Total			102.0		%		80-120	06-AUG-19
Cesium (Cs)-Total			98.8		%		80-120	06-AUG-19
Cobalt (Co)-Total			100.8		%		80-120	06-AUG-19
Copper (Cu)-Total			99.8		%		80-120	06-AUG-19
Iron (Fe)-Total			100.6		%		80-120	06-AUG-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4741114								
WG3124978-2 LCS								
Lead (Pb)-Total			101.0		%		80-120	06-AUG-19
Lithium (Li)-Total			98.8		%		80-120	06-AUG-19
Magnesium (Mg)-Total			103.9		%		80-120	06-AUG-19
Manganese (Mn)-Total			102.7		%		80-120	06-AUG-19
Molybdenum (Mo)-Total			103.8		%		80-120	06-AUG-19
Nickel (Ni)-Total			99.4		%		80-120	06-AUG-19
Phosphorus (P)-Total			104.9		%		70-130	06-AUG-19
Potassium (K)-Total			95.8		%		80-120	06-AUG-19
Rubidium (Rb)-Total			102.8		%		80-120	06-AUG-19
Selenium (Se)-Total			99.98		%		80-120	06-AUG-19
Silicon (Si)-Total			104.8		%		60-140	06-AUG-19
Silver (Ag)-Total			101.5		%		80-120	06-AUG-19
Sodium (Na)-Total			103.2		%		80-120	06-AUG-19
Strontium (Sr)-Total			100.0		%		80-120	06-AUG-19
Sulfur (S)-Total			102.7		%		80-120	06-AUG-19
Thallium (Tl)-Total			99.8		%		80-120	06-AUG-19
Tellurium (Te)-Total			101.1		%		80-120	06-AUG-19
Thorium (Th)-Total			99.2		%		70-130	06-AUG-19
Tin (Sn)-Total			101.4		%		80-120	06-AUG-19
Titanium (Ti)-Total			99.8		%		80-120	06-AUG-19
Tungsten (W)-Total			102.8		%		80-120	06-AUG-19
Uranium (U)-Total			100.7		%		80-120	06-AUG-19
Vanadium (V)-Total			102.7		%		80-120	06-AUG-19
Zinc (Zn)-Total			96.9		%		80-120	06-AUG-19
Zirconium (Zr)-Total			96.9		%		80-120	06-AUG-19
WG3124978-1 MB								
Aluminum (Al)-Total			<0.0050		mg/L		0.005	06-AUG-19
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	06-AUG-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	06-AUG-19
Barium (Ba)-Total			<0.00010		mg/L		0.0001	06-AUG-19
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	06-AUG-19
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	06-AUG-19
Boron (B)-Total			<0.010		mg/L		0.01	06-AUG-19
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	06-AUG-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4741114								
WG3124978-1 MB								
Calcium (Ca)-Total			<0.050		mg/L		0.05	06-AUG-19
Chromium (Cr)-Total			<0.00050		mg/L		0.0005	06-AUG-19
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	06-AUG-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	06-AUG-19
Copper (Cu)-Total			<0.0010		mg/L		0.001	06-AUG-19
Iron (Fe)-Total			<0.010		mg/L		0.01	06-AUG-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	06-AUG-19
Lithium (Li)-Total			<0.0010		mg/L		0.001	06-AUG-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	06-AUG-19
Manganese (Mn)-Total			<0.00050		mg/L		0.0005	06-AUG-19
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	06-AUG-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	06-AUG-19
Phosphorus (P)-Total			<0.050		mg/L		0.05	06-AUG-19
Potassium (K)-Total			<0.050		mg/L		0.05	06-AUG-19
Rubidium (Rb)-Total			<0.00020		mg/L		0.0002	06-AUG-19
Selenium (Se)-Total			<0.000050		mg/L		0.00005	06-AUG-19
Silicon (Si)-Total			<0.10		mg/L		0.1	06-AUG-19
Silver (Ag)-Total			<0.000050		mg/L		0.00005	06-AUG-19
Sodium (Na)-Total			<0.050		mg/L		0.05	06-AUG-19
Strontium (Sr)-Total			<0.0010		mg/L		0.001	06-AUG-19
Sulfur (S)-Total			<0.50		mg/L		0.5	06-AUG-19
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	06-AUG-19
Tellurium (Te)-Total			<0.00020		mg/L		0.0002	06-AUG-19
Thorium (Th)-Total			<0.00010		mg/L		0.0001	06-AUG-19
Tin (Sn)-Total			<0.00010		mg/L		0.0001	06-AUG-19
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	06-AUG-19
Tungsten (W)-Total			<0.00010		mg/L		0.0001	06-AUG-19
Uranium (U)-Total			<0.000010		mg/L		0.00001	06-AUG-19
Vanadium (V)-Total			<0.00050		mg/L		0.0005	06-AUG-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	06-AUG-19
Zirconium (Zr)-Total			<0.00020		mg/L		0.0002	06-AUG-19
WG3124978-5 MS		**WG3124978-3**						
Aluminum (Al)-Total			96.7		%		70-130	06-AUG-19
Antimony (Sb)-Total			104.9		%		70-130	06-AUG-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4741114								
WG3124978-5 MS		**WG3124978-3**						
Arsenic (As)-Total			98.6		%		70-130	06-AUG-19
Barium (Ba)-Total			94.3		%		70-130	06-AUG-19
Beryllium (Be)-Total			100.7		%		70-130	06-AUG-19
Bismuth (Bi)-Total			103.2		%		70-130	06-AUG-19
Boron (B)-Total			88.2		%		70-130	06-AUG-19
Cadmium (Cd)-Total			100.6		%		70-130	06-AUG-19
Calcium (Ca)-Total			N/A	MS-B	%		-	06-AUG-19
Chromium (Cr)-Total			101.1		%		70-130	06-AUG-19
Cesium (Cs)-Total			102.4		%		70-130	06-AUG-19
Cobalt (Co)-Total			98.3		%		70-130	06-AUG-19
Copper (Cu)-Total			96.9		%		70-130	06-AUG-19
Iron (Fe)-Total			91.2		%		70-130	06-AUG-19
Lead (Pb)-Total			102.0		%		70-130	06-AUG-19
Lithium (Li)-Total			98.0		%		70-130	06-AUG-19
Magnesium (Mg)-Total			N/A	MS-B	%		-	06-AUG-19
Manganese (Mn)-Total			98.5		%		70-130	06-AUG-19
Molybdenum (Mo)-Total			106.0		%		70-130	06-AUG-19
Nickel (Ni)-Total			96.9		%		70-130	06-AUG-19
Phosphorus (P)-Total			103.4		%		70-130	06-AUG-19
Potassium (K)-Total			93.7		%		70-130	06-AUG-19
Rubidium (Rb)-Total			N/A	MS-B	%		-	06-AUG-19
Selenium (Se)-Total			101.6		%		70-130	06-AUG-19
Silicon (Si)-Total			N/A	MS-B	%		-	06-AUG-19
Silver (Ag)-Total			104.6		%		70-130	06-AUG-19
Sodium (Na)-Total			102.4		%		70-130	06-AUG-19
Strontium (Sr)-Total			99.0		%		70-130	06-AUG-19
Sulfur (S)-Total			92.3		%		70-130	06-AUG-19
Thallium (Tl)-Total			100.6		%		70-130	06-AUG-19
Tellurium (Te)-Total			96.8		%		70-130	06-AUG-19
Thorium (Th)-Total			100.2		%		70-130	06-AUG-19
Tin (Sn)-Total			101.5		%		70-130	06-AUG-19
Titanium (Ti)-Total			97.5		%		70-130	06-AUG-19
Tungsten (W)-Total			107.1		%		70-130	06-AUG-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4741114								
WG3124978-5 MS		**WG3124978-3**						
Uranium (U)-Total			N/A	MS-B	%		-	06-AUG-19
Vanadium (V)-Total			101.0		%		70-130	06-AUG-19
Zinc (Zn)-Total			94.5		%		70-130	06-AUG-19
Zirconium (Zr)-Total			100.3		%		70-130	06-AUG-19
NH3-F-WT	**Water**							
Batch R4743713								
WG3126765-3 DUP		**L2322602-2**						
Ammonia, Total (as N)		9.14	8.99		mg/L	1.6	20	08-AUG-19
WG3126765-2 LCS								
Ammonia, Total (as N)			100.4		%		85-115	08-AUG-19
WG3126765-1 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	08-AUG-19
WG3126765-4 MS		**L2322602-2**						
Ammonia, Total (as N)			N/A	MS-B	%		-	08-AUG-19
NO3-IC-WT	**Water**							
Batch R4744094								
WG3125528-10 DUP		**WG3125528-8**						
Nitrate (as N)		2.56	2.56		mg/L	0.0	20	07-AUG-19
WG3125528-7 LCS								
Nitrate (as N)			101.2		%		90-110	07-AUG-19
WG3125528-6 MB								
Nitrate (as N)			<0.020		mg/L		0.02	07-AUG-19
WG3125528-9 MS		**WG3125528-8**						
Nitrate (as N)			N/A	MS-B	%		-	07-AUG-19
P-T-COL-WT	**Water**							
Batch R4742575								
WG3125087-3 DUP		**L2322602-1**						
Phosphorus, Total		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	07-AUG-19
WG3125087-2 LCS								
Phosphorus, Total			101.8		%		80-120	07-AUG-19
WG3125087-1 MB								
Phosphorus, Total			<0.0030		mg/L		0.003	07-AUG-19
WG3125087-4 MS		**L2322602-1**						
Phosphorus, Total			95.3		%		70-130	07-AUG-19
PH-BF	**Water**							

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PH-BF	**Water**							
Batch R4741111								
WG3124164-2 DUP		**L2322602-1**						
pH		8.07	8.04	J	pH units	0.03	0.2	06-AUG-19
WG3124164-1 LCS								
pH			7.00		pH units		6.9-7.1	06-AUG-19
SO4-IC-N-WT	**Water**							
Batch R4744094								
WG3125528-10 DUP		**WG3125528-8**						
Sulfate (SO4)		23.1	23.1		mg/L	0.0	20	07-AUG-19
WG3125528-7 LCS								
Sulfate (SO4)			102.1		%		90-110	07-AUG-19
WG3125528-6 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	07-AUG-19
WG3125528-9 MS		**WG3125528-8**						
Sulfate (SO4)			99.3		%		75-125	07-AUG-19
SOLIDS-TDS-BF	**Water**							
Batch R4741128								
WG3124158-3 DUP		**L2319868-1**						
Total Dissolved Solids		448	458		mg/L	2.3	20	06-AUG-19
WG3124158-2 LCS								
Total Dissolved Solids			106.1		%		85-115	06-AUG-19
WG3124158-1 MB								
Total Dissolved Solids			<20		mg/L		20	06-AUG-19
SOLIDS-TSS-BF	**Water**							
Batch R4741116								
WG3124156-3 DUP		**L2322603-1**						
Total Suspended Solids		<2.0	<2.0	RPD-NA	mg/L	N/A	25	06-AUG-19
WG3124156-2 LCS								
Total Suspended Solids			99.0		%		85-115	06-AUG-19
WG3124156-1 MB								
Total Suspended Solids			<2.0		mg/L		2	06-AUG-19
TKN-WT	**Water**							
Batch R4745346								
WG3127324-3 DUP		**L2320918-33**						
Total Kjeldahl Nitrogen		0.81	0.86		mg/L	6.3	20	09-AUG-19
WG3127324-2 LCS								
Total Kjeldahl Nitrogen			111.3		%		75-125	09-AUG-19
WG3127324-1 MB								

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TKN-WT	**Water**							
Batch R4745346								
WG3127324-1 MB								
Total Kjeldahl Nitrogen			<0.15		mg/L		0.15	09-AUG-19
WG3127324-4 MS		**L2320918-33**						
Total Kjeldahl Nitrogen			113.2		%		70-130	09-AUG-19
TOC-WT	**Water**							
Batch R4743210								
WG3125378-8 DUP		**L2322602-1**						
Total Organic Carbon		3.54	3.61		mg/L	2.0	20	07-AUG-19
WG3125378-6 LCS								
Total Organic Carbon			98.2		%		80-120	07-AUG-19
WG3125378-5 MB								
Total Organic Carbon			<0.50		mg/L		0.5	07-AUG-19
WG3125378-7 MS		**L2322602-1**						
Total Organic Carbon			98.7		%		70-130	07-AUG-19
TURBIDITY-BF	**Water**							
Batch R4741112								
WG3124166-3 DUP		**L2322603-2**						
Turbidity		0.74	0.73		NTU	0.8	15	06-AUG-19
WG3124166-2 LCS								
Turbidity			106.0		%		85-115	06-AUG-19
WG3124166-1 MB								
Turbidity			<0.10		NTU		0.1	06-AUG-19

Quality Control Report

Workorder: L2322602 Report Date: 26-AUG-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

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

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

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.

Thursday, August 22, 2019

Rick Hawthorne
ALS Environmental
60 Northland Rd, Unit 1
Waterloo Canada, ON N2V 2B8

Re: ALS Workorder: 1908209
Project Name:
Project Number: L2322602

Dear Mr. Hawthorne:

Two water samples were received from ALS Environmental, on 8/8/2019. The samples were scheduled for the following analysis:

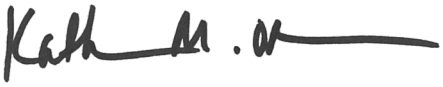
Radium-226

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,



ALS Environmental
Katie M. OBrien
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
AIHA	214884
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280

1908209

Radium-226:

The samples were prepared and analyzed according to the current revision of SOP 783.

All acceptance criteria were met.

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1908209
Client Name: ALS Environmental
Client Project Name:
Client Project Number: L2322602
Client PO Number: L2322602

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
L2322602-1	1908209-1		WATER	05-Aug-19	
L2322602-2	1908209-2		WATER	05-Aug-19	

ALS Environmental

L2322602

WATERLOO

1908209

Subcontract Request Form

Subcontract To:

ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
225 COMMERCE DRIVE
FORT COLLINS,CO 80524

NOTES: Please reference on final report and invoice: PO# *L2322602*
ALS requires QC data to be provided with your final results.

Please see enclosed 2 sample(s) in 2 Container(s)

	SAMPLE NUMBER	ANALYTICAL REQUIRED	DATE SAMPLED / DUE DATE	Priority Flag
(1)	**L2322602-1 MS-08**		8/ 5/ 2019	E
		Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	8/23/2019	
(2)	**L2322602-2 MS-0801**		8/ 5/ 2019	E
		Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	8/23/2019	

Subcontract Info Contact: Mary-Lynn Pike (519) 886-6910
Analysis and reporting info contact: Rick Hawthorne
60 NORTHLAND ROAD, UNIT 1
WATERLOO,ON N2V 2B8
Phone: (519) 886-6910 Email: Rick.Hawthorne@alsglobal.com

Please email confirmation of receipt to: Rick.Hawthorne@alsglobal.com

Shipped By: _____ Date Shipped: _____

Received By: AD Date Received: 8.8.19

Verified By: _____ Date Verified: _____

Temperature: _____

Sample Integrity Issues: _____

ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: ALS Water100 Workorder No: 1908209

Project Manager: KO Initials: NJ Date: 8.9.19

1.	Are airbills / shipping documents present and/or removable?	DROP OFF	YES	NO
2.	Are custody seals on **shipping** containers intact?	NONE	YES	NO *
3.	Are custody seals on **sample** containers intact?	NONE	YES	NO *
4.	Is there a COC (chain-of-custody) present?		YES	NO *
5.	Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)		YES	NO *
6.	Are short-hold samples present?		YES	NO
7.	Are all samples within holding times for the requested analyses?		YES	NO *
8.	Were all sample containers received intact? (not broken or leaking)		YES	NO *
9.	Is there sufficient sample for the requested analyses?		YES	NO *
10.	Are all samples in the proper containers for the requested analyses?		YES	NO *
11.	Are all aqueous samples preserved correctly, if required? (excluding volatiles)	N/A	YES	NO *
12.	Are all aqueous non-preserved samples pH 4-9?	N/A	YES	NO *
13.	Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm (1/4 inch) diameter? (i.e. size of green pea)	N/A	YES	NO
14.	Were the samples shipped on ice?		YES	NO
15.	Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: #1 #3 #4	RAD ONLY	YES	NO

Cooler #:	1								
Temperature (°C):	Amb								
No. of custody seals on cooler:	1								
DOT Survey/ Acceptance Information — External µR/hr reading:	11								
Background µR/hr reading:	14								

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? **YES / NO / NA** (If no, see Form 008.)

*** Please provide details here for NO responses to gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.**

All client bottle ID's vs ALS lab ID's double-checked by: NJ

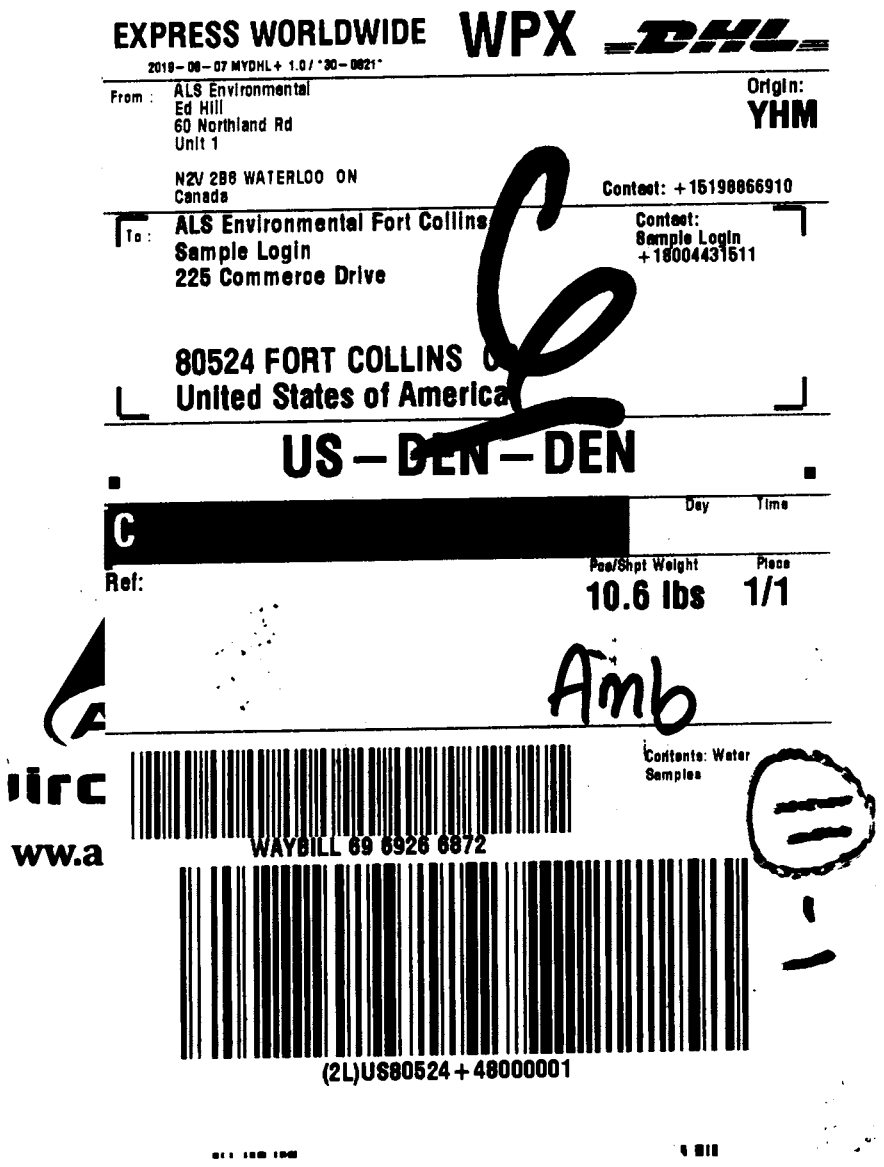
If applicable, was the client contacted? **YES / NO / NA** Contact: _____ Date/Time: _____

Project Manager Signature / Date: 8/9/19

Form 201r27.xls
(02/11/2019)

*IR Gun #1, VWR SN 170560549
*IR Gun #3, VWR SN 170647571
*IR Gun #4, Oakton, SN 2372220101-0002

1908209



EXPRESS WORLDWIDE WPX DHL

2019-06-07 MYDHL+ 1.0 / *30-0821*

From : ALS Environmental
Ed Hill
60 Northland Rd
Unit 1

N2V 2B8 WATERLOO ON
Canada

Origin:
YHM

Contact: +15198866910

To : ALS Environmental Fort Collins
Sample Login
225 Commerce Drive

Contact:
Sample Login
+18004431511

80524 FORT COLLINS C
United States of America

US-DEN-DEN

C [redacted] Day Time

Ref:

Pce/Shpt Weight 10.6 lbs

Place 1/1

Amb

Contents: Water Samples

WAYBILL 69 6926 6872

(2L)US80524+48000001

Client:	ALS Environmental	**Date:**	*22-Aug-19*
Project:	L2322602	**Work Order:**	1908209
Sample ID:	L2322602-1	**Lab ID:**	1908209-1
Legal Location:		**Matrix:**	WATER
Collection Date:	8/5/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **8/13/2019**		PrepBy: **JXH**
Ra-226	**0.091 (+/- 0.026)**		**0.0068**	**BQ/l**	NA	8/21/2019 11:49
Carr: BARIUM	*98.1*		*40-110*	*%REC*	DL = NA	8/21/2019 11:49

Client:	ALS Environmental	**Date:**	*22-Aug-19*
Project:	L2322602	**Work Order:**	1908209
Sample ID:	L2322602-2	**Lab ID:**	1908209-2
Legal Location:		**Matrix:**	WATER
Collection Date:	8/5/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **8/13/2019**		PrepBy: **JXH**
Ra-226	**0.076 (+/- 0.023)**		**0.006**	**BQ/l**	NA	8/21/2019 11:49
Carr: BARIUM	*98.4*		*40-110*	*%REC*	DL = NA	8/21/2019 11:49

Client:	ALS Environmental	**Date:**	*22-Aug-19*
Project:	L2322602	**Work Order:**	1908209
Sample ID:	L2322602-2	**Lab ID:**	1908209-2
Legal Location:		**Matrix:**	WATER
Collection Date:	8/5/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed

Explanation of Qualifiers

Radiochemistry:

- "Report Limit" is the MDC

U or ND - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

Y2 - Chemical Yield outside default limits.

W - DER is greater than Warning Limit of 1.42

* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.
# - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.
G - Sample density differs by more than 15% of LCS density.
D - DER is greater than Control Limit

M - Requested MDC not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS, Matrix Spike Recovery within control limits.

N - Matrix Spike Recovery outside control limits

NC - Not Calculated for duplicate results less than 5 times MDC

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

Inorganics:

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).

U or ND - Indicates that the compound was analyzed for but not detected.

E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.

M - Duplicate injection precision was not met.

N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.

Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.

* - Duplicate analysis (relative percent difference) not within control limits.

S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

Organics:

U or ND - Indicates that the compound was analyzed for but not detected.

B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.

E - Analyte concentration exceeds the upper level of the calibration range.

J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).

A - A tentatively identified compound is a suspected aldol-condensation product.

X - The analyte was diluted below an accurate quantitation level.

* - The spike recovery is equal to or outside the control criteria used.

+ - The relative percent difference (RPD) equals or exceeds the control criteria.

G - A pattern resembling gasoline was detected in this sample.

D - A pattern resembling diesel was detected in this sample.

M - A pattern resembling motor oil was detected in this sample.

C - A pattern resembling crude oil was detected in this sample.

4 - A pattern resembling JP-4 was detected in this sample.

5 - A pattern resembling JP-5 was detected in this sample.

H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.

L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.

Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
- gasoline
- JP-8
- diesel
- mineral spirits
- motor oil
- Stoddard solvent
- bunker C

QC BATCH REPORT

Batch ID: **RE190813-1-1** Instrument ID **Alpha Scin** Method: **Radium-226 by Radon Emanation**

LCS Sample ID: **RE190813-1** Units: **BQ/l** Analysis Date: **8/21/2019 13:02**

Client ID: Run ID: **RE190813-1A** Prep Date: **8/13/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.43 (+/- 0.358)	0.0125	1.72		83.1	67-120					P,M3
Carr: BARIUM	14900		15280		97.3	40-110					

LCSD Sample ID: **RE190813-1** Units: **BQ/l** Analysis Date: **8/21/2019 13:02**

Client ID: Run ID: **RE190813-1A** Prep Date: **8/13/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.32 (+/- 0.331)	0.0142	1.72		76.5	67-120		1.43	0.2	2.1	P,M3
Carr: BARIUM	14900		15290		97.7	40-110		14900			

MB Sample ID: **RE190813-1** Units: **BQ/l** Analysis Date: **8/21/2019 11:49**

Client ID: Run ID: **RE190813-1A** Prep Date: **8/13/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	0.0015 (+/- 0.0040)	0.0073									U
Carr: BARIUM	14700		15290		96.2	40-110					

The following samples were analyzed in this batch: 1908209-1 1908209-2

AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

TOXICITY TEST REPORT

Daphnia magna
EPS 1/RM/14

Work Order : 239917
Sample Number : 60171

SAMPLE IDENTIFICATION

Company :	ALS Laboratory Group, Waterloo	Date Collected :	2019-08-05
Location :	Waterloo ON	Time Collected :	16:50
Job Number :	L2322602-1	Date Received :	2019-08-06
Substance :	MS-08 L2322602-1	Time Received :	15:20
Sampling Method :	Grab	Temperature on Receipt :	12.0 °C
Sampled By :	KB/ML	Date Tested :	2019-08-07
Sample Description :	Cloudy, yellow, odourless.		

Test Method : Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*. Environment Canada EPS 1/RM/14 (Second Edition, December 2000, with February 2016 amendments).

48-HOUR TEST RESULTS

Substance	Effect	Value
Control	Mean Immobility	0.0 %
	Mean Mortality	0.0 %
100%	Mean Immobility	33.3 %
	Mean Mortality	0.0 %

The results reported relate only to the sample tested and as received.

TEST ORGANISM

Species :	*Daphnia magna*	Time to First Brood :	8.6 days
Organism Batch :	Dm19-15	Average Brood Size :	38.6 young
Culture Mortality :	1.9% (previous 7 days)		

TEST CONDITIONS

Sample Treatment :	None	Number of Replicates :	3
pH Adjustment :	None	Organisms / Replicate :	10
Pre-aeration Rate :	~30 mL/min/L	Organisms / Test Level :	30
Pre-aeration Time :	0 minutes	Organism Loading Rate :	15.0 mL/organism
Test Aeration :	None	Impaired Control Organisms :	0.0%
Hardness Adjustment :	None	Test Method Deviation(s) :	None

REFERENCE TOXICANT DATA

Toxicant :	Sodium Chloride	Historical Mean LC50 :	6.4 g/L
Date Tested :	2019-08-06	Warning Limits (± 2SD) :	5.7 - 7.0 g/L
LC50 :	7.1 g/L **	Organism Batch :	Dm19-15
95% Confidence Limits :	6.9 - 7.4 g/L	Analyst(s) :	NM, KP
Statistical Method :	Spearman-Kärber		

COMMENTS

All test validity criteria as specified in the test method were satisfied.
**Note: The reference toxicant test result exceeded the 95% warning limits for historical data. Approximately 5% of the test results would be expected to fall outside the warning limits. No other unusual circumstances were observed and therefore the test result is considered acceptable.

Date : 2019-08-14
yyyy-mm-dd

Approved By : JMdas
Project Manager

Work Order : 239917
Sample Number : 60171

TEST DATA

	pH	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	Temperature (°C)	O_2 Saturation (%)*	Hardness (as $CaCO_3$)
Initial Water Chemistry (100%) :	7.8	8.6	6730	20.0	100	>1000 mg/L

0 HOURS

Date & Time 2019-08-07 9:00
Analyst(s) : NM(CG)

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O_2	Conductivity	Temperature	O_2 Saturation (%)*	Hardness
100	A	0	0	7.8	8.6	6730	20.0	100	>1000
100	B	0	0	7.8	8.6	6730	20.0	100	>1000
100	C	0	0	7.8	8.6	6730	20.0	100	>1000
Control	A	0	0	8.5	8.7	787	20.0	100	230
Control	B	0	0	8.5	8.7	787	20.0	100	230
Control	C	0	0	8.5	8.7	787	20.0	100	230

Notes:

24 HOURS

Date & Time 2019-08-08 9:00
Analyst(s) : NM(CG)

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O_2	Conductivity	Temperature
100	A	–	1	–	–	–	20.0
100	B	–	0	–	–	–	20.0
100	C	–	0	–	–	–	20.0
Control	A	–	0	–	–	–	20.0
Control	B	–	0	–	–	–	20.0
Control	C	–	0	–	–	–	20.0

Notes:

48 HOURS

Date & Time 2019-08-09 9:00
Analyst(s) : KP/NM (SV)

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O_2	Conductivity	Temperature
100	A	0	5	7.3	8.3	7060	20.0
100	B	0	4	7.4	8.2	6710	20.0
100	C	0	1	7.4	8.2	6730	20.0
Control	A	0	0	8.5	8.5	803	20.0
Control	B	0	0	8.5	8.4	797	20.0
Control	C	0	0	8.5	8.4	795	20.0

Notes:

Number immobile does not include number dead.

– = not measured/not required
* adjusted for temperature and barometric pressure

Test Data Reviewed By : EJS
Date : 2019-08-14

AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

TOXICITY TEST REPORT

Rainbow Trout
EPS 1/RM/13

Work Order : 239917
Sample Number : 60171

SAMPLE IDENTIFICATION

Company :	ALS Laboratory Group, Waterloo	Date Collected :	2019-08-05
Location :	Waterloo ON	Time Collected :	16:50
Job Number :	L2322602-1	Date Received :	2019-08-06
Substance :	MS-08 L2322602-1	Time Received :	15:20
Sampling Method :	Grab	Temperature on Receipt :	12.0 °C
Sampled By :	KB/ML	Date Tested :	2019-08-07
Sample Description :	Cloudy, yellow, odourless.		

Test Method(s) : Reference Method for Determining Acute Lethality of Liquid Effluents to Rainbow Trout. Environment Canada, EPS 1/RM/13 (2nd Edition, December 2000, with May 2007 and February 2016 amendments).

96-HOUR TEST RESULTS

Substance	Effect	Value
Control	Mean Impairment	0.0 %
	Mean Mortality	0.0 %
100%	Mean Impairment	0.0 %
	Mean Mortality	10.0 %

The results reported relate only to the sample tested and as received.

TEST ORGANISM

Test Organism :	*Oncorhynchus mykiss*	Average Fork Length (± 2 SD) :	42.4 mm (±7.1)
Organism Batch :	T19-14	Range of Fork Lengths :	35 - 46 mm
Control Sample Size :	10	Average Wet Weight (± 2 SD) :	0.67 g (±0.32)
Cumulative stock tank mortality rate :	0% (previous 7 days)	Range of Wet Weights :	0.34 - 0.87 g
Control organisms showing stress :	0 (at test completion)	Organism Loading Rate :	0.3 g/L

TEST CONDITIONS

Sample Treatment :	None	Volume Tested (L) :	21
pH Adjustment :	None	Number of Replicates :	1
Test Aeration :	Yes	Organisms Per Replicate :	10
Pre-aeration/Aeration Rate :	6.5 ± 1 mL/min/L	Organisms Per Test Level :	10
Total Pre-Aeration Time :	30 minutes	Test Method Deviation(s) :	None

REFERENCE TOXICANT DATA

Toxicant :	Potassium Chloride	Date Tested :	2019-08-01
Organism Batch :	T19-14	Historical Mean LC50 :	3801 mg/L
LC50 :	3209 mg/L **	Warning Limits (± 2SD) :	3217 - 4490 mg/L
95% Confidence Limits :	2958 - 3544 mg/L	Analyst(s) :	ALC, TA
Statistical Method :	Linear Regression (MLE)		

COMMENTS

•All test validity criteria as specified in the test method were satisfied.
**Note: The reference toxicant test result exceeded the 95% warning limits for historical data. Approximately 5% of the test results would be expected to fall outside the warning limits. No other unusual circumstances were observed and therefore the test result is considered acceptable.

Date : 2019-08-14
yyyy-mm-dd

Approved By : *Project Manager*

Work Order : 239917
Sample Number : 60171

TEST DATA

	pH	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	Temperature (°C)	O_2 Saturation (%)*
Initial Water Chemistry (100%) :	7.6	8.5	6700	16.0	95
After 30 min pre-aeration :	7.6	8.7	6700	16.0	96

0 HOURS

Date & Time 2019-08-07 9:05
Analyst(s) : ALC(SV)

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature	O_2 Saturation*
100%	0	0	7.6	8.7	6700	16.0	96
Control	0	0	8.0	9.1	831	16.0	98

Notes:

24 HOURS

Date & Time 2019-08-08 9:05
Analyst(s) : SV

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	1	0	7.0	8.7	–	15.0
Control	0	0	8.1	8.7	–	15.0

Notes:

48 HOURS

Date & Time 2019-08-09 9:05
Analyst(s) : SV

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	1	0	7.3	9.3	–	15.0
Control	0	0	8.2	9.2	–	15.0

Notes:

72 HOURS

Date & Time 2019-08-10 9:05
Analyst(s) : SV

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	1	0	7.1	9.1	–	15.0
Control	0	0	8.2	9.1	–	15.0

Notes:

96 HOURS

Date & Time 2019-08-11 9:05
Analyst(s) : SV

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	1	0	7.2	9.3	6479	15.0
Control	0	0	8.2	9.4	843	15.0

Notes:

"–" = not measured/not required
Number impaired does not include number dead.
* adjusted for temperature and barometric pressure

Test Data Reviewed By : FS
Date : 2019-08-12

CHAIN OF CUSTODY RECORD

AQUATOX

AquaTox Work Order No: 239917

Shipping Address: AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, Ontario Canada N0B 2J0

Voice: (519) 763-4412 **Fax:** (519) 763-4419

P.O. Number: 4500057496

Field Sampler Name (print): KB/ML

Signature:

Affiliation: Baffinland Iron Mine / ALS Environmental

Sample Storage (prior to shipping):

Custody Relinquished by: Kendra Button

Date/Time Shipped: 5-Aug-19/ 20:00

Client: ALS Environmental c/o Baffinland Iron Mine

Quote # (2019): 162705399-19

Phone: (519) 886-6910

Fax: (519) 886-9047

Contact: Rick Hawthorne (ALS) / Martina Rendas (Aquatox)

Sample Identification					Analyses Requested									Sample Method and Volume		
Date Collected (yyyy-mm-dd)	Time Collected (e.g. 14:30, 24 hr clock)	Sample Name	AquaTox Sample Number	Temp. on arrival	Rainbow Trout Single Concentration	Rainbow Trout LC50	*Daphnia magna* Single Concentration	*Daphnia magna* LC50	Fathead Minnow Survival & Growth	*Ceriodaphnia dubia* Survival & Reproduction	*Lemna minor* Growth	*Pseudokirchneriella subcapitata* Growth	Other (please specify below)	Grab	Composite	# of Containers and Volume (eg. 2 x 1L, 3 x 10L, etc.)
2019-08-05	16:50	MS-08 L2322602-1	60171	12.0	✓		✓							✓		2 x 10LCarboy

For Lab Use Only

Received By: SV

Date: 2019-08-06

Time: 15:25

Storage Location:

Storage Temp.(°C)

Please list any special requests or instructions:

Rush TAT w/ Daily updates. PH required.

Report Distribution: bimcore@alsglobal.com, rick.hawthorne@alsglobal.com

ALS Environmental

L2322602

WATERLOO

Subcontract Request Form

Subcontract To:

AQUATOX TESTING AND CONSULTING
11B NICHOLAS BEAVER ROAD
RR3
GUELPH,ON N1H 6H9

NOTES: Please reference on final report and invoice: PO# *L2322602*
ALS requires QC data to be provided with your final results.

Please see enclosed 1 **sample(s) in** 0 **Container(s)**

SAMPLE NUMBER	ANALYTICAL REQUIRED	DATE SAMPLED / DUE DATE	Priority Flag
L2322602-1 MS-08		8/ 5/ 2019	**E**
	Special Request Aquatox (SPECIAL REQUEST2-AQT 14)	8/14/2019	
	Special Request Aquatox (SPECIAL REQUEST-AQT 14)	8/14/2019	

Subcontract Info Contact: Mary-Lynn Pike (519) 886-6910
Analysis and reporting info contact: Rick Hawthorne
60 NORTHLAND ROAD, UNIT 1
WATERLOO,ON N2V 2B8
Phone: (519) 886-6910 Email:Rick.Hawthorne@alsglobal.com

Please email confirmation of receipt to: **Rick.Hawthorne@alsglobal.com**

Shipped By: _____ Date Shipped: _____

Received By: _____ Date Received: _____

Verified By: _____ Date Verified: _____

Temperature: _____

Sample Integrity Issues: _____

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2322602-COFC

COC Number: 15 -

Report To	Contact and company name below will appear on the final report
Company:	Baffinland Iron Mines Corp.
Contact:	Wiliam Bowden and Connor Devereaux
Phone:	647-253-0596 EXT 6016
	Company address below will appear on the final report
Street:	2275 Upper Middle Rd. E., Suite #300
City/Province:	Oakville, ON
Postal Code:	L6H 0C3
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	
Contact:	

Report Forma	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	bimcore@alsglobal.com
Email 2	
Email 3	

Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	ap@baffinland.com
Email 2	commercial@baffinland.com

Project Information	
ALS Account # / Quote #:	23642 /Q42455
Job #:	MS-08 WT TOX
PO / AFE:	4500057496
LSD:	

Oil and Gas Required Fields (client use)	
AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only)	L2322602	ALS Contact:	Sampler: KB/ML

Confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☐ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
	4 day [P4] ☐		1 Business day [E1] ☐
	3 day [P3] ☐		Same Day, Weekend or Statutory holiday [E0] ☑
	2 day [P2] ☐		

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	BIM-MMER-WT	Group 3	Number of Containers
	MS-08	5-Aug-19	16:50	Water	E0	E1	11
	MS-0801	5-Aug-19	16:50	Water	E0		9

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☑ NO	
Are samples for human drinking water use? ☐ YES ☑ NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐
Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			18.0		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released By: Kendra Button	Date: 5-Aug-19	Time: 18:00	Received by: J.STREETER	Date: AUG 5/19	Time: 9:00 PM	Received by: AP	Date: 6-AUG-19	Time: 11:17

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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 specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Baffinland Iron Mine's Corporation (Oakville)
ATTN: William Bowden/Connor Devereaux
2275 Upper Middle Rd. E.
Suite #300
Oakville ON L6H 0C3

Date Received: 12-AUG-19
Report Date: 03-SEP-19 10:06 (MT)
Version: FINAL

Client Phone: 647-253-0596

Certificate of Analysis

Lab Work Order #: L2328349

Project P.O. #: 4500057496
Job Reference: MS-08 DEL
C of C Numbers:
Legal Site Desc:

Rick Hawthorne
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2328349-1 MS-08 Sampled By: KB/LM on 12-AUG-19 @ 17:00 Matrix: WATER							
Physical Tests							
Conductivity	6030		3.0	umhos/cm		15-AUG-19	R4755249
pH	7.46		0.10	pH units		12-AUG-19	R4756750
Total Suspended Solids	17.2		2.0	mg/L		13-AUG-19	R4756763
Total Dissolved Solids	7410		20	mg/L		14-AUG-19	R4756769
Turbidity	30.1		0.10	NTU		12-AUG-19	R4756755
Anions and Nutrients							
Ammonia, Total (as N)	7.04	DLHC	0.20	mg/L		15-AUG-19	R4755762
Cyanides							
Cyanide, Total	0.0246		0.0020	mg/L		14-AUG-19	R4756456
Total Metals							
Aluminum (Al)-Total	<0.050	DLHC	0.050	mg/L	14-AUG-19	14-AUG-19	R4753590
Antimony (Sb)-Total	<0.0010	DLHC	0.0010	mg/L	14-AUG-19	14-AUG-19	R4753590
Arsenic (As)-Total	<0.0010	DLHC	0.0010	mg/L	14-AUG-19	14-AUG-19	R4753590
Barium (Ba)-Total	0.0268	DLHC	0.0010	mg/L	14-AUG-19	14-AUG-19	R4753590
Beryllium (Be)-Total	<0.0010	DLHC	0.0010	mg/L	14-AUG-19	14-AUG-19	R4753590
Bismuth (Bi)-Total	<0.00050	DLHC	0.00050	mg/L	14-AUG-19	14-AUG-19	R4753590
Boron (B)-Total	<0.10	DLHC	0.10	mg/L	14-AUG-19	14-AUG-19	R4753590
Cadmium (Cd)-Total	<0.000050	DLHC	0.000050	mg/L	14-AUG-19	14-AUG-19	R4753590
Calcium (Ca)-Total	488	DLHC	0.50	mg/L	14-AUG-19	14-AUG-19	R4753590
Cesium (Cs)-Total	0.00014	DLHC	0.00010	mg/L	14-AUG-19	14-AUG-19	R4753590
Chromium (Cr)-Total	<0.0050	DLHC	0.0050	mg/L	14-AUG-19	14-AUG-19	R4753590
Cobalt (Co)-Total	0.0501	DLHC	0.0010	mg/L	14-AUG-19	14-AUG-19	R4753590
Copper (Cu)-Total	<0.010	DLHC	0.010	mg/L	14-AUG-19	14-AUG-19	R4753590
Iron (Fe)-Total	6.97	DLHC	0.10	mg/L	14-AUG-19	14-AUG-19	R4753590
Lead (Pb)-Total	<0.00050	DLHC	0.00050	mg/L	14-AUG-19	14-AUG-19	R4753590
Lithium (Li)-Total	0.071	DLHC	0.010	mg/L	14-AUG-19	14-AUG-19	R4753590
Magnesium (Mg)-Total	871	DLHC	0.050	mg/L	14-AUG-19	14-AUG-19	R4753590
Manganese (Mn)-Total	16.5	DLHC	0.0050	mg/L	14-AUG-19	14-AUG-19	R4753590
Molybdenum (Mo)-Total	<0.00050	DLHC	0.00050	mg/L	14-AUG-19	14-AUG-19	R4753590
Nickel (Ni)-Total	0.0454	DLHC	0.0050	mg/L	14-AUG-19	14-AUG-19	R4753590
Phosphorus (P)-Total	<0.50	DLHC	0.50	mg/L	14-AUG-19	14-AUG-19	R4753590
Potassium (K)-Total	7.76	DLHC	0.50	mg/L	14-AUG-19	14-AUG-19	R4753590
Rubidium (Rb)-Total	0.0130	DLHC	0.0020	mg/L	14-AUG-19	14-AUG-19	R4753590
Selenium (Se)-Total	0.00867	DLHC	0.00050	mg/L	14-AUG-19	14-AUG-19	R4753590
Silicon (Si)-Total	<1.0	DLHC	1.0	mg/L	14-AUG-19	14-AUG-19	R4753590
Silver (Ag)-Total	<0.00050	DLHC	0.00050	mg/L	14-AUG-19	14-AUG-19	R4753590
Sodium (Na)-Total	6.44	DLHC	0.50	mg/L	14-AUG-19	14-AUG-19	R4753590
Strontium (Sr)-Total	1.02	DLHC	0.010	mg/L	14-AUG-19	14-AUG-19	R4753590
Sulfur (S)-Total	1660	DLHC	5.0	mg/L	14-AUG-19	14-AUG-19	R4753590
Tellurium (Te)-Total	<0.0020	DLHC	0.0020	mg/L	14-AUG-19	14-AUG-19	R4753590
Thallium (Tl)-Total	0.00024	DLHC	0.00010	mg/L	14-AUG-19	14-AUG-19	R4753590
Thorium (Th)-Total	<0.0010	DLHC	0.0010	mg/L	14-AUG-19	14-AUG-19	R4753590

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2328349-1 MS-08 Sampled By: KB/LM on 12-AUG-19 @ 17:00 Matrix: WATER							
Total Metals							
Tin (Sn)-Total	0.0018	DLHC	0.0010	mg/L	14-AUG-19	14-AUG-19	R4753590
Titanium (Ti)-Total	<0.0030	DLHC	0.0030	mg/L	14-AUG-19	14-AUG-19	R4753590
Tungsten (W)-Total	<0.0010	DLHC	0.0010	mg/L	14-AUG-19	14-AUG-19	R4753590
Uranium (U)-Total	0.00034	DLHC	0.00010	mg/L	14-AUG-19	14-AUG-19	R4753590
Vanadium (V)-Total	<0.0050	DLHC	0.0050	mg/L	14-AUG-19	14-AUG-19	R4753590
Zinc (Zn)-Total	<0.030	DLHC	0.030	mg/L	14-AUG-19	14-AUG-19	R4753590
Zirconium (Zr)-Total	<0.0020	DLHC	0.0020	mg/L	14-AUG-19	14-AUG-19	R4753590
Radiological Parameters							
Ra-226	0.027		0.0075	Bq/L	23-AUG-19	31-AUG-19	R4780785

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

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Molybdenum (Mo)-Total	B	L2328349-1
Matrix Spike	Barium (Ba)-Total	MS-B	L2328349-1
Matrix Spike	Boron (B)-Total	MS-B	L2328349-1
Matrix Spike	Calcium (Ca)-Total	MS-B	L2328349-1
Matrix Spike	Cobalt (Co)-Total	MS-B	L2328349-1
Matrix Spike	Iron (Fe)-Total	MS-B	L2328349-1
Matrix Spike	Lithium (Li)-Total	MS-B	L2328349-1
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2328349-1
Matrix Spike	Manganese (Mn)-Total	MS-B	L2328349-1
Matrix Spike	Nickel (Ni)-Total	MS-B	L2328349-1
Matrix Spike	Potassium (K)-Total	MS-B	L2328349-1
Matrix Spike	Rubidium (Rb)-Total	MS-B	L2328349-1
Matrix Spike	Silicon (Si)-Total	MS-B	L2328349-1
Matrix Spike	Sodium (Na)-Total	MS-B	L2328349-1
Matrix Spike	Strontium (Sr)-Total	MS-B	L2328349-1
Matrix Spike	Sulfur (S)-Total	MS-B	L2328349-1
Matrix Spike	Uranium (U)-Total	MS-B	L2328349-1

Sample Parameter Qualifier key listed:

Qualifier	Description
B	Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
PEHR	Parameter Exceeded Recommended Holding Time On Receipt: Proceed With Analysis As Requested.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
CN-TOT-WT	Water	Cyanide, Total	ISO 14403-2

Total cyanide is determined by the combination of UV digestion and distillation. Cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

When using this method, high levels of thiocyanate in samples can cause false positives at ~1-2% of the thiocyanate concentration. For samples with detectable cyanide analyzed by this method, ALS recommends analysis for thiocyanate to check for this potential interference

EC-SCREEN-WT	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

EC-WT	Water	Conductivity	APHA 2510 B

Water samples can be measured directly by immersing the conductivity cell into the sample.

MET-T-CCMS-WT	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

NH3-F-WT	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

PH-BF	Water	pH	APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

RA226-MMER-FC	Water	Ra226 by Alpha Scint, MDC=0.01 Bq/L	EPA 903.1
SOLIDS-TDS-BF	Water	Total Dissolved Solids	APHA 2540C

Reference Information

A well-mixed sample is filtered though glass fibres filter. A known volume of the filtrate is evaporated and dried at 180 +/- 2C for 1hr.

SOLIDS-TSS-BF Water Suspended solids APHA 2540 D-Gravimetric

A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104 +/- 1C for a minimum of four hours or until a constant weight is achieved.

TURBIDITY-BF Water Turbidity APHA 2130 B

Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.

** 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
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA
FC	ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
BF	ALS ENVIRONMENTAL - BAFFIN ISLAND, NUNAVUT, 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 weight of sample
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

Workorder: L2328349 Report Date: 03-SEP-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CN-TOT-WT	**Water**							
Batch R4756456								
WG3132683-7 DUP		**L2328349-1**						
Cyanide, Total		0.0246	0.0255		mg/L	3.6	20	14-AUG-19
WG3132683-6 LCS								
Cyanide, Total			108.4		%		80-120	14-AUG-19
WG3132683-5 MB								
Cyanide, Total			<0.0020		mg/L		0.002	14-AUG-19
WG3132683-8 MS		**L2328349-1**						
Cyanide, Total			92.2		%		70-130	14-AUG-19
EC-WT	**Water**							
Batch R4755249								
WG3133051-4 DUP		**WG3133051-3**						
Conductivity		87.2	87.1		umhos/cm	0.1	10	15-AUG-19
WG3133051-2 LCS								
Conductivity			98.6		%		90-110	15-AUG-19
WG3133051-1 MB								
Conductivity			<3.0		umhos/cm		3	15-AUG-19
MET-T-CCMS-WT	**Water**							
Batch R4753590								
WG3132891-4 DUP		**WG3132891-3**						
Aluminum (Al)-Total		<0.050	<0.050	RPD-NA	mg/L	N/A	20	14-AUG-19
Antimony (Sb)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	14-AUG-19
Arsenic (As)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	14-AUG-19
Barium (Ba)-Total		0.0268	0.0254		mg/L	5.3	20	14-AUG-19
Beryllium (Be)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	14-AUG-19
Bismuth (Bi)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	14-AUG-19
Boron (B)-Total		<0.10	<0.10	RPD-NA	mg/L	N/A	20	14-AUG-19
Cadmium (Cd)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	14-AUG-19
Calcium (Ca)-Total		488	486		mg/L	0.4	20	14-AUG-19
Chromium (Cr)-Total		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	14-AUG-19
Cesium (Cs)-Total		0.00014	0.00014		mg/L	2.8	20	14-AUG-19
Cobalt (Co)-Total		0.0501	0.0481		mg/L	4.2	20	14-AUG-19
Copper (Cu)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	14-AUG-19
Iron (Fe)-Total		6.97	6.72		mg/L	3.6	20	14-AUG-19
Lead (Pb)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	14-AUG-19
Lithium (Li)-Total		0.071	0.072		mg/L	2.2	20	14-AUG-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4753590								
WG3132891-4 DUP		**WG3132891-3**						
Magnesium (Mg)-Total		871	831		mg/L	4.6	20	14-AUG-19
Manganese (Mn)-Total		16.5	15.9		mg/L	3.8	20	14-AUG-19
Molybdenum (Mo)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	14-AUG-19
Nickel (Ni)-Total		0.0454	0.0433		mg/L	4.7	20	14-AUG-19
Phosphorus (P)-Total		<0.50	<0.50	RPD-NA	mg/L	N/A	20	14-AUG-19
Potassium (K)-Total		7.76	7.54		mg/L	3.0	20	14-AUG-19
Rubidium (Rb)-Total		0.0130	0.0130		mg/L	0.4	20	14-AUG-19
Selenium (Se)-Total		0.00867	0.00788		mg/L	9.5	20	14-AUG-19
Silicon (Si)-Total		<1.0	<1.0	RPD-NA	mg/L	N/A	20	14-AUG-19
Silver (Ag)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	14-AUG-19
Sodium (Na)-Total		6.44	6.18		mg/L	4.1	20	14-AUG-19
Strontium (Sr)-Total		1.02	1.01		mg/L	1.4	20	14-AUG-19
Sulfur (S)-Total		1660	1630		mg/L	1.7	25	14-AUG-19
Thallium (Tl)-Total		0.00024	0.00022		mg/L	8.8	20	14-AUG-19
Tellurium (Te)-Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	14-AUG-19
Thorium (Th)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	25	14-AUG-19
Tin (Sn)-Total		0.0018	0.0020		mg/L	8.7	20	14-AUG-19
Titanium (Ti)-Total		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	14-AUG-19
Tungsten (W)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	14-AUG-19
Uranium (U)-Total		0.00034	0.00032		mg/L	5.3	20	14-AUG-19
Vanadium (V)-Total		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	14-AUG-19
Zinc (Zn)-Total		<0.030	<0.030	RPD-NA	mg/L	N/A	20	14-AUG-19
Zirconium (Zr)-Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	14-AUG-19
WG3132891-2 LCS								
Aluminum (Al)-Total			99.8		%		80-120	14-AUG-19
Antimony (Sb)-Total			103.4		%		80-120	14-AUG-19
Arsenic (As)-Total			97.5		%		80-120	14-AUG-19
Barium (Ba)-Total			105.3		%		80-120	14-AUG-19
Beryllium (Be)-Total			94.6		%		80-120	14-AUG-19
Bismuth (Bi)-Total			98.2		%		80-120	14-AUG-19
Boron (B)-Total			95.8		%		80-120	14-AUG-19
Cadmium (Cd)-Total			101.5		%		80-120	14-AUG-19
Calcium (Ca)-Total			100.9		%		80-120	14-AUG-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4753590								
WG3132891-2 LCS								
Chromium (Cr)-Total			96.8		%		80-120	14-AUG-19
Cesium (Cs)-Total			108.0		%		80-120	14-AUG-19
Cobalt (Co)-Total			96.2		%		80-120	14-AUG-19
Copper (Cu)-Total			95.2		%		80-120	14-AUG-19
Iron (Fe)-Total			94.0		%		80-120	14-AUG-19
Lead (Pb)-Total			104.1		%		80-120	14-AUG-19
Lithium (Li)-Total			96.3		%		80-120	14-AUG-19
Magnesium (Mg)-Total			94.6		%		80-120	14-AUG-19
Manganese (Mn)-Total			97.7		%		80-120	14-AUG-19
Molybdenum (Mo)-Total			104.8		%		80-120	14-AUG-19
Nickel (Ni)-Total			95.5		%		80-120	14-AUG-19
Phosphorus (P)-Total			93.7		%		70-130	14-AUG-19
Potassium (K)-Total			93.7		%		80-120	14-AUG-19
Rubidium (Rb)-Total			99.5		%		80-120	14-AUG-19
Selenium (Se)-Total			96.3		%		80-120	14-AUG-19
Silicon (Si)-Total			99.7		%		60-140	14-AUG-19
Silver (Ag)-Total			106.2		%		80-120	14-AUG-19
Sodium (Na)-Total			92.2		%		80-120	14-AUG-19
Strontium (Sr)-Total			105.0		%		80-120	14-AUG-19
Sulfur (S)-Total			89.6		%		80-120	14-AUG-19
Thallium (Tl)-Total			94.2		%		80-120	14-AUG-19
Tellurium (Te)-Total			101.4		%		80-120	14-AUG-19
Thorium (Th)-Total			103.9		%		70-130	14-AUG-19
Tin (Sn)-Total			103.4		%		80-120	14-AUG-19
Titanium (Ti)-Total			95.3		%		80-120	14-AUG-19
Tungsten (W)-Total			104.3		%		80-120	14-AUG-19
Uranium (U)-Total			106.0		%		80-120	14-AUG-19
Vanadium (V)-Total			98.1		%		80-120	14-AUG-19
Zinc (Zn)-Total			95.4		%		80-120	14-AUG-19
Zirconium (Zr)-Total			104.5		%		80-120	14-AUG-19
WG3132891-1 MB								
Aluminum (Al)-Total			<0.0050		mg/L		0.005	14-AUG-19
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	14-AUG-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	14-AUG-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4753590								
WG3132891-1 MB								
Barium (Ba)-Total			<0.00010		mg/L		0.0001	14-AUG-19
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	14-AUG-19
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	14-AUG-19
Boron (B)-Total			<0.010		mg/L		0.01	14-AUG-19
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	14-AUG-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	14-AUG-19
Chromium (Cr)-Total			<0.00050		mg/L		0.0005	14-AUG-19
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	14-AUG-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	14-AUG-19
Copper (Cu)-Total			<0.0010		mg/L		0.001	14-AUG-19
Iron (Fe)-Total			<0.010		mg/L		0.01	14-AUG-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	14-AUG-19
Lithium (Li)-Total			<0.0010		mg/L		0.001	14-AUG-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	14-AUG-19
Manganese (Mn)-Total			<0.00050		mg/L		0.0005	14-AUG-19
Molybdenum (Mo)-Total			0.000063	B	mg/L		0.00005	14-AUG-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	14-AUG-19
Phosphorus (P)-Total			<0.050		mg/L		0.05	14-AUG-19
Potassium (K)-Total			<0.050		mg/L		0.05	14-AUG-19
Rubidium (Rb)-Total			<0.00020		mg/L		0.0002	14-AUG-19
Selenium (Se)-Total			<0.000050		mg/L		0.00005	14-AUG-19
Silicon (Si)-Total			<0.10		mg/L		0.1	14-AUG-19
Silver (Ag)-Total			<0.000050		mg/L		0.00005	14-AUG-19
Sodium (Na)-Total			<0.050		mg/L		0.05	14-AUG-19
Strontium (Sr)-Total			<0.0010		mg/L		0.001	14-AUG-19
Sulfur (S)-Total			<0.50		mg/L		0.5	14-AUG-19
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	14-AUG-19
Tellurium (Te)-Total			<0.00020		mg/L		0.0002	14-AUG-19
Thorium (Th)-Total			<0.00010		mg/L		0.0001	14-AUG-19
Tin (Sn)-Total			<0.00010		mg/L		0.0001	14-AUG-19
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	14-AUG-19
Tungsten (W)-Total			<0.00010		mg/L		0.0001	14-AUG-19
Uranium (U)-Total			<0.000010		mg/L		0.00001	14-AUG-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4753590								
WG3132891-1 MB								
Vanadium (V)-Total			<0.00050		mg/L		0.0005	14-AUG-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	14-AUG-19
Zirconium (Zr)-Total			<0.00020		mg/L		0.0002	14-AUG-19
WG3132891-5 MS		**WG3132891-3**						
Aluminum (Al)-Total			95.4		%		70-130	14-AUG-19
Antimony (Sb)-Total			109.2		%		70-130	14-AUG-19
Arsenic (As)-Total			96.3		%		70-130	14-AUG-19
Barium (Ba)-Total			N/A	MS-B	%		-	14-AUG-19
Beryllium (Be)-Total			93.7		%		70-130	14-AUG-19
Bismuth (Bi)-Total			105.0		%		70-130	14-AUG-19
Boron (B)-Total			N/A	MS-B	%		-	14-AUG-19
Cadmium (Cd)-Total			97.0		%		70-130	14-AUG-19
Calcium (Ca)-Total			N/A	MS-B	%		-	14-AUG-19
Chromium (Cr)-Total			94.3		%		70-130	14-AUG-19
Cesium (Cs)-Total			108.8		%		70-130	14-AUG-19
Cobalt (Co)-Total			N/A	MS-B	%		-	14-AUG-19
Copper (Cu)-Total			94.3		%		70-130	14-AUG-19
Iron (Fe)-Total			N/A	MS-B	%		-	14-AUG-19
Lead (Pb)-Total			103.8		%		70-130	14-AUG-19
Lithium (Li)-Total			N/A	MS-B	%		-	14-AUG-19
Magnesium (Mg)-Total			N/A	MS-B	%		-	14-AUG-19
Manganese (Mn)-Total			N/A	MS-B	%		-	14-AUG-19
Molybdenum (Mo)-Total			105.9		%		70-130	14-AUG-19
Nickel (Ni)-Total			N/A	MS-B	%		-	14-AUG-19
Phosphorus (P)-Total			113.9		%		70-130	14-AUG-19
Potassium (K)-Total			N/A	MS-B	%		-	14-AUG-19
Rubidium (Rb)-Total			N/A	MS-B	%		-	14-AUG-19
Selenium (Se)-Total			99.9		%		70-130	14-AUG-19
Silicon (Si)-Total			N/A	MS-B	%		-	14-AUG-19
Silver (Ag)-Total			103.2		%		70-130	14-AUG-19
Sodium (Na)-Total			N/A	MS-B	%		-	14-AUG-19
Strontium (Sr)-Total			N/A	MS-B	%		-	14-AUG-19
Sulfur (S)-Total			N/A	MS-B	%		-	14-AUG-19
Thallium (Tl)-Total			102.5		%		70-130	14-AUG-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4753590								
WG3132891-5 MS		**WG3132891-3**						
Tellurium (Te)-Total			108.3		%		70-130	14-AUG-19
Thorium (Th)-Total			105.4		%		70-130	14-AUG-19
Tin (Sn)-Total			102.1		%		70-130	14-AUG-19
Titanium (Ti)-Total			96.8		%		70-130	14-AUG-19
Tungsten (W)-Total			108.1		%		70-130	14-AUG-19
Uranium (U)-Total			N/A	MS-B	%		-	14-AUG-19
Vanadium (V)-Total			99.7		%		70-130	14-AUG-19
Zinc (Zn)-Total			98.9		%		70-130	14-AUG-19
Zirconium (Zr)-Total			105.3		%		70-130	14-AUG-19
NH3-F-WT	**Water**							
Batch R4755762								
WG3133645-3 DUP		**L2325883-1**						
Ammonia, Total (as N)		0.043	0.043		mg/L	0.5	20	15-AUG-19
WG3133645-2 LCS								
Ammonia, Total (as N)			99.8		%		85-115	15-AUG-19
WG3133645-1 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	15-AUG-19
WG3133645-4 MS		**L2325883-1**						
Ammonia, Total (as N)			92.9		%		75-125	15-AUG-19
PH-BF	**Water**							
Batch R4756750								
WG3133984-3 LCS								
pH			7.03		pH units		6.9-7.1	12-AUG-19
SOLIDS-TDS-BF	**Water**							
Batch R4756769								
WG3134038-2 LCS								
Total Dissolved Solids			101.2		%		85-115	14-AUG-19
WG3134038-1 MB								
Total Dissolved Solids			<20		mg/L		20	14-AUG-19
SOLIDS-TSS-BF	**Water**							
Batch R4756763								
WG3134036-2 LCS								
Total Suspended Solids			101.0		%		85-115	13-AUG-19
WG3134036-1 MB								

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SOLIDS-TSS-BF	**Water**							
Batch R4756763								
WG3134036-1 MB								
Total Suspended Solids			<2.0		mg/L		2	13-AUG-19
TURBIDITY-BF	**Water**							
Batch R4756755								
WG3134035-2 LCS								
Turbidity			102.0		%		85-115	12-AUG-19
WG3134035-1 MB								
Turbidity			<0.10		NTU		0.1	12-AUG-19

Quality Control Report

Workorder: L2328349 Report Date: 03-SEP-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

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

Sample Parameter Qualifier Definitions:

Qualifier	Description
B	Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

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.

Saturday, August 31, 2019

Rick Hawthorne
ALS Environmental
60 Northland Rd, Unit 1
Waterloo Canada, ON N2V 2B8

Re: ALS Workorder: 1908358
Project Name:
Project Number: L2328349

Dear Mr. Hawthorne:

One water sample was received from ALS Environmental, on 8/15/2019. The sample was scheduled for the following analysis:

Radium-226

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,

ALS Environmental
Katie M. OBrien
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
AIHA	214884
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280

1908358

Radium-226:
The sample was prepared and analyzed according to the current revision of SOP 783.

All acceptance criteria were met.

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1908358
Client Name: ALS Environmental
Client Project Name:
Client Project Number: L2328349
Client PO Number: L2328349

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
L2328349-1	1908358-1		WATER	12-Aug-19	

~~1908358~~ ~~L2328349~~ 8/15/19

L2328349

WATERLOO

ALS Environmental

Subcontract Request Form 1908358

Subcontract To:

ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
225 COMMERCE DRIVE
FORT COLLINS,CO 80524

NOTES: Please reference on final report and invoice: PO# *L2328349*
ALS requires QC data to be provided with your final results.

Please see enclosed 1 sample(s) in 1 Container(s)

SAMPLE NUMBER	ANALYTICAL REQUIRED	DATE SAMPLED / DUE DATE	Priority Flag
L2328349-1 MS-08		8/12/2019	E
	Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	9/3/2019	

Subcontract Info Contact: Mary-Lynn Pike (519) 886-6910
Analysis and reporting info contact: Rick Hawthorne
60 NORTHLAND ROAD, UNIT 1
WATERLOO,ON N2V 2B8
Phone: (519) 886-6910 Email: Rick.Hawthorne@alsglobal.com

Please email confirmation of receipt to: Rick.Hawthorne@alsglobal.com

Shipped By: _____ Date Shipped: _____

Received By: Madeline Mason Date Received: 8/15/2019

Verified By: _____ Date Verified: _____

Temperature: _____

Sample Integrity Issues: _____

ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: ALS Waterloo Workorder No: 1908358

Project Manager: KMo Initials: MMM Date: 8/15/2019

1.	Are airbills / shipping documents present and/or removable?	DROP OFF	YES	NO
2.	Are custody seals on **shipping** containers intact?	NONE	YES	NO *
3.	Are custody seals on **sample** containers intact?	NONE	YES	NO *
4.	Is there a COC (chain-of-custody) present?		YES	NO *
5.	Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)		YES	NO *
6.	Are short-hold samples present?		YES	NO
7.	Are all samples within holding times for the requested analyses?		YES	NO *
8.	Were all sample containers received intact? (not broken or leaking)		YES	NO *
9.	Is there sufficient sample for the requested analyses?		YES	NO *
10.	Are all samples in the proper containers for the requested analyses?		YES	NO *
11.	Are all aqueous samples preserved correctly, if required? (excluding volatiles)	N/A	YES	NO *
12.	Are all aqueous non-preserved samples pH 4-9?	N/A	YES	NO *
13.	Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm (1/4 inch) diameter? (i.e. size of green pea)	N/A	YES	NO
14.	Were the samples shipped on ice?		YES	NO
15.	Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: #1 #3 #4	RAD ONLY	YES	NO

Cooler #:	1
Temperature (°C):	8.4°C
No. of custody seals on cooler:	0
DOT Survey/ Acceptance Information — External µR/hr reading:	11
DOT Survey/ Acceptance Information — Background µR/hr reading:	13

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? **YES / NO / NA** (If no, see Form 008.)

*** Please provide details here for NO responses to gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.**

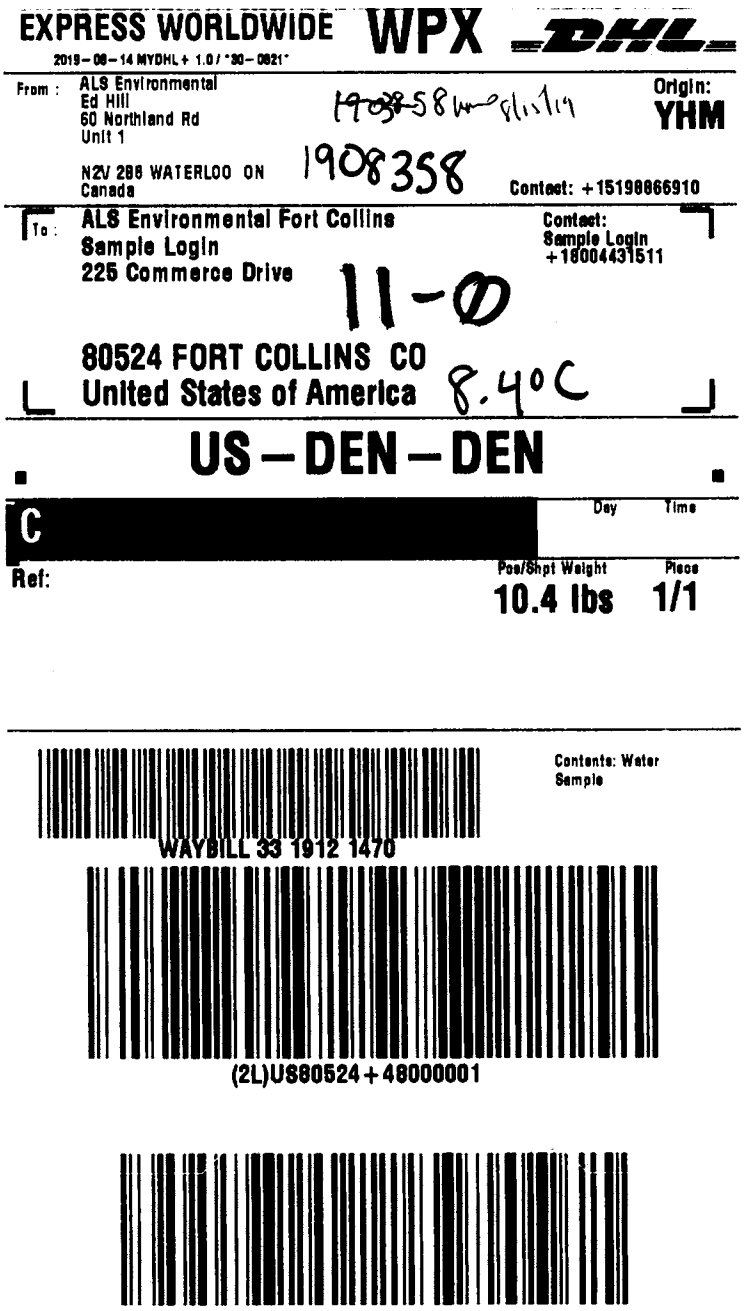
All client bottle ID's vs ALS lab ID's double-checked by: MMM

If applicable, was the client contacted? **YES / NO / NA** Contact: _____ Date/Time: _____

Project Manager Signature / Date: 8/15/19

Form 201r27.xls
(02/11/2019)

*IR Gun #1, VWR SN 170560549
*IR Gun #3, VWR SN 170647571
*IR Gun #4, Oakton, SN 2372220101-0002



EXPRESS WORLDWIDE WPX DHL

2019-08-14 MYDHL+ 1.0 / *30-0821*

From : ALS Environmental
Ed Hill
60 Northland Rd
Unit 1
N2V 2B8 WATERLOO ON
Canada

1908358 8/15/19

1908358

Origin: YHM

Contact: +15198866910

To : ALS Environmental Fort Collins
Sample Login
225 Commerce Drive

11-0

80524 FORT COLLINS CO
United States of America 8.4°C

Contact:
Sample Login
+18004431511

US-DEN-DEN

C [redacted] Day Time

Ref:

Pce/Shpt Weight 10.4 lbs

Piece 1/1

Contents: Water Sample

WAYBILL 33 1912 1470

(2L)US80524+48000001

Client:	ALS Environmental	**Date:**	*31-Aug-19*
Project:	L2328349	**Work Order:**	1908358
Sample ID:	L2328349-1	**Lab ID:**	1908358-1
Legal Location:		**Matrix:**	WATER
Collection Date:	8/12/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**			Prep Date: **8/23/2019**	PrepBy: **TRW**
Ra-226	**0.027 (+/- 0.010)**	Y1	**0.0075**	**BQ/l**	NA	8/31/2019 10:40
Carr: BARIUM	*103*	Y1	*40-110*	*%REC*	DL = NA	8/31/2019 10:40

Client:	ALS Environmental	**Date:**	*31-Aug-19*
Project:	L2328349	**Work Order:**	1908358
Sample ID:	L2328349-1	**Lab ID:**	1908358-1
Legal Location:		**Matrix:**	WATER
Collection Date:	8/12/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed

Explanation of Qualifiers

Radiochemistry:

- "Report Limit" is the MDC

U or ND - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

Y2 - Chemical Yield outside default limits.

W - DER is greater than Warning Limit of 1.42

* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.
# - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.
G - Sample density differs by more than 15% of LCS density.
D - DER is greater than Control Limit

M - Requested MDC not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS, Matrix Spike Recovery within control limits.

N - Matrix Spike Recovery outside control limits

NC - Not Calculated for duplicate results less than 5 times MDC

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

Inorganics:

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).

U or ND - Indicates that the compound was analyzed for but not detected.

E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.

M - Duplicate injection precision was not met.

N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.

Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.

* - Duplicate analysis (relative percent difference) not within control limits.

S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

Organics:

U or ND - Indicates that the compound was analyzed for but not detected.

B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.

E - Analyte concentration exceeds the upper level of the calibration range.

J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).

A - A tentatively identified compound is a suspected aldol-condensation product.

X - The analyte was diluted below an accurate quantitation level.

* - The spike recovery is equal to or outside the control criteria used.

+ - The relative percent difference (RPD) equals or exceeds the control criteria.

G - A pattern resembling gasoline was detected in this sample.

D - A pattern resembling diesel was detected in this sample.

M - A pattern resembling motor oil was detected in this sample.

C - A pattern resembling crude oil was detected in this sample.

4 - A pattern resembling JP-4 was detected in this sample.

5 - A pattern resembling JP-5 was detected in this sample.

H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.

L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.

Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
- gasoline
- JP-8
- diesel
- mineral spirits
- motor oil
- Stoddard solvent
- bunker C

QC BATCH REPORT

Batch ID: **RE190823-1-1** Instrument ID **Alpha Scin** Method: **Radium-226 by Radon Emanation**

LCS Sample ID: **RE190823-1** Units: **BQ/l** Analysis Date: **8/31/2019 10:40**

Client ID: Run ID: **RE190823-1A** Prep Date: **8/23/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.58 (+/- 0.399)	0.0225	1.72		91.8	67-120					P,Y1,M3
Carr: BARIUM	16700		16340		102	40-110					Y1

LCSD Sample ID: **RE190823-1** Units: **BQ/l** Analysis Date: **8/31/2019 11:30**

Client ID: Run ID: **RE190823-1A** Prep Date: **8/23/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.66 (+/- 0.417)	0.0164	1.72		96.7	67-120		1.58	0.1	2.1	P,M3
Carr: BARIUM	16400		16420		99.8	40-110		16700			

MB Sample ID: **RE190823-1** Units: **BQ/l** Analysis Date: **8/31/2019 09:54**

Client ID: Run ID: **RE190823-1A** Prep Date: **8/23/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	-0.0013 (+/- 0.0032)	0.007									Y1,U
Carr: BARIUM	16600		16330		102	40-110					Y1

The following samples were analyzed in this batch: 1908358-1

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2328349-COFC

COC Number: 15 -

Page 1 of 1

Report To	Contact and company name below will appear on the final report
Company:	Baffinland Iron Mines Corp.
Contact:	Wiliam Bowden and Connor Devereaux
Phone:	647-253-0596 EXT 6016
	Company address below will appear on the final report
Street:	2275 Upper Middle Rd. E., Suite #300
City/Province:	Oakville, ON
Postal Code:	L6H 0C3
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)

Quality Control (QC) Report with Report ☑ YES ☐ NO

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax bimcore@alsglobal.com

Email 2

Email 3

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax ap@baffinland.com

Email 2 commercial@baffinland.com

Project Information

ALS Account # / Quote #:	23642 /Q42455
Job #:	MS-08 DEL
PO / AFE:	4500057496
LSD:	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only) L2328349 AP

ALS Contact: **Sampler:** KB/LM

Confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☐ standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
	4 day [P4] ☐		1 Business day [E1] ☐
	3 day [P3] ☐		Same Day, Weekend or Statutory holiday [E0] ☑
	2 day [P2] ☐		

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	BIM-MMER-DEL	Number of Containers
	MS-08	12-Aug-19	17:00	Water	E0	5

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human drinking water use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			14.1		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released By: Kendra Button	Date: 12-Aug-19	Time: 17:40	Received by:	Date:	Time:	Received by: AP	Date: 14-AUG-19	Time: 9:30

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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 specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Baffinland Iron Mine's Corporation (Oakville)
ATTN: William Bowden/Connor Devereaux
2275 Upper Middle Rd. E.
Suite #300
Oakville ON L6H 0C3

Date Received: 21-AUG-19
Report Date: 12-SEP-19 10:50 (MT)
Version: FINAL

Client Phone: 647-253-0596

Certificate of Analysis

Lab Work Order #: L2333539

Project P.O. #: 4500057496
Job Reference: MS-08 DEL
C of C Numbers:
Legal Site Desc:

Rick Hawthorne
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2333539-1 MS-08 Sampled By: AZ/LM/SS on 21-AUG-19 @ 11:50 Matrix: Water							
Physical Tests							
Conductivity	6960		3.0	umhos/cm		24-AUG-19	R4768390
pH	8.73		0.10	pH units		21-AUG-19	R4765144
Total Suspended Solids	6.3		2.0	mg/L		22-AUG-19	R4762890
Total Dissolved Solids	8610		20	mg/L		22-AUG-19	R4765133
Turbidity	9.72		0.10	NTU		21-AUG-19	R4765172
Anions and Nutrients							
Ammonia, Total (as N)	5.71	DLHC	0.10	mg/L		23-AUG-19	R4767350
Cyanides							
Cyanide, Total	<2.0	DLM	2.0	mg/L		27-AUG-19	R4769594
Total Metals							
Aluminum (Al)-Total	<0.50	DLHC	0.50	mg/L	23-AUG-19	23-AUG-19	R4765749
Antimony (Sb)-Total	<0.010	DLHC	0.010	mg/L	23-AUG-19	23-AUG-19	R4765749
Arsenic (As)-Total	<0.010	DLHC	0.010	mg/L	23-AUG-19	23-AUG-19	R4765749
Barium (Ba)-Total	0.026	DLHC	0.010	mg/L	23-AUG-19	23-AUG-19	R4765749
Beryllium (Be)-Total	<0.010	DLHC	0.010	mg/L	23-AUG-19	23-AUG-19	R4765749
Bismuth (Bi)-Total	<0.0050	DLHC	0.0050	mg/L	23-AUG-19	23-AUG-19	R4765749
Boron (B)-Total	<1.0	DLHC	1.0	mg/L	23-AUG-19	23-AUG-19	R4765749
Cadmium (Cd)-Total	<0.00050	DLHC	0.00050	mg/L	23-AUG-19	23-AUG-19	R4765749
Calcium (Ca)-Total	626	DLHC	5.0	mg/L	23-AUG-19	23-AUG-19	R4765749
Cesium (Cs)-Total	<0.0010	DLHC	0.0010	mg/L	23-AUG-19	23-AUG-19	R4765749
Chromium (Cr)-Total	<0.050	DLHC	0.050	mg/L	23-AUG-19	23-AUG-19	R4765749
Cobalt (Co)-Total	0.020	DLHC	0.010	mg/L	23-AUG-19	23-AUG-19	R4765749
Copper (Cu)-Total	<0.10	DLHC	0.10	mg/L	23-AUG-19	23-AUG-19	R4765749
Iron (Fe)-Total	1.4	DLHC	1.0	mg/L	23-AUG-19	23-AUG-19	R4765749
Lead (Pb)-Total	<0.0050	DLHC	0.0050	mg/L	23-AUG-19	23-AUG-19	R4765749
Lithium (Li)-Total	<0.10	DLHC	0.10	mg/L	23-AUG-19	23-AUG-19	R4765749
Magnesium (Mg)-Total	1160	DLHC	0.50	mg/L	23-AUG-19	23-AUG-19	R4765749
Manganese (Mn)-Total	11.3	DLHC	0.050	mg/L	23-AUG-19	23-AUG-19	R4765749
Molybdenum (Mo)-Total	<0.0050	DLHC	0.0050	mg/L	23-AUG-19	23-AUG-19	R4765749
Nickel (Ni)-Total	<0.050	DLHC	0.050	mg/L	23-AUG-19	23-AUG-19	R4765749
Phosphorus (P)-Total	<5.0	DLHC	5.0	mg/L	23-AUG-19	23-AUG-19	R4765749
Potassium (K)-Total	9.1	DLHC	5.0	mg/L	23-AUG-19	23-AUG-19	R4765749
Rubidium (Rb)-Total	<0.020	DLHC	0.020	mg/L	23-AUG-19	23-AUG-19	R4765749
Selenium (Se)-Total	0.0093	DLHC	0.0050	mg/L	23-AUG-19	23-AUG-19	R4765749
Silicon (Si)-Total	<10	DLHC	10	mg/L	23-AUG-19	23-AUG-19	R4765749
Silver (Ag)-Total	<0.0050	DLHC	0.0050	mg/L	23-AUG-19	23-AUG-19	R4765749
Sodium (Na)-Total	9.6	DLHC	5.0	mg/L	23-AUG-19	23-AUG-19	R4765749
Strontium (Sr)-Total	1.20	DLHC	0.10	mg/L	23-AUG-19	23-AUG-19	R4765749
Sulfur (S)-Total	2150	DLHC	50	mg/L	23-AUG-19	23-AUG-19	R4765749
Tellurium (Te)-Total	<0.020	DLHC	0.020	mg/L	23-AUG-19	23-AUG-19	R4765749
Thallium (Tl)-Total	<0.0010	DLHC	0.0010	mg/L	23-AUG-19	23-AUG-19	R4765749
Thorium (Th)-Total	<0.010	DLHC	0.010	mg/L	23-AUG-19	23-AUG-19	R4765749

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2333539-1 MS-08 Sampled By: AZ/LM/SS on 21-AUG-19 @ 11:50 Matrix: Water							
Total Metals							
Tin (Sn)-Total	<0.010	DLHC	0.010	mg/L	23-AUG-19	23-AUG-19	R4765749
Titanium (Ti)-Total	<0.030	DLHC	0.030	mg/L	23-AUG-19	23-AUG-19	R4765749
Tungsten (W)-Total	<0.010	DLHC	0.010	mg/L	23-AUG-19	23-AUG-19	R4765749
Uranium (U)-Total	<0.0010	DLHC	0.0010	mg/L	23-AUG-19	23-AUG-19	R4765749
Vanadium (V)-Total	<0.050	DLHC	0.050	mg/L	23-AUG-19	23-AUG-19	R4765749
Zinc (Zn)-Total	<0.30	DLHC	0.30	mg/L	23-AUG-19	23-AUG-19	R4765749
Zirconium (Zr)-Total	<0.020	DLHC	0.020	mg/L	23-AUG-19	23-AUG-19	R4765749
Radiological Parameters							
Ra-226	0.067		0.0039	Bq/L	03-SEP-19	11-SEP-19	R4780785

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

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Aluminum (Al)-Total	MS-B	L2333539-1
Matrix Spike	Barium (Ba)-Total	MS-B	L2333539-1
Matrix Spike	Boron (B)-Total	MS-B	L2333539-1
Matrix Spike	Calcium (Ca)-Total	MS-B	L2333539-1
Matrix Spike	Iron (Fe)-Total	MS-B	L2333539-1
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2333539-1
Matrix Spike	Manganese (Mn)-Total	MS-B	L2333539-1
Matrix Spike	Potassium (K)-Total	MS-B	L2333539-1
Matrix Spike	Silicon (Si)-Total	MS-B	L2333539-1
Matrix Spike	Sodium (Na)-Total	MS-B	L2333539-1
Matrix Spike	Strontium (Sr)-Total	MS-B	L2333539-1
Matrix Spike	Sulfur (S)-Total	MS-B	L2333539-1
Matrix Spike	Uranium (U)-Total	MS-B	L2333539-1
Matrix Spike	Zinc (Zn)-Total	MS-B	L2333539-1

Sample Parameter Qualifier key listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
CN-TOT-WT	Water	Cyanide, Total	ISO 14403-2

Total cyanide is determined by the combination of UV digestion and distillation. Cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

When using this method, high levels of thiocyanate in samples can cause false positives at ~1-2% of the thiocyanate concentration. For samples with detectable cyanide analyzed by this method, ALS recommends analysis for thiocyanate to check for this potential interference

EC-SCREEN-WT	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

EC-WT	Water	Conductivity	APHA 2510 B

Water samples can be measured directly by immersing the conductivity cell into the sample.

MET-T-CCMS-WT	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

NH3-F-WT	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

PH-BF	Water	pH	APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

RA226-MMER-FC	Water	Ra226 by Alpha Scint, MDC=0.01 Bq/L	EPA 903.1

SOLIDS-TDS-BF	Water	Total Dissolved Solids	APHA 2540C

A well-mixed sample is filtered though glass fibres filter. A known volume of the filtrate is evaporated and dried at 180 +/- 2C for 1hr.

SOLIDS-TSS-BF	Water	Suspended solids	APHA 2540 D-Gravimetric

A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104 +/- 1C for a minimum of four hours or until a constant weight is achieved.

TURBIDITY-BF	Water	Turbidity	APHA 2130 B

Reference Information

Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.

** 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
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA
FC	ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
BF	ALS ENVIRONMENTAL - BAFFIN ISLAND, NUNAVUT, 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 weight of sample
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

Workorder: L2333539 Report Date: 12-SEP-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CN-TOT-WT	**Water**							
Batch R4769594								
WG3144396-3 DUP		**L2333539-1**						
Cyanide, Total		<2.0	<2.0	RPD-NA	mg/L	N/A	20	27-AUG-19
WG3144396-2 LCS								
Cyanide, Total			89.8		%		80-120	27-AUG-19
WG3144396-1 MB								
Cyanide, Total			<0.0020		mg/L		0.002	27-AUG-19
WG3144396-4 MS		**L2333539-1**						
Cyanide, Total			85.7		%		70-130	27-AUG-19
EC-WT	**Water**							
Batch R4768390								
WG3142449-4 DUP		**WG3142449-3**						
Conductivity		1140	1140		umhos/cm	0.2	10	24-AUG-19
WG3142449-2 LCS								
Conductivity			100.6		%		90-110	24-AUG-19
WG3142449-1 MB								
Conductivity			<3.0		umhos/cm		3	24-AUG-19
MET-T-CCMS-WT	**Water**							
Batch R4765749								
WG3142186-4 DUP		**WG3142186-3**						
Aluminum (Al)-Total		0.108	0.115		mg/L	7.0	20	23-AUG-19
Antimony (Sb)-Total		0.00017	0.00017		mg/L	2.9	20	23-AUG-19
Arsenic (As)-Total		0.00026	0.00025		mg/L	4.6	20	23-AUG-19
Barium (Ba)-Total		0.0777	0.0774		mg/L	0.4	20	23-AUG-19
Beryllium (Be)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	23-AUG-19
Bismuth (Bi)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	23-AUG-19
Boron (B)-Total		0.233	0.239		mg/L	2.6	20	23-AUG-19
Cadmium (Cd)-Total		0.000241	0.000244		mg/L	1.2	20	23-AUG-19
Calcium (Ca)-Total		118	118		mg/L	0.0	20	23-AUG-19
Chromium (Cr)-Total		0.00055	0.00060		mg/L	9.1	20	23-AUG-19
Cesium (Cs)-Total		0.000015	0.000015		mg/L	4.7	20	23-AUG-19
Cobalt (Co)-Total		0.00016	0.00015		mg/L	4.5	20	23-AUG-19
Copper (Cu)-Total		0.0029	0.0029		mg/L	1.2	20	23-AUG-19
Iron (Fe)-Total		0.158	0.158		mg/L	0.1	20	23-AUG-19
Lead (Pb)-Total		0.00145	0.00144		mg/L	0.6	20	23-AUG-19
Lithium (Li)-Total		0.0068	0.0068		mg/L	0.8	20	23-AUG-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4765749								
WG3142186-4 DUP		**WG3142186-3**						
Magnesium (Mg)-Total		29.3	28.9		mg/L	1.4	20	23-AUG-19
Manganese (Mn)-Total		0.0558	0.0558		mg/L	0.1	20	23-AUG-19
Molybdenum (Mo)-Total		0.000836	0.000855		mg/L	2.2	20	23-AUG-19
Nickel (Ni)-Total		0.00175	0.00180		mg/L	2.6	20	23-AUG-19
Phosphorus (P)-Total		<0.050	<0.050	RPD-NA	mg/L	N/A	20	23-AUG-19
Potassium (K)-Total		3.54	3.48		mg/L	1.7	20	23-AUG-19
Rubidium (Rb)-Total		0.00302	0.00291		mg/L	3.9	20	23-AUG-19
Selenium (Se)-Total		0.000444	0.000426		mg/L	4.1	20	23-AUG-19
Silicon (Si)-Total		4.99	5.04		mg/L	0.8	20	23-AUG-19
Silver (Ag)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	23-AUG-19
Sodium (Na)-Total		108	108		mg/L	0.4	20	23-AUG-19
Strontium (Sr)-Total		0.964	0.971		mg/L	0.7	20	23-AUG-19
Sulfur (S)-Total		22.4	22.5		mg/L	0.2	25	23-AUG-19
Thallium (Tl)-Total		0.000053	0.000052		mg/L	1.5	20	23-AUG-19
Tellurium (Te)-Total		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	23-AUG-19
Thorium (Th)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	25	23-AUG-19
Tin (Sn)-Total		0.00039	0.00039		mg/L	0.3	20	23-AUG-19
Titanium (Ti)-Total		0.00341	0.00339		mg/L	0.8	20	23-AUG-19
Tungsten (W)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	23-AUG-19
Uranium (U)-Total		0.000591	0.000588		mg/L	0.6	20	23-AUG-19
Vanadium (V)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	23-AUG-19
Zinc (Zn)-Total		0.0794	0.0804		mg/L	1.2	20	23-AUG-19
Zirconium (Zr)-Total		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	23-AUG-19
WG3142186-2 LCS								
Aluminum (Al)-Total			100.7		%		80-120	23-AUG-19
Antimony (Sb)-Total			98.3		%		80-120	23-AUG-19
Arsenic (As)-Total			93.2		%		80-120	23-AUG-19
Barium (Ba)-Total			96.1		%		80-120	23-AUG-19
Beryllium (Be)-Total			97.0		%		80-120	23-AUG-19
Bismuth (Bi)-Total			93.9		%		80-120	23-AUG-19
Boron (B)-Total			92.9		%		80-120	23-AUG-19
Cadmium (Cd)-Total			92.6		%		80-120	23-AUG-19
Calcium (Ca)-Total			95.9		%		80-120	23-AUG-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4765749								
WG3142186-2 LCS								
Chromium (Cr)-Total			94.8		%		80-120	23-AUG-19
Cesium (Cs)-Total			96.4		%		80-120	23-AUG-19
Cobalt (Co)-Total			93.8		%		80-120	23-AUG-19
Copper (Cu)-Total			94.3		%		80-120	23-AUG-19
Iron (Fe)-Total			97.7		%		80-120	23-AUG-19
Lead (Pb)-Total			95.6		%		80-120	23-AUG-19
Lithium (Li)-Total			95.9		%		80-120	23-AUG-19
Magnesium (Mg)-Total			96.3		%		80-120	23-AUG-19
Manganese (Mn)-Total			96.2		%		80-120	23-AUG-19
Molybdenum (Mo)-Total			98.2		%		80-120	23-AUG-19
Nickel (Ni)-Total			93.5		%		80-120	23-AUG-19
Phosphorus (P)-Total			99.2		%		70-130	23-AUG-19
Potassium (K)-Total			100.3		%		80-120	23-AUG-19
Rubidium (Rb)-Total			95.9		%		80-120	23-AUG-19
Selenium (Se)-Total			92.2		%		80-120	23-AUG-19
Silicon (Si)-Total			103.9		%		60-140	23-AUG-19
Silver (Ag)-Total			96.8		%		80-120	23-AUG-19
Sodium (Na)-Total			96.6		%		80-120	23-AUG-19
Strontium (Sr)-Total			96.5		%		80-120	23-AUG-19
Sulfur (S)-Total			101.3		%		80-120	23-AUG-19
Thallium (Tl)-Total			94.6		%		80-120	23-AUG-19
Tellurium (Te)-Total			92.0		%		80-120	23-AUG-19
Thorium (Th)-Total			95.9		%		70-130	23-AUG-19
Tin (Sn)-Total			95.4		%		80-120	23-AUG-19
Titanium (Ti)-Total			94.0		%		80-120	23-AUG-19
Tungsten (W)-Total			95.6		%		80-120	23-AUG-19
Uranium (U)-Total			96.4		%		80-120	23-AUG-19
Vanadium (V)-Total			96.9		%		80-120	23-AUG-19
Zinc (Zn)-Total			93.5		%		80-120	23-AUG-19
Zirconium (Zr)-Total			94.4		%		80-120	23-AUG-19
WG3142186-1 MB								
Aluminum (Al)-Total			<0.0050		mg/L		0.005	23-AUG-19
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	23-AUG-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	23-AUG-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4765749								
WG3142186-1 MB								
Barium (Ba)-Total			<0.00010		mg/L		0.0001	23-AUG-19
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	23-AUG-19
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	23-AUG-19
Boron (B)-Total			<0.010		mg/L		0.01	23-AUG-19
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	23-AUG-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	23-AUG-19
Chromium (Cr)-Total			<0.00050		mg/L		0.0005	23-AUG-19
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	23-AUG-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	23-AUG-19
Copper (Cu)-Total			<0.0010		mg/L		0.001	23-AUG-19
Iron (Fe)-Total			<0.010		mg/L		0.01	23-AUG-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	23-AUG-19
Lithium (Li)-Total			<0.0010		mg/L		0.001	23-AUG-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	23-AUG-19
Manganese (Mn)-Total			<0.00050		mg/L		0.0005	23-AUG-19
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	23-AUG-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	23-AUG-19
Phosphorus (P)-Total			<0.050		mg/L		0.05	23-AUG-19
Potassium (K)-Total			<0.050		mg/L		0.05	23-AUG-19
Rubidium (Rb)-Total			<0.00020		mg/L		0.0002	23-AUG-19
Selenium (Se)-Total			<0.000050		mg/L		0.00005	23-AUG-19
Silicon (Si)-Total			<0.10		mg/L		0.1	23-AUG-19
Silver (Ag)-Total			<0.000050		mg/L		0.00005	23-AUG-19
Sodium (Na)-Total			<0.050		mg/L		0.05	23-AUG-19
Strontium (Sr)-Total			<0.0010		mg/L		0.001	23-AUG-19
Sulfur (S)-Total			<0.50		mg/L		0.5	23-AUG-19
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	23-AUG-19
Tellurium (Te)-Total			<0.00020		mg/L		0.0002	23-AUG-19
Thorium (Th)-Total			<0.00010		mg/L		0.0001	23-AUG-19
Tin (Sn)-Total			<0.00010		mg/L		0.0001	23-AUG-19
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	23-AUG-19
Tungsten (W)-Total			<0.00010		mg/L		0.0001	23-AUG-19
Uranium (U)-Total			<0.000010		mg/L		0.00001	23-AUG-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4765749								
WG3142186-1 MB								
Vanadium (V)-Total			<0.00050		mg/L		0.0005	23-AUG-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	23-AUG-19
Zirconium (Zr)-Total			<0.00020		mg/L		0.0002	23-AUG-19
WG3142186-5 MS		**WG3142186-6**						
Aluminum (Al)-Total			N/A	MS-B	%		-	23-AUG-19
Antimony (Sb)-Total			104.5		%		70-130	23-AUG-19
Arsenic (As)-Total			101.1		%		70-130	23-AUG-19
Barium (Ba)-Total			N/A	MS-B	%		-	23-AUG-19
Beryllium (Be)-Total			106.8		%		70-130	23-AUG-19
Bismuth (Bi)-Total			87.4		%		70-130	23-AUG-19
Boron (B)-Total			N/A	MS-B	%		-	23-AUG-19
Cadmium (Cd)-Total			91.2		%		70-130	23-AUG-19
Calcium (Ca)-Total			N/A	MS-B	%		-	23-AUG-19
Chromium (Cr)-Total			99.5		%		70-130	23-AUG-19
Cesium (Cs)-Total			102.0		%		70-130	23-AUG-19
Cobalt (Co)-Total			95.7		%		70-130	23-AUG-19
Copper (Cu)-Total			88.8		%		70-130	23-AUG-19
Iron (Fe)-Total			N/A	MS-B	%		-	23-AUG-19
Lead (Pb)-Total			90.4		%		70-130	23-AUG-19
Lithium (Li)-Total			105.1		%		70-130	23-AUG-19
Magnesium (Mg)-Total			N/A	MS-B	%		-	23-AUG-19
Manganese (Mn)-Total			N/A	MS-B	%		-	23-AUG-19
Molybdenum (Mo)-Total			109.0		%		70-130	23-AUG-19
Nickel (Ni)-Total			88.4		%		70-130	23-AUG-19
Phosphorus (P)-Total			121.5		%		70-130	23-AUG-19
Potassium (K)-Total			N/A	MS-B	%		-	23-AUG-19
Rubidium (Rb)-Total			101.9		%		70-130	23-AUG-19
Selenium (Se)-Total			95.0		%		70-130	23-AUG-19
Silicon (Si)-Total			N/A	MS-B	%		-	23-AUG-19
Silver (Ag)-Total			93.3		%		70-130	23-AUG-19
Sodium (Na)-Total			N/A	MS-B	%		-	23-AUG-19
Strontium (Sr)-Total			N/A	MS-B	%		-	23-AUG-19
Sulfur (S)-Total			N/A	MS-B	%		-	23-AUG-19
Thallium (Tl)-Total			91.0		%		70-130	23-AUG-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4765749								
WG3142186-5 MS		**WG3142186-6**						
Tellurium (Te)-Total			90.5		%		70-130	23-AUG-19
Thorium (Th)-Total			97.8		%		70-130	23-AUG-19
Tin (Sn)-Total			99.96		%		70-130	23-AUG-19
Titanium (Ti)-Total			105.7		%		70-130	23-AUG-19
Tungsten (W)-Total			101.2		%		70-130	23-AUG-19
Uranium (U)-Total			N/A	MS-B	%		-	23-AUG-19
Vanadium (V)-Total			108.2		%		70-130	23-AUG-19
Zinc (Zn)-Total			N/A	MS-B	%		-	23-AUG-19
Zirconium (Zr)-Total			106.0		%		70-130	23-AUG-19
NH3-F-WT	**Water**							
Batch R4767350								
WG3141496-7 DUP		**L2334184-4**						
Ammonia, Total (as N)		<0.010	<0.010	RPD-NA	mg/L	N/A	20	23-AUG-19
WG3141496-6 LCS								
Ammonia, Total (as N)			89.5		%		85-115	23-AUG-19
WG3141496-5 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	23-AUG-19
WG3141496-8 MS		**L2334184-4**						
Ammonia, Total (as N)			89.9		%		75-125	23-AUG-19
PH-BF	**Water**							
Batch R4765144								
WG3140797-2 DUP		**L2333539-1**						
pH		8.73	8.73	J	pH units	0.00	0.2	21-AUG-19
WG3140797-1 LCS								
pH			7.01		pH units		6.9-7.1	21-AUG-19
SOLIDS-TDS-BF	**Water**							
Batch R4765133								
WG3140770-3 DUP		**L2333537-1**						
Total Dissolved Solids		2060	2090		mg/L	1.5	20	22-AUG-19
WG3140770-2 LCS								
Total Dissolved Solids			104.0		%		85-115	22-AUG-19
WG3140770-1 MB								
Total Dissolved Solids			<20		mg/L		20	22-AUG-19
SOLIDS-TSS-BF	**Water**							

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SOLIDS-TSS-BF	**Water**							
Batch R4762890								
WG3139914-3 DUP		**L2333539-1**						
Total Suspended Solids		6.3	4.9		mg/L	24	25	22-AUG-19
WG3139914-2 LCS								
Total Suspended Solids			99.2		%		85-115	22-AUG-19
WG3139914-1 MB								
Total Suspended Solids			<2.0		mg/L		2	22-AUG-19
TURBIDITY-BF	**Water**							
Batch R4765172								
WG3140821-3 DUP		**L2332396-1**						
Turbidity		74.5	74.2		NTU	0.4	15	21-AUG-19
WG3140821-2 LCS								
Turbidity			110.0		%		85-115	21-AUG-19
WG3140821-1 MB								
Turbidity			<0.10		NTU		0.1	21-AUG-19

Quality Control Report

Workorder: L2333539 Report Date: 12-SEP-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

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

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

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.

Wednesday, September 11, 2019

Rick Hawthorne
ALS Environmental
60 Northland Rd, Unit 1
Waterloo Canada, ON N2V 2B8

Re: ALS Workorder: 1908649
Project Name:
Project Number: L2333539

Dear Mr. Hawthorne:

One water sample was received from ALS Environmental, on 8/27/2019. The sample was scheduled for the following analysis:

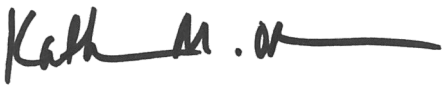
Radium-226

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,



ALS Environmental
Katie M. OBrien
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
AIHA	214884
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280

1908649

Radium-226:
The sample was prepared and analyzed according to the current revision of SOP 783.

All acceptance criteria were met.

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1908649
Client Name: ALS Environmental
Client Project Name:
Client Project Number: L2333539
Client PO Number: L2333539

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
L2333539-1	1908649-1		WATER	21-Aug-19	

ALS Environmental

1908649

Subcontract Request Form

Subcontract To:

ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
225 COMMERCE DRIVE
FORT COLLINS,CO 80524

NOTES: Please reference on final report and invoice: PO# *L2333539*
ALS requires QC data to be provided with your final results.

Please see enclosed 1 sample(s) in 1 Container(s)

SAMPLE NUMBER	ANALYTICAL REQUIRED	DATE SAMPLED / DUE DATE	Priority Flag
(1) **L2333539-1 MS-08**		8/21/2019	E
	Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	9/12/2019	

Subcontract Info Contact: Mary-Lynn Pike (519) 886-6910
Analysis and reporting info contact: Rick Hawthorne
60 NORTHLAND ROAD, UNIT 1
WATERLOO,ON N2V 2B8
Phone: (519) 886-6910 Email: Rick.Hawthorne@alsglobal.com

Please email confirmation of receipt to: Rick.Hawthorne@alsglobal.com

Shipped By: _____ Date Shipped: _____
Received By: _____ Date Received: 8.27.19 13:10
Verified By: _____ Date Verified: _____
Temperature: _____
Sample Integrity Issues: _____

ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: ALS Water100 Workorder No: 1908649

Project Manager: KO Initials: NJ Date: 8.27.19

1.	Are airbills / shipping documents present and/or removable?	DROP OFF	(YES)	NO
2.	Are custody seals on **shipping** containers intact?	NONE	(YES)	NO *
3.	Are custody seals on **sample** containers intact?	(NONE)	YES	NO *
4.	Is there a COC (chain-of-custody) present?		(YES)	NO *
5.	Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)		(YES)	NO *
6.	Are short-hold samples present?		YES	(NO)
7.	Are all samples within holding times for the requested analyses?		(YES)	NO *
8.	Were all sample containers received intact? (not broken or leaking)		(YES)	NO *
9.	Is there sufficient sample for the requested analyses?		(YES)	NO *
10.	Are all samples in the proper containers for the requested analyses?		(YES)	NO *
11.	Are all aqueous samples preserved correctly, if required? (excluding volatiles)	N/A	(YES)	NO *
12.	Are all aqueous non-preserved samples pH 4-9?	(N/A)	YES	NO *
13.	Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm (1/4 inch) diameter? (i.e. size of green pea)	(N/A)	YES	NO
14.	Were the samples shipped on ice?		(YES)	NO
15.	Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: #1 (#3) #4	RAD ONLY	YES	(NO)

Cooler #:	1							
Temperature (°C):	10.0							
No. of custody seals on cooler:	1							
DOT Survey/ Acceptance Information — External µR/hr reading:	11							
Background µR/hr reading:	12							

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? **YES / NO / NA** (If no, see Form 008.)

*** Please provide details here for NO responses to gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.**

All client bottle ID's vs ALS lab ID's double-checked by: NJ

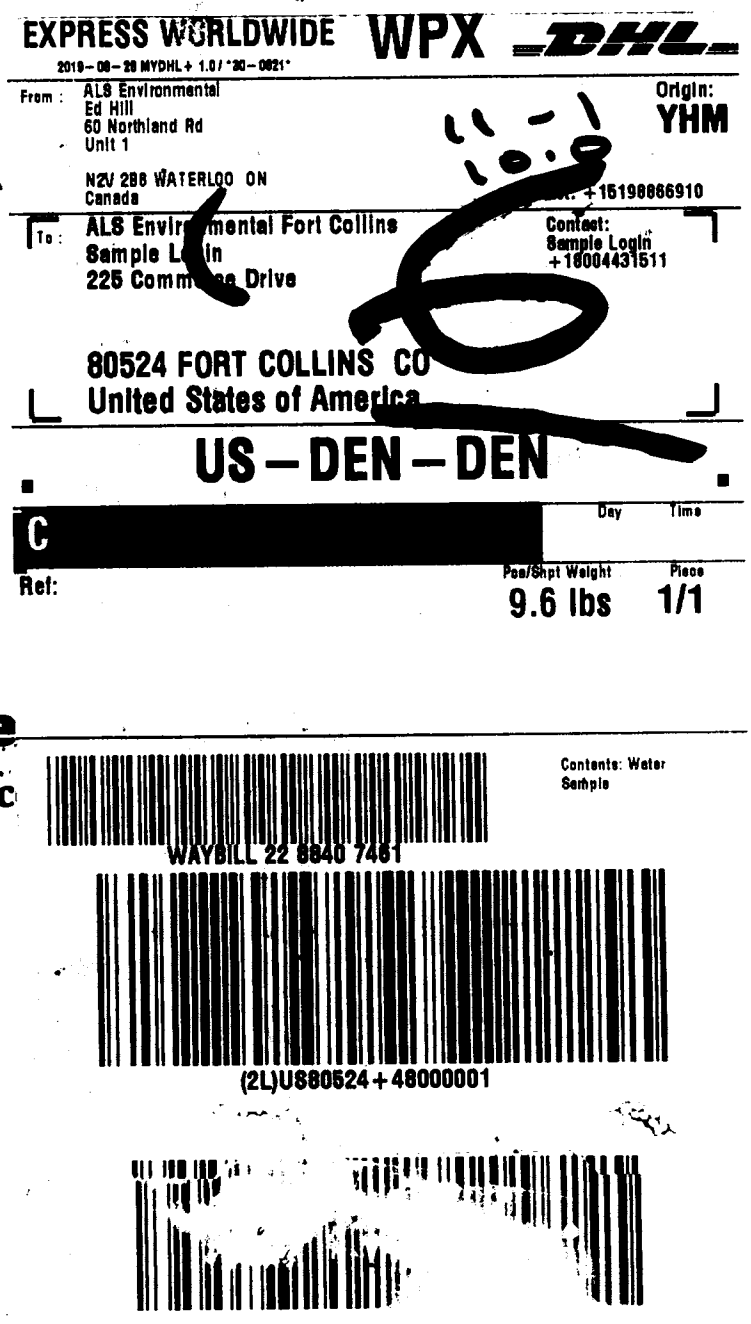
If applicable, was the client contacted? **YES / NO / NA** Contact: _____ Date/Time: _____

Project Manager Signature / Date: 8/28/19

Form 201r27.xls
(02/11/2019)

*IR Gun #1, VWR SN 170560549
*IR Gun #3, VWR SN 170647571
*IR Gun #4, Oakton, SN 2372220101-0002

1908649


EXPRESS WORLDWIDE
WPX
DHL
2019-08-28 MYDHL+ 1.0/*20-0021*
From :
ALS Environmental
Ed Hill
60 Northland Rd
Unit 1
N2V 2B6 WATERLOO ON
Canada
Origin:
YHM
+15198866910
To :
ALS Environmental Fort Collins
Sample Login
225 Commerce Drive
Contact:
Sample Login
+16004431511
80524 FORT COLLINS CO
United States of America
US-DEN-DEN
C
Day
Time
Ref:
Pcs/Shpt Weight
9.6 lbs
Piece
1/1
Contents: Water
Sample
WAYBILL 22 8840 7461
(2L)US80524+48000001

Client:	ALS Environmental	**Date:**	*11-Sep-19*
Project:	L2333539	**Work Order:**	1908649
Sample ID:	L2333539-1	**Lab ID:**	1908649-1
Legal Location:		**Matrix:**	WATER
Collection Date:	8/21/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**			Prep Date: **9/3/2019**	PrepBy: **JXH**
Ra-226	**0.067 (+/- 0.020)**		**0.0039**	**BQ/l**	NA	9/11/2019 12:23
Carr: BARIUM	*97*		*40-110*	*%REC*	DL = NA	9/11/2019 12:23

Client:	ALS Environmental	**Date:**	*11-Sep-19*
Project:	L2333539	**Work Order:**	1908649
Sample ID:	L2333539-1	**Lab ID:**	1908649-1
Legal Location:		**Matrix:**	WATER
Collection Date:	8/21/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed

Explanation of Qualifiers

Radiochemistry:

- "Report Limit" is the MDC

U or ND - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

Y2 - Chemical Yield outside default limits.

W - DER is greater than Warning Limit of 1.42

* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.
# - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.
G - Sample density differs by more than 15% of LCS density.
D - DER is greater than Control Limit

M - Requested MDC not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS, Matrix Spike Recovery within control limits.

N - Matrix Spike Recovery outside control limits

NC - Not Calculated for duplicate results less than 5 times MDC

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

Inorganics:

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).

U or ND - Indicates that the compound was analyzed for but not detected.

E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.

M - Duplicate injection precision was not met.

N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.

Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.

* - Duplicate analysis (relative percent difference) not within control limits.

S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

Organics:

U or ND - Indicates that the compound was analyzed for but not detected.

B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.

E - Analyte concentration exceeds the upper level of the calibration range.

J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).

A - A tentatively identified compound is a suspected aldol-condensation product.

X - The analyte was diluted below an accurate quantitation level.

* - The spike recovery is equal to or outside the control criteria used.

+ - The relative percent difference (RPD) equals or exceeds the control criteria.

G - A pattern resembling gasoline was detected in this sample.

D - A pattern resembling diesel was detected in this sample.

M - A pattern resembling motor oil was detected in this sample.

C - A pattern resembling crude oil was detected in this sample.

4 - A pattern resembling JP-4 was detected in this sample.

5 - A pattern resembling JP-5 was detected in this sample.

H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.

L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.

Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
- gasoline
- JP-8
- diesel
- mineral spirits
- motor oil
- Stoddard solvent
- bunker C

Batch ID: **RE190903-1-1** Instrument ID **Alpha Scin** Method: **Radium-226 by Radon Emanation**

LCS Sample ID: **RE190903-1** Units: **BQ/l** Analysis Date: **9/11/2019 13:01**
Client ID: Run ID: **RE190903-1A** Prep Date: **9/3/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.88 (+/- 0.467)	0.0161	1.72		109	67-120					P,M3
Carr: BARIUM	17000		17150		99	40-110					

LCSD Sample ID: **RE190903-1** Units: **BQ/l** Analysis Date: **9/11/2019 13:01**
Client ID: Run ID: **RE190903-1A** Prep Date: **9/3/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.46 (+/- 0.368)	0.0125	1.72		84.6	67-120		1.88	0.7	2.1	P,M3
Carr: BARIUM	16900		17150		98.7	40-110		17000			

MB Sample ID: **RE190903-1** Units: **BQ/l** Analysis Date: **9/11/2019 13:01**
Client ID: Run ID: **RE190903-1A** Prep Date: **9/3/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	-0.00083 (+/- 0.0039)	0.0078									U
Carr: BARIUM	16900		17150		98.3	40-110					

The following samples were analyzed in this batch: 1908649-1

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2333539-COFC

COC Number: 15 -

Page 1 of 1

Report To	Contact and company name below will appear on the final report
Company:	Baffinland Iron Mines Corp.
Contact:	Wiliam Bowden and Connor Devereaux
Phone:	647-253-0596 EXT 6016
	Company address below will appear on the final report
Street:	2275 Upper Middle Rd. E., Suite #300
City/Province:	Oakville, ON
Postal Code:	L6H 0C3
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	
Contact:	

Report Form	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	bimcore@alsglobal.com
Email 2	
Email 3	

Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	ap@baffinland.com
Email 2	commercial@baffinland.com

Project Information	
ALS Account # / Quote #:	23642 /Q42455
Job #:	MS-08 DEL
PO / AFE:	4500057496
LSD:	

Oil and Gas Required Fields (client use)	
AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only)	L2333539	ALS Contact:	Sampler: AZ/LM/SS

Confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☐ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
4 day [P4]	☐	1 Business day [E1]	☐
3 day [P3]	☐	Same Day, Weekend or Statutory holiday [E0]	☑
2 day [P2]	☐		

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	F/P	BIM-MMER-DEL	Number of Containers
	MS-08	21-Aug-19	11:50	Water	E0		6

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☑ NO	
Are samples for human drinking water use? ☐ YES ☑ NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
	5		1.4.0		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released By: Megan LaCarte	Date: 21 Aug 2019	Time: 14:27	Received by: Adam Jodoin	Date: Aug.21/19	Time:	Received by:	Date: 23.8.19	Time: 9:45

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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 specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Baffinland Iron Mine's Corporation (Oakville)
ATTN: William Bowden/Connor Devereaux
2275 Upper Middle Rd. E.
Suite #300
Oakville ON L6H 0C3

Date Received: 26-AUG-19
Report Date: 20-SEP-19 10:06 (MT)
Version: FINAL

Client Phone: 647-253-0596

Certificate of Analysis

Lab Work Order #: L2336449

Project P.O. #: 4500057496
Job Reference: MS-08 DEL
C of C Numbers:
Legal Site Desc:

Rick Hawthorne
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2336449-1 MS-08 Sampled By: AZ/RH/SS on 26-AUG-19 @ 11:15 Matrix: WATER							
Physical Tests							
Conductivity	4420		3.0	umhos/cm		28-AUG-19	R4774970
pH	8.89		0.10	pH units		27-AUG-19	R4769988
Total Suspended Solids	9.6		2.0	mg/L		27-AUG-19	R4769946
Total Dissolved Solids	4390		20	mg/L		27-AUG-19	R4770253
Turbidity	24.4		0.10	NTU		27-AUG-19	R4769962
Anions and Nutrients							
Ammonia, Total (as N)	2.77	DLHC	0.20	mg/L		28-AUG-19	R4772608
Cyanides							
Cyanide, Total	<0.020	DLM	0.020	mg/L		29-AUG-19	R4776401
Total Metals							
Aluminum (Al)-Total	<0.050	DLHC	0.050	mg/L	28-AUG-19	28-AUG-19	R4774089
Antimony (Sb)-Total	<0.0010	DLHC	0.0010	mg/L	28-AUG-19	28-AUG-19	R4774089
Arsenic (As)-Total	<0.0010	DLHC	0.0010	mg/L	28-AUG-19	28-AUG-19	R4774089
Barium (Ba)-Total	0.0197	DLHC	0.0010	mg/L	28-AUG-19	28-AUG-19	R4774089
Beryllium (Be)-Total	<0.0010	DLHC	0.0010	mg/L	28-AUG-19	28-AUG-19	R4774089
Bismuth (Bi)-Total	<0.00050	DLHC	0.00050	mg/L	28-AUG-19	28-AUG-19	R4774089
Boron (B)-Total	<0.10	DLHC	0.10	mg/L	28-AUG-19	28-AUG-19	R4774089
Cadmium (Cd)-Total	<0.000050	DLHC	0.000050	mg/L	28-AUG-19	28-AUG-19	R4774089
Calcium (Ca)-Total	269	DLHC	0.50	mg/L	28-AUG-19	28-AUG-19	R4774089
Cesium (Cs)-Total	<0.00010	DLHC	0.00010	mg/L	28-AUG-19	28-AUG-19	R4774089
Chromium (Cr)-Total	<0.0050	DLHC	0.0050	mg/L	28-AUG-19	28-AUG-19	R4774089
Cobalt (Co)-Total	0.0129	DLHC	0.0010	mg/L	28-AUG-19	28-AUG-19	R4774089
Copper (Cu)-Total	<0.010	DLHC	0.010	mg/L	28-AUG-19	28-AUG-19	R4774089
Iron (Fe)-Total	1.74	DLHC	0.10	mg/L	28-AUG-19	28-AUG-19	R4774089
Lead (Pb)-Total	<0.00050	DLHC	0.00050	mg/L	28-AUG-19	28-AUG-19	R4774089
Lithium (Li)-Total	0.032	DLHC	0.010	mg/L	28-AUG-19	28-AUG-19	R4774089
Magnesium (Mg)-Total	570	DLHC	0.050	mg/L	28-AUG-19	28-AUG-19	R4774089
Manganese (Mn)-Total	4.93	DLHC	0.0050	mg/L	28-AUG-19	28-AUG-19	R4774089
Molybdenum (Mo)-Total	<0.00050	DLHC	0.00050	mg/L	28-AUG-19	28-AUG-19	R4774089
Nickel (Ni)-Total	0.0156	DLHC	0.0050	mg/L	28-AUG-19	28-AUG-19	R4774089
Phosphorus (P)-Total	<0.50	DLHC	0.50	mg/L	28-AUG-19	28-AUG-19	R4774089
Potassium (K)-Total	5.57	DLHC	0.50	mg/L	28-AUG-19	28-AUG-19	R4774089
Rubidium (Rb)-Total	0.0066	DLHC	0.0020	mg/L	28-AUG-19	28-AUG-19	R4774089
Selenium (Se)-Total	0.00564	DLHC	0.00050	mg/L	28-AUG-19	28-AUG-19	R4774089
Silicon (Si)-Total	<1.0	DLHC	1.0	mg/L	28-AUG-19	28-AUG-19	R4774089
Silver (Ag)-Total	<0.00050	DLHC	0.00050	mg/L	28-AUG-19	28-AUG-19	R4774089
Sodium (Na)-Total	5.24	DLHC	0.50	mg/L	28-AUG-19	28-AUG-19	R4774089
Strontium (Sr)-Total	0.494	DLHC	0.010	mg/L	28-AUG-19	28-AUG-19	R4774089
Sulfur (S)-Total	1030	DLHC	5.0	mg/L	28-AUG-19	28-AUG-19	R4774089
Tellurium (Te)-Total	<0.0020	DLHC	0.0020	mg/L	28-AUG-19	28-AUG-19	R4774089
Thallium (Tl)-Total	<0.00010	DLHC	0.00010	mg/L	28-AUG-19	28-AUG-19	R4774089
Thorium (Th)-Total	<0.0010	DLHC	0.0010	mg/L	28-AUG-19	28-AUG-19	R4774089

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2336449-1 MS-08 Sampled By: AZ/RH/SS on 26-AUG-19 @ 11:15 Matrix: WATER							
Total Metals							
Tin (Sn)-Total	<0.0010	DLHC	0.0010	mg/L	28-AUG-19	28-AUG-19	R4774089
Titanium (Ti)-Total	<0.0030	DLHC	0.0030	mg/L	28-AUG-19	28-AUG-19	R4774089
Tungsten (W)-Total	<0.0010	DLHC	0.0010	mg/L	28-AUG-19	28-AUG-19	R4774089
Uranium (U)-Total	0.00094	DLHC	0.00010	mg/L	28-AUG-19	28-AUG-19	R4774089
Vanadium (V)-Total	<0.0050	DLHC	0.0050	mg/L	28-AUG-19	28-AUG-19	R4774089
Zinc (Zn)-Total	<0.030	DLHC	0.030	mg/L	28-AUG-19	28-AUG-19	R4774089
Zirconium (Zr)-Total	<0.0020	DLHC	0.0020	mg/L	28-AUG-19	28-AUG-19	R4774089
Radiological Parameters							
Ra-226	0.023		0.0079	Bq/L	04-SEP-19	16-SEP-19	R4780785

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

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Thallium (Tl)-Total	B	L2336449-1
Matrix Spike	Aluminum (Al)-Total	MS-B	L2336449-1
Matrix Spike	Barium (Ba)-Total	MS-B	L2336449-1
Matrix Spike	Calcium (Ca)-Total	MS-B	L2336449-1
Matrix Spike	Iron (Fe)-Total	MS-B	L2336449-1
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2336449-1
Matrix Spike	Silicon (Si)-Total	MS-B	L2336449-1
Matrix Spike	Sodium (Na)-Total	MS-B	L2336449-1
Matrix Spike	Strontium (Sr)-Total	MS-B	L2336449-1
Matrix Spike	Sulfur (S)-Total	MS-B	L2336449-1
Matrix Spike	Titanium (Ti)-Total	MS-B	L2336449-1
Matrix Spike	Uranium (U)-Total	MS-B	L2336449-1

Sample Parameter Qualifier key listed:

Qualifier	Description
B	Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
CN-TOT-WT	Water	Cyanide, Total	ISO 14403-2

Total cyanide is determined by the combination of UV digestion and distillation. Cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

When using this method, high levels of thiocyanate in samples can cause false positives at ~1-2% of the thiocyanate concentration. For samples with detectable cyanide analyzed by this method, ALS recommends analysis for thiocyanate to check for this potential interference

EC-SCREEN-WT	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

EC-WT	Water	Conductivity	APHA 2510 B

Water samples can be measured directly by immersing the conductivity cell into the sample.

MET-T-CCMS-WT	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

NH3-F-WT	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

PH-BF	Water	pH	APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

RA226-MMER-FC	Water	Ra226 by Alpha Scint, MDC=0.01 Bq/L	EPA 903.1

SOLIDS-TDS-BF	Water	Total Dissolved Solids	APHA 2540C

A well-mixed sample is filtered though glass fibres filter. A known volume of the filtrate is evaporated and dried at 180 +/- 2C for 1hr.

SOLIDS-TSS-BF	Water	Suspended solids	APHA 2540 D-Gravimetric

A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104 +/- 1C for a minimum of four hours or until a constant weight is achieved.

TURBIDITY-BF	Water	Turbidity	APHA 2130 B

Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered

Reference Information

by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.

** 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
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA
FC	ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
BF	ALS ENVIRONMENTAL - BAFFIN ISLAND, NUNAVUT, 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 weight of sample
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

Workorder: L2336449 Report Date: 20-SEP-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CN-TOT-WT	**Water**							
Batch R4776401								
WG3146740-3 DUP		**L2337811-1**						
Cyanide, Total		<0.020	<0.020	RPD-NA	mg/L	N/A	20	29-AUG-19
WG3146740-2 LCS								
Cyanide, Total			91.7		%		80-120	29-AUG-19
WG3146740-1 MB								
Cyanide, Total			<0.0020		mg/L		0.002	29-AUG-19
WG3146740-4 MS		**L2337811-1**						
Cyanide, Total			91.3		%		70-130	29-AUG-19
EC-WT	**Water**							
Batch R4774970								
WG3145888-4 DUP		**WG3145888-3**						
Conductivity		913	910		umhos/cm	0.3	10	28-AUG-19
WG3145888-2 LCS								
Conductivity			108.3		%		90-110	28-AUG-19
WG3145888-1 MB								
Conductivity			<3.0		umhos/cm		3	28-AUG-19
MET-T-CCMS-WT	**Water**							
Batch R4774089								
WG3146312-4 DUP		**WG3146312-3**						
Aluminum (Al)-Total		0.333	0.353		mg/L	5.8	20	28-AUG-19
Antimony (Sb)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	28-AUG-19
Arsenic (As)-Total		0.00011	<0.00010	RPD-NA	mg/L	N/A	20	28-AUG-19
Barium (Ba)-Total		0.0162	0.0161		mg/L	0.8	20	28-AUG-19
Beryllium (Be)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	28-AUG-19
Bismuth (Bi)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	28-AUG-19
Boron (B)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	28-AUG-19
Cadmium (Cd)-Total		<0.0000050	<0.000005(	RPD-NA	mg/L	N/A	20	28-AUG-19
Calcium (Ca)-Total		21.7	21.8		mg/L	0.6	20	28-AUG-19
Chromium (Cr)-Total		0.00064	0.00064		mg/L	0.4	20	28-AUG-19
Cesium (Cs)-Total		0.000040	0.000042		mg/L	5.2	20	28-AUG-19
Cobalt (Co)-Total		0.00014	0.00014		mg/L	1.9	20	28-AUG-19
Copper (Cu)-Total		0.0013	0.0014		mg/L	1.2	20	28-AUG-19
Iron (Fe)-Total		0.274	0.279		mg/L	1.8	20	28-AUG-19
Lead (Pb)-Total		0.000265	0.000267		mg/L	0.9	20	28-AUG-19
Lithium (Li)-Total		0.0012	0.0012		mg/L	0.8	20	28-AUG-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4774089								
WG3146312-4 DUP		**WG3146312-3**						
Magnesium (Mg)-Total		13.2	13.1		mg/L	0.9	20	28-AUG-19
Manganese (Mn)-Total		0.00377	0.00404		mg/L	7.1	20	28-AUG-19
Molybdenum (Mo)-Total		0.000473	0.000479		mg/L	1.3	20	28-AUG-19
Nickel (Ni)-Total		0.00078	0.00074		mg/L	6.2	20	28-AUG-19
Phosphorus (P)-Total		<0.050	<0.050	RPD-NA	mg/L	N/A	20	28-AUG-19
Potassium (K)-Total		1.58	1.55		mg/L	1.6	20	28-AUG-19
Rubidium (Rb)-Total		0.00251	0.00260		mg/L	3.3	20	28-AUG-19
Selenium (Se)-Total		<0.000050	0.000065	RPD-NA	mg/L	N/A	20	28-AUG-19
Silicon (Si)-Total		1.59	1.60		mg/L	0.5	20	28-AUG-19
Silver (Ag)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	28-AUG-19
Sodium (Na)-Total		5.06	4.96		mg/L	2.0	20	28-AUG-19
Strontium (Sr)-Total		0.0265	0.0268		mg/L	1.1	20	28-AUG-19
Sulfur (S)-Total		6.46	6.46		mg/L	0.1	25	28-AUG-19
Thallium (Tl)-Total		<0.000010	0.000012	RPD-NA	mg/L	N/A	20	28-AUG-19
Tellurium (Te)-Total		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	28-AUG-19
Thorium (Th)-Total		0.00037	0.00039		mg/L	5.1	25	28-AUG-19
Tin (Sn)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	28-AUG-19
Titanium (Ti)-Total		0.0163	0.0168		mg/L	3.2	20	28-AUG-19
Tungsten (W)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	28-AUG-19
Uranium (U)-Total		0.00608	0.00611		mg/L	0.6	20	28-AUG-19
Vanadium (V)-Total		0.00073	0.00072		mg/L	1.1	20	28-AUG-19
Zinc (Zn)-Total		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	28-AUG-19
Zirconium (Zr)-Total		0.00086	0.00093		mg/L	7.2	20	28-AUG-19
WG3146312-2 LCS								
Aluminum (Al)-Total			100.4		%		80-120	28-AUG-19
Antimony (Sb)-Total			103.4		%		80-120	28-AUG-19
Arsenic (As)-Total			96.9		%		80-120	28-AUG-19
Barium (Ba)-Total			102.7		%		80-120	28-AUG-19
Beryllium (Be)-Total			99.1		%		80-120	28-AUG-19
Bismuth (Bi)-Total			100.9		%		80-120	28-AUG-19
Boron (B)-Total			99.4		%		80-120	28-AUG-19
Cadmium (Cd)-Total			99.8		%		80-120	28-AUG-19
Calcium (Ca)-Total			102.6		%		80-120	28-AUG-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4774089								
WG3146312-2 LCS								
Chromium (Cr)-Total			96.6		%		80-120	28-AUG-19
Cesium (Cs)-Total			106.0		%		80-120	28-AUG-19
Cobalt (Co)-Total			97.5		%		80-120	28-AUG-19
Copper (Cu)-Total			97.6		%		80-120	28-AUG-19
Iron (Fe)-Total			102.9		%		80-120	28-AUG-19
Lead (Pb)-Total			102.9		%		80-120	28-AUG-19
Lithium (Li)-Total			104.9		%		80-120	28-AUG-19
Magnesium (Mg)-Total			95.1		%		80-120	28-AUG-19
Manganese (Mn)-Total			98.0		%		80-120	28-AUG-19
Molybdenum (Mo)-Total			102.2		%		80-120	28-AUG-19
Nickel (Ni)-Total			96.7		%		80-120	28-AUG-19
Phosphorus (P)-Total			101.6		%		70-130	28-AUG-19
Potassium (K)-Total			101.7		%		80-120	28-AUG-19
Rubidium (Rb)-Total			100.2		%		80-120	28-AUG-19
Selenium (Se)-Total			98.2		%		80-120	28-AUG-19
Silicon (Si)-Total			104.9		%		60-140	28-AUG-19
Silver (Ag)-Total			103.7		%		80-120	28-AUG-19
Sodium (Na)-Total			99.8		%		80-120	28-AUG-19
Strontium (Sr)-Total			102.1		%		80-120	28-AUG-19
Sulfur (S)-Total			101.5		%		80-120	28-AUG-19
Thallium (Tl)-Total			101.6		%		80-120	28-AUG-19
Tellurium (Te)-Total			94.6		%		80-120	28-AUG-19
Thorium (Th)-Total			103.4		%		70-130	28-AUG-19
Tin (Sn)-Total			103.5		%		80-120	28-AUG-19
Titanium (Ti)-Total			95.4		%		80-120	28-AUG-19
Tungsten (W)-Total			105.2		%		80-120	28-AUG-19
Uranium (U)-Total			107.5		%		80-120	28-AUG-19
Vanadium (V)-Total			99.7		%		80-120	28-AUG-19
Zinc (Zn)-Total			93.7		%		80-120	28-AUG-19
Zirconium (Zr)-Total			102.4		%		80-120	28-AUG-19
WG3146312-1 MB								
Aluminum (Al)-Total			<0.0050		mg/L		0.005	28-AUG-19
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	28-AUG-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	28-AUG-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4774089								
WG3146312-1 MB								
Barium (Ba)-Total			<0.00010		mg/L		0.0001	28-AUG-19
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	28-AUG-19
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	28-AUG-19
Boron (B)-Total			<0.010		mg/L		0.01	28-AUG-19
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	28-AUG-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	28-AUG-19
Chromium (Cr)-Total			<0.00050		mg/L		0.0005	28-AUG-19
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	28-AUG-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	28-AUG-19
Copper (Cu)-Total			<0.0010		mg/L		0.001	28-AUG-19
Iron (Fe)-Total			<0.010		mg/L		0.01	28-AUG-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	28-AUG-19
Lithium (Li)-Total			<0.0010		mg/L		0.001	28-AUG-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	28-AUG-19
Manganese (Mn)-Total			<0.00050		mg/L		0.0005	28-AUG-19
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	28-AUG-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	28-AUG-19
Phosphorus (P)-Total			<0.050		mg/L		0.05	28-AUG-19
Potassium (K)-Total			<0.050		mg/L		0.05	28-AUG-19
Rubidium (Rb)-Total			<0.00020		mg/L		0.0002	28-AUG-19
Selenium (Se)-Total			<0.000050		mg/L		0.00005	28-AUG-19
Silicon (Si)-Total			<0.10		mg/L		0.1	28-AUG-19
Silver (Ag)-Total			<0.000050		mg/L		0.00005	28-AUG-19
Sodium (Na)-Total			<0.050		mg/L		0.05	28-AUG-19
Strontium (Sr)-Total			<0.0010		mg/L		0.001	28-AUG-19
Sulfur (S)-Total			<0.50		mg/L		0.5	28-AUG-19
Thallium (Tl)-Total			0.000036	B	mg/L		0.00001	28-AUG-19
Tellurium (Te)-Total			<0.00020		mg/L		0.0002	28-AUG-19
Thorium (Th)-Total			<0.00010		mg/L		0.0001	28-AUG-19
Tin (Sn)-Total			<0.00010		mg/L		0.0001	28-AUG-19
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	28-AUG-19
Tungsten (W)-Total			<0.00010		mg/L		0.0001	28-AUG-19
Uranium (U)-Total			<0.000010		mg/L		0.00001	28-AUG-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4774089								
WG3146312-1 MB								
Vanadium (V)-Total			<0.00050		mg/L		0.0005	28-AUG-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	28-AUG-19
Zirconium (Zr)-Total			<0.00020		mg/L		0.0002	28-AUG-19
WG3146312-5 MS		**WG3146312-3**						
Aluminum (Al)-Total			N/A	MS-B	%		-	28-AUG-19
Antimony (Sb)-Total			126.6		%		70-130	28-AUG-19
Arsenic (As)-Total			117.5		%		70-130	28-AUG-19
Barium (Ba)-Total			N/A	MS-B	%		-	28-AUG-19
Beryllium (Be)-Total			120.3		%		70-130	28-AUG-19
Bismuth (Bi)-Total			117.2		%		70-130	28-AUG-19
Boron (B)-Total			119.9		%		70-130	28-AUG-19
Cadmium (Cd)-Total			119.0		%		70-130	28-AUG-19
Calcium (Ca)-Total			N/A	MS-B	%		-	28-AUG-19
Chromium (Cr)-Total			117.0		%		70-130	28-AUG-19
Cobalt (Co)-Total			115.6		%		70-130	28-AUG-19
Copper (Cu)-Total			112.4		%		70-130	28-AUG-19
Iron (Fe)-Total			N/A	MS-B	%		-	28-AUG-19
Lead (Pb)-Total			120.3		%		70-130	28-AUG-19
Lithium (Li)-Total			126.7		%		70-130	28-AUG-19
Magnesium (Mg)-Total			N/A	MS-B	%		-	28-AUG-19
Manganese (Mn)-Total			116.8		%		70-130	28-AUG-19
Molybdenum (Mo)-Total			126.5		%		70-130	28-AUG-19
Nickel (Ni)-Total			113.0		%		70-130	28-AUG-19
Phosphorus (P)-Total			121.3		%		70-130	28-AUG-19
Potassium (K)-Total			111.9		%		70-130	28-AUG-19
Rubidium (Rb)-Total			118.3		%		70-130	28-AUG-19
Selenium (Se)-Total			119.7		%		70-130	28-AUG-19
Silicon (Si)-Total			N/A	MS-B	%		-	28-AUG-19
Silver (Ag)-Total			125.3		%		70-130	28-AUG-19
Sodium (Na)-Total			N/A	MS-B	%		-	28-AUG-19
Strontium (Sr)-Total			N/A	MS-B	%		-	28-AUG-19
Sulfur (S)-Total			N/A	MS-B	%		-	28-AUG-19
Thallium (Tl)-Total			119.8		%		70-130	28-AUG-19
Tellurium (Te)-Total			112.3		%		70-130	28-AUG-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4774089								
WG3146312-5 MS		**WG3146312-3**						
Thorium (Th)-Total			124.5		%		70-130	28-AUG-19
Tin (Sn)-Total			123.6		%		70-130	28-AUG-19
Titanium (Ti)-Total			N/A	MS-B	%		-	28-AUG-19
Tungsten (W)-Total			126.7		%		70-130	28-AUG-19
Uranium (U)-Total			N/A	MS-B	%		-	28-AUG-19
Vanadium (V)-Total			120.5		%		70-130	28-AUG-19
Zinc (Zn)-Total			106.3		%		70-130	28-AUG-19
Zirconium (Zr)-Total			126.1		%		70-130	28-AUG-19
NH3-F-WT	**Water**							
Batch R4772608								
WG3145689-20 DUP		**L2336465-2**						
Ammonia, Total (as N)		<0.010	<0.010	RPD-NA	mg/L	N/A	20	28-AUG-19
WG3145689-18 LCS								
Ammonia, Total (as N)			98.2		%		85-115	28-AUG-19
WG3145689-17 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	28-AUG-19
WG3145689-19 MS		**L2336465-2**						
Ammonia, Total (as N)			98.6		%		75-125	28-AUG-19
PH-BF	**Water**							
Batch R4769988								
WG3144902-2 DUP		**L2336096-1**						
pH		6.93	6.95	J	pH units	0.02	0.2	27-AUG-19
WG3144902-1 LCS								
pH			7.01		pH units		6.9-7.1	27-AUG-19
SOLIDS-TDS-BF	**Water**							
Batch R4770253								
WG3145298-3 DUP		**L2335484-1**						
Total Dissolved Solids		524	446		mg/L	16	20	27-AUG-19
WG3145298-2 LCS								
Total Dissolved Solids			96.8		%		85-115	27-AUG-19
WG3145298-1 MB								
Total Dissolved Solids			<20		mg/L		20	27-AUG-19
SOLIDS-TSS-BF	**Water**							

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SOLIDS-TSS-BF	**Water**							
Batch R4769946								
WG3144919-3 DUP		**L2336096-1**						
Total Suspended Solids		2.7	2.0	J	mg/L	0.6	4	27-AUG-19
WG3144919-2 LCS								
Total Suspended Solids			99.8		%		85-115	27-AUG-19
WG3144919-1 MB								
Total Suspended Solids			<2.0		mg/L		2	27-AUG-19
TURBIDITY-BF	**Water**							
Batch R4769962								
WG3144915-3 DUP		**L2336096-1**						
Turbidity		7.82	7.79		NTU	0.4	15	27-AUG-19
WG3144915-2 LCS								
Turbidity			104.0		%		85-115	27-AUG-19
WG3144915-1 MB								
Turbidity			<0.10		NTU		0.1	27-AUG-19

Quality Control Report

Workorder: L2336449 Report Date: 20-SEP-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

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

Sample Parameter Qualifier Definitions:

Qualifier	Description
B	Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

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.

Tuesday, September 17, 2019

Rick Hawthorne
ALS Environmental
60 Northland Rd, Unit 1
Waterloo Canada, ON N2V 2B8

Re: ALS Workorder: 1908790
Project Name:
Project Number: L2336449

Dear Mr. Hawthorne:

One water sample was received from ALS Environmental, on 8/30/2019. The sample was scheduled for the following analysis:

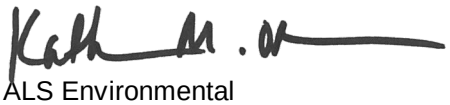
Radium-226

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,



ALS Environmental
Katie M. OBrien
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
AIHA	214884
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280

1908790

Radium-226:
The sample was prepared and analyzed according to the current revision of SOP 783.

All acceptance criteria were met.

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1908790
Client Name: ALS Environmental
Client Project Name:
Client Project Number: L2336449
Client PO Number: L2336449

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
L2336449-1	1908790-1		WATER	26-Aug-19	

ALS Environmental

L2336449

WATERLOO

1908790

Subcontract Request Form

Subcontract To:

ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
225 COMMERCE DRIVE
FORT COLLINS,CO 80524

NOTES: Please reference on final report and invoice: PO# *L2336449*
ALS requires QC data to be provided with your final results.

Please see enclosed 1 **sample(s) in** 1 **Container(s)**

SAMPLE NUMBER	ANALYTICAL REQUIRED	DATE SAMPLED / DUE DATE	Priority Flag
L2336449-1 MS-08		8/ 26/ 2019	**E**
	Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	9/16/2019	

Subcontract Info Contact: Mary-Lynn Pike (519) 886-6910
Analysis and reporting info contact: Rick Hawthorne
60 NORTHLAND ROAD, UNIT 1
WATERLOO,ON N2V 2B8
Phone: (519) 886-6910 Email: Rick.Hawthorne@alsglobal.com

Please email confirmation of receipt to: **Rick.Hawthorne@alsglobal.com**

Shipped By: _____ Date Shipped: _____
Received By: Emily Lyons Date Received: 08-30-19 1520
Verified By: _____ Date Verified: _____
Temperature: _____

Sample Integrity Issues: _____

ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: ALS-Waterloo Workorder No: 1908790

Project Manager: KMO Initials: EM Date: 08.31.19

1.	Are airbills / shipping documents present and/or removable?	DROP OFF	(YES)	NO
2.	Are custody seals on **shipping** containers intact?	NONE	(YES)	NO *
3.	Are custody seals on **sample** containers intact?	(NONE)	YES	NO *
4.	Is there a COC (chain-of-custody) present?		(YES)	NO *
5.	Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)		(YES)	NO *
6.	Are short-hold samples present?		YES	(NO)
7.	Are all samples within holding times for the requested analyses?		(YES)	NO *
8.	Were all sample containers received intact? (not broken or leaking)		(YES)	NO *
9.	Is there sufficient sample for the requested analyses?		(YES)	NO *
10.	Are all samples in the proper containers for the requested analyses?		(YES)	NO *
11.	Are all aqueous samples preserved correctly, if required? (excluding volatiles)	N/A	(YES)	NO *
12.	Are all aqueous non-preserved samples pH 4-9?	(N/A)	YES	NO *
13.	Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm (1/4 inch) diameter? (i.e. size of green pea)	(N/A)	YES	NO
14.	Were the samples shipped on ice?		(YES)	NO
15.	Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: #1 (#3) #4	(RAD ONLY)	YES	NO

Cooler #:	1
Temperature (°C):	22.8
No. of custody seals on cooler:	1
DOT Survey/ Acceptance Information — External µR/hr reading:	14
DOT Survey/ Acceptance Information — Background µR/hr reading:	13

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? **YES / NO / NA** (If no, see Form 008.)

*** Please provide details here for NO responses to gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.**

All client bottle ID's vs ALS lab ID's double-checked by: EM

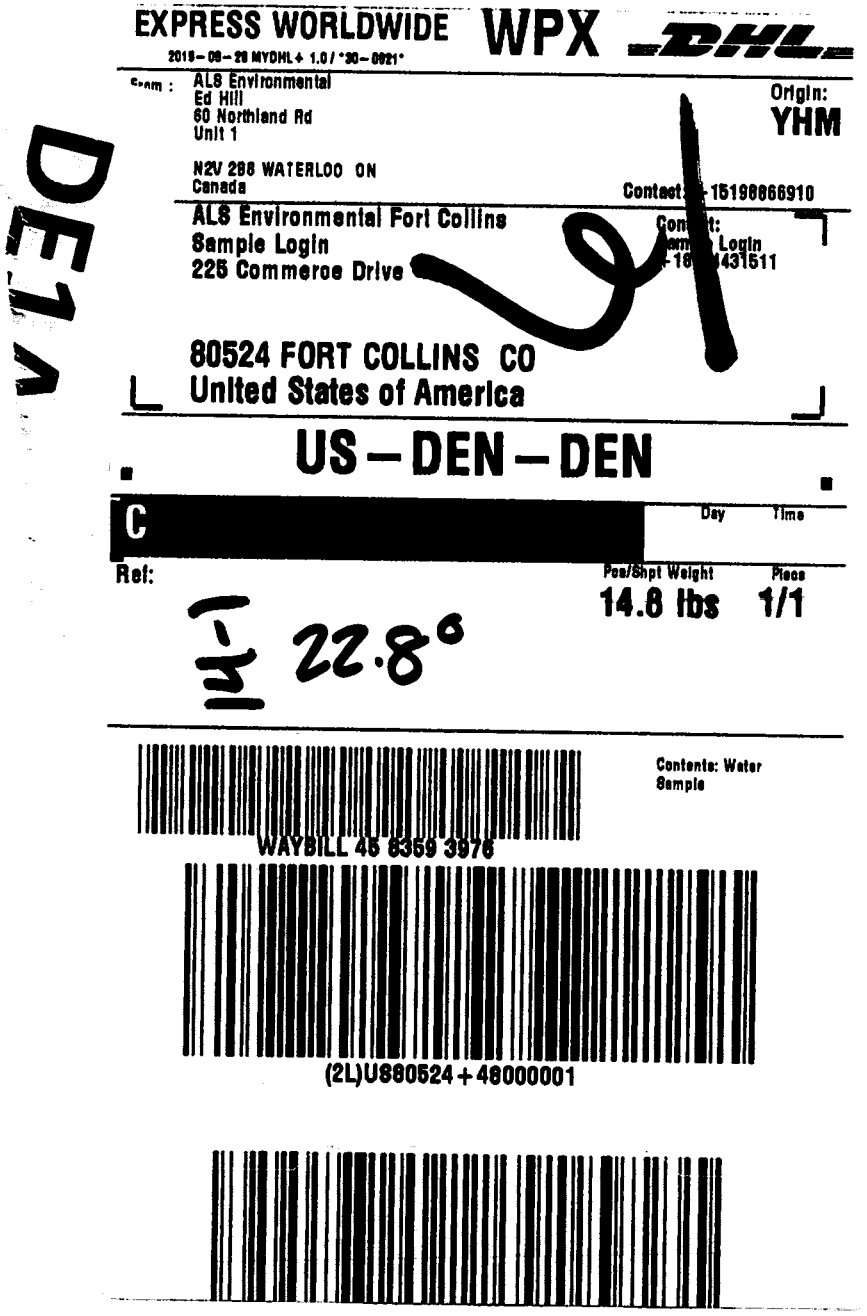
If applicable, was the client contacted? **YES / NO / NA** Contact: _____ Date/Time: _____

Project Manager Signature / Date: 9/3/19

Form 201r27.xls
(02/11/2019)

*IR Gun #1, VWR SN 170560549
*IR Gun #3, VWR SN 170647571
*IR Gun #4, Oakton, SN 2372220101-0002

1908190


EXPRESS WORLDWIDE
WPX
DHL
2019-09-26 MYDHL+ 1.0 / *30-0921*
From :
ALS Environmental
Ed Hill
60 Northland Rd
Unit 1
N2V 2B8 WATERLOO ON
Canada
Origin:
YHM
Contact: 15198666910
ALS Environmental Fort Collins
Sample Login
225 Commerce Drive
80524 FORT COLLINS CO
United States of America
US-DEN-DEN
C
Day
Time
Ref:
Pce/Shpt Weight
14.8 lbs
Piece
1/1
22.8°
Contents: Water Sample
WAYBILL 45 8359 3976
(2L)US80524+46000001

Client:	ALS Environmental	**Date:**	*17-Sep-19*
Project:	L2336449	**Work Order:**	1908790
Sample ID:	L2336449-1	**Lab ID:**	1908790-1
Legal Location:		**Matrix:**	WATER
Collection Date:	8/26/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **9/4/2019**		PrepBy: **TRW**
Ra-226	**0.023 (+/- 0.0092)**		**0.0079**	**BQ/l**	NA	9/16/2019 14:24
Carr: BARIUM	*95.4*		*40-110*	*%REC*	DL = NA	9/16/2019 14:24

Client:	ALS Environmental	**Date:**	*17-Sep-19*
Project:	L2336449	**Work Order:**	1908790
Sample ID:	L2336449-1	**Lab ID:**	1908790-1
Legal Location:		**Matrix:**	WATER
Collection Date:	8/26/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed

Explanation of Qualifiers

Radiochemistry:

- "Report Limit" is the MDC

U or ND - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

Y2 - Chemical Yield outside default limits.

W - DER is greater than Warning Limit of 1.42

* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.
# - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.
G - Sample density differs by more than 15% of LCS density.
D - DER is greater than Control Limit

M - Requested MDC not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS, Matrix Spike Recovery within control limits.

N - Matrix Spike Recovery outside control limits

NC - Not Calculated for duplicate results less than 5 times MDC

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

Inorganics:

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).

U or ND - Indicates that the compound was analyzed for but not detected.

E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.

M - Duplicate injection precision was not met.

N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.

Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.

* - Duplicate analysis (relative percent difference) not within control limits.

S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

Organics:

U or ND - Indicates that the compound was analyzed for but not detected.

B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.

E - Analyte concentration exceeds the upper level of the calibration range.

J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).

A - A tentatively identified compound is a suspected aldol-condensation product.

X - The analyte was diluted below an accurate quantitation level.

* - The spike recovery is equal to or outside the control criteria used.

+ - The relative percent difference (RPD) equals or exceeds the control criteria.

G - A pattern resembling gasoline was detected in this sample.

D - A pattern resembling diesel was detected in this sample.

M - A pattern resembling motor oil was detected in this sample.

C - A pattern resembling crude oil was detected in this sample.

4 - A pattern resembling JP-4 was detected in this sample.

5 - A pattern resembling JP-5 was detected in this sample.

H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.

L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.

Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
- gasoline
- JP-8
- diesel
- mineral spirits
- motor oil
- Stoddard solvent
- bunker C

Batch ID: **RE190904-1-2** Instrument ID **Alpha Scin** Method: **Radium-226 by Radon Emanation**

LCS Sample ID: **RE190904-1** Units: **BQ/l** Analysis Date: **9/16/2019 14:24**
Client ID: Run ID: **RE190904-1B** Prep Date: **9/4/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.19 (+/- 0.301)	0.0137	1.72		69.2	67-120					P,Y1,M3
Carr: BARIUM	16300		16290		100	40-110					Y1

LCSD Sample ID: **RE190904-1** Units: **BQ/l** Analysis Date: **9/16/2019 14:24**
Client ID: Run ID: **RE190904-1B** Prep Date: **9/4/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.56 (+/- 0.388)	0.0106	1.72		90.6	67-120		1.19	0.7	2.1	P,Y1,M3
Carr: BARIUM	16300		16290		100	40-110		16300			Y1

MB Sample ID: **RE190904-1** Units: **BQ/l** Analysis Date: **9/16/2019 13:22**
Client ID: Run ID: **RE190904-1B** Prep Date: **9/4/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	0.00048 (+/- 0.0042)	0.0079									U
Carr: BARIUM	16100		16290		98.9	40-110					

The following samples were analyzed in this batch: 1908790-1

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2336449-COFC

COC Number: 15 -

Page 1 of 1

Report To	Contact and company name below will appear on the final report
Company:	Baffinland Iron Mines Corp.
Contact:	Wiliam Bowden and Connor Devereaux
Phone:	647-253-0596 EXT 6016
	Company address below will appear on the final report
Street:	2275 Upper Middle Rd. E., Suite #300
City/Province:	Oakville, ON
Postal Code:	L6H 0C3
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	
Contact:	

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	bimcore@alsglobal.com
Email 2	
Email 3	

Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	ap@baffinland.com
Email 2	commercial@baffinland.com

Confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☐ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
4 day [P4]	☐	1 Business day [E1]	☐
3 day [P3]	☐	Same Day, Weekend or Statutory holiday [E0]	☑
2 day [P2]	☐		

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information	
ALS Account # / Quote #:	23642 /Q42455
Job #:	MS-08 DEL
PO / AFE:	4500057496
LSD:	

Oil and Gas Required Fields (client use)	
AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only): L2336449-AP

ALS Contact: | Sampler: AZ/RH/SS

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	F/P	BIM-MMER-DEL	Number of Containers
	MS-08	26-Aug-19	11:15	Water	E0		6

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human drinking water use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
6			13.9		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released By: Megan LaCarte	Date: August 26 2019	Time: 15:26	Received by: F. Khalili	Date: Apr 26	Time: 16:30	Received by: AP	Date: 28-8-19	Time: 10:00

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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 specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Baffinland Iron Mine's Corporation (Oakville)
ATTN: William Bowden/Connor Devereaux
2275 Upper Middle Rd. E.
Suite #300
Oakville ON L6H 0C3

Date Received: 28-AUG-19
Report Date: 20-SEP-19 10:08 (MT)
Version: FINAL

Client Phone: 647-253-0596

Certificate of Analysis

Lab Work Order #: L2336465

Project P.O. #: 4500057496
Job Reference: MS-08 EFF CHARACTERIZATION - REFERENCE AND EXPOSURE
C of C Numbers:
Legal Site Desc:

Rick Hawthorne
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2336465-1 MS-08-DS Sampled By: JD/EP on 26-AUG-19 @ 10:40 Matrix: WATER							
Physical Tests							
Conductivity	271		3.0	umhos/cm		28-AUG-19	R4774970
Hardness (as CaCO3)	109	HTC	0.50	mg/L		29-AUG-19	
pH	8.20		0.10	pH units		28-AUG-19	R4774970
Total Suspended Solids	3.1		2.0	mg/L	28-AUG-19	29-AUG-19	R4775851
Anions and Nutrients							
Alkalinity, Total (as CaCO3)	91		10	mg/L		28-AUG-19	R4774970
Ammonia, Total (as N)	<0.010		0.010	mg/L		28-AUG-19	R4772608
Chloride (Cl)	14.2		0.50	mg/L		28-AUG-19	R4777541
Fluoride (F)	0.029		0.020	mg/L		28-AUG-19	R4777541
Nitrate (as N)	0.082		0.020	mg/L		28-AUG-19	R4777541
Total Kjeldahl Nitrogen	0.24		0.15	mg/L	28-AUG-19	29-AUG-19	R4776788
Phosphorus, Total	0.0178		0.0030	mg/L	28-AUG-19	29-AUG-19	R4775873
Sulfate (SO4)	18.8		0.30	mg/L		28-AUG-19	R4777541
Organic / Inorganic Carbon							
Dissolved Carbon Filtration Location	LAB					28-AUG-19	R4774329
Dissolved Organic Carbon	1.54		0.50	mg/L	28-AUG-19	29-AUG-19	R4776478
Total Organic Carbon	2.17		0.50	mg/L		29-AUG-19	R4776476
Total Metals							
Aluminum (Al)-Total	0.333		0.0050	mg/L	28-AUG-19	28-AUG-19	R4774089
Antimony (Sb)-Total	<0.00010		0.00010	mg/L	28-AUG-19	28-AUG-19	R4774089
Arsenic (As)-Total	0.00011		0.00010	mg/L	28-AUG-19	28-AUG-19	R4774089
Barium (Ba)-Total	0.0162		0.00010	mg/L	28-AUG-19	28-AUG-19	R4774089
Beryllium (Be)-Total	<0.00010		0.00010	mg/L	28-AUG-19	28-AUG-19	R4774089
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L	28-AUG-19	28-AUG-19	R4774089
Boron (B)-Total	<0.010		0.010	mg/L	28-AUG-19	28-AUG-19	R4774089
Cadmium (Cd)-Total	<0.0000050		0.0000050	mg/L	28-AUG-19	28-AUG-19	R4774089
Calcium (Ca)-Total	21.7		0.050	mg/L	28-AUG-19	28-AUG-19	R4774089
Cesium (Cs)-Total	0.000040		0.000010	mg/L	28-AUG-19	28-AUG-19	R4774089
Chromium (Cr)-Total	0.00064		0.00050	mg/L	28-AUG-19	28-AUG-19	R4774089
Cobalt (Co)-Total	0.00014		0.00010	mg/L	28-AUG-19	28-AUG-19	R4774089
Copper (Cu)-Total	0.0013		0.0010	mg/L	28-AUG-19	28-AUG-19	R4774089
Iron (Fe)-Total	0.274		0.010	mg/L	28-AUG-19	28-AUG-19	R4774089
Lead (Pb)-Total	0.000265		0.000050	mg/L	28-AUG-19	28-AUG-19	R4774089
Lithium (Li)-Total	0.0012		0.0010	mg/L	28-AUG-19	28-AUG-19	R4774089
Magnesium (Mg)-Total	13.2		0.0050	mg/L	28-AUG-19	28-AUG-19	R4774089
Manganese (Mn)-Total	0.00377		0.00050	mg/L	28-AUG-19	28-AUG-19	R4774089
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		29-AUG-19	R4776872
Molybdenum (Mo)-Total	0.000473		0.000050	mg/L	28-AUG-19	28-AUG-19	R4774089
Nickel (Ni)-Total	0.00078		0.00050	mg/L	28-AUG-19	28-AUG-19	R4774089
Phosphorus (P)-Total	<0.050		0.050	mg/L	28-AUG-19	28-AUG-19	R4774089
Potassium (K)-Total	1.58		0.050	mg/L	28-AUG-19	28-AUG-19	R4774089
Rubidium (Rb)-Total	0.00251		0.00020	mg/L	28-AUG-19	28-AUG-19	R4774089

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2336465-1 MS-08-DS Sampled By: JD/EP on 26-AUG-19 @ 10:40 Matrix: WATER							
Total Metals							
Selenium (Se)-Total	<0.000050		0.000050	mg/L	28-AUG-19	28-AUG-19	R4774089
Silicon (Si)-Total	1.59		0.10	mg/L	28-AUG-19	28-AUG-19	R4774089
Silver (Ag)-Total	<0.000050		0.000050	mg/L	28-AUG-19	28-AUG-19	R4774089
Sodium (Na)-Total	5.06		0.050	mg/L	28-AUG-19	28-AUG-19	R4774089
Strontium (Sr)-Total	0.0265		0.0010	mg/L	28-AUG-19	28-AUG-19	R4774089
Sulfur (S)-Total	6.46		0.50	mg/L	28-AUG-19	28-AUG-19	R4774089
Tellurium (Te)-Total	<0.00020		0.00020	mg/L	28-AUG-19	28-AUG-19	R4774089
Thallium (Tl)-Total	<0.000010		0.000010	mg/L	28-AUG-19	28-AUG-19	R4774089
Thorium (Th)-Total	0.00037		0.00010	mg/L	28-AUG-19	28-AUG-19	R4774089
Tin (Sn)-Total	<0.00010		0.00010	mg/L	28-AUG-19	28-AUG-19	R4774089
Titanium (Ti)-Total	0.0163		0.00030	mg/L	28-AUG-19	28-AUG-19	R4774089
Tungsten (W)-Total	<0.00010		0.00010	mg/L	28-AUG-19	28-AUG-19	R4774089
Uranium (U)-Total	0.00608		0.000010	mg/L	28-AUG-19	28-AUG-19	R4774089
Vanadium (V)-Total	0.00073		0.00050	mg/L	28-AUG-19	28-AUG-19	R4774089
Zinc (Zn)-Total	<0.0030		0.0030	mg/L	28-AUG-19	28-AUG-19	R4774089
Zirconium (Zr)-Total	0.00086		0.00020	mg/L	28-AUG-19	28-AUG-19	R4774089
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					29-AUG-19	R4775931
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	29-AUG-19	29-AUG-19	R4776948
Radiological Parameters							
Ra-226	0.0093		0.0093	Bq/L	04-SEP-19	16-SEP-19	R4780785
L2336465-2 MS-08-US Sampled By: JD/EP on 26-AUG-19 @ 10:15 Matrix: WATER							
Physical Tests							
Conductivity	240		3.0	umhos/cm		28-AUG-19	R4774970
Hardness (as CaCO3)	94.8	HTC	0.50	mg/L		29-AUG-19	
pH	8.15		0.10	pH units		28-AUG-19	R4774970
Total Suspended Solids	3.3		2.0	mg/L	28-AUG-19	29-AUG-19	R4775851
Anions and Nutrients							
Alkalinity, Total (as CaCO3)	88		10	mg/L		28-AUG-19	R4774970
Ammonia, Total (as N)	<0.010		0.010	mg/L		28-AUG-19	R4772608
Chloride (Cl)	13.6		0.50	mg/L		28-AUG-19	R4777541
Fluoride (F)	0.031		0.020	mg/L		28-AUG-19	R4777541
Nitrate (as N)	0.176		0.020	mg/L		28-AUG-19	R4777541
Total Kjeldahl Nitrogen	0.23		0.15	mg/L	28-AUG-19	29-AUG-19	R4776788
Phosphorus, Total	0.0096		0.0030	mg/L	28-AUG-19	29-AUG-19	R4775873
Sulfate (SO4)	9.07		0.30	mg/L		28-AUG-19	R4777541
Organic / Inorganic Carbon							
Dissolved Carbon Filtration Location	LAB					28-AUG-19	R4774329
Dissolved Organic Carbon	1.69		0.50	mg/L	28-AUG-19	29-AUG-19	R4776478
Total Organic Carbon	2.10		0.50	mg/L		29-AUG-19	R4776476

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2336465-2 MS-08-US Sampled By: JD/EP on 26-AUG-19 @ 10:15 Matrix: WATER							
Organic / Inorganic Carbon							
Total Metals							
Aluminum (Al)-Total	0.360		0.0050	mg/L	28-AUG-19	28-AUG-19	R4774089
Antimony (Sb)-Total	<0.00010		0.00010	mg/L	28-AUG-19	28-AUG-19	R4774089
Arsenic (As)-Total	0.00011		0.00010	mg/L	28-AUG-19	28-AUG-19	R4774089
Barium (Ba)-Total	0.0160		0.00010	mg/L	28-AUG-19	28-AUG-19	R4774089
Beryllium (Be)-Total	<0.00010		0.00010	mg/L	28-AUG-19	28-AUG-19	R4774089
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L	28-AUG-19	28-AUG-19	R4774089
Boron (B)-Total	<0.010		0.010	mg/L	28-AUG-19	28-AUG-19	R4774089
Cadmium (Cd)-Total	<0.0000050		0.0000050	mg/L	28-AUG-19	28-AUG-19	R4774089
Calcium (Ca)-Total	19.9		0.050	mg/L	28-AUG-19	28-AUG-19	R4774089
Cesium (Cs)-Total	0.000041		0.000010	mg/L	28-AUG-19	28-AUG-19	R4774089
Chromium (Cr)-Total	0.00065		0.00050	mg/L	28-AUG-19	28-AUG-19	R4774089
Cobalt (Co)-Total	0.00014		0.00010	mg/L	28-AUG-19	28-AUG-19	R4774089
Copper (Cu)-Total	0.0014		0.0010	mg/L	28-AUG-19	28-AUG-19	R4774089
Iron (Fe)-Total	0.298		0.010	mg/L	28-AUG-19	28-AUG-19	R4774089
Lead (Pb)-Total	0.000273		0.000050	mg/L	28-AUG-19	28-AUG-19	R4774089
Lithium (Li)-Total	0.0011		0.0010	mg/L	28-AUG-19	28-AUG-19	R4774089
Magnesium (Mg)-Total	11.0		0.0050	mg/L	28-AUG-19	28-AUG-19	R4774089
Manganese (Mn)-Total	0.00405		0.00050	mg/L	28-AUG-19	28-AUG-19	R4774089
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		29-AUG-19	R4776872
Molybdenum (Mo)-Total	0.000497		0.000050	mg/L	28-AUG-19	28-AUG-19	R4774089
Nickel (Ni)-Total	0.00073		0.00050	mg/L	28-AUG-19	28-AUG-19	R4774089
Phosphorus (P)-Total	<0.050		0.050	mg/L	28-AUG-19	28-AUG-19	R4774089
Potassium (K)-Total	1.58		0.050	mg/L	28-AUG-19	28-AUG-19	R4774089
Rubidium (Rb)-Total	0.00257		0.00020	mg/L	28-AUG-19	28-AUG-19	R4774089
Selenium (Se)-Total	<0.000050		0.000050	mg/L	28-AUG-19	28-AUG-19	R4774089
Silicon (Si)-Total	1.67		0.10	mg/L	28-AUG-19	28-AUG-19	R4774089
Silver (Ag)-Total	<0.000050		0.000050	mg/L	28-AUG-19	28-AUG-19	R4774089
Sodium (Na)-Total	5.27		0.050	mg/L	28-AUG-19	28-AUG-19	R4774089
Strontium (Sr)-Total	0.0237		0.0010	mg/L	28-AUG-19	28-AUG-19	R4774089
Sulfur (S)-Total	2.53		0.50	mg/L	28-AUG-19	28-AUG-19	R4774089
Tellurium (Te)-Total	<0.00020		0.00020	mg/L	28-AUG-19	28-AUG-19	R4774089
Thallium (Tl)-Total	<0.000010		0.000010	mg/L	28-AUG-19	28-AUG-19	R4774089
Thorium (Th)-Total	0.00042		0.00010	mg/L	28-AUG-19	28-AUG-19	R4774089
Tin (Sn)-Total	<0.00010		0.00010	mg/L	28-AUG-19	28-AUG-19	R4774089
Titanium (Ti)-Total	0.0182		0.00030	mg/L	28-AUG-19	28-AUG-19	R4774089
Tungsten (W)-Total	<0.00010		0.00010	mg/L	28-AUG-19	28-AUG-19	R4774089
Uranium (U)-Total	0.00624		0.000010	mg/L	28-AUG-19	28-AUG-19	R4774089
Vanadium (V)-Total	0.00076		0.00050	mg/L	28-AUG-19	28-AUG-19	R4774089
Zinc (Zn)-Total	<0.0030		0.0030	mg/L	28-AUG-19	28-AUG-19	R4774089
Zirconium (Zr)-Total	0.00088		0.00020	mg/L	28-AUG-19	28-AUG-19	R4774089

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2336465-2 MS-08-US Sampled By: JD/EP on 26-AUG-19 @ 10:15 Matrix: WATER							
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					29-AUG-19	R4775931
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	29-AUG-19	29-AUG-19	R4776948
Radiological Parameters							
Ra-226	0.0061		0.0047	Bq/L	04-SEP-19	16-SEP-19	R4780785

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

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Thallium (Tl)-Total	B	L2336465-1, -2
Matrix Spike	Aluminum (Al)-Total	MS-B	L2336465-1, -2
Matrix Spike	Barium (Ba)-Total	MS-B	L2336465-1, -2
Matrix Spike	Calcium (Ca)-Total	MS-B	L2336465-1, -2
Matrix Spike	Iron (Fe)-Total	MS-B	L2336465-1, -2
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2336465-1, -2
Matrix Spike	Silicon (Si)-Total	MS-B	L2336465-1, -2
Matrix Spike	Sodium (Na)-Total	MS-B	L2336465-1, -2
Matrix Spike	Strontium (Sr)-Total	MS-B	L2336465-1, -2
Matrix Spike	Sulfur (S)-Total	MS-B	L2336465-1, -2
Matrix Spike	Titanium (Ti)-Total	MS-B	L2336465-1, -2
Matrix Spike	Uranium (U)-Total	MS-B	L2336465-1, -2
Matrix Spike	Nitrate (as N)	MS-B	L2336465-1, -2

Sample Parameter Qualifier key listed:

Qualifier	Description
B	Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.
HTC	Hardness was calculated from Total Ca and/or Mg concentrations and may be biased high (dissolved Ca/Mg results unavailable).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-WT	Water	Alkalinity, Total (as CaCO3)	EPA 310.2

This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.

CL-IC-N-WT	Water	Chloride by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

DOC-WT	Water	Dissolved Organic Carbon	APHA 5310B

Sample is filtered through a 0.45um filter, then injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic carbon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.

EC-SCREEN-WT	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

EC-WT	Water	Conductivity	APHA 2510 B

Water samples can be measured directly by immersing the conductivity cell into the sample.

F-IC-N-WT	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-WT	Water	Hardness	APHA 2340 B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-WT	Water	Dissolved Mercury in Water by CVAAS	EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

HG-T-CVAA-WT	Water	Total Mercury in Water by CVAAS	EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

MET-T-CCMS-WT	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Reference Information

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

NH3-F-WT	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO3-IC-WT	Water	Nitrate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-COL-WT	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is deteremined colourimetrically after persulphate digestion of the sample.

PH-WT	Water	pH	APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011). Holdtime for samples under this regulation is 28 days

RA226-MMER-FC	Water	Ra226 by Alpha Scint, MDC=0.01 Bq/L	EPA 903.1
SO4-IC-N-WT	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TSS-WT	Water	Suspended solids	APHA 2540 D-Gravimetric

A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104–1°C for a minimum of four hours or until a constant weight is achieved.

TKN-WT	Water	Total Kjeldahl Nitrogen	APHA 4500-Norg D

This analysis is carried out using procedures adapted from APHA Method 4500-Norg "Nitrogen (Organic)". Total Kjeldahl Nitrogen is determined by sample digestion at 380 Celsius with analysis using an automated colorimetric method.

TOC-WT	Water	Total Organic Carbon	APHA 5310B

Sample is injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic cabon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.

** 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
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA
FC	ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA

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 weight of sample
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

Workorder: L2336465 Report Date: 20-SEP-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3

Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ALK-WT	**Water**							
Batch R4774970								
WG3145888-4 DUP		**WG3145888-3**						
Alkalinity, Total (as CaCO3)		199	199		mg/L	0.2	20	28-AUG-19
WG3145888-2 LCS								
Alkalinity, Total (as CaCO3)			101.9		%		85-115	28-AUG-19
WG3145888-1 MB								
Alkalinity, Total (as CaCO3)			<10		mg/L		10	28-AUG-19
CL-IC-N-WT	**Water**							
Batch R4777541								
WG3145484-19 DUP		**WG3145484-20**						
Chloride (Cl)		45.8	45.9		mg/L	0.1	20	28-AUG-19
WG3145484-17 LCS								
Chloride (Cl)			101.5		%		90-110	28-AUG-19
WG3145484-16 MB								
Chloride (Cl)			<0.50		mg/L		0.5	28-AUG-19
WG3145484-18 MS		**WG3145484-20**						
Chloride (Cl)			101.4		%		75-125	28-AUG-19
DOC-WT	**Water**							
Batch R4776478								
WG3146409-3 DUP		**L2336465-1**						
Dissolved Organic Carbon		1.54	1.62		mg/L	5.3	20	29-AUG-19
WG3146409-2 LCS								
Dissolved Organic Carbon			96.1		%		80-120	29-AUG-19
WG3146409-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	29-AUG-19
WG3146409-4 MS		**L2336465-1**						
Dissolved Organic Carbon			100.9		%		70-130	29-AUG-19
EC-WT	**Water**							
Batch R4774970								
WG3145888-4 DUP		**WG3145888-3**						
Conductivity		913	910		umhos/cm	0.3	10	28-AUG-19
WG3145888-2 LCS								
Conductivity			108.3		%		90-110	28-AUG-19
WG3145888-1 MB								
Conductivity			<3.0		umhos/cm		3	28-AUG-19
F-IC-N-WT	**Water**							

Quality Control Report

Workorder: L2336465 Report Date: 20-SEP-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3

Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F-IC-N-WT	**Water**							
Batch R4777541								
WG3145484-19 DUP		**WG3145484-20**						
Fluoride (F)		0.050	0.050		mg/L	0.9	20	28-AUG-19
WG3145484-17 LCS								
Fluoride (F)			103.5		%		90-110	28-AUG-19
WG3145484-16 MB								
Fluoride (F)			<0.020		mg/L		0.02	28-AUG-19
WG3145484-18 MS		**WG3145484-20**						
Fluoride (F)			99.0		%		75-125	28-AUG-19
HG-D-CVAA-WT	**Water**							
Batch R4776948								
WG3147153-4 DUP		**WG3147153-3**						
Mercury (Hg)-Dissolved		<0.0000050	<0.000005(	RPD-NA	mg/L	N/A	20	29-AUG-19
WG3147153-2 LCS								
Mercury (Hg)-Dissolved			92.2		%		80-120	29-AUG-19
WG3147153-1 MB								
Mercury (Hg)-Dissolved			<0.000005(		mg/L		0.000005	29-AUG-19
WG3147153-6 MS		**WG3147153-5**						
Mercury (Hg)-Dissolved			98.1		%		70-130	29-AUG-19
HG-T-CVAA-WT	**Water**							
Batch R4776872								
WG3147127-10 DUP		**WG3147127-9**						
Mercury (Hg)-Total		<0.0000050	<0.000005(	RPD-NA	mg/L	N/A	20	29-AUG-19
WG3147127-8 LCS								
Mercury (Hg)-Total			93.1		%		80-120	29-AUG-19
WG3147127-7 MB								
Mercury (Hg)-Total			<0.000005(		mg/L		0.000005	29-AUG-19
WG3147127-12 MS		**WG3147127-11**						
Mercury (Hg)-Total			84.1		%		70-130	29-AUG-19
MET-T-CCMS-WT	**Water**							
Batch R4774089								
WG3146312-4 DUP		**WG3146312-3**						
Aluminum (Al)-Total		0.333	0.353		mg/L	5.8	20	28-AUG-19
Antimony (Sb)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	28-AUG-19
Arsenic (As)-Total		0.00011	<0.00010	RPD-NA	mg/L	N/A	20	28-AUG-19
Barium (Ba)-Total		0.0162	0.0161		mg/L	0.8	20	28-AUG-19
Beryllium (Be)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	28-AUG-19
Bismuth (Bi)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	28-AUG-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4774089								
WG3146312-4 DUP		**WG3146312-3**						
Boron (B)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	28-AUG-19
Cadmium (Cd)-Total		<0.0000050	<0.000005(	RPD-NA	mg/L	N/A	20	28-AUG-19
Calcium (Ca)-Total		21.7	21.8		mg/L	0.6	20	28-AUG-19
Chromium (Cr)-Total		0.00064	0.00064		mg/L	0.4	20	28-AUG-19
Cesium (Cs)-Total		0.000040	0.000042		mg/L	5.2	20	28-AUG-19
Cobalt (Co)-Total		0.00014	0.00014		mg/L	1.9	20	28-AUG-19
Copper (Cu)-Total		0.0013	0.0014		mg/L	1.2	20	28-AUG-19
Iron (Fe)-Total		0.274	0.279		mg/L	1.8	20	28-AUG-19
Lead (Pb)-Total		0.000265	0.000267		mg/L	0.9	20	28-AUG-19
Lithium (Li)-Total		0.0012	0.0012		mg/L	0.8	20	28-AUG-19
Magnesium (Mg)-Total		13.2	13.1		mg/L	0.9	20	28-AUG-19
Manganese (Mn)-Total		0.00377	0.00404		mg/L	7.1	20	28-AUG-19
Molybdenum (Mo)-Total		0.000473	0.000479		mg/L	1.3	20	28-AUG-19
Nickel (Ni)-Total		0.00078	0.00074		mg/L	6.2	20	28-AUG-19
Phosphorus (P)-Total		<0.050	<0.050	RPD-NA	mg/L	N/A	20	28-AUG-19
Potassium (K)-Total		1.58	1.55		mg/L	1.6	20	28-AUG-19
Rubidium (Rb)-Total		0.00251	0.00260		mg/L	3.3	20	28-AUG-19
Selenium (Se)-Total		<0.000050	0.000065	RPD-NA	mg/L	N/A	20	28-AUG-19
Silicon (Si)-Total		1.59	1.60		mg/L	0.5	20	28-AUG-19
Silver (Ag)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	28-AUG-19
Sodium (Na)-Total		5.06	4.96		mg/L	2.0	20	28-AUG-19
Strontium (Sr)-Total		0.0265	0.0268		mg/L	1.1	20	28-AUG-19
Sulfur (S)-Total		6.46	6.46		mg/L	0.1	25	28-AUG-19
Thallium (Tl)-Total		<0.000010	0.000012	RPD-NA	mg/L	N/A	20	28-AUG-19
Tellurium (Te)-Total		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	28-AUG-19
Thorium (Th)-Total		0.00037	0.00039		mg/L	5.1	25	28-AUG-19
Tin (Sn)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	28-AUG-19
Titanium (Ti)-Total		0.0163	0.0168		mg/L	3.2	20	28-AUG-19
Tungsten (W)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	28-AUG-19
Uranium (U)-Total		0.00608	0.00611		mg/L	0.6	20	28-AUG-19
Vanadium (V)-Total		0.00073	0.00072		mg/L	1.1	20	28-AUG-19
Zinc (Zn)-Total		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	28-AUG-19
Zirconium (Zr)-Total		0.00086	0.00093		mg/L			28-AUG-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4774089								
WG3146312-4 DUP		**WG3146312-3**						
Zirconium (Zr)-Total		0.00086	0.00093		mg/L	7.2	20	28-AUG-19
WG3146312-2 LCS								
Aluminum (Al)-Total			100.4		%		80-120	28-AUG-19
Antimony (Sb)-Total			103.4		%		80-120	28-AUG-19
Arsenic (As)-Total			96.9		%		80-120	28-AUG-19
Barium (Ba)-Total			102.7		%		80-120	28-AUG-19
Beryllium (Be)-Total			99.1		%		80-120	28-AUG-19
Bismuth (Bi)-Total			100.9		%		80-120	28-AUG-19
Boron (B)-Total			99.4		%		80-120	28-AUG-19
Cadmium (Cd)-Total			99.8		%		80-120	28-AUG-19
Calcium (Ca)-Total			102.6		%		80-120	28-AUG-19
Chromium (Cr)-Total			96.6		%		80-120	28-AUG-19
Cesium (Cs)-Total			106.0		%		80-120	28-AUG-19
Cobalt (Co)-Total			97.5		%		80-120	28-AUG-19
Copper (Cu)-Total			97.6		%		80-120	28-AUG-19
Iron (Fe)-Total			102.9		%		80-120	28-AUG-19
Lead (Pb)-Total			102.9		%		80-120	28-AUG-19
Lithium (Li)-Total			104.9		%		80-120	28-AUG-19
Magnesium (Mg)-Total			95.1		%		80-120	28-AUG-19
Manganese (Mn)-Total			98.0		%		80-120	28-AUG-19
Molybdenum (Mo)-Total			102.2		%		80-120	28-AUG-19
Nickel (Ni)-Total			96.7		%		80-120	28-AUG-19
Phosphorus (P)-Total			101.6		%		70-130	28-AUG-19
Potassium (K)-Total			101.7		%		80-120	28-AUG-19
Rubidium (Rb)-Total			100.2		%		80-120	28-AUG-19
Selenium (Se)-Total			98.2		%		80-120	28-AUG-19
Silicon (Si)-Total			104.9		%		60-140	28-AUG-19
Silver (Ag)-Total			103.7		%		80-120	28-AUG-19
Sodium (Na)-Total			99.8		%		80-120	28-AUG-19
Strontium (Sr)-Total			102.1		%		80-120	28-AUG-19
Sulfur (S)-Total			101.5		%		80-120	28-AUG-19
Thallium (Tl)-Total			101.6		%		80-120	28-AUG-19
Tellurium (Te)-Total			94.6		%		80-120	28-AUG-19
Thorium (Th)-Total			103.4		%		70-130	28-AUG-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4774089								
WG3146312-2 LCS								
Tin (Sn)-Total			103.5		%		80-120	28-AUG-19
Titanium (Ti)-Total			95.4		%		80-120	28-AUG-19
Tungsten (W)-Total			105.2		%		80-120	28-AUG-19
Uranium (U)-Total			107.5		%		80-120	28-AUG-19
Vanadium (V)-Total			99.7		%		80-120	28-AUG-19
Zinc (Zn)-Total			93.7		%		80-120	28-AUG-19
Zirconium (Zr)-Total			102.4		%		80-120	28-AUG-19
WG3146312-1 MB								
Aluminum (Al)-Total			<0.0050		mg/L		0.005	28-AUG-19
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	28-AUG-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	28-AUG-19
Barium (Ba)-Total			<0.00010		mg/L		0.0001	28-AUG-19
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	28-AUG-19
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	28-AUG-19
Boron (B)-Total			<0.010		mg/L		0.01	28-AUG-19
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	28-AUG-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	28-AUG-19
Chromium (Cr)-Total			<0.00050		mg/L		0.0005	28-AUG-19
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	28-AUG-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	28-AUG-19
Copper (Cu)-Total			<0.0010		mg/L		0.001	28-AUG-19
Iron (Fe)-Total			<0.010		mg/L		0.01	28-AUG-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	28-AUG-19
Lithium (Li)-Total			<0.0010		mg/L		0.001	28-AUG-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	28-AUG-19
Manganese (Mn)-Total			<0.00050		mg/L		0.0005	28-AUG-19
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	28-AUG-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	28-AUG-19
Phosphorus (P)-Total			<0.050		mg/L		0.05	28-AUG-19
Potassium (K)-Total			<0.050		mg/L		0.05	28-AUG-19
Rubidium (Rb)-Total			<0.00020		mg/L		0.0002	28-AUG-19
Selenium (Se)-Total			<0.000050		mg/L		0.00005	28-AUG-19
Silicon (Si)-Total			<0.10		mg/L		0.1	28-AUG-19
Silver (Ag)-Total			<0.000050		mg/L		0.00005	28-AUG-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4774089								
WG3146312-1 MB								
Sodium (Na)-Total			<0.050		mg/L		0.05	28-AUG-19
Strontium (Sr)-Total			<0.0010		mg/L		0.001	28-AUG-19
Sulfur (S)-Total			<0.50		mg/L		0.5	28-AUG-19
Thallium (Tl)-Total			0.000036	B	mg/L		0.00001	28-AUG-19
Tellurium (Te)-Total			<0.00020		mg/L		0.0002	28-AUG-19
Thorium (Th)-Total			<0.00010		mg/L		0.0001	28-AUG-19
Tin (Sn)-Total			<0.00010		mg/L		0.0001	28-AUG-19
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	28-AUG-19
Tungsten (W)-Total			<0.00010		mg/L		0.0001	28-AUG-19
Uranium (U)-Total			<0.000010		mg/L		0.00001	28-AUG-19
Vanadium (V)-Total			<0.00050		mg/L		0.0005	28-AUG-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	28-AUG-19
Zirconium (Zr)-Total			<0.00020		mg/L		0.0002	28-AUG-19
WG3146312-5 MS		**WG3146312-3**						
Aluminum (Al)-Total			N/A	MS-B	%		-	28-AUG-19
Antimony (Sb)-Total			126.6		%		70-130	28-AUG-19
Arsenic (As)-Total			117.5		%		70-130	28-AUG-19
Barium (Ba)-Total			N/A	MS-B	%		-	28-AUG-19
Beryllium (Be)-Total			120.3		%		70-130	28-AUG-19
Bismuth (Bi)-Total			117.2		%		70-130	28-AUG-19
Boron (B)-Total			119.9		%		70-130	28-AUG-19
Cadmium (Cd)-Total			119.0		%		70-130	28-AUG-19
Calcium (Ca)-Total			N/A	MS-B	%		-	28-AUG-19
Chromium (Cr)-Total			117.0		%		70-130	28-AUG-19
Cobalt (Co)-Total			115.6		%		70-130	28-AUG-19
Copper (Cu)-Total			112.4		%		70-130	28-AUG-19
Iron (Fe)-Total			N/A	MS-B	%		-	28-AUG-19
Lead (Pb)-Total			120.3		%		70-130	28-AUG-19
Lithium (Li)-Total			126.7		%		70-130	28-AUG-19
Magnesium (Mg)-Total			N/A	MS-B	%		-	28-AUG-19
Manganese (Mn)-Total			116.8		%		70-130	28-AUG-19
Molybdenum (Mo)-Total			126.5		%		70-130	28-AUG-19
Nickel (Ni)-Total			113.0		%		70-130	28-AUG-19
Phosphorus (P)-Total			121.3		%		70-130	28-AUG-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4774089								
WG3146312-5 MS		**WG3146312-3**						
Potassium (K)-Total			111.9		%		70-130	28-AUG-19
Rubidium (Rb)-Total			118.3		%		70-130	28-AUG-19
Selenium (Se)-Total			119.7		%		70-130	28-AUG-19
Silicon (Si)-Total			N/A	MS-B	%		-	28-AUG-19
Silver (Ag)-Total			125.3		%		70-130	28-AUG-19
Sodium (Na)-Total			N/A	MS-B	%		-	28-AUG-19
Strontium (Sr)-Total			N/A	MS-B	%		-	28-AUG-19
Sulfur (S)-Total			N/A	MS-B	%		-	28-AUG-19
Thallium (Tl)-Total			119.8		%		70-130	28-AUG-19
Tellurium (Te)-Total			112.3		%		70-130	28-AUG-19
Thorium (Th)-Total			124.5		%		70-130	28-AUG-19
Tin (Sn)-Total			123.6		%		70-130	28-AUG-19
Titanium (Ti)-Total			N/A	MS-B	%		-	28-AUG-19
Tungsten (W)-Total			126.7		%		70-130	28-AUG-19
Uranium (U)-Total			N/A	MS-B	%		-	28-AUG-19
Vanadium (V)-Total			120.5		%		70-130	28-AUG-19
Zinc (Zn)-Total			106.3		%		70-130	28-AUG-19
Zirconium (Zr)-Total			126.1		%		70-130	28-AUG-19
NH3-F-WT	**Water**							
Batch R4772608								
WG3145689-20 DUP		**L2336465-2**						
Ammonia, Total (as N)		<0.010	<0.010	RPD-NA	mg/L	N/A	20	28-AUG-19
WG3145689-18 LCS								
Ammonia, Total (as N)			98.2		%		85-115	28-AUG-19
WG3145689-17 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	28-AUG-19
WG3145689-19 MS		**L2336465-2**						
Ammonia, Total (as N)			98.6		%		75-125	28-AUG-19
NO3-IC-WT	**Water**							
Batch R4777541								
WG3145484-19 DUP		**WG3145484-20**						
Nitrate (as N)		5.30	5.31		mg/L	0.1	20	28-AUG-19
WG3145484-17 LCS								
Nitrate (as N)			100.8		%		90-110	28-AUG-19
WG3145484-16 MB								

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO3-IC-WT	**Water**							
Batch R4777541								
WG3145484-16 MB								
Nitrate (as N)			<0.020		mg/L		0.02	28-AUG-19
WG3145484-18 MS		**WG3145484-20**						
Nitrate (as N)			N/A	MS-B	%		-	28-AUG-19
P-T-COL-WT	**Water**							
Batch R4775873								
WG3146321-3 DUP		**L2337811-1**						
Phosphorus, Total		0.0125	0.0110		mg/L	12	20	29-AUG-19
WG3146321-2 LCS								
Phosphorus, Total			97.5		%		80-120	29-AUG-19
WG3146321-1 MB								
Phosphorus, Total			<0.0030		mg/L		0.003	29-AUG-19
WG3146321-4 MS		**L2337811-1**						
Phosphorus, Total			82.9		%		70-130	29-AUG-19
PH-WT	**Water**							
Batch R4774970								
WG3145888-4 DUP		**WG3145888-3**						
pH		8.18	8.18	J	pH units	0.00	0.2	28-AUG-19
WG3145888-2 LCS								
pH			7.00		pH units		6.9-7.1	28-AUG-19
SO4-IC-N-WT	**Water**							
Batch R4777541								
WG3145484-19 DUP		**WG3145484-20**						
Sulfate (SO4)		63.7	63.7		mg/L	0.1	20	28-AUG-19
WG3145484-17 LCS								
Sulfate (SO4)			101.8		%		90-110	28-AUG-19
WG3145484-16 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	28-AUG-19
WG3145484-18 MS		**WG3145484-20**						
Sulfate (SO4)			102.5		%		75-125	28-AUG-19
SOLIDS-TSS-WT	**Water**							
Batch R4775851								
WG3146034-3 DUP		**L2336763-7**						
Total Suspended Solids		3570	3600		mg/L	0.8	20	29-AUG-19
WG3146034-2 LCS								
Total Suspended Solids			98.8		%		85-115	29-AUG-19
WG3146034-1 MB								

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SOLIDS-TSS-WT	**Water**							
Batch R4775851								
WG3146034-1 MB								
Total Suspended Solids			<2.0		mg/L		2	29-AUG-19
TKN-WT	**Water**							
Batch R4776788								
WG3146254-3 DUP		**L2334510-1**						
Total Kjeldahl Nitrogen		0.19	0.21		mg/L	12	20	29-AUG-19
WG3146254-2 LCS								
Total Kjeldahl Nitrogen			101.8		%		75-125	29-AUG-19
WG3146254-1 MB								
Total Kjeldahl Nitrogen			<0.15		mg/L		0.15	29-AUG-19
WG3146254-4 MS		**L2334510-1**						
Total Kjeldahl Nitrogen			90.4		%		70-130	29-AUG-19
TOC-WT	**Water**							
Batch R4776476								
WG3146743-3 DUP		**L2336465-1**						
Total Organic Carbon		2.17	2.17		mg/L	0.0	20	29-AUG-19
WG3146743-2 LCS								
Total Organic Carbon			96.9		%		80-120	29-AUG-19
WG3146743-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	29-AUG-19
WG3146743-4 MS		**L2336465-1**						
Total Organic Carbon			97.9		%		70-130	29-AUG-19

Quality Control Report

Workorder: L2336465 Report Date: 20-SEP-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

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

Sample Parameter Qualifier Definitions:

Qualifier	Description
B	Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

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.

Tuesday, September 17, 2019

Rick Hawthorne
ALS Environmental
60 Northland Rd, Unit 1
Waterloo Canada, ON N2V 2B8

Re: ALS Workorder: 1908789
Project Name:
Project Number: L2336465

Dear Mr. Hawthorne:

Two water samples were received from ALS Environmental, on 8/30/2019. The samples were scheduled for the following analysis:

Radium-226

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,

ALS Environmental
Katie M. OBrien
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
AIHA	214884
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280

1908789

Radium-226:
The samples were prepared and analyzed according to the current revision of SOP 783.

All acceptance criteria were met.

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1908789
Client Name: ALS Environmental
Client Project Name:
Client Project Number: L2336465
Client PO Number: L2336465

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
L2336465-1	1908789-1		WATER	26-Aug-19	
L2336465-2	1908789-2		WATER	26-Aug-19	

ALS Environmental

L2336465

WATERLOO

1908789

Subcontract Request Form

Subcontract To:

ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
225 COMMERCE DRIVE
FORT COLLINS,CO 80524

NOTES: Please reference on final report and invoice: PO# *L2336465*
ALS requires QC data to be provided with your final results.

Please see enclosed 2 sample(s) in 2 Container(s)

	SAMPLE NUMBER	ANALYTICAL REQUIRED	DATE SAMPLED / DUE DATE	Priority Flag
1	**L2336465-1 MS-08-DS**		8/ 26/ 2019	**E**
		Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	9/16/2019	
2	**L2336465-2 MS-08-US**		8/ 26/ 2019	**E**
		Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	9/16/2019	

Subcontract Info Contact: Mary-Lynn Pike (519) 886-6910
Analysis and reporting info contact: Rick Hawthorne
60 NORTHLAND ROAD, UNIT 1
WATERLOO,ON N2V 2B8
Phone: (519) 886-6910 Email: Rick.Hawthorne@alsglobal.com

Please email confirmation of receipt to: Rick.Hawthorne@alsglobal.com

Shipped By: _____ Date Shipped: _____
Received By: Emily Lyons Date Received: 08·30·19 1520
Verified By: _____ Date Verified: _____
Temperature: _____

Sample Integrity Issues: _____

ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: ALS-Waterloo Workorder No: 1908789

Project Manager: KMO Initials: EM Date: 08-31-19

1.	Are airbills / shipping documents present and/or removable?	DROP OFF	(YES)	NO
2.	Are custody seals on **shipping** containers intact?	NONE	(YES)	NO *
3.	Are custody seals on **sample** containers intact?	(NONE)	YES	NO *
4.	Is there a COC (chain-of-custody) present?		(YES)	NO *
5.	Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)		(YES)	NO *
6.	Are short-hold samples present?		YES	(NO)
7.	Are all samples within holding times for the requested analyses?		(YES)	NO *
8.	Were all sample containers received intact? (not broken or leaking)		(YES)	NO *
9.	Is there sufficient sample for the requested analyses?		(YES)	NO *
10.	Are all samples in the proper containers for the requested analyses?		(YES)	NO *
11.	Are all aqueous samples preserved correctly, if required? (excluding volatiles)	N/A	(YES)	NO *
12.	Are all aqueous non-preserved samples pH 4-9?	(N/A)	YES	NO *
13.	Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm (1/4 inch) diameter? (i.e. size of green pea)	(N/A)	YES	NO
14.	Were the samples shipped on ice?		(YES)	NO
15.	Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: #1 (#3) #4	(RAD ONLY)	YES	NO

Cooler #:	1							
Temperature (°C):	22.8							
No. of custody seals on cooler:	1							
DOT Survey/ Acceptance Information — External µR/hr reading:	14							
Background µR/hr reading:	13							

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? **YES / NO / NA** (If no, see Form 008.)

*** Please provide details here for NO responses to gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.**

All client bottle ID's vs ALS lab ID's double-checked by: EM

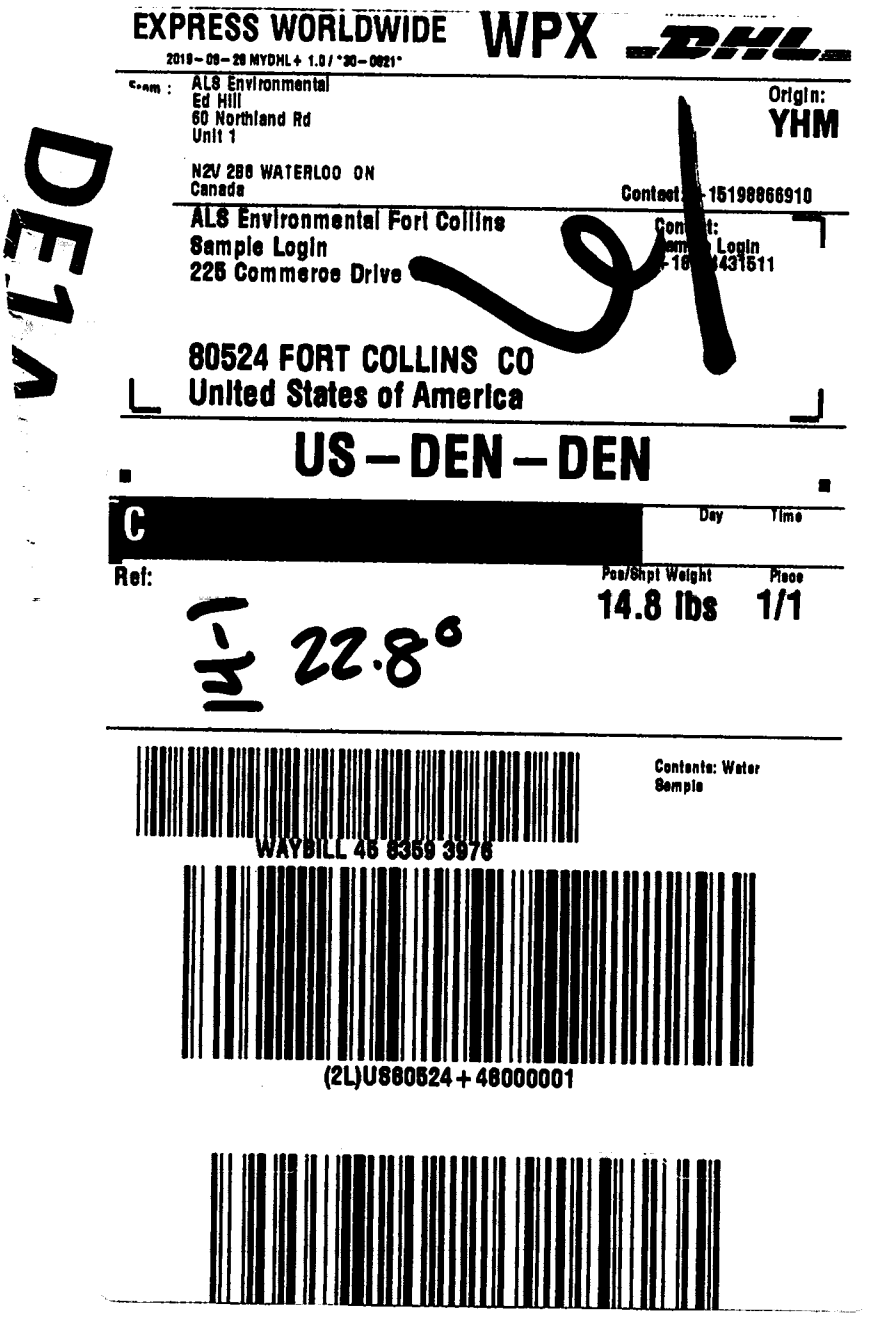
If applicable, was the client contacted? **YES / NO / NA** Contact: _____ Date/Time: _____

Project Manager Signature / Date: 9/3/19

Form 201r27.xls
(02/11/2019)

*IR Gun #1, VWR SN 170560549
*IR Gun #3, VWR SN 170647571
*IR Gun #4, Oakton, SN 2372220101-0002

1408789


EXPRESS WORLDWIDE
WPX
DHL
2019-09-29 MYDHL+ 1.0/*30-0021*
From :
ALS Environmental
Ed Hill
60 Northland Rd
Unit 1
N2V 2B8 WATERLOO ON
Canada
Origin:
YHM
Contact: 15198866910
ALS Environmental Fort Collins
Sample Login
225 Commerce Drive
Contact:
Sample Login
431511
80524 FORT COLLINS CO
United States of America
US-DEN-DEN
C
Day
Time
Ref:
Pcs/Shpt Weight
14.8 lbs
Piece
1/1
22.8°
Contents: Water Sample
WAYBILL 45 8359 3976
(2L)US80524+46000001

Client:	ALS Environmental	**Date:**	*17-Sep-19*
Project:	L2336465	**Work Order:**	1908789
Sample ID:	L2336465-1	**Lab ID:**	1908789-1
Legal Location:		**Matrix:**	WATER
Collection Date:	8/26/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **9/4/2019**		PrepBy: **TRW**
Ra-226	0.0093 (+/- 0.0070)	U	0.0093	BQ/l	NA	9/16/2019 13:53
Carr: BARIUM	*84.4*		*40-110*	*%REC*	DL = NA	9/16/2019 13:53

Client:	ALS Environmental	**Date:**	*17-Sep-19*
Project:	L2336465	**Work Order:**	1908789
Sample ID:	L2336465-2	**Lab ID:**	1908789-2
Legal Location:		**Matrix:**	WATER
Collection Date:	8/26/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1			**SOP 783**		Prep Date: **9/4/2019**	PrepBy: **TRW**
Ra-226	**0.0061 (+/- 0.0042)**		**0.0047**	**BQ/l**	NA	9/16/2019 14:24
Carr: BARIUM	*96.1*		*40-110*	*%REC*	DL = NA	9/16/2019 14:24

Client:	ALS Environmental	**Date:**	*17-Sep-19*
Project:	L2336465	**Work Order:**	1908789
Sample ID:	L2336465-2	**Lab ID:**	1908789-2
Legal Location:		**Matrix:**	WATER
Collection Date:	8/26/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed

Explanation of Qualifiers

Radiochemistry:

- "Report Limit" is the MDC

U or ND - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

Y2 - Chemical Yield outside default limits.

W - DER is greater than Warning Limit of 1.42

* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.

- Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.

G - Sample density differs by more than 15% of LCS density.

D - DER is greater than Control Limit

M - Requested MDC not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS, Matrix Spike Recovery within control limits.

N - Matrix Spike Recovery outside control limits

NC - Not Calculated for duplicate results less than 5 times MDC

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

Inorganics:

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).

U or ND - Indicates that the compound was analyzed for but not detected.

E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.

M - Duplicate injection precision was not met.

N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.

Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.

* - Duplicate analysis (relative percent difference) not within control limits.

S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

Organics:

U or ND - Indicates that the compound was analyzed for but not detected.

B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.

E - Analyte concentration exceeds the upper level of the calibration range.

J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).

A - A tentatively identified compound is a suspected aldol-condensation product.

X - The analyte was diluted below an accurate quantitation level.

* - The spike recovery is equal to or outside the control criteria used.

+ - The relative percent difference (RPD) equals or exceeds the control criteria.

G - A pattern resembling gasoline was detected in this sample.

D - A pattern resembling diesel was detected in this sample.

M - A pattern resembling motor oil was detected in this sample.

C - A pattern resembling crude oil was detected in this sample.

4 - A pattern resembling JP-4 was detected in this sample.

5 - A pattern resembling JP-5 was detected in this sample.

H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.

L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.

Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
- gasoline
- JP-8
- diesel
- mineral spirits
- motor oil
- Stoddard solvent
- bunker C

Batch ID: **RE190904-1-2** Instrument ID **Alpha Scin** Method: **Radium-226 by Radon Emanation**

LCS Sample ID: **RE190904-1** Units: **BQ/l** Analysis Date: **9/16/2019 14:24**
Client ID: Run ID: **RE190904-1B** Prep Date: **9/4/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.19 (+/- 0.301)	0.0137	1.72		69.2	67-120					P,Y1,M3
Carr: BARIUM	16300		16290		100	40-110					Y1

LCSD Sample ID: **RE190904-1** Units: **BQ/l** Analysis Date: **9/16/2019 14:24**
Client ID: Run ID: **RE190904-1B** Prep Date: **9/4/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.56 (+/- 0.388)	0.0106	1.72		90.6	67-120		1.19	0.7	2.1	P,Y1,M3
Carr: BARIUM	16300		16290		100	40-110		16300			Y1

MB Sample ID: **RE190904-1** Units: **BQ/l** Analysis Date: **9/16/2019 13:22**
Client ID: Run ID: **RE190904-1B** Prep Date: **9/4/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	0.00048 (+/- 0.0042)	0.0079									U
Carr: BARIUM	16100		16290		98.9	40-110					

The following samples were analyzed in this batch: 1908789-1 1908789-2

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

L2336465-COFC

COC Number: 15 -

Page 1 of 1

Report To	Contact and company name below will appear on the final report
Company:	Baffinland Iron Mines Corp.
Contact:	Wiliam Bowden and Connor Devereaux
Phone:	647-253-0596 EXT 6016
	Company address below will appear on the final report
Street:	2275 Upper Middle Rd. E., Suite #300
City/Province:	Oakville, ON
Postal Code:	L6H 0C3
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	
Contact:	

Report Format

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)

Quality Control (QC) Report with Report ☑ YES ☐ NO

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: bimcore@alsglobal.com

Email 2: bimww@alsglobal.com

Email 3:

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: ap@baffinland.com

Email 2: commercial@baffinland.com

Project Information

ALS Account # / Quote #:	23642 /Q42455
Job #:	MS-08 Eff Characterization - Reference and Exposure
PO / AFE:	4500057496
LSD:	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only): L2336465 AP

ALS Contact:

Sampler: JD/EP

Regular [R] ☐ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4] ☐ | 3 day [P3] ☐ | 2 day [P2] ☐

EMERGENCY: 1 Business day [E1] ☐ | Same Day, Weekend or Statutory holiday [E0] ☑

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	F/P	BIM-MMER-EFF	Number of Containers
	MS-08-DS	26-Aug-19	10:40	Water	E0		7
	MS-08-US	26-Aug-19	10:15	Water	E0		7

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human drinking water use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			13.9		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Megan LaCarte	Release Date: August 26 2019	Time: 14:07	Received by:	Date:	Time:	Received by: AP	Date: 28-8-19	Time: 10:00

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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 specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Baffinland Iron Mine's Corporation (Oakville)
ATTN: William Bowden/Connor Devereaux
2275 Upper Middle Rd. E.
Suite #300
Oakville ON L6H 0C3

Date Received: 03-SEP-19
Report Date: 24-SEP-19 11:40 (MT)
Version: FINAL

Client Phone: 647-253-0596

Certificate of Analysis

Lab Work Order #: L2339839

Project P.O. #: 4500057496
Job Reference: MS-08 WT TOX
C of C Numbers:
Legal Site Desc:

Rick Hawthorne
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2339839-1 MS-08 Sampled By: KB/CP on 02-SEP-19 @ 14:25 Matrix: WATER							
Physical Tests							
Conductivity	3180		3.0	umhos/cm		04-SEP-19	R4782545
Hardness (as CaCO3)	2350		1.3	mg/L		03-SEP-19	
pH	8.47		0.10	pH units		03-SEP-19	R4781669
Total Suspended Solids	10.0		2.0	mg/L		03-SEP-19	R4781869
Total Dissolved Solids	3190		20	mg/L		03-SEP-19	R4782348
Turbidity	9.32		0.10	NTU		02-SEP-19	R4782363
Anions and Nutrients							
Acidity (as CaCO3)	5.0		5.0	mg/L		05-SEP-19	R4784118
Alkalinity, Total (as CaCO3)	63		10	mg/L		04-SEP-19	R4782545
Ammonia, Total (as N)	1.43	DLHC	0.10	mg/L		03-SEP-19	R4781881
Chloride (Cl)	11	DLDS	10	mg/L		03-SEP-19	R4782656
Fluoride (F)	<0.40	DLDS	0.40	mg/L		03-SEP-19	R4782656
Nitrate (as N)	10.4	DLDS	0.40	mg/L		03-SEP-19	R4782656
Total Kjeldahl Nitrogen	1.31		0.15	mg/L	03-SEP-19	04-SEP-19	R4782526
Phosphorus, Total	0.0036		0.0030	mg/L	03-SEP-19	04-SEP-19	R4782483
Sulfate (SO4)	2490	DLDS	6.0	mg/L		03-SEP-19	R4782656
Cyanides							
Cyanide, Total	<0.0020	SP	0.0020	mg/L		04-SEP-19	R4783059
Organic / Inorganic Carbon							
Dissolved Carbon Filtration Location	LAB					03-SEP-19	R4782235
Dissolved Organic Carbon	2.90		0.50	mg/L	03-SEP-19	04-SEP-19	R4782677
Total Organic Carbon	3.51		0.50	mg/L		04-SEP-19	R4782674
Total Metals							
Aluminum (Al)-Total	0.092	DLHC	0.050	mg/L	03-SEP-19	03-SEP-19	R4782041
Antimony (Sb)-Total	<0.0010	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782041
Arsenic (As)-Total	<0.0010	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782041
Barium (Ba)-Total	0.0150	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782041
Beryllium (Be)-Total	<0.0010	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782041
Bismuth (Bi)-Total	<0.00050	DLHC	0.00050	mg/L	03-SEP-19	03-SEP-19	R4782041
Boron (B)-Total	<0.10	DLHC	0.10	mg/L	03-SEP-19	03-SEP-19	R4782041
Cadmium (Cd)-Total	<0.000050	DLHC	0.000050	mg/L	03-SEP-19	03-SEP-19	R4782041
Calcium (Ca)-Total	199	DLHC	0.50	mg/L	03-SEP-19	03-SEP-19	R4782041
Cesium (Cs)-Total	<0.00010	DLHC	0.00010	mg/L	03-SEP-19	03-SEP-19	R4782041
Chromium (Cr)-Total	<0.0050	DLHC	0.0050	mg/L	03-SEP-19	03-SEP-19	R4782041
Cobalt (Co)-Total	0.0366	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782041
Copper (Cu)-Total	<0.010	DLHC	0.010	mg/L	03-SEP-19	03-SEP-19	R4782041
Iron (Fe)-Total	0.96	DLHC	0.10	mg/L	03-SEP-19	03-SEP-19	R4782041
Lead (Pb)-Total	<0.00050	DLHC	0.00050	mg/L	03-SEP-19	03-SEP-19	R4782041
Lithium (Li)-Total	0.026	DLHC	0.010	mg/L	03-SEP-19	03-SEP-19	R4782041
Magnesium (Mg)-Total	462	DLHC	0.050	mg/L	03-SEP-19	03-SEP-19	R4782041
Manganese (Mn)-Total	9.41	DLHC	0.0050	mg/L	03-SEP-19	03-SEP-19	R4782041
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		04-SEP-19	R4782727

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2339839-1 MS-08 Sampled By: KB/CP on 02-SEP-19 @ 14:25 Matrix: WATER							
Total Metals							
Molybdenum (Mo)-Total	0.00082	DLHC	0.00050	mg/L	03-SEP-19	03-SEP-19	R4782041
Nickel (Ni)-Total	0.0442	DLHC	0.0050	mg/L	03-SEP-19	03-SEP-19	R4782041
Phosphorus (P)-Total	<0.50	DLHC	0.50	mg/L	03-SEP-19	03-SEP-19	R4782041
Potassium (K)-Total	7.38	DLHC	0.50	mg/L	03-SEP-19	03-SEP-19	R4782041
Rubidium (Rb)-Total	0.0078	DLHC	0.0020	mg/L	03-SEP-19	03-SEP-19	R4782041
Selenium (Se)-Total	0.00525	DLHC	0.00050	mg/L	03-SEP-19	03-SEP-19	R4782041
Silicon (Si)-Total	1.1	DLHC	1.0	mg/L	03-SEP-19	03-SEP-19	R4782041
Silver (Ag)-Total	<0.00050	DLHC	0.00050	mg/L	03-SEP-19	03-SEP-19	R4782041
Sodium (Na)-Total	5.64	DLHC	0.50	mg/L	03-SEP-19	03-SEP-19	R4782041
Strontium (Sr)-Total	0.337	DLHC	0.010	mg/L	03-SEP-19	03-SEP-19	R4782041
Sulfur (S)-Total	781	DLHC	5.0	mg/L	03-SEP-19	03-SEP-19	R4782041
Tellurium (Te)-Total	<0.0020	DLHC	0.0020	mg/L	03-SEP-19	03-SEP-19	R4782041
Thallium (Tl)-Total	<0.00010	DLHC	0.00010	mg/L	03-SEP-19	03-SEP-19	R4782041
Thorium (Th)-Total	<0.0010	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782041
Tin (Sn)-Total	<0.0010	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782041
Titanium (Ti)-Total	0.0060	DLHC	0.0030	mg/L	03-SEP-19	03-SEP-19	R4782041
Tungsten (W)-Total	<0.0010	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782041
Uranium (U)-Total	0.00397	DLHC	0.00010	mg/L	03-SEP-19	03-SEP-19	R4782041
Vanadium (V)-Total	<0.0050	DLHC	0.0050	mg/L	03-SEP-19	03-SEP-19	R4782041
Zinc (Zn)-Total	<0.030	DLHC	0.030	mg/L	03-SEP-19	03-SEP-19	R4782041
Zirconium (Zr)-Total	<0.0020	DLHC	0.0020	mg/L	03-SEP-19	03-SEP-19	R4782041
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					03-SEP-19	R4781089
Dissolved Metals Filtration Location	FIELD					03-SEP-19	R4781204
Aluminum (Al)-Dissolved	<0.050	DLHC	0.050	mg/L	03-SEP-19	03-SEP-19	R4782250
Antimony (Sb)-Dissolved	<0.0010	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782250
Arsenic (As)-Dissolved	<0.0010	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782250
Barium (Ba)-Dissolved	0.0151	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782250
Beryllium (Be)-Dissolved	<0.0010	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782250
Bismuth (Bi)-Dissolved	<0.00050	DLHC	0.00050	mg/L	03-SEP-19	03-SEP-19	R4782250
Boron (B)-Dissolved	<0.10	DLHC	0.10	mg/L	03-SEP-19	03-SEP-19	R4782250
Cadmium (Cd)-Dissolved	<0.000050	DLHC	0.000050	mg/L	03-SEP-19	03-SEP-19	R4782250
Calcium (Ca)-Dissolved	201	DLHC	0.50	mg/L	03-SEP-19	03-SEP-19	R4782250
Cesium (Cs)-Dissolved	<0.00010	DLHC	0.00010	mg/L	03-SEP-19	03-SEP-19	R4782250
Chromium (Cr)-Dissolved	<0.0050	DLHC	0.0050	mg/L	03-SEP-19	03-SEP-19	R4782250
Cobalt (Co)-Dissolved	0.0328	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782250
Copper (Cu)-Dissolved	0.0036	DLHC	0.0020	mg/L	03-SEP-19	03-SEP-19	R4782250
Iron (Fe)-Dissolved	<0.10	DLHC	0.10	mg/L	03-SEP-19	03-SEP-19	R4782250
Lead (Pb)-Dissolved	<0.00050	DLHC	0.00050	mg/L	03-SEP-19	03-SEP-19	R4782250
Lithium (Li)-Dissolved	0.024	DLHC	0.010	mg/L	03-SEP-19	03-SEP-19	R4782250
Magnesium (Mg)-Dissolved	449	DLHC	0.050	mg/L	03-SEP-19	03-SEP-19	R4782250

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2339839-1 MS-08 Sampled By: KB/CP on 02-SEP-19 @ 14:25 Matrix: WATER							
Dissolved Metals							
Manganese (Mn)-Dissolved	8.84	DLHC	0.0050	mg/L	03-SEP-19	03-SEP-19	R4782250
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	03-SEP-19	04-SEP-19	R4782733
Molybdenum (Mo)-Dissolved	0.00082	DLHC	0.00050	mg/L	03-SEP-19	03-SEP-19	R4782250
Nickel (Ni)-Dissolved	0.0404	DLHC	0.0050	mg/L	03-SEP-19	03-SEP-19	R4782250
Phosphorus (P)-Dissolved	<0.50	DLHC	0.50	mg/L	03-SEP-19	03-SEP-19	R4782250
Potassium (K)-Dissolved	7.44	DLHC	0.50	mg/L	03-SEP-19	03-SEP-19	R4782250
Rubidium (Rb)-Dissolved	0.0074	DLHC	0.0020	mg/L	03-SEP-19	03-SEP-19	R4782250
Selenium (Se)-Dissolved	0.00467	DLHC	0.00050	mg/L	03-SEP-19	03-SEP-19	R4782250
Silicon (Si)-Dissolved	0.92	DLHC	0.50	mg/L	03-SEP-19	03-SEP-19	R4782250
Silver (Ag)-Dissolved	<0.00050	DLHC	0.00050	mg/L	03-SEP-19	03-SEP-19	R4782250
Sodium (Na)-Dissolved	5.61	DLHC	0.50	mg/L	03-SEP-19	03-SEP-19	R4782250
Strontium (Sr)-Dissolved	0.333	DLHC	0.010	mg/L	03-SEP-19	03-SEP-19	R4782250
Sulfur (S)-Dissolved	769	DLHC	5.0	mg/L	03-SEP-19	03-SEP-19	R4782250
Tellurium (Te)-Dissolved	<0.0020	DLHC	0.0020	mg/L	03-SEP-19	03-SEP-19	R4782250
Thallium (Tl)-Dissolved	<0.00010	DLHC	0.00010	mg/L	03-SEP-19	03-SEP-19	R4782250
Thorium (Th)-Dissolved	<0.0010	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782250
Tin (Sn)-Dissolved	<0.0010	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782250
Titanium (Ti)-Dissolved	<0.0030	DLHC	0.0030	mg/L	03-SEP-19	03-SEP-19	R4782250
Tungsten (W)-Dissolved	<0.0010	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782250
Uranium (U)-Dissolved	0.00381	DLHC	0.00010	mg/L	03-SEP-19	03-SEP-19	R4782250
Vanadium (V)-Dissolved	<0.0050	DLHC	0.0050	mg/L	03-SEP-19	03-SEP-19	R4782250
Zinc (Zn)-Dissolved	<0.010	DLHC	0.010	mg/L	03-SEP-19	03-SEP-19	R4782250
Zirconium (Zr)-Dissolved	<0.0020	DLHC	0.0020	mg/L	03-SEP-19	03-SEP-19	R4782250
Radiological Parameters							
Ra-226	0.020		0.0075	Bq/L	09-SEP-19	19-SEP-19	R4780785

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

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Chloride (Cl)	MS-B	L2339839-1
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2339839-1
Matrix Spike	Boron (B)-Dissolved	MS-B	L2339839-1
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2339839-1
Matrix Spike	Cobalt (Co)-Dissolved	MS-B	L2339839-1
Matrix Spike	Lithium (Li)-Dissolved	MS-B	L2339839-1
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2339839-1
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L2339839-1
Matrix Spike	Nickel (Ni)-Dissolved	MS-B	L2339839-1
Matrix Spike	Potassium (K)-Dissolved	MS-B	L2339839-1
Matrix Spike	Rubidium (Rb)-Dissolved	MS-B	L2339839-1
Matrix Spike	Silicon (Si)-Dissolved	MS-B	L2339839-1
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2339839-1
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2339839-1
Matrix Spike	Sulfur (S)-Dissolved	MS-B	L2339839-1
Matrix Spike	Aluminum (Al)-Total	MS-B	L2339839-1
Matrix Spike	Barium (Ba)-Total	MS-B	L2339839-1
Matrix Spike	Boron (B)-Total	MS-B	L2339839-1
Matrix Spike	Calcium (Ca)-Total	MS-B	L2339839-1
Matrix Spike	Copper (Cu)-Total	MS-B	L2339839-1
Matrix Spike	Iron (Fe)-Total	MS-B	L2339839-1
Matrix Spike	Lithium (Li)-Total	MS-B	L2339839-1
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2339839-1
Matrix Spike	Manganese (Mn)-Total	MS-B	L2339839-1
Matrix Spike	Molybdenum (Mo)-Total	MS-B	L2339839-1
Matrix Spike	Potassium (K)-Total	MS-B	L2339839-1
Matrix Spike	Rubidium (Rb)-Total	MS-B	L2339839-1
Matrix Spike	Silicon (Si)-Total	MS-B	L2339839-1
Matrix Spike	Sodium (Na)-Total	MS-B	L2339839-1
Matrix Spike	Strontium (Sr)-Total	MS-B	L2339839-1
Matrix Spike	Sulfur (S)-Total	MS-B	L2339839-1
Matrix Spike	Titanium (Ti)-Total	MS-B	L2339839-1
Matrix Spike	Uranium (U)-Total	MS-B	L2339839-1
Matrix Spike	Zinc (Zn)-Total	MS-B	L2339839-1
Matrix Spike	Phosphorus, Total	MS-B	L2339839-1

Sample Parameter Qualifier key listed:

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
SP	Sample was Preserved at the laboratory

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACY-TITR-TB	Water	Acidity	APHA 2310 B modified

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

ALK-WT	Water	Alkalinity, Total (as CaCO3)	EPA 310.2

This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.

CL-IC-N-WT	Water	Chloride by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

Reference Information

CN-TOT-WT	Water	Cyanide, Total	ISO 14403-2

Total cyanide is determined by the combination of UV digestion and distillation. Cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

When using this method, high levels of thiocyanate in samples can cause false positives at ~1-2% of the thiocyanate concentration. For samples with detectable cyanide analyzed by this method, ALS recommends analysis for thiocyanate to check for this potential interference

DOC-WT	Water	Dissolved Organic Carbon	APHA 5310B

Sample is filtered through a 0.45um filter, then injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic carbon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.

EC-SCREEN-WT	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

EC-WT	Water	Conductivity	APHA 2510 B

Water samples can be measured directly by immersing the conductivity cell into the sample.

F-IC-N-WT	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-WT	Water	Hardness	APHA 2340 B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-WT	Water	Dissolved Mercury in Water by CVAAS	EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

HG-T-CVAA-WT	Water	Total Mercury in Water by CVAAS	EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

MET-D-CCMS-WT	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

MET-T-CCMS-WT	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

NH3-F-WT	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO3-IC-WT	Water	Nitrate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-COL-WT	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is deteremined colourimetrically after persulphate digestion of the sample.

PH-BF	Water	pH	APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

RA226-MMER-FC	Water	Ra226 by Alpha Scint, MDC=0.01 Bq/L	EPA 903.1

Reference Information

SO4-IC-N-WT	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-BF Water Total Dissolved Solids APHA 2540C

A well-mixed sample is filtered though glass fibres filter. A known volume of the filtrate is evaporated and dried at 180 +/- 2C for 1hr.

SOLIDS-TSS-BF Water Suspended solids APHA 2540 D-Gravimetric

A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104 +/- 1C for a minimum of four hours or until a constant weight is achieved.

TKN-WT Water Total Kjeldahl Nitrogen APHA 4500-Norg D

This analysis is carried out using procedures adapted from APHA Method 4500-Norg "Nitrogen (Organic)". Total Kjeldahl Nitrogen is determined by sample digestion at 380 Celsius with analysis using an automated colorimetric method.

TOC-WT Water Total Organic Carbon APHA 5310B

Sample is injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic cabon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.

TURBIDITY-BF Water Turbidity APHA 2130 B

Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.

** 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
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA
FC	ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
TB	ALS ENVIRONMENTAL - THUNDER BAY, ONTARIO, CANADA
BF	ALS ENVIRONMENTAL - BAFFIN ISLAND, NUNAVUT, 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 weight of sample
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

Workorder: L2339839 Report Date: 24-SEP-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACY-TITR-TB	**Water**							
Batch R4784118								
WG3152901-3 DUP		**L2339862-1**						
Acidity (as CaCO3)		4.1	3.7		mg/L	10	20	05-SEP-19
WG3152901-2 LCS								
Acidity (as CaCO3)			94.6		%		85-115	05-SEP-19
WG3152901-1 MB								
Acidity (as CaCO3)			<2.0		mg/L		2	05-SEP-19
ALK-WT	**Water**							
Batch R4782545								
WG3151110-4 DUP		**WG3151110-3**						
Alkalinity, Total (as CaCO3)		150	150		mg/L	0.3	20	04-SEP-19
WG3151110-2 LCS								
Alkalinity, Total (as CaCO3)			103.0		%		85-115	04-SEP-19
WG3151110-1 MB								
Alkalinity, Total (as CaCO3)			<10		mg/L		10	04-SEP-19
CL-IC-N-WT	**Water**							
Batch R4782656								
WG3150765-10 DUP		**WG3150765-8**						
Chloride (Cl)		212	211		mg/L	0.4	20	03-SEP-19
WG3150765-7 LCS								
Chloride (Cl)			100.8		%		90-110	03-SEP-19
WG3150765-6 MB								
Chloride (Cl)			<0.50		mg/L		0.5	03-SEP-19
WG3150765-9 MS		**WG3150765-8**						
Chloride (Cl)			N/A	MS-B	%		-	03-SEP-19
CN-TOT-WT	**Water**							
Batch R4783059								
WG3151281-3 DUP		**L2339844-2**						
Cyanide, Total		<2.0	<2.0	RPD-NA	mg/L	N/A	20	04-SEP-19
WG3151281-2 LCS								
Cyanide, Total			86.3		%		80-120	04-SEP-19
WG3151281-1 MB								
Cyanide, Total			<0.0020		mg/L		0.002	04-SEP-19
WG3151281-4 MS		**L2339844-2**						
Cyanide, Total			77		%		70-130	04-SEP-19
DOC-WT	**Water**							

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
DOC-WT	**Water**							
Batch R4782677								
WG3150890-3 DUP		**L2339830-1**						
Dissolved Organic Carbon		2.69	2.84		mg/L	5.7	20	04-SEP-19
WG3150890-2 LCS								
Dissolved Organic Carbon			98.0		%		80-120	04-SEP-19
WG3150890-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	04-SEP-19
WG3150890-4 MS		**L2339830-1**						
Dissolved Organic Carbon			99.8		%		70-130	04-SEP-19
EC-WT	**Water**							
Batch R4782545								
WG3151110-4 DUP		**WG3151110-3**						
Conductivity		1280	1270		umhos/cm	0.5	10	04-SEP-19
WG3151110-2 LCS								
Conductivity			100.8		%		90-110	04-SEP-19
WG3151110-1 MB								
Conductivity			<3.0		umhos/cm		3	04-SEP-19
F-IC-N-WT	**Water**							
Batch R4782656								
WG3150765-10 DUP		**WG3150765-8**						
Fluoride (F)		0.132	0.133		mg/L	1.1	20	03-SEP-19
WG3150765-7 LCS								
Fluoride (F)			101.2		%		90-110	03-SEP-19
WG3150765-6 MB								
Fluoride (F)			<0.020		mg/L		0.02	03-SEP-19
WG3150765-9 MS		**WG3150765-8**						
Fluoride (F)			100.0		%		75-125	03-SEP-19
HG-D-CVAA-WT	**Water**							
Batch R4782733								
WG3150261-4 DUP		**WG3150261-3**						
Mercury (Hg)-Dissolved		<0.000050	0.0000360		mg/L	18	20	04-SEP-19
WG3150261-2 LCS								
Mercury (Hg)-Dissolved			98.2		%		80-120	04-SEP-19
WG3150261-1 MB								
Mercury (Hg)-Dissolved			<0.000005(		mg/L		0.000005	04-SEP-19
WG3150261-5 MS		**WG3150261-3**						
Mercury (Hg)-Dissolved			85.1		%		70-130	04-SEP-19
HG-T-CVAA-WT	**Water**							

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-T-CVAA-WT	**Water**							
Batch R4782727								
WG3150240-3 DUP		**L2339830-1**						
Mercury (Hg)-Total		<0.0000050	<0.000005C	RPD-NA	mg/L	N/A	20	04-SEP-19
WG3150240-2 LCS								
Mercury (Hg)-Total			97.6		%		80-120	04-SEP-19
WG3150240-1 MB								
Mercury (Hg)-Total			<0.000005C		mg/L		0.000005	04-SEP-19
WG3150240-4 MS		**L2339839-1**						
Mercury (Hg)-Total			90.9		%		70-130	04-SEP-19
MET-D-CCMS-WT	**Water**							
Batch R4782250								
WG3150303-4 DUP		**WG3150303-3**						
Aluminum (Al)-Dissolved		<0.050	<0.050	RPD-NA	mg/L	N/A	20	03-SEP-19
Antimony (Sb)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	03-SEP-19
Arsenic (As)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	03-SEP-19
Barium (Ba)-Dissolved		0.0199	0.0206		mg/L	3.5	20	03-SEP-19
Beryllium (Be)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	03-SEP-19
Bismuth (Bi)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	03-SEP-19
Boron (B)-Dissolved		<0.10	<0.10	RPD-NA	mg/L	N/A	20	03-SEP-19
Cadmium (Cd)-Dissolved		0.000338	0.000374		mg/L	10	20	03-SEP-19
Calcium (Ca)-Dissolved		107	106		mg/L	1.1	20	03-SEP-19
Cesium (Cs)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	03-SEP-19
Chromium (Cr)-Dissolved		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	03-SEP-19
Cobalt (Co)-Dissolved		0.0816	0.0823		mg/L	0.9	20	03-SEP-19
Copper (Cu)-Dissolved		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	03-SEP-19
Iron (Fe)-Dissolved		<0.10	<0.10	RPD-NA	mg/L	N/A	20	03-SEP-19
Lead (Pb)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	03-SEP-19
Lithium (Li)-Dissolved		0.063	0.059		mg/L	5.4	20	03-SEP-19
Magnesium (Mg)-Dissolved		277	278		mg/L	0.6	20	03-SEP-19
Manganese (Mn)-Dissolved		14.1	14.0		mg/L	0.6	20	03-SEP-19
Molybdenum (Mo)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	03-SEP-19
Nickel (Ni)-Dissolved		0.0918	0.0931		mg/L	1.5	20	03-SEP-19
Phosphorus (P)-Dissolved		<0.50	<0.50	RPD-NA	mg/L	N/A	20	03-SEP-19
Potassium (K)-Dissolved		11.4	11.6		mg/L	1.6	20	03-SEP-19
Rubidium (Rb)-Dissolved		0.0153	0.0156		mg/L	1.9	20	03-SEP-19
Selenium (Se)-Dissolved		0.00232	0.00227		mg/L	2.3	20	03-SEP-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4782250								
WG3150303-4 DUP		**WG3150303-3**						
Silicon (Si)-Dissolved		2.11	2.13		mg/L	1.3	20	03-SEP-19
Silver (Ag)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	03-SEP-19
Sodium (Na)-Dissolved		6.81	6.77		mg/L	0.6	20	03-SEP-19
Strontium (Sr)-Dissolved		0.200	0.200		mg/L	0.1	20	03-SEP-19
Sulfur (S)-Dissolved		480	467		mg/L	2.6	20	03-SEP-19
Tellurium (Te)-Dissolved		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	03-SEP-19
Thallium (Tl)-Dissolved		0.00013	0.00012		mg/L	1.9	20	03-SEP-19
Thorium (Th)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	03-SEP-19
Tin (Sn)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	03-SEP-19
Titanium (Ti)-Dissolved		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	03-SEP-19
Tungsten (W)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	03-SEP-19
Uranium (U)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	03-SEP-19
Vanadium (V)-Dissolved		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	03-SEP-19
Zinc (Zn)-Dissolved		0.013	0.012		mg/L	4.5	20	03-SEP-19
Zirconium (Zr)-Dissolved		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	03-SEP-19
WG3150303-2 LCS								
Aluminum (Al)-Dissolved			104.9		%		80-120	03-SEP-19
Antimony (Sb)-Dissolved			100.8		%		80-120	03-SEP-19
Arsenic (As)-Dissolved			99.0		%		80-120	03-SEP-19
Barium (Ba)-Dissolved			99.9		%		80-120	03-SEP-19
Beryllium (Be)-Dissolved			100.4		%		80-120	03-SEP-19
Bismuth (Bi)-Dissolved			101.0		%		80-120	03-SEP-19
Boron (B)-Dissolved			100.1		%		80-120	03-SEP-19
Cadmium (Cd)-Dissolved			95.7		%		80-120	03-SEP-19
Calcium (Ca)-Dissolved			102.1		%		80-120	03-SEP-19
Cesium (Cs)-Dissolved			100.2		%		80-120	03-SEP-19
Chromium (Cr)-Dissolved			101.2		%		80-120	03-SEP-19
Cobalt (Co)-Dissolved			98.9		%		80-120	03-SEP-19
Copper (Cu)-Dissolved			97.0		%		80-120	03-SEP-19
Iron (Fe)-Dissolved			96.9		%		80-120	03-SEP-19
Lead (Pb)-Dissolved			102.2		%		80-120	03-SEP-19
Lithium (Li)-Dissolved			98.9		%		80-120	03-SEP-19
Magnesium (Mg)-Dissolved			101.5		%		80-120	03-SEP-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4782250								
WG3150303-2 LCS								
Manganese (Mn)-Dissolved			101.2		%		80-120	03-SEP-19
Molybdenum (Mo)-Dissolved			103.8		%		80-120	03-SEP-19
Nickel (Ni)-Dissolved			97.6		%		80-120	03-SEP-19
Phosphorus (P)-Dissolved			98.1		%		80-120	03-SEP-19
Potassium (K)-Dissolved			101.0		%		80-120	03-SEP-19
Rubidium (Rb)-Dissolved			100.2		%		80-120	03-SEP-19
Selenium (Se)-Dissolved			99.8		%		80-120	03-SEP-19
Silicon (Si)-Dissolved			102.0		%		60-140	03-SEP-19
Silver (Ag)-Dissolved			99.2		%		80-120	03-SEP-19
Sodium (Na)-Dissolved			104.4		%		80-120	03-SEP-19
Strontium (Sr)-Dissolved			99.96		%		80-120	03-SEP-19
Sulfur (S)-Dissolved			105.1		%		80-120	03-SEP-19
Tellurium (Te)-Dissolved			95.8		%		80-120	03-SEP-19
Thallium (Tl)-Dissolved			102.1		%		80-120	03-SEP-19
Thorium (Th)-Dissolved			96.9		%		80-120	03-SEP-19
Tin (Sn)-Dissolved			98.1		%		80-120	03-SEP-19
Titanium (Ti)-Dissolved			97.3		%		80-120	03-SEP-19
Tungsten (W)-Dissolved			99.99		%		80-120	03-SEP-19
Uranium (U)-Dissolved			99.0		%		80-120	03-SEP-19
Vanadium (V)-Dissolved			101.0		%		80-120	03-SEP-19
Zinc (Zn)-Dissolved			95.9		%		80-120	03-SEP-19
Zirconium (Zr)-Dissolved			98.1		%		80-120	03-SEP-19
WG3150303-1 MB								
Aluminum (Al)-Dissolved			<0.0050		mg/L		0.005	03-SEP-19
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	03-SEP-19
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	03-SEP-19
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	03-SEP-19
Beryllium (Be)-Dissolved			<0.00010		mg/L		0.0001	03-SEP-19
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	03-SEP-19
Boron (B)-Dissolved			<0.010		mg/L		0.01	03-SEP-19
Cadmium (Cd)-Dissolved			<0.000005(		mg/L		0.000005	03-SEP-19
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	03-SEP-19
Cesium (Cs)-Dissolved			<0.000010		mg/L		0.00001	03-SEP-19
Chromium (Cr)-Dissolved			<0.00050		mg/L		0.0005	03-SEP-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4782250								
WG3150303-1 MB								
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	03-SEP-19
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	03-SEP-19
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	03-SEP-19
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	03-SEP-19
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	03-SEP-19
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	03-SEP-19
Manganese (Mn)-Dissolved			<0.00050		mg/L		0.0005	03-SEP-19
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	03-SEP-19
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	03-SEP-19
Phosphorus (P)-Dissolved			<0.050		mg/L		0.05	03-SEP-19
Potassium (K)-Dissolved			<0.050		mg/L		0.05	03-SEP-19
Rubidium (Rb)-Dissolved			<0.00020		mg/L		0.0002	03-SEP-19
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	03-SEP-19
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	03-SEP-19
Silver (Ag)-Dissolved			<0.000050		mg/L		0.00005	03-SEP-19
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	03-SEP-19
Strontium (Sr)-Dissolved			<0.0010		mg/L		0.001	03-SEP-19
Sulfur (S)-Dissolved			<0.50		mg/L		0.5	03-SEP-19
Tellurium (Te)-Dissolved			<0.00020		mg/L		0.0002	03-SEP-19
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	03-SEP-19
Thorium (Th)-Dissolved			<0.00010		mg/L		0.0001	03-SEP-19
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	03-SEP-19
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	03-SEP-19
Tungsten (W)-Dissolved			<0.00010		mg/L		0.0001	03-SEP-19
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	03-SEP-19
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	03-SEP-19
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	03-SEP-19
Zirconium (Zr)-Dissolved			<0.00020		mg/L		0.0002	03-SEP-19
WG3150303-5 MS		**WG3150303-3**						
Aluminum (Al)-Dissolved			96.0		%		70-130	03-SEP-19
Antimony (Sb)-Dissolved			97.4		%		70-130	03-SEP-19
Arsenic (As)-Dissolved			98.8		%		70-130	03-SEP-19
Barium (Ba)-Dissolved			N/A	MS-B	%		-	03-SEP-19
Beryllium (Be)-Dissolved			96.0		%		70-130	03-SEP-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4782250								
WG3150303-5 MS		**WG3150303-3**						
Bismuth (Bi)-Dissolved			94.8		%		70-130	03-SEP-19
Boron (B)-Dissolved			N/A	MS-B	%		-	03-SEP-19
Cadmium (Cd)-Dissolved			94.7		%		70-130	03-SEP-19
Calcium (Ca)-Dissolved			N/A	MS-B	%		-	03-SEP-19
Cesium (Cs)-Dissolved			97.2		%		70-130	03-SEP-19
Chromium (Cr)-Dissolved			97.5		%		70-130	03-SEP-19
Cobalt (Co)-Dissolved			N/A	MS-B	%		-	03-SEP-19
Copper (Cu)-Dissolved			93.9		%		70-130	03-SEP-19
Iron (Fe)-Dissolved			85.3		%		70-130	03-SEP-19
Lead (Pb)-Dissolved			95.1		%		70-130	03-SEP-19
Lithium (Li)-Dissolved			N/A	MS-B	%		-	03-SEP-19
Magnesium (Mg)-Dissolved			N/A	MS-B	%		-	03-SEP-19
Manganese (Mn)-Dissolved			N/A	MS-B	%		-	03-SEP-19
Molybdenum (Mo)-Dissolved			99.8		%		70-130	03-SEP-19
Nickel (Ni)-Dissolved			N/A	MS-B	%		-	03-SEP-19
Phosphorus (P)-Dissolved			104.8		%		70-130	03-SEP-19
Potassium (K)-Dissolved			N/A	MS-B	%		-	03-SEP-19
Rubidium (Rb)-Dissolved			N/A	MS-B	%		-	03-SEP-19
Selenium (Se)-Dissolved			95.5		%		70-130	03-SEP-19
Silicon (Si)-Dissolved			N/A	MS-B	%		-	03-SEP-19
Silver (Ag)-Dissolved			95.3		%		70-130	03-SEP-19
Sodium (Na)-Dissolved			N/A	MS-B	%		-	03-SEP-19
Strontium (Sr)-Dissolved			N/A	MS-B	%		-	03-SEP-19
Sulfur (S)-Dissolved			N/A	MS-B	%		-	03-SEP-19
Tellurium (Te)-Dissolved			92.1		%		70-130	03-SEP-19
Thallium (Tl)-Dissolved			94.4		%		70-130	03-SEP-19
Thorium (Th)-Dissolved			92.1		%		70-130	03-SEP-19
Tin (Sn)-Dissolved			96.4		%		70-130	03-SEP-19
Titanium (Ti)-Dissolved			94.7		%		70-130	03-SEP-19
Tungsten (W)-Dissolved			94.5		%		70-130	03-SEP-19
Vanadium (V)-Dissolved			99.8		%		70-130	03-SEP-19
Zirconium (Zr)-Dissolved			94.0		%		70-130	03-SEP-19
MET-T-CCMS-WT	**Water**							

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4782041								
WG3150225-4 DUP		**WG3150225-3**						
Aluminum (Al)-Total		1.11	1.15		mg/L	3.7	20	03-SEP-19
Antimony (Sb)-Total		0.0022	0.0022		mg/L	0.0	20	03-SEP-19
Arsenic (As)-Total		0.0034	0.0037		mg/L	8.9	20	03-SEP-19
Barium (Ba)-Total		0.0565	0.0582		mg/L	2.8	20	03-SEP-19
Beryllium (Be)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	03-SEP-19
Bismuth (Bi)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	03-SEP-19
Boron (B)-Total		0.86	0.89		mg/L	3.0	20	03-SEP-19
Cadmium (Cd)-Total		0.000098	0.000099		mg/L	0.8	20	03-SEP-19
Calcium (Ca)-Total		71.6	73.0		mg/L	1.9	20	03-SEP-19
Chromium (Cr)-Total		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	03-SEP-19
Cesium (Cs)-Total		0.00018	0.00018		mg/L	2.9	20	03-SEP-19
Cobalt (Co)-Total		0.0013	0.0013		mg/L	0.2	20	03-SEP-19
Copper (Cu)-Total		0.021	0.022		mg/L	3.3	20	03-SEP-19
Iron (Fe)-Total		1.56	1.56		mg/L	0.0	20	03-SEP-19
Lead (Pb)-Total		0.00317	0.00327		mg/L	3.1	20	03-SEP-19
Lithium (Li)-Total		0.136	0.138		mg/L	1.3	20	03-SEP-19
Magnesium (Mg)-Total		20.7	21.2		mg/L	2.5	20	03-SEP-19
Manganese (Mn)-Total		0.0947	0.0954		mg/L	0.7	20	03-SEP-19
Molybdenum (Mo)-Total		0.325	0.319		mg/L	1.8	20	03-SEP-19
Nickel (Ni)-Total		<0.0050	0.0065	RPD-NA	mg/L	N/A	20	03-SEP-19
Phosphorus (P)-Total		<0.50	<0.50	RPD-NA	mg/L	N/A	20	03-SEP-19
Potassium (K)-Total		32.8	33.1		mg/L	0.9	20	03-SEP-19
Rubidium (Rb)-Total		0.0188	0.0191		mg/L	1.7	20	03-SEP-19
Selenium (Se)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	03-SEP-19
Silicon (Si)-Total		4.1	4.5		mg/L	10	20	03-SEP-19
Silver (Ag)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	03-SEP-19
Sodium (Na)-Total		112	115		mg/L	3.1	20	03-SEP-19
Strontium (Sr)-Total		0.398	0.383		mg/L	3.7	20	03-SEP-19
Sulfur (S)-Total		19.7	19.3		mg/L	1.6	25	03-SEP-19
Thallium (Tl)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	03-SEP-19
Tellurium (Te)-Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	03-SEP-19
Thorium (Th)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	25	03-SEP-19
Tin (Sn)-Total		<0.0010	<0.0010		mg/L			03-SEP-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4782041								
WG3150225-4 DUP		**WG3150225-3**						
Tin (Sn)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	03-SEP-19
Titanium (Ti)-Total		0.0476	0.0471		mg/L	1.1	20	03-SEP-19
Tungsten (W)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	03-SEP-19
Uranium (U)-Total		0.0106	0.0106		mg/L	0.3	20	03-SEP-19
Vanadium (V)-Total		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	03-SEP-19
Zinc (Zn)-Total		0.137	0.137		mg/L	0.2	20	03-SEP-19
Zirconium (Zr)-Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	03-SEP-19
WG3150225-2 LCS								
Aluminum (Al)-Total			103.1		%		80-120	03-SEP-19
Antimony (Sb)-Total			98.0		%		80-120	03-SEP-19
Arsenic (As)-Total			100.4		%		80-120	03-SEP-19
Barium (Ba)-Total			98.8		%		80-120	03-SEP-19
Beryllium (Be)-Total			97.2		%		80-120	03-SEP-19
Bismuth (Bi)-Total			96.9		%		80-120	03-SEP-19
Boron (B)-Total			96.3		%		80-120	03-SEP-19
Cadmium (Cd)-Total			95.4		%		80-120	03-SEP-19
Calcium (Ca)-Total			96.3		%		80-120	03-SEP-19
Chromium (Cr)-Total			98.2		%		80-120	03-SEP-19
Cesium (Cs)-Total			96.2		%		80-120	03-SEP-19
Cobalt (Co)-Total			97.3		%		80-120	03-SEP-19
Copper (Cu)-Total			97.6		%		80-120	03-SEP-19
Iron (Fe)-Total			95.4		%		80-120	03-SEP-19
Lead (Pb)-Total			98.9		%		80-120	03-SEP-19
Lithium (Li)-Total			92.9		%		80-120	03-SEP-19
Magnesium (Mg)-Total			100.6		%		80-120	03-SEP-19
Manganese (Mn)-Total			102.0		%		80-120	03-SEP-19
Molybdenum (Mo)-Total			98.2		%		80-120	03-SEP-19
Nickel (Ni)-Total			97.5		%		80-120	03-SEP-19
Phosphorus (P)-Total			102.8		%		70-130	03-SEP-19
Potassium (K)-Total			100.3		%		80-120	03-SEP-19
Rubidium (Rb)-Total			93.5		%		80-120	03-SEP-19
Selenium (Se)-Total			100.5		%		80-120	03-SEP-19
Silicon (Si)-Total			102.2		%		60-140	03-SEP-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4782041								
WG3150225-2 LCS								
Silver (Ag)-Total			95.4		%		80-120	03-SEP-19
Sodium (Na)-Total			106.3		%		80-120	03-SEP-19
Strontium (Sr)-Total			95.3		%		80-120	03-SEP-19
Sulfur (S)-Total			99.1		%		80-120	03-SEP-19
Thallium (Tl)-Total			98.7		%		80-120	03-SEP-19
Tellurium (Te)-Total			92.7		%		80-120	03-SEP-19
Thorium (Th)-Total			93.9		%		70-130	03-SEP-19
Tin (Sn)-Total			94.5		%		80-120	03-SEP-19
Titanium (Ti)-Total			99.1		%		80-120	03-SEP-19
Tungsten (W)-Total			96.0		%		80-120	03-SEP-19
Uranium (U)-Total			96.0		%		80-120	03-SEP-19
Vanadium (V)-Total			99.6		%		80-120	03-SEP-19
Zinc (Zn)-Total			96.3		%		80-120	03-SEP-19
Zirconium (Zr)-Total			94.6		%		80-120	03-SEP-19
WG3150225-1 MB								
Aluminum (Al)-Total			<0.0050		mg/L		0.005	03-SEP-19
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	03-SEP-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	03-SEP-19
Barium (Ba)-Total			<0.00010		mg/L		0.0001	03-SEP-19
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	03-SEP-19
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	03-SEP-19
Boron (B)-Total			<0.010		mg/L		0.01	03-SEP-19
Cadmium (Cd)-Total			<0.000005C		mg/L		0.000005	03-SEP-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	03-SEP-19
Chromium (Cr)-Total			<0.00050		mg/L		0.0005	03-SEP-19
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	03-SEP-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	03-SEP-19
Copper (Cu)-Total			<0.0010		mg/L		0.001	03-SEP-19
Iron (Fe)-Total			<0.010		mg/L		0.01	03-SEP-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	03-SEP-19
Lithium (Li)-Total			<0.0010		mg/L		0.001	03-SEP-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	03-SEP-19
Manganese (Mn)-Total			<0.00050		mg/L		0.0005	03-SEP-19
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	03-SEP-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4782041								
WG3150225-1 MB								
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	03-SEP-19
Phosphorus (P)-Total			<0.050		mg/L		0.05	03-SEP-19
Potassium (K)-Total			<0.050		mg/L		0.05	03-SEP-19
Rubidium (Rb)-Total			<0.00020		mg/L		0.0002	03-SEP-19
Selenium (Se)-Total			<0.000050		mg/L		0.00005	03-SEP-19
Silicon (Si)-Total			<0.10		mg/L		0.1	03-SEP-19
Silver (Ag)-Total			<0.000050		mg/L		0.00005	03-SEP-19
Sodium (Na)-Total			<0.050		mg/L		0.05	03-SEP-19
Strontium (Sr)-Total			<0.0010		mg/L		0.001	03-SEP-19
Sulfur (S)-Total			<0.50		mg/L		0.5	03-SEP-19
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	03-SEP-19
Tellurium (Te)-Total			<0.00020		mg/L		0.0002	03-SEP-19
Thorium (Th)-Total			<0.00010		mg/L		0.0001	03-SEP-19
Tin (Sn)-Total			<0.00010		mg/L		0.0001	03-SEP-19
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	03-SEP-19
Tungsten (W)-Total			<0.00010		mg/L		0.0001	03-SEP-19
Uranium (U)-Total			<0.000010		mg/L		0.00001	03-SEP-19
Vanadium (V)-Total			<0.00050		mg/L		0.0005	03-SEP-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	03-SEP-19
Zirconium (Zr)-Total			<0.00020		mg/L		0.0002	03-SEP-19
WG3150225-5 MS		**WG3150225-3**						
Aluminum (Al)-Total			N/A	MS-B	%		-	03-SEP-19
Antimony (Sb)-Total			98.6		%		70-130	03-SEP-19
Arsenic (As)-Total			103.6		%		70-130	03-SEP-19
Barium (Ba)-Total			N/A	MS-B	%		-	03-SEP-19
Beryllium (Be)-Total			109.4		%		70-130	03-SEP-19
Bismuth (Bi)-Total			98.2		%		70-130	03-SEP-19
Boron (B)-Total			N/A	MS-B	%		-	03-SEP-19
Cadmium (Cd)-Total			104.8		%		70-130	03-SEP-19
Calcium (Ca)-Total			N/A	MS-B	%		-	03-SEP-19
Chromium (Cr)-Total			103.3		%		70-130	03-SEP-19
Cesium (Cs)-Total			102.0		%		70-130	03-SEP-19
Cobalt (Co)-Total			102.6		%		70-130	03-SEP-19
Copper (Cu)-Total			N/A	MS-B	%		-	03-SEP-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4782041								
WG3150225-5 MS		**WG3150225-3**						
Iron (Fe)-Total			N/A	MS-B	%		-	03-SEP-19
Lead (Pb)-Total			99.1		%		70-130	03-SEP-19
Lithium (Li)-Total			N/A	MS-B	%		-	03-SEP-19
Magnesium (Mg)-Total			N/A	MS-B	%		-	03-SEP-19
Manganese (Mn)-Total			N/A	MS-B	%		-	03-SEP-19
Molybdenum (Mo)-Total			N/A	MS-B	%		-	03-SEP-19
Nickel (Ni)-Total			102.8		%		70-130	03-SEP-19
Phosphorus (P)-Total			90.1		%		70-130	03-SEP-19
Potassium (K)-Total			N/A	MS-B	%		-	03-SEP-19
Rubidium (Rb)-Total			N/A	MS-B	%		-	03-SEP-19
Selenium (Se)-Total			100.8		%		70-130	03-SEP-19
Silicon (Si)-Total			N/A	MS-B	%		-	03-SEP-19
Silver (Ag)-Total			94.3		%		70-130	03-SEP-19
Sodium (Na)-Total			N/A	MS-B	%		-	03-SEP-19
Strontium (Sr)-Total			N/A	MS-B	%		-	03-SEP-19
Sulfur (S)-Total			N/A	MS-B	%		-	03-SEP-19
Thallium (Tl)-Total			98.3		%		70-130	03-SEP-19
Tellurium (Te)-Total			98.3		%		70-130	03-SEP-19
Tin (Sn)-Total			98.5		%		70-130	03-SEP-19
Titanium (Ti)-Total			N/A	MS-B	%		-	03-SEP-19
Tungsten (W)-Total			98.7		%		70-130	03-SEP-19
Uranium (U)-Total			N/A	MS-B	%		-	03-SEP-19
Vanadium (V)-Total			104.1		%		70-130	03-SEP-19
Zinc (Zn)-Total			N/A	MS-B	%		-	03-SEP-19
NH3-F-WT	**Water**							
Batch R4781881								
WG3150401-7 DUP		**L2339522-6**						
Ammonia, Total (as N)		<0.010	<0.010	RPD-NA	mg/L	N/A	20	03-SEP-19
WG3150401-6 LCS								
Ammonia, Total (as N)			97.3		%		85-115	03-SEP-19
WG3150401-5 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	03-SEP-19
WG3150401-8 MS		**L2339522-6**						
Ammonia, Total (as N)			93.2		%		75-125	03-SEP-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO3-IC-WT	**Water**							
Batch R4782656								
WG3150765-10 DUP		**WG3150765-8**						
Nitrate (as N)		2.09	2.08		mg/L	0.1	20	03-SEP-19
WG3150765-7 LCS								
Nitrate (as N)			101.4		%		90-110	03-SEP-19
WG3150765-6 MB								
Nitrate (as N)			<0.020		mg/L		0.02	03-SEP-19
WG3150765-9 MS		**WG3150765-8**						
Nitrate (as N)			96.2		%		75-125	03-SEP-19
P-T-COL-WT	**Water**							
Batch R4782483								
WG3150772-3 DUP		**L2338742-1**						
Phosphorus, Total		0.106	0.110		mg/L	3.5	20	04-SEP-19
WG3150772-2 LCS								
Phosphorus, Total			97.3		%		80-120	04-SEP-19
WG3150772-1 MB								
Phosphorus, Total			<0.0030		mg/L		0.003	04-SEP-19
WG3150772-4 MS		**L2338742-1**						
Phosphorus, Total			N/A	MS-B	%		-	04-SEP-19
PH-BF	**Water**							
Batch R4781669								
WG3150384-2 DUP		**L2339918-1**						
pH		7.04	7.05	J	pH units	0.01	0.2	03-SEP-19
WG3150384-1 LCS								
pH			7.01		pH units		6.9-7.1	03-SEP-19
SO4-IC-N-WT	**Water**							
Batch R4782656								
WG3150765-10 DUP		**WG3150765-8**						
Sulfate (SO4)		43.7	43.4		mg/L	0.6	20	03-SEP-19
WG3150765-7 LCS								
Sulfate (SO4)			100.8		%		90-110	03-SEP-19
WG3150765-6 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	03-SEP-19
WG3150765-9 MS		**WG3150765-8**						
Sulfate (SO4)			96.8		%		75-125	03-SEP-19
SOLIDS-TDS-BF	**Water**							

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SOLIDS-TDS-BF	**Water**							
Batch R4782348								
WG3151105-3 DUP		**L2339753-2**						
Total Dissolved Solids		3310	3210		mg/L	3.1	20	03-SEP-19
WG3151105-2 LCS								
Total Dissolved Solids			101.9		%		85-115	03-SEP-19
WG3151105-1 MB								
Total Dissolved Solids			<20		mg/L		20	03-SEP-19
SOLIDS-TSS-BF	**Water**							
Batch R4781869								
WG3150478-3 DUP		**L2339918-2**						
Total Suspended Solids		94.0	92.0		mg/L	2.2	25	03-SEP-19
WG3150478-2 LCS								
Total Suspended Solids			100.8		%		85-115	03-SEP-19
WG3150478-1 MB								
Total Suspended Solids			<2.0		mg/L		2	03-SEP-19
TKN-WT	**Water**							
Batch R4782526								
WG3150802-3 DUP		**L2334143-2**						
Total Kjeldahl Nitrogen		<0.15	<0.15	RPD-NA	mg/L	N/A	20	04-SEP-19
WG3150802-2 LCS								
Total Kjeldahl Nitrogen			95.3		%		75-125	04-SEP-19
WG3150802-1 MB								
Total Kjeldahl Nitrogen			<0.15		mg/L		0.15	04-SEP-19
WG3150802-4 MS		**L2334143-2**						
Total Kjeldahl Nitrogen			102.8		%		70-130	04-SEP-19
TOC-WT	**Water**							
Batch R4782674								
WG3151130-3 DUP		**L2339830-1**						
Total Organic Carbon		3.06	3.15		mg/L	2.8	20	04-SEP-19
WG3151130-2 LCS								
Total Organic Carbon			97.0		%		80-120	04-SEP-19
WG3151130-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	04-SEP-19
WG3151130-4 MS		**L2339830-1**						
Total Organic Carbon			95.8		%		70-130	04-SEP-19
TURBIDITY-BF	**Water**							

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TURBIDITY-BF	**Water**							
Batch R4782363								
WG3151144-3 DUP		**L2339839-1**						
Turbidity		9.32	9.32		NTU	0.0	15	02-SEP-19
WG3151144-2 LCS								
Turbidity			110.0		%		85-115	02-SEP-19
WG3151144-1 MB								
Turbidity			<0.10		NTU		0.1	02-SEP-19

Quality Control Report

Workorder: L2339839 Report Date: 24-SEP-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

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

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

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.

Thursday, September 19, 2019

Rick Hawthorne
ALS Environmental
60 Northland Rd, Unit 1
Waterloo Canada, ON N2V 2B8

Re: ALS Workorder: 1909038
Project Name:
Project Number: L2339839

Dear Mr. Hawthorne:

One water sample was received from ALS Environmental, on 9/4/2019. The sample was scheduled for the following analysis:

Radium-226

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,

ALS Environmental
Katie M. OBrien
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
AIHA	214884
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1909038
Client Name: ALS Environmental
Client Project Name:
Client Project Number: L2339839
Client PO Number: L2339839

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
L2339839-1	1909038-1		WATER	02-Sep-19	

1909038

Radium-226:

The sample was prepared and analyzed according to the current revision of SOP 783.

All acceptance criteria were met.

ALS Environmental

1909038

Subcontract Request Form

Subcontract To:

ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
225 COMMERCE DRIVE
FORT COLLINS,CO 80524

1 x ILP

NOTES: Please reference on final report and invoice: PO# *L2339839*
ALS requires QC data to be provided with your final results.

Please see enclosed 1 **sample(s) in** 1 **Container(s)**

SAMPLE NUMBER	ANALYTICAL REQUIRED	DATE SAMPLED / DUE DATE	Priority Flag
L2339839-1 MS-08		9/ 2/ 2019	E
	Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	9/20/2019	

Subcontract Info Contact: Mary-Lynn Pike (519) 886-6910
Analysis and reporting info contact: Rick Hawthorne
60 NORTHLAND ROAD, UNIT 1
WATERLOO,ON N2V 2B8
Phone: (519) 886-6910 Email: Rick.Hawthorne@alsglobal.com

Please email confirmation of receipt to: **Rick.Hawthorne@alsglobal.com**

Shipped By: _____ Date Shipped: _____

Received By: EMC Date Received: 9/4/19 1620

Verified By: _____ Date Verified: _____

Temperature: _____

Sample Integrity Issues: _____

ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: ALS Waterloo Workorder No: 1909038

Project Manager: KMO Initials: EE Date: 9/5/19

1. Are airbills / shipping documents present and/or removable?		DROP OFF	YES	NO
2. Are custody seals on **shipping** containers intact?		NONE	YES	NO *
3. Are custody seals on **sample** containers intact?		NONE	YES	NO *
4. Is there a COC (chain-of-custody) present?			YES	NO *
5. Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)			YES	NO *
6. Are short-hold samples present?			YES	NO
7. Are all samples within holding times for the requested analyses?			YES	NO *
8. Were all sample containers received intact? (not broken or leaking)			YES	NO *
9. Is there sufficient sample for the requested analyses?			YES	NO *
10. Are all samples in the proper containers for the requested analyses?			YES	NO *
11. Are all aqueous samples preserved correctly, if required? (excluding volatiles)		N/A	YES	NO *
12. Are all aqueous non-preserved samples pH 4-9?		N/A	YES	NO *
13. Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm (1/4 inch) diameter? (i.e. size of green pea)		N/A	YES	NO
14. Were the samples shipped on ice?			YES	NO
15. Were cooler temperatures measured at 0.1-6.0°C?	IR gun used*: #1 #3 #4	RAD ONLY	YES	NO

Cooler #:	1							
Temperature (°C):	7.6							
No. of custody seals on cooler:	3							
DOT Survey/ Acceptance Information — External µR/hr reading:	11							
Background µR/hr reading:	13							

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? YES / NO / NA (If no, see Form 008.)

*** Please provide details here for NO responses to gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.**

All client bottle ID's vs ALS lab ID's double-checked by: EE

If applicable, was the client contacted? YES / NO / NA Contact: _____ Date/Time: _____

Project Manager Signature / Date: 9/6/19

Form 201r27.xls
(02/11/2019)

*IR Gun #1, VWR SN 170560549
*IR Gun #3, VWR SN 170647571
*IR Gun #4, Oakton, SN 2372220101-0002

K909038

EXPRESS WORLDWIDE **WPX** DHL

2019-09-03 MYDHL+ 1.0 / *30-0821*

From : ALS Environmental
Ed Hill
60 Northland Rd
Unit 1

N2V 2B8 WATERLOO ON
Canada

Origin:
YHM

11-3

Contact: +15198666910

To : **ALS Environmental Fort Collins**
Sample Login
225 Commerce Drive

7.60

Contact:
Sample Login
+18004431511

80524 FORT COLLINS Colorado
United States of America

US-DEN-DEN

C [redacted] Day Time

Ref:

Pce/Shpt Weight: **39.8 lbs**
Piece: **1/1**

Contents: Water Samples

WAYBILL 53 7295 2104

(2L)US80524+48000001

Client:	ALS Environmental	**Date:**	*19-Sep-19*
Project:	L2339839	**Work Order:**	1909038
Sample ID:	L2339839-1	**Lab ID:**	1909038-1
Legal Location:		**Matrix:**	WATER
Collection Date:	9/2/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **9/9/2019**		PrepBy: **JXH**
Ra-226	**0.020 (+/- 0.0088)**		**0.0075**	**BQ/l**	NA	9/19/2019 12:00
Carr: BARIUM	*96.6*		*40-110*	*%REC*	DL = NA	9/19/2019 12:00

Client:	ALS Environmental	**Date:**	*19-Sep-19*
Project:	L2339839	**Work Order:**	1909038
Sample ID:	L2339839-1	**Lab ID:**	1909038-1
Legal Location:		**Matrix:**	WATER
Collection Date:	9/2/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed

Explanation of Qualifiers

Radiochemistry:

- "Report Limit" is the MDC

U or ND - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

Y2 - Chemical Yield outside default limits.

W - DER is greater than Warning Limit of 1.42

* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.
# - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.
G - Sample density differs by more than 15% of LCS density.
D - DER is greater than Control Limit

M - Requested MDC not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS, Matrix Spike Recovery within control limits.

N - Matrix Spike Recovery outside control limits

NC - Not Calculated for duplicate results less than 5 times MDC

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

Inorganics:

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).

U or ND - Indicates that the compound was analyzed for but not detected.

E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.

M - Duplicate injection precision was not met.

N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.

Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.

* - Duplicate analysis (relative percent difference) not within control limits.

S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

Organics:

U or ND - Indicates that the compound was analyzed for but not detected.

B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.

E - Analyte concentration exceeds the upper level of the calibration range.

J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).

A - A tentatively identified compound is a suspected aldol-condensation product.

X - The analyte was diluted below an accurate quantitation level.

* - The spike recovery is equal to or outside the control criteria used.

+ - The relative percent difference (RPD) equals or exceeds the control criteria.

G - A pattern resembling gasoline was detected in this sample.

D - A pattern resembling diesel was detected in this sample.

M - A pattern resembling motor oil was detected in this sample.

C - A pattern resembling crude oil was detected in this sample.

4 - A pattern resembling JP-4 was detected in this sample.

5 - A pattern resembling JP-5 was detected in this sample.

H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.

L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.

Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
- gasoline
- JP-8
- diesel
- mineral spirits
- motor oil
- Stoddard solvent
- bunker C

QC BATCH REPORT

Batch ID: **RE190909-1-1** Instrument ID **Alpha Scin** Method: **Radium-226 by Radon Emanation**

LCS Sample ID: **RE190909-1** Units: **BQ/l** Analysis Date: **9/19/2019 12:32**

Client ID: Run ID: **RE190909-1A** Prep Date: **9/9/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.77 (+/- 0.442)	0.0116	1.72		103	67-120					P,M3
Carr: BARIUM	15500		16020		96.7	40-110					

LCSD Sample ID: **RE190909-1** Units: **BQ/l** Analysis Date: **9/19/2019 12:32**

Client ID: Run ID: **RE190909-1A** Prep Date: **9/9/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.83 (+/- 0.457)	0.012	1.72		106	67-120		1.77	0.1	2.1	P,M3
Carr: BARIUM	15700		16020		98.3	40-110		15500			

MB Sample ID: **RE190909-1** Units: **BQ/l** Analysis Date: **9/19/2019 12:00**

Client ID: Run ID: **RE190909-1A** Prep Date: **9/9/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	0.0021 (+/- 0.0039)	0.0068									U
Carr: BARIUM	15400		16020		95.9	40-110					

The following samples were analyzed in this batch: 1909038-1

AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

TOXICITY TEST REPORT

Daphnia magna
EPS 1/RM/14

Work Order : 240166
Sample Number : 60495

SAMPLE IDENTIFICATION

Company :	ALS Laboratory Group, Waterloo	Date Collected :	2019-09-02
Location :	Waterloo ON	Time Collected :	14:25
Job Number :	L2339839	Date Received :	2019-09-03
Substance :	MS-08	Time Received :	11:55
Sampling Method :	Grab	Temperature on Receipt :	9.0 °C
Sampled By :	KB/CP	Date Tested :	2019-09-03
Sample Description :	Clear, light brown, odourless.		

Test Method : Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna* . Environment Canada EPS 1/RM/14 (Second Edition, December 2000, with February 2016 amendments).

48-HOUR TEST RESULTS

Substance	Effect	Value
Control	Mean Immobility	0.0 %
	Mean Mortality	0.0 %
100%	Mean Immobility	0.0 %
	Mean Mortality	0.0 %

The results reported relate only to the sample tested and as received.

TEST ORGANISM

Species :	*Daphnia magna*	Time to First Brood :	8.4 days
Organism Batch :	Dm19-17	Average Brood Size :	42.0 young
Culture Mortality :	0% (previous 7 days)		

TEST CONDITIONS

Sample Treatment :	None	Number of Replicates :	3
pH Adjustment :	None	Organisms / Replicate :	10
Pre-aeration Rate :	~30 mL/min/L	Organisms / Test Level :	30
Pre-aeration Time :	30 minutes	Organism Loading Rate :	15.0 mL/organism
Test Aeration :	None	Impaired Control Organisms :	0.0%
Hardness Adjustment :	None	Test Method Deviation(s) :	None

REFERENCE TOXICANT DATA

Toxicant :	Sodium Chloride	Historical Mean LC50 :	6.4 g/L
Date Tested :	2019-09-03	Warning Limits (± 2SD) :	5.8 - 7.2 g/L
LC50 :	6.2 g/L	Organism Batch :	Dm19-17
95% Confidence Limits :	6.0 - 6.4 g/L	Analyst(s) :	MJT, RK
Statistical Method :	Spearman-Kärber		

COMMENTS

All test validity criteria as specified in the test method were satisfied.

Date : 2019-09-09
yyyy-mm-dd

Approved By : _____
Project Manager

AQUATOX

TOXICITY TEST REPORT

Daphnia magna

EPS 1/RM/14

Work Order : 240166
Sample Number : 60495

TEST DATA

	pH	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	Temperature (°C)	O_2 Saturation (%)*	Hardness (as $CaCO_3$)
Initial Water Chemistry (100%) :	8.4	10.0	3240	20.0	116	>1000 mg/L

0 HOURS

Date & Time 2019-09-03 14:20
Analyst(s) : KP

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O_2	Conductivity	Temperature	O_2 Saturation (%)*	Hardness
100	A	0	0	8.3	9.5	3240	20.0	110	>1000
100	B	0	0	8.3	9.5	3240	20.0	110	>1000
100	C	0	0	8.3	9.5	3240	20.0	110	>1000
Control	A	0	0	8.5	8.8	780	20.0	100	220
Control	B	0	0	8.5	8.8	780	20.0	100	220
Control	C	0	0	8.5	8.8	780	20.0	100	220

Notes:

24 HOURS

Date & Time 2019-09-04 14:20
Analyst(s) : RK (MJT)

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O_2	Conductivity	Temperature
100	A	–	0	–	–	–	19.0
100	B	–	0	–	–	–	19.0
100	C	–	0	–	–	–	19.0
Control	A	–	0	–	–	–	19.0
Control	B	–	0	–	–	–	19.0
Control	C	–	0	–	–	–	19.0

Notes:

48 HOURS

Date & Time 2019-09-05 14:20
Analyst(s) : KP

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O_2	Conductivity	Temperature
100	A	0	0	8.0	8.5	3280	19.0
100	B	0	0	8.0	8.5	3260	19.0
100	C	0	0	8.0	8.5	3260	19.0
Control	A	0	0	8.5	8.5	795	19.0
Control	B	0	0	8.5	8.5	795	19.0
Control	C	0	0	8.5	8.5	790	19.0

Notes:

Number immobile does not include number dead.

– = not measured/not required
* adjusted for temperature and barometric pressure

Test Data Reviewed By : FS
Date : 2019-09-09

AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

TOXICITY TEST REPORT

Rainbow Trout
EPS 1/RM/13

Work Order : 240166
Sample Number : 60495

SAMPLE IDENTIFICATION

Company :	ALS Laboratory Group, Waterloo	Date Collected :	2019-09-02
Location :	Waterloo ON	Time Collected :	14:25
Job Number :	L2339839	Date Received :	2019-09-03
Substance :	MS-08	Time Received :	11:55
Sampling Method :	Grab	Temperature on Receipt :	9.0 °C
Sampled By :	KB/CP	Date Tested :	2019-09-03
Sample Description :	Clear, light brown, odourless.		

Test Method(s) : Reference Method for Determining Acute Lethality of Liquid Effluents to Rainbow Trout. Environment Canada, EPS 1/RM/13 (2nd Edition, December 2000, with May 2007 and February 2016 amendments).

96-HOUR TEST RESULTS

Substance	Effect	Value
Control	Mean Impairment	0.0 %
	Mean Mortality	0.0 %
100%	Mean Impairment	0.0 %
	Mean Mortality	0.0 %

The results reported relate only to the sample tested and as received.

TEST ORGANISM

Test Organism :	*Oncorhynchus mykiss*	Average Fork Length (± 2 SD) :	44.1 mm (±8.0)
Organism Batch :	T19-16	Range of Fork Lengths :	39 - 50 mm
Control Sample Size :	10	Average Wet Weight (± 2 SD) :	0.73 g (±0.45)
Cumulative stock tank mortality rate :	0% (previous 7 days)	Range of Wet Weights :	0.46 - 1.04 g
Control organisms showing stress :	0 (at test completion)	Organism Loading Rate :	0.4 g/L

TEST CONDITIONS

Sample Treatment :	None	Volume Tested (L) :	20
pH Adjustment :	None	Number of Replicates :	1
Test Aeration :	Yes	Organisms Per Replicate :	10
Pre-aeration/Aeration Rate :	6.5 ± 1 mL/min/L	Organisms Per Test Level :	10
Total Pre-Aeration Time :	120 minutes	Test Method Deviation(s) :	None

REFERENCE TOXICANT DATA

Toxicant :	Potassium Chloride	Date Tested :	2019-09-03
Organism Batch :	T19-16	Historical Mean LC50 :	3760 mg/L
LC50 :	3661 mg/L	Warning Limits (± 2SD) :	3139 - 4503 mg/L
95% Confidence Limits :	3264 - 4089 mg/L	Analyst(s) :	MDH, ALC, KTL, FS
Statistical Method :	Linear Regression (MLE)		

COMMENTS

•All test validity criteria as specified in the test method were satisfied.

Date : 2019-09-09
yyyy-mm-dd

Approved By : *Project Manager*

Work Order : 240166
Sample Number : 60495

TEST DATA

	pH	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	Temperature (°C)	O_2 Saturation (%)*
Initial Water Chemistry (100%) :	8.4	10.1	3430	14.0	105
After 30 min pre-aeration :	8.4	9.9	3417	14.0	103

0 HOURS

Date & Time 2019-09-03 15:50
Analyst(s) : MDH

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature	O_2 Saturation*
100%	0	0	8.4	9.5	3408	14.0	100
Control	0	0	8.1	9.6	927	14.5	100

Notes:

24 HOURS

Date & Time 2019-09-04 15:50
Analyst(s) : FS

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	7.8	–	–	15.0
Control	0	0	–	–	–	15.0

Notes:

48 HOURS

Date & Time 2019-09-05 15:50
Analyst(s) : MDH

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	7.6	–	–	15.0
Control	0	0	8.2	–	–	15.0

Notes:

72 HOURS

Date & Time 2019-09-06 15:50
Analyst(s) : TL

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	7.6	–	–	15.0
Control	0	0	8.2	–	–	15.0

Notes:

96 HOURS

Date & Time 2019-09-07 15:50
Analyst(s) : MDH

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	7.7	9.2	3409	14.5
Control	0	0	8.2	9.3	910	14.5

Notes:

"–" = not measured/not required
Number impaired does not include number dead.
* adjusted for temperature and barometric pressure

Test Data Reviewed By : FS
Date : 2019-09-09

CHAIN OF CUSTODY RECORD

AQUATOX

AquaTox Work Order No: 240 166

Shipping Address: AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, Ontario Canada N0B 2J0

Voice: (519) 763-4412 **Fax:** (519) 763-4419

P.O. Number:	4500057496
Field Sampler Name (print):	KB/CP
Signature:	
Affiliation:	Baffinland Iron Mine / ALS Environmental
Sample Storage (prior to shipping):	
Custody Relinquished by:	Kendra Button
Date/Time Shipped:	2-Sep-19/ 20:00

Client:	ALS Environmental c/o Baffinland Iron Mine Quote # (2019): 162705399-19
Phone:	(519) 886-6910
Fax:	(519) 886-9047
Contact:	Rick Hawthorne (ALS) / Martina Rendas (Aquatox)

Sample Identification					Analyses Requested									Sample Method and Volume		
Date Collected (yyyy-mm-dd)	Time Collected (e.g. 14:30, 24 hr clock)	Sample Name	AquaTox Sample Number	Temp. on arrival	Rainbow Trout Single Concentration	Rainbow Trout LC50	*Daphnia magna* Single Concentration	*Daphnia magna* LC50	Fathead Minnow Survival & Growth	*Ceriodaphnia dubia* Survival & Reproduction	*Lemna minor* Growth	*Pseudokirchneriella subcapitata* Growth	Other (please specify below)	Grab	Composite	# of Containers and Volume (eg. 2 x 1L, 3 x 10L, etc.)
2019-09-02	14:25	MS-08	60495	9°C	✓		✓							✓		2 x 10LCarboy

C23839839

For Lab Use Only	
Received By:	AS / RD
Date:	2019-09-03
Time:	11:55
Storage Location:	
Storage Temp.(°C)	

Please list any special requests or instructions:

Rush TAT w/ Daily updates. PH required.
Report Distribution: bimcore@alsglobal.com, rick.hawthorne@alsglobal.com

ALS Environmental

L2339839

WATERLOO

Subcontract Request Form

Subcontract To:

AQUATOX TESTING AND CONSULTING
11B NICHOLAS BEAVER ROAD
RR3
GUELPH,ON N1H 6H9

NOTES: Please reference on final report and invoice: PO# *L2339839*
ALS requires QC data to be provided with your final results.

Please see enclosed 1 **sample(s) in** 0 **Container(s)**

SAMPLE NUMBER	ANALYTICAL REQUIRED	DATE SAMPLED / DUE DATE	Priority Flag
L2339839-1 MS-08		9/ 2/ 2019	**E**
	Special Request Aquatox (SPECIAL REQUEST2-AQT 14)	9/9/2019	
	Special Request Aquatox (SPECIAL REQUEST-AQT 14)	9/9/2019	

Subcontract Info Contact: Mary-Lynn Pike (519) 886-6910
Analysis and reporting info contact: Rick Hawthorne
60 NORTHLAND ROAD, UNIT 1
WATERLOO,ON N2V 2B8
Phone: (519) 886-6910 Email: Rick.Hawthorne@alsglobal.com

Please email confirmation of receipt to: **Rick.Hawthorne@alsglobal.com**

Shipped By: _____ Date Shipped: _____

Received By: _____ Date Received: _____

Verified By: _____ Date Verified: _____

Temperature: _____

Sample Integrity Issues: _____

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2339839-COFC

Report To	Contact and company name below will appear on the final report
Company:	Baffinland Iron Mines Corp.
Contact:	Wiliam Bowden and Connor Devereaux
Phone:	647-253-0596 EXT 6016
	Company address below will appear on the final report
Street:	2275 Upper Middle Rd. E., Suite #300
City/Province:	Oakville, ON
Postal Code:	L6H 0C3
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report ☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax: bimcore@alsglobal.com
Email 2:
Email 3:

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax: ap@baffinland.com
Email 2: commercial@baffinland.com

Project Information

ALS Account # / Quote #:	23642 /Q42455
Job #:	MS-08 WT TOX
PO / AFE:	4500057496
LSD:	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#:
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only): L2339839

ALS Contact: **Sampler:** KB/CP

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☐ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
	4 day [P4] ☐		1 Business day [E1] ☐
	3 day [P3] ☐		Same Day, Weekend or Statutory holiday [E0] ☑
	2 day [P2] ☐		

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	BIM-MMER-WT	Group 3	Number of Containers
	MS-08	2-Sep-19	14:25	Water	E0	E1	11

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human drinking water use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐
Ice Packs ☐ Ice Cubes ☑ Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			2.0		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released By: Kendra Button	Date: 2-Sep-19	Time: 16:40	Received by:	Date:	Time:	Received by:	Date: 3 Sep 19	Time: 1000

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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 specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Baffinland Iron Mine's Corporation (Oakville)
ATTN: William Bowden/Connor Devereaux
2275 Upper Middle Rd. E.
Suite #300
Oakville ON L6H 0C3

Date Received: 28-SEP-19
Report Date: 21-OCT-19 11:03 (MT)
Version: FINAL

Client Phone: 647-253-0596

Certificate of Analysis

Lab Work Order #: L2356235

Project P.O. #: 4500057496
Job Reference: MS-08 DEL
C of C Numbers:
Legal Site Desc:

Rick Hawthorne
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2356235-1 MS-08 Sampled By: KB/LM on 28-SEP-19 @ 13:30 Matrix: WATER							
Physical Tests							
Conductivity	1390		3.0	umhos/cm		02-OCT-19	R4857597
pH	6.91		0.10	pH units		29-SEP-19	R4849880
Total Suspended Solids	40.5		2.0	mg/L		29-SEP-19	R4849883
Total Dissolved Solids	1080		20	mg/L		29-SEP-19	R4849913
Turbidity	42.1		0.10	NTU		29-SEP-19	R4849881
Anions and Nutrients							
Ammonia, Total (as N)	0.50	DLHC	0.10	mg/L		02-OCT-19	R4856571
Cyanides							
Cyanide, Total	<0.020	DLM	0.020	mg/L		03-OCT-19	R4857913
Total Metals							
Aluminum (Al)-Total	1.02	DLHC	0.050	mg/L	02-OCT-19	02-OCT-19	R4854170
Antimony (Sb)-Total	<0.0010	DLHC	0.0010	mg/L	02-OCT-19	02-OCT-19	R4854170
Arsenic (As)-Total	<0.0010	DLHC	0.0010	mg/L	02-OCT-19	02-OCT-19	R4854170
Barium (Ba)-Total	0.0148	DLHC	0.0010	mg/L	02-OCT-19	02-OCT-19	R4854170
Beryllium (Be)-Total	<0.0010	DLHC	0.0010	mg/L	02-OCT-19	02-OCT-19	R4854170
Bismuth (Bi)-Total	<0.00050	DLHC	0.00050	mg/L	02-OCT-19	02-OCT-19	R4854170
Boron (B)-Total	<0.10	DLHC	0.10	mg/L	02-OCT-19	02-OCT-19	R4854170
Cadmium (Cd)-Total	0.000133	DLHC	0.000050	mg/L	02-OCT-19	02-OCT-19	R4854170
Calcium (Ca)-Total	44.6	DLHC	0.50	mg/L	02-OCT-19	02-OCT-19	R4854170
Cesium (Cs)-Total	<0.00010	DLHC	0.00010	mg/L	02-OCT-19	02-OCT-19	R4854170
Chromium (Cr)-Total	<0.0050	DLHC	0.0050	mg/L	02-OCT-19	02-OCT-19	R4854170
Cobalt (Co)-Total	0.0691	DLHC	0.0010	mg/L	02-OCT-19	02-OCT-19	R4854170
Copper (Cu)-Total	<0.010	DLHC	0.010	mg/L	02-OCT-19	02-OCT-19	R4854170
Iron (Fe)-Total	4.43	DLHC	0.10	mg/L	02-OCT-19	02-OCT-19	R4854170
Lead (Pb)-Total	0.00120	DLHC	0.00050	mg/L	02-OCT-19	02-OCT-19	R4854170
Lithium (Li)-Total	<0.010	DLHC	0.010	mg/L	02-OCT-19	02-OCT-19	R4854170
Magnesium (Mg)-Total	169	DLHC	0.050	mg/L	02-OCT-19	02-OCT-19	R4854170
Manganese (Mn)-Total	5.85	DLHC	0.0050	mg/L	02-OCT-19	02-OCT-19	R4854170
Molybdenum (Mo)-Total	0.00072	DLHC	0.00050	mg/L	02-OCT-19	02-OCT-19	R4854170
Nickel (Ni)-Total	0.0774	DLHC	0.0050	mg/L	02-OCT-19	02-OCT-19	R4854170
Phosphorus (P)-Total	<0.50	DLHC	0.50	mg/L	02-OCT-19	02-OCT-19	R4854170
Potassium (K)-Total	2.76	DLHC	0.50	mg/L	02-OCT-19	02-OCT-19	R4854170
Rubidium (Rb)-Total	0.0051	DLHC	0.0020	mg/L	02-OCT-19	02-OCT-19	R4854170
Selenium (Se)-Total	0.00243	DLHC	0.00050	mg/L	02-OCT-19	02-OCT-19	R4854170
Silicon (Si)-Total	2.3	DLHC	1.0	mg/L	02-OCT-19	02-OCT-19	R4854170
Silver (Ag)-Total	<0.00050	DLHC	0.00050	mg/L	02-OCT-19	02-OCT-19	R4854170
Sodium (Na)-Total	1.52	DLHC	0.50	mg/L	02-OCT-19	02-OCT-19	R4854170
Strontium (Sr)-Total	0.033	DLHC	0.010	mg/L	02-OCT-19	02-OCT-19	R4854170
Sulfur (S)-Total	258	DLHC	5.0	mg/L	02-OCT-19	02-OCT-19	R4854170
Tellurium (Te)-Total	<0.0020	DLHC	0.0020	mg/L	02-OCT-19	02-OCT-19	R4854170
Thallium (Tl)-Total	<0.00010	DLHC	0.00010	mg/L	02-OCT-19	02-OCT-19	R4854170
Thorium (Th)-Total	<0.0010	DLHC	0.0010	mg/L	02-OCT-19	02-OCT-19	R4854170

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2356235-1 MS-08 Sampled By: KB/LM on 28-SEP-19 @ 13:30 Matrix: WATER							
Total Metals							
Tin (Sn)-Total	<0.0010	DLHC	0.0010	mg/L	02-OCT-19	02-OCT-19	R4854170
Titanium (Ti)-Total	0.0547	DLHC	0.0030	mg/L	02-OCT-19	02-OCT-19	R4854170
Tungsten (W)-Total	<0.0010	DLHC	0.0010	mg/L	02-OCT-19	02-OCT-19	R4854170
Uranium (U)-Total	0.00151	DLHC	0.00010	mg/L	02-OCT-19	02-OCT-19	R4854170
Vanadium (V)-Total	<0.0050	DLHC	0.0050	mg/L	02-OCT-19	02-OCT-19	R4854170
Zinc (Zn)-Total	<0.030	DLHC	0.030	mg/L	02-OCT-19	02-OCT-19	R4854170
Zirconium (Zr)-Total	<0.0020	DLHC	0.0020	mg/L	02-OCT-19	02-OCT-19	R4854170
Radiological Parameters							
Ra-226	0.017		0.0048	Bq/L	08-OCT-19	17-OCT-19	R4851666

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

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)

Sample Parameter Qualifier key listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
CN-TOT-WT	Water	Cyanide, Total	ISO 14403-2

Total cyanide is determined by the combination of UV digestion and distillation. Cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

When using this method, high levels of thiocyanate in samples can cause false positives at ~1-2% of the thiocyanate concentration. For samples with detectable cyanide analyzed by this method, ALS recommends analysis for thiocyanate to check for this potential interference

EC-SCREEN-WT	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

EC-WT	Water	Conductivity	APHA 2510 B

Water samples can be measured directly by immersing the conductivity cell into the sample.

MET-T-CCMS-WT	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

NH3-F-WT	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

PH-BF	Water	pH	APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

RA226-MMER-FC	Water	Ra226 by Alpha Scint, MDC=0.01 Bq/L	EPA 903.1
SOLIDS-TDS-BF	Water	Total Dissolved Solids	APHA 2540C

A well-mixed sample is filtered though glass fibres filter. A known volume of the filtrate is evaporated and dried at 180 +/- 2C for 1hr.

SOLIDS-TSS-BF	Water	Suspended solids	APHA 2540 D-Gravimetric

A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104 +/- 1C for a minimum of four hours or until a constant weight is achieved.

TURBIDITY-BF	Water	Turbidity	APHA 2130 B

Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.

** 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
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA
FC	ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
BF	ALS ENVIRONMENTAL - BAFFIN ISLAND, NUNAVUT, CANADA

Chain of Custody Numbers:

Reference Information

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 weight of sample
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

Workorder: L2356235 Report Date: 21-OCT-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3

Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CN-TOT-WT	**Water**							
Batch R4857913								
WG3180527-3 DUP		**L2357043-2**						
Cyanide, Total		0.025	0.037	J	mg/L	0.013	0.04	03-OCT-19
WG3180527-2 LCS								
Cyanide, Total			102.1		%		80-120	02-OCT-19
WG3180527-1 MB								
Cyanide, Total			<0.0020		mg/L		0.002	02-OCT-19
WG3180527-4 MS		**L2357043-2**						
Cyanide, Total			89.7		%		70-130	03-OCT-19
EC-WT	**Water**							
Batch R4857597								
WG3179309-4 DUP		**WG3179309-3**						
Conductivity		2090	2080		umhos/cm	0.5	10	02-OCT-19
WG3179309-2 LCS								
Conductivity			100.2		%		90-110	02-OCT-19
WG3179309-1 MB								
Conductivity			<3.0		umhos/cm		3	02-OCT-19
MET-T-CCMS-WT	**Water**							
Batch R4854170								
WG3179173-4 DUP		**WG3179173-3**						
Aluminum (Al)-Total		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	02-OCT-19
Antimony (Sb)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	02-OCT-19
Arsenic (As)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	02-OCT-19
Barium (Ba)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	02-OCT-19
Beryllium (Be)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	02-OCT-19
Bismuth (Bi)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	02-OCT-19
Boron (B)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	02-OCT-19
Cadmium (Cd)-Total		<0.0000050	<0.000005(	RPD-NA	mg/L	N/A	20	02-OCT-19
Calcium (Ca)-Total		<0.050	<0.050	RPD-NA	mg/L	N/A	20	02-OCT-19
Chromium (Cr)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	02-OCT-19
Cesium (Cs)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	02-OCT-19
Cobalt (Co)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	02-OCT-19
Copper (Cu)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	02-OCT-19
Iron (Fe)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	02-OCT-19
Lead (Pb)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	02-OCT-19
Lithium (Li)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	02-OCT-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4854170								
WG3179173-4 DUP		**WG3179173-3**						
Magnesium (Mg)-Total		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	02-OCT-19
Manganese (Mn)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	02-OCT-19
Molybdenum (Mo)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	02-OCT-19
Nickel (Ni)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	02-OCT-19
Phosphorus (P)-Total		<0.050	<0.050	RPD-NA	mg/L	N/A	20	02-OCT-19
Potassium (K)-Total		<0.050	<0.050	RPD-NA	mg/L	N/A	20	02-OCT-19
Rubidium (Rb)-Total		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	02-OCT-19
Selenium (Se)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	02-OCT-19
Silicon (Si)-Total		<0.10	<0.10	RPD-NA	mg/L	N/A	20	02-OCT-19
Silver (Ag)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	02-OCT-19
Sodium (Na)-Total		<0.050	<0.050	RPD-NA	mg/L	N/A	20	02-OCT-19
Strontium (Sr)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	02-OCT-19
Sulfur (S)-Total		<0.50	<0.50	RPD-NA	mg/L	N/A	25	02-OCT-19
Thallium (Tl)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	02-OCT-19
Tellurium (Te)-Total		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	02-OCT-19
Thorium (Th)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	25	02-OCT-19
Tin (Sn)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	02-OCT-19
Titanium (Ti)-Total		<0.00030	<0.00030	RPD-NA	mg/L	N/A	20	02-OCT-19
Tungsten (W)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	02-OCT-19
Uranium (U)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	02-OCT-19
Vanadium (V)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	02-OCT-19
Zinc (Zn)-Total		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	02-OCT-19
Zirconium (Zr)-Total		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	02-OCT-19
WG3179173-2 LCS								
Aluminum (Al)-Total			103.6		%		80-120	02-OCT-19
Antimony (Sb)-Total			101.1		%		80-120	02-OCT-19
Arsenic (As)-Total			98.7		%		80-120	02-OCT-19
Barium (Ba)-Total			99.7		%		80-120	02-OCT-19
Beryllium (Be)-Total			95.9		%		80-120	02-OCT-19
Bismuth (Bi)-Total			96.5		%		80-120	02-OCT-19
Boron (B)-Total			93.0		%		80-120	02-OCT-19
Cadmium (Cd)-Total			95.4		%		80-120	02-OCT-19
Calcium (Ca)-Total			95.8		%		80-120	02-OCT-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4854170								
WG3179173-2 LCS								
Chromium (Cr)-Total			99.6		%		80-120	02-OCT-19
Cesium (Cs)-Total			96.1		%		80-120	02-OCT-19
Cobalt (Co)-Total			97.0		%		80-120	02-OCT-19
Copper (Cu)-Total			95.7		%		80-120	02-OCT-19
Iron (Fe)-Total			96.4		%		80-120	02-OCT-19
Lead (Pb)-Total			99.6		%		80-120	02-OCT-19
Lithium (Li)-Total			95.9		%		80-120	02-OCT-19
Magnesium (Mg)-Total			106.9		%		80-120	02-OCT-19
Manganese (Mn)-Total			100.5		%		80-120	02-OCT-19
Molybdenum (Mo)-Total			96.7		%		80-120	02-OCT-19
Nickel (Ni)-Total			95.8		%		80-120	02-OCT-19
Phosphorus (P)-Total			102.6		%		70-130	02-OCT-19
Potassium (K)-Total			98.4		%		80-120	02-OCT-19
Rubidium (Rb)-Total			99.6		%		80-120	02-OCT-19
Selenium (Se)-Total			98.8		%		80-120	02-OCT-19
Silicon (Si)-Total			100.1		%		60-140	02-OCT-19
Silver (Ag)-Total			95.8		%		80-120	02-OCT-19
Sodium (Na)-Total			104.7		%		80-120	02-OCT-19
Strontium (Sr)-Total			101.5		%		80-120	02-OCT-19
Sulfur (S)-Total			96.5		%		80-120	02-OCT-19
Thallium (Tl)-Total			97.4		%		80-120	02-OCT-19
Tellurium (Te)-Total			95.3		%		80-120	02-OCT-19
Thorium (Th)-Total			97.1		%		70-130	02-OCT-19
Tin (Sn)-Total			98.4		%		80-120	02-OCT-19
Titanium (Ti)-Total			98.3		%		80-120	02-OCT-19
Tungsten (W)-Total			96.2		%		80-120	02-OCT-19
Uranium (U)-Total			93.5		%		80-120	02-OCT-19
Vanadium (V)-Total			101.1		%		80-120	02-OCT-19
Zinc (Zn)-Total			96.4		%		80-120	02-OCT-19
Zirconium (Zr)-Total			93.6		%		80-120	02-OCT-19
WG3179173-1 MB								
Aluminum (Al)-Total			<0.0050		mg/L		0.005	02-OCT-19
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	02-OCT-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	02-OCT-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4854170								
WG3179173-1 MB								
Barium (Ba)-Total			<0.00010		mg/L		0.0001	02-OCT-19
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	02-OCT-19
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	02-OCT-19
Boron (B)-Total			<0.010		mg/L		0.01	02-OCT-19
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	02-OCT-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	02-OCT-19
Chromium (Cr)-Total			<0.00050		mg/L		0.0005	02-OCT-19
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	02-OCT-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	02-OCT-19
Copper (Cu)-Total			<0.0010		mg/L		0.001	02-OCT-19
Iron (Fe)-Total			<0.010		mg/L		0.01	02-OCT-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	02-OCT-19
Lithium (Li)-Total			<0.0010		mg/L		0.001	02-OCT-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	02-OCT-19
Manganese (Mn)-Total			<0.00050		mg/L		0.0005	02-OCT-19
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	02-OCT-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	02-OCT-19
Phosphorus (P)-Total			<0.050		mg/L		0.05	02-OCT-19
Potassium (K)-Total			<0.050		mg/L		0.05	02-OCT-19
Rubidium (Rb)-Total			<0.00020		mg/L		0.0002	02-OCT-19
Selenium (Se)-Total			<0.000050		mg/L		0.00005	02-OCT-19
Silicon (Si)-Total			<0.10		mg/L		0.1	02-OCT-19
Silver (Ag)-Total			<0.000050		mg/L		0.00005	02-OCT-19
Sodium (Na)-Total			<0.050		mg/L		0.05	02-OCT-19
Strontium (Sr)-Total			<0.0010		mg/L		0.001	02-OCT-19
Sulfur (S)-Total			<0.50		mg/L		0.5	02-OCT-19
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	02-OCT-19
Tellurium (Te)-Total			<0.00020		mg/L		0.0002	02-OCT-19
Thorium (Th)-Total			<0.00010		mg/L		0.0001	02-OCT-19
Tin (Sn)-Total			<0.00010		mg/L		0.0001	02-OCT-19
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	02-OCT-19
Tungsten (W)-Total			<0.00010		mg/L		0.0001	02-OCT-19
Uranium (U)-Total			<0.000010		mg/L		0.00001	02-OCT-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4854170								
WG3179173-1 MB								
Vanadium (V)-Total			<0.00050		mg/L		0.0005	02-OCT-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	02-OCT-19
Zirconium (Zr)-Total			<0.00020		mg/L		0.0002	02-OCT-19
WG3179173-5 MS		**WG3179173-3**						
Aluminum (Al)-Total			100.4		%		70-130	02-OCT-19
Antimony (Sb)-Total			101.1		%		70-130	02-OCT-19
Arsenic (As)-Total			98.9		%		70-130	02-OCT-19
Barium (Ba)-Total			98.2		%		70-130	02-OCT-19
Beryllium (Be)-Total			97.5		%		70-130	02-OCT-19
Bismuth (Bi)-Total			97.4		%		70-130	02-OCT-19
Boron (B)-Total			95.9		%		70-130	02-OCT-19
Cadmium (Cd)-Total			98.9		%		70-130	02-OCT-19
Calcium (Ca)-Total			98.1		%		70-130	02-OCT-19
Chromium (Cr)-Total			99.9		%		70-130	02-OCT-19
Cesium (Cs)-Total			95.8		%		70-130	02-OCT-19
Cobalt (Co)-Total			98.8		%		70-130	02-OCT-19
Copper (Cu)-Total			99.3		%		70-130	02-OCT-19
Iron (Fe)-Total			98.4		%		70-130	02-OCT-19
Lead (Pb)-Total			101.9		%		70-130	02-OCT-19
Lithium (Li)-Total			97.7		%		70-130	02-OCT-19
Magnesium (Mg)-Total			106.9		%		70-130	02-OCT-19
Manganese (Mn)-Total			103.3		%		70-130	02-OCT-19
Molybdenum (Mo)-Total			95.3		%		70-130	02-OCT-19
Nickel (Ni)-Total			97.5		%		70-130	02-OCT-19
Phosphorus (P)-Total			103.3		%		70-130	02-OCT-19
Potassium (K)-Total			98.3		%		70-130	02-OCT-19
Rubidium (Rb)-Total			100.8		%		70-130	02-OCT-19
Selenium (Se)-Total			100.3		%		70-130	02-OCT-19
Silicon (Si)-Total			99.4		%		70-130	02-OCT-19
Silver (Ag)-Total			96.2		%		70-130	02-OCT-19
Sodium (Na)-Total			105.7		%		70-130	02-OCT-19
Strontium (Sr)-Total			100.7		%		70-130	02-OCT-19
Sulfur (S)-Total			99.8		%		70-130	02-OCT-19
Thallium (Tl)-Total			99.4		%		70-130	02-OCT-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4854170								
WG3179173-5 MS		**WG3179173-3**						
Tellurium (Te)-Total			93.3		%		70-130	02-OCT-19
Thorium (Th)-Total			95.3		%		70-130	02-OCT-19
Tin (Sn)-Total			96.3		%		70-130	02-OCT-19
Titanium (Ti)-Total			99.9		%		70-130	02-OCT-19
Tungsten (W)-Total			97.7		%		70-130	02-OCT-19
Uranium (U)-Total			94.6		%		70-130	02-OCT-19
Vanadium (V)-Total			101.3		%		70-130	02-OCT-19
Zinc (Zn)-Total			96.6		%		70-130	02-OCT-19
Zirconium (Zr)-Total			93.6		%		70-130	02-OCT-19
NH3-F-WT	**Water**							
Batch R4856571								
WG3179170-19 DUP		**L2356009-15**						
Ammonia, Total (as N)		0.035	0.039		mg/L	11	20	02-OCT-19
WG3179170-18 LCS								
Ammonia, Total (as N)			103.1		%		85-115	02-OCT-19
WG3179170-17 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	02-OCT-19
WG3179170-20 MS		**L2356009-15**						
Ammonia, Total (as N)			91.7		%		75-125	02-OCT-19
PH-BF	**Water**							
Batch R4849880								
WG3176164-2 DUP		**L2356235-1**						
pH		6.91	6.91	J	pH units	0.00	0.2	29-SEP-19
WG3176164-1 LCS								
pH			7.01		pH units		6.9-7.1	29-SEP-19
SOLIDS-TDS-BF	**Water**							
Batch R4849913								
WG3176171-3 DUP		**L2356119-2**						
Total Dissolved Solids		711	677		mg/L	5.0	20	29-SEP-19
WG3176171-2 LCS								
Total Dissolved Solids			103.6		%		85-115	29-SEP-19
WG3176171-1 MB								
Total Dissolved Solids			<20		mg/L		20	29-SEP-19
SOLIDS-TSS-BF	**Water**							

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SOLIDS-TSS-BF	**Water**							
Batch R4849883								
WG3176170-3 DUP		**L2356235-1**						
Total Suspended Solids		40.5	40.5		mg/L	0.0	25	29-SEP-19
WG3176170-2 LCS								
Total Suspended Solids			99.4		%		85-115	29-SEP-19
WG3176170-1 MB								
Total Suspended Solids			<2.0		mg/L		2	29-SEP-19
TURBIDITY-BF	**Water**							
Batch R4849881								
WG3176166-3 DUP		**L2356119-2**						
Turbidity		22.2	22.2		NTU	0.0	15	29-SEP-19
WG3176166-2 LCS								
Turbidity			110.0		%		85-115	29-SEP-19
WG3176166-1 MB								
Turbidity			<0.10		NTU		0.1	29-SEP-19

Quality Control Report

Workorder: L2356235 Report Date: 21-OCT-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

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

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

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.

Friday, October 18, 2019

Rick Hawthorne
ALS Environmental
60 Northland Rd, Unit 1
Waterloo Canada, ON N2V 2B8

Re: ALS Workorder: 1910088
Project Name:
Project Number: L2356235

Dear Mr. Hawthorne:

One water sample was received from ALS Environmental, on 10/3/2019. The sample was scheduled for the following analysis:

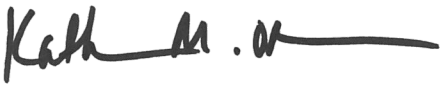
Radium-226

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,



ALS Environmental
Katie M. OBrien
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
AIHA	214884
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280

1910088

Radium-226:
The sample was prepared and analyzed according to the current revision of SOP 783.

All acceptance criteria were met.

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1910088
Client Name: ALS Environmental
Client Project Name:
Client Project Number: L2356235
Client PO Number: L2356235

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
L2356235-1	1910088-1		WATER	28-Sep-19	

ALS Environmental

L2356235

WATERLOO

1910088

Subcontract Request Form

Subcontract To:

ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
225 COMMERCE DRIVE
FORT COLLINS,CO 80524

NOTES: Please reference on final report and invoice: PO# *L2356235*
ALS requires QC data to be provided with your final results.

Please see enclosed 1 **sample(s) in** 1 **Container(s)**

SAMPLE NUMBER	ANALYTICAL REQUIRED	DATE SAMPLED / DUE DATE	Priority Flag
L2356235-1 MS-08		9/28/2019	E
	Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	10/18/2019	

Subcontract Info Contact: Mary-Lynn Pike (519) 886-6910
Analysis and reporting info contact: Rick Hawthorne
60 NORTHLAND ROAD, UNIT 1
WATERLOO,ON N2V 2B8
Phone: (519) 886-6910 Email: Rick.Hawthorne@alsglobal.com

Please email confirmation of receipt to: **Rick.Hawthorne@alsglobal.com**

Shipped By: _____ Date Shipped: _____

Received By: Emily Lyons Date Received: 10·03·19 1005

Verified By: _____ Date Verified: _____

Temperature: _____

Sample Integrity Issues: _____

ALS Environmental - Fort Collins

CONDITION OF SAMPLE UPON RECEIPT FORM

Client: ALS-Waterloo Workorder No: 1910088

Project Manager: KMO Initials: Eur Date: 10.03.19

1.	Are airbills / shipping documents present and/or removable?	DROP OFF	(YES)	NO
2.	Are custody seals on **shipping** containers intact?	(NONE)	YES	NO *
3.	Are custody seals on **sample** containers intact?	(NONE)	YES	NO *
4.	Is there a COC (chain-of-custody) present?		(YES)	NO *
5.	Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)		(YES)	NO *
6.	Are short-hold samples present?		YES	(NO)
7.	Are all samples within holding times for the requested analyses?		(YES)	NO *
8.	Were all sample containers received intact? (not broken or leaking)		(YES)	NO *
9.	Is there sufficient sample for the requested analyses?		(YES)	NO *
10.	Are all samples in the proper containers for the requested analyses?		(YES)	NO *
11.	Are all aqueous samples preserved correctly, if required? (excluding volatiles)	N/A	(YES)	NO *
12.	Are all aqueous non-preserved samples pH 4-9?	(N/A)	YES	NO *
13.	Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm (1/4 inch) diameter? (i.e. size of green pea)	(N/A)	YES	NO
14.	Were the samples shipped on ice?		(YES)	NO
15.	Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: #1 (#3) #4	(RAD ONLY)	YES	NO

Cooler #:	1							
Temperature (°C):	11.8							
No. of custody seals on cooler:	0							
DOT Survey/ Acceptance Information — External µR/hr reading:	12							
Background µR/hr reading:	14							

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? YES / NO / NA (If no, see Form 008.)

*** Please provide details here for NO responses to gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.**

All client bottle ID's vs ALS lab ID's double-checked by: Eur

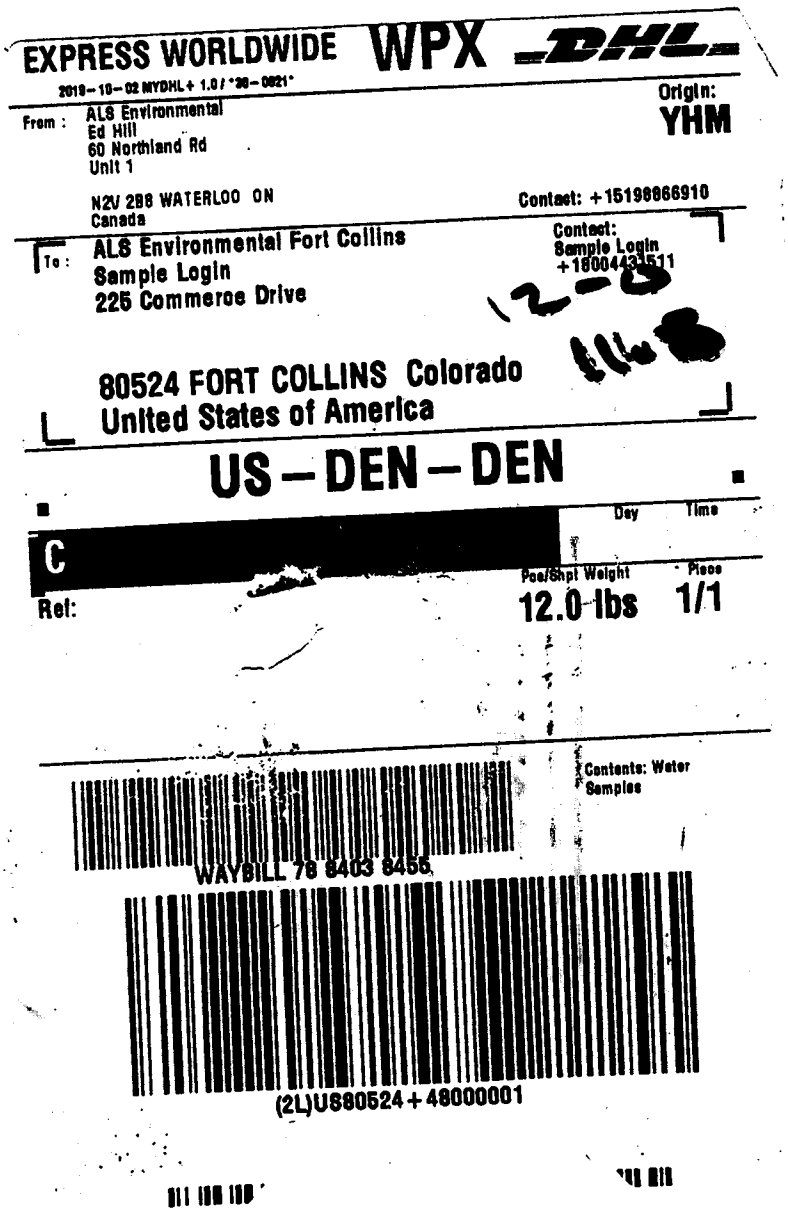
If applicable, was the client contacted? YES / NO / NA Contact: _____ Date/Time: _____

Project Manager Signature / Date: 10/4/19

Form 201r27.xls
(02/11/2019)

*IR Gun #1, VWR SN 170560549
*IR Gun #3, VWR SN 170647571
*IR Gun #4, Oakton, SN 2372220101-0002

1910088



EXPRESS WORLDWIDE WPX DHL

2019-10-02 MYDHL+ 1.0/*36-0821*

From : ALS Environmental
Ed Hill
60 Northland Rd
Unit 1

N2V 2B8 WATERLOO ON
Canada

Origin:
YHM

Contact: +15198866910

To : ALS Environmental Fort Collins
Sample Login
225 Commerce Drive

Contact:
Sample Login
+18004431511

12-8

80524 FORT COLLINS Colorado
United States of America

US-DEN-DEN

Day Time

C

Ref:

Pce/Shpt Weight 12.0 lbs

Piece 1/1

Contents: Water Samples

WAYBILL 78 8403 8455

(2L)US80524+48000001

Client:	ALS Environmental	**Date:**	*18-Oct-19*
Project:	L2356235	**Work Order:**	1910088
Sample ID:	L2356235-1	**Lab ID:**	1910088-1
Legal Location:		**Matrix:**	WATER
Collection Date:	9/28/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**			Prep Date: **10/8/2019**	PrepBy: **TRW**
Ra-226	**0.017 (+/- 0.0070)**	Y1	**0.0048**	**BQ/l**	NA	10/17/2019 14:05
Carr: BARIUM	*102*	Y1	*40-110*	*%REC*	DL = NA	10/17/2019 14:05

Client:	ALS Environmental	**Date:**	*18-Oct-19*
Project:	L2356235	**Work Order:**	1910088
Sample ID:	L2356235-1	**Lab ID:**	1910088-1
Legal Location:		**Matrix:**	WATER
Collection Date:	9/28/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed

Explanation of Qualifiers

Radiochemistry:

- "Report Limit" is the MDC

U or ND - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

Y2 - Chemical Yield outside default limits.

W - DER is greater than Warning Limit of 1.42

* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.
# - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.
G - Sample density differs by more than 15% of LCS density.
D - DER is greater than Control Limit

M - Requested MDC not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS, Matrix Spike Recovery within control limits.

N - Matrix Spike Recovery outside control limits

NC - Not Calculated for duplicate results less than 5 times MDC

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

Inorganics:

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).

U or ND - Indicates that the compound was analyzed for but not detected.

E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.

M - Duplicate injection precision was not met.

N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.

Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.

* - Duplicate analysis (relative percent difference) not within control limits.

S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

Organics:

U or ND - Indicates that the compound was analyzed for but not detected.

B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.

E - Analyte concentration exceeds the upper level of the calibration range.

J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).

A - A tentatively identified compound is a suspected aldol-condensation product.

X - The analyte was diluted below an accurate quantitation level.

* - The spike recovery is equal to or outside the control criteria used.

+ - The relative percent difference (RPD) equals or exceeds the control criteria.

G - A pattern resembling gasoline was detected in this sample.

D - A pattern resembling diesel was detected in this sample.

M - A pattern resembling motor oil was detected in this sample.

C - A pattern resembling crude oil was detected in this sample.

4 - A pattern resembling JP-4 was detected in this sample.

5 - A pattern resembling JP-5 was detected in this sample.

H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.

L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.

Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
- gasoline
- JP-8
- diesel
- mineral spirits
- motor oil
- Stoddard solvent
- bunker C

Batch ID: **RE191008-2-1** Instrument ID **Alpha Scin** Method: **Radium-226 by Radon Emanation**

LCS Sample ID: **RE191008-2** Units: **BQ/l** Analysis Date: **10/17/2019 14:40**
Client ID: Run ID: **RE191008-2A** Prep Date: **10/8/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.58 (+/- 0.393)	0.0155	1.72		91.6	67-120					P,Y1,M3
Carr: BARIUM	16500		16380		101	40-110					Y1

LCSD Sample ID: **RE191008-2** Units: **BQ/l** Analysis Date: **10/17/2019 14:40**
Client ID: Run ID: **RE191008-2A** Prep Date: **10/8/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.49 (+/- 0.373)	0.0178	1.72		86.7	67-120		1.58	0.2	2.1	P,Y1,M3
Carr: BARIUM	16500		16390		101	40-110		16500			Y1

MB Sample ID: **RE191008-2** Units: **BQ/l** Analysis Date: **10/17/2019 14:40**
Client ID: Run ID: **RE191008-2A** Prep Date: **10/8/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	0.0023 (+/- 0.0027)	0.0041									Y1,U
Carr: BARIUM	16600		16380		102	40-110					Y1

The following samples were analyzed in this batch: 1910088-1

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2356235-COFC

COC Number: 15 -

Page 1 of 1

Report To	Contact and company name below will appear on the final report
Company:	Baffinland Iron Mines Corp.
Contact:	Wiliam Bowden and Connor Devereaux
Phone:	647-253-0596 EXT 6016
	Company address below will appear on the final report
Street:	2275 Upper Middle Rd. E., Suite #300
City/Province:	Oakville, ON
Postal Code:	L6H 0C3

Invoice To		
	Same as Report To	☑ YES ☐ NO
	Copy of Invoice with Report	☐ YES ☑ NO
Company:		
Contact:		

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)

Quality Control (QC) Report with Report ☑ YES ☐ NO

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: bimcore@alsglobal.com

Email 2:

Email 3:

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: ap@baffinland.com

Email 2: commercial@baffinland.com

Project Information

ALS Account # / Quote #:	23642 /Q42455
Job #:	MS-08 DEL
PO / AFE:	4500057496
LSD:	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#:
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only): L2356235

ALS Contact:

Sampler: KB/LM

Confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☐ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
4 day [P4]	☐	1 Business day [E1]	☐
3 day [P3]	☐	Same Day, Weekend or Statutory holiday [E0]	☑
2 day [P2]	☐		

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	BIM-MMER-DEL	Number of Containers
	MS-08	28-Sep-19	13:30	Water	E0	6

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☑ NO	
Are samples for human drinking water use? ☐ YES ☑ NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			12.8		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Kendra Button	Release Date: 28-Sep-19	Time: 16:30	Received by:	Date:	Time:	Received by: J.Streeter	Date: Sept 28/19 2-Oct-19	Time: 6:00pm 9:15

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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 specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Baffinland Iron Mine's Corporation (Oakville)
ATTN: William Bowden/Connor Devereaux
2275 Upper Middle Rd. E.
Suite #300
Oakville ON L6H 0C3

Date Received: 30-SEP-19
Report Date: 21-OCT-19 11:04 (MT)
Version: FINAL

Client Phone: 647-253-0596

Certificate of Analysis

Lab Work Order #: L2356892

Project P.O. #: 4500057496
Job Reference: MS-08 EFF CHARACTERIZATION
C of C Numbers:
Legal Site Desc:

Comments: ADDITIONAL 02-OCT-19 07:45

Rick Hawthorne
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2356892-1 MS-08 Sampled By: KB/AZ on 30-SEP-19 @ 09:20 Matrix: WATER							
Physical Tests							
Conductivity	870		3.0	umhos/cm		02-OCT-19	R4857597
Hardness (as CaCO3)	479	HTC	1.3	mg/L		03-OCT-19	
pH	6.92		0.10	pH units		01-OCT-19	R4851198
Total Suspended Solids	55.5		2.0	mg/L		01-OCT-19	R4851221
Total Dissolved Solids	643		20	mg/L		01-OCT-19	R4851401
Turbidity	72.1		0.10	NTU		01-OCT-19	R4851213
Anions and Nutrients							
Alkalinity, Total (as CaCO3)	25		10	mg/L		02-OCT-19	R4857597
Ammonia, Total (as N)	0.39	DLHC	0.10	mg/L		02-OCT-19	R4856571
Chloride (Cl)	2.21		0.50	mg/L		02-OCT-19	R4857755
Fluoride (F)	0.047		0.020	mg/L		02-OCT-19	R4857755
Nitrate (as N)	2.71		0.020	mg/L		02-OCT-19	R4857755
Total Kjeldahl Nitrogen	<1.5	DLM	1.5	mg/L	02-OCT-19	03-OCT-19	R4858209
Phosphorus, Total	0.052	DLM	0.030	mg/L	02-OCT-19	03-OCT-19	R4858093
Sulfate (SO4)	424		0.30	mg/L		02-OCT-19	R4857755
Cyanides							
Cyanide, Total	0.0065		0.0020	mg/L		02-OCT-19	R4857913
Organic / Inorganic Carbon							
Dissolved Carbon Filtration Location	LAB					02-OCT-19	R4857502
Dissolved Organic Carbon	1.33		0.50	mg/L	02-OCT-19	03-OCT-19	R4857987
Total Organic Carbon	2.22		0.50	mg/L		02-OCT-19	R4855629
Total Metals							
Aluminum (Al)-Total	1.88	DLHC	0.050	mg/L	02-OCT-19	02-OCT-19	R4854170
Antimony (Sb)-Total	<0.0010	DLHC	0.0010	mg/L	02-OCT-19	02-OCT-19	R4854170
Arsenic (As)-Total	<0.0010	DLHC	0.0010	mg/L	02-OCT-19	02-OCT-19	R4854170
Barium (Ba)-Total	0.0175	DLHC	0.0010	mg/L	02-OCT-19	02-OCT-19	R4854170
Beryllium (Be)-Total	<0.0010	DLHC	0.0010	mg/L	02-OCT-19	02-OCT-19	R4854170
Bismuth (Bi)-Total	<0.00050	DLHC	0.00050	mg/L	02-OCT-19	02-OCT-19	R4854170
Boron (B)-Total	<0.10	DLHC	0.10	mg/L	02-OCT-19	02-OCT-19	R4854170
Cadmium (Cd)-Total	0.000066	DLHC	0.000050	mg/L	02-OCT-19	02-OCT-19	R4854170
Calcium (Ca)-Total	30.5	DLHC	0.50	mg/L	02-OCT-19	02-OCT-19	R4854170
Cesium (Cs)-Total	0.00015	DLHC	0.00010	mg/L	02-OCT-19	02-OCT-19	R4854170
Chromium (Cr)-Total	<0.0050	DLHC	0.0050	mg/L	02-OCT-19	02-OCT-19	R4854170
Cobalt (Co)-Total	0.0359	DLHC	0.0010	mg/L	02-OCT-19	02-OCT-19	R4854170
Copper (Cu)-Total	<0.010	DLHC	0.010	mg/L	02-OCT-19	02-OCT-19	R4854170
Iron (Fe)-Total	6.55	DLHC	0.10	mg/L	02-OCT-19	02-OCT-19	R4854170
Lead (Pb)-Total	0.00227	DLHC	0.00050	mg/L	02-OCT-19	02-OCT-19	R4854170
Lithium (Li)-Total	<0.010	DLHC	0.010	mg/L	02-OCT-19	02-OCT-19	R4854170
Magnesium (Mg)-Total	97.8	DLHC	0.050	mg/L	02-OCT-19	02-OCT-19	R4854170
Manganese (Mn)-Total	3.33	DLHC	0.0050	mg/L	02-OCT-19	02-OCT-19	R4854170
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		02-OCT-19	R4855211
Molybdenum (Mo)-Total	0.00121	DLHC	0.00050	mg/L	02-OCT-19	02-OCT-19	R4854170

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2356892-1 MS-08 Sampled By: KB/AZ on 30-SEP-19 @ 09:20 Matrix: WATER							
Total Metals							
Nickel (Ni)-Total	0.0384	DLHC	0.0050	mg/L	02-OCT-19	02-OCT-19	R4854170
Phosphorus (P)-Total	<0.50	DLHC	0.50	mg/L	02-OCT-19	02-OCT-19	R4854170
Potassium (K)-Total	3.85	DLHC	0.50	mg/L	02-OCT-19	02-OCT-19	R4854170
Rubidium (Rb)-Total	0.0069	DLHC	0.0020	mg/L	02-OCT-19	02-OCT-19	R4854170
Selenium (Se)-Total	0.00123	DLHC	0.00050	mg/L	02-OCT-19	02-OCT-19	R4854170
Silicon (Si)-Total	3.6	DLHC	1.0	mg/L	02-OCT-19	02-OCT-19	R4854170
Silver (Ag)-Total	<0.00050	DLHC	0.00050	mg/L	02-OCT-19	02-OCT-19	R4854170
Sodium (Na)-Total	1.56	DLHC	0.50	mg/L	02-OCT-19	02-OCT-19	R4854170
Strontium (Sr)-Total	0.027	DLHC	0.010	mg/L	02-OCT-19	02-OCT-19	R4854170
Sulfur (S)-Total	146	DLHC	5.0	mg/L	02-OCT-19	02-OCT-19	R4854170
Tellurium (Te)-Total	<0.0020	DLHC	0.0020	mg/L	02-OCT-19	02-OCT-19	R4854170
Thallium (Tl)-Total	<0.00010	DLHC	0.00010	mg/L	02-OCT-19	02-OCT-19	R4854170
Thorium (Th)-Total	0.0013	DLHC	0.0010	mg/L	02-OCT-19	02-OCT-19	R4854170
Tin (Sn)-Total	<0.0010	DLHC	0.0010	mg/L	02-OCT-19	02-OCT-19	R4854170
Titanium (Ti)-Total	0.0893	DLHC	0.0030	mg/L	02-OCT-19	02-OCT-19	R4854170
Tungsten (W)-Total	<0.0010	DLHC	0.0010	mg/L	02-OCT-19	02-OCT-19	R4854170
Uranium (U)-Total	0.00263	DLHC	0.00010	mg/L	02-OCT-19	02-OCT-19	R4854170
Vanadium (V)-Total	<0.0050	DLHC	0.0050	mg/L	02-OCT-19	02-OCT-19	R4854170
Zinc (Zn)-Total	<0.030	DLHC	0.030	mg/L	02-OCT-19	02-OCT-19	R4854170
Zirconium (Zr)-Total	<0.0020	DLHC	0.0020	mg/L	02-OCT-19	02-OCT-19	R4854170
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					02-OCT-19	R4854329
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	02-OCT-19	02-OCT-19	R4855218
Radiological Parameters							
Ra-226	<0.0068		0.0068	Bq/L	08-OCT-19	17-OCT-19	R4851666
L2356892-2 MS-0802 Sampled By: KB/AZ on 30-SEP-19 @ 09:20 Matrix: WATER							
Physical Tests							
Conductivity	<3.0		3.0	umhos/cm		02-OCT-19	R4857597
Hardness (as CaCO3)	<0.50	HTC	0.50	mg/L		03-OCT-19	
pH	5.77		0.10	pH units		02-OCT-19	R4857597
Total Suspended Solids	<2.0		2.0	mg/L	02-OCT-19	03-OCT-19	R4857622
Total Dissolved Solids	<10		10	mg/L		02-OCT-19	R4857823
Turbidity	0.16	PEHT	0.10	NTU	03-OCT-19	03-OCT-19	R4858080
Anions and Nutrients							
Alkalinity, Total (as CaCO3)	<10		10	mg/L		02-OCT-19	R4857597
Ammonia, Total (as N)	<0.010		0.010	mg/L		02-OCT-19	R4856571
Chloride (Cl)	<0.50		0.50	mg/L		02-OCT-19	R4857755
Fluoride (F)	<0.020		0.020	mg/L		02-OCT-19	R4857755
Nitrate (as N)	<0.020		0.020	mg/L		02-OCT-19	R4857755
Total Kjeldahl Nitrogen	<0.15		0.15	mg/L	02-OCT-19	03-OCT-19	R4858209

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2356892-2 MS-0802 Sampled By: KB/AZ on 30-SEP-19 @ 09:20 Matrix: WATER							
Anions and Nutrients							
Phosphorus, Total	<0.0030		0.0030	mg/L	02-OCT-19	03-OCT-19	R4858093
Sulfate (SO4)	<0.30		0.30	mg/L		02-OCT-19	R4857755
Cyanides							
Cyanide, Total	<0.0020		0.0020	mg/L		02-OCT-19	R4857913
Organic / Inorganic Carbon							
Dissolved Carbon Filtration Location	LAB					02-OCT-19	R4857502
Dissolved Organic Carbon	<0.50		0.50	mg/L	02-OCT-19	03-OCT-19	R4857987
Total Organic Carbon	<0.50		0.50	mg/L		02-OCT-19	R4855629
Total Metals							
Aluminum (Al)-Total	<0.0050		0.0050	mg/L	02-OCT-19	02-OCT-19	R4854170
Antimony (Sb)-Total	<0.00010		0.00010	mg/L	02-OCT-19	02-OCT-19	R4854170
Arsenic (As)-Total	<0.00010		0.00010	mg/L	02-OCT-19	02-OCT-19	R4854170
Barium (Ba)-Total	<0.00010		0.00010	mg/L	02-OCT-19	02-OCT-19	R4854170
Beryllium (Be)-Total	<0.00010		0.00010	mg/L	02-OCT-19	02-OCT-19	R4854170
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L	02-OCT-19	02-OCT-19	R4854170
Boron (B)-Total	<0.010		0.010	mg/L	02-OCT-19	02-OCT-19	R4854170
Cadmium (Cd)-Total	<0.0000050		0.0000050	mg/L	02-OCT-19	02-OCT-19	R4854170
Calcium (Ca)-Total	<0.050		0.050	mg/L	02-OCT-19	02-OCT-19	R4854170
Cesium (Cs)-Total	<0.000010		0.000010	mg/L	02-OCT-19	02-OCT-19	R4854170
Chromium (Cr)-Total	<0.00050		0.00050	mg/L	02-OCT-19	02-OCT-19	R4854170
Cobalt (Co)-Total	<0.00010		0.00010	mg/L	02-OCT-19	02-OCT-19	R4854170
Copper (Cu)-Total	<0.0010		0.0010	mg/L	02-OCT-19	02-OCT-19	R4854170
Iron (Fe)-Total	<0.010		0.010	mg/L	02-OCT-19	02-OCT-19	R4854170
Lead (Pb)-Total	<0.000050		0.000050	mg/L	02-OCT-19	02-OCT-19	R4854170
Lithium (Li)-Total	<0.0010		0.0010	mg/L	02-OCT-19	02-OCT-19	R4854170
Magnesium (Mg)-Total	<0.0050		0.0050	mg/L	02-OCT-19	02-OCT-19	R4854170
Manganese (Mn)-Total	<0.00050		0.00050	mg/L	02-OCT-19	02-OCT-19	R4854170
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		02-OCT-19	R4855211
Molybdenum (Mo)-Total	<0.000050		0.000050	mg/L	02-OCT-19	02-OCT-19	R4854170
Nickel (Ni)-Total	<0.00050		0.00050	mg/L	02-OCT-19	02-OCT-19	R4854170
Phosphorus (P)-Total	<0.050		0.050	mg/L	02-OCT-19	02-OCT-19	R4854170
Potassium (K)-Total	<0.050		0.050	mg/L	02-OCT-19	02-OCT-19	R4854170
Rubidium (Rb)-Total	<0.00020		0.00020	mg/L	02-OCT-19	02-OCT-19	R4854170
Selenium (Se)-Total	<0.000050		0.000050	mg/L	02-OCT-19	02-OCT-19	R4854170
Silicon (Si)-Total	<0.10		0.10	mg/L	02-OCT-19	02-OCT-19	R4854170
Silver (Ag)-Total	<0.000050		0.000050	mg/L	02-OCT-19	02-OCT-19	R4854170
Sodium (Na)-Total	<0.050		0.050	mg/L	02-OCT-19	02-OCT-19	R4854170
Strontium (Sr)-Total	<0.0010		0.0010	mg/L	02-OCT-19	02-OCT-19	R4854170
Sulfur (S)-Total	<0.50		0.50	mg/L	02-OCT-19	02-OCT-19	R4854170
Tellurium (Te)-Total	<0.00020		0.00020	mg/L	02-OCT-19	02-OCT-19	R4854170
Thallium (Tl)-Total	<0.000010		0.000010	mg/L	02-OCT-19	02-OCT-19	R4854170
Thorium (Th)-Total	<0.00010		0.00010	mg/L	02-OCT-19	02-OCT-19	R4854170

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2356892-2 MS-0802 Sampled By: KB/AZ on 30-SEP-19 @ 09:20 Matrix: WATER							
Total Metals							
Tin (Sn)-Total	<0.00010		0.00010	mg/L	02-OCT-19	02-OCT-19	R4854170
Titanium (Ti)-Total	<0.00030		0.00030	mg/L	02-OCT-19	02-OCT-19	R4854170
Tungsten (W)-Total	<0.00010		0.00010	mg/L	02-OCT-19	02-OCT-19	R4854170
Uranium (U)-Total	<0.000010		0.000010	mg/L	02-OCT-19	02-OCT-19	R4854170
Vanadium (V)-Total	<0.00050		0.00050	mg/L	02-OCT-19	02-OCT-19	R4854170
Zinc (Zn)-Total	<0.0030		0.0030	mg/L	02-OCT-19	02-OCT-19	R4854170
Zirconium (Zr)-Total	<0.00020		0.00020	mg/L	02-OCT-19	02-OCT-19	R4854170
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					02-OCT-19	R4854329
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	02-OCT-19	02-OCT-19	R4855218
Radiological Parameters							
Ra-226	0.018		0.0078	Bq/L	08-OCT-19	17-OCT-19	R4851666

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

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)

Sample Parameter Qualifier key listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
HTC	Hardness was calculated from Total Ca and/or Mg concentrations and may be biased high (dissolved Ca/Mg results unavailable).
PEHT	Parameter Exceeded Recommended Holding Time Prior to Analysis

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-WT	Water	Alkalinity, Total (as CaCO3)	EPA 310.2

This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.

CL-IC-N-WT Water Chloride by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

CN-TOT-WT Water Cyanide, Total ISO 14403-2

Total cyanide is determined by the combination of UV digestion and distillation. Cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

When using this method, high levels of thiocyanate in samples can cause false positives at ~1-2% of the thiocyanate concentration. For samples with detectable cyanide analyzed by this method, ALS recommends analysis for thiocyanate to check for this potential interference

DOC-WT Water Dissolved Organic Carbon APHA 5310B

Sample is filtered through a 0.45um filter, then injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic carbon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.

EC-SCREEN-WT Water Conductivity Screen (Internal Use Only) APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

EC-WT Water Conductivity APHA 2510 B

Water samples can be measured directly by immersing the conductivity cell into the sample.

F-IC-N-WT Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-WT Water Hardness APHA 2340 B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-WT Water Dissolved Mercury in Water by CVAAS EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

HG-T-CVAA-WT Water Total Mercury in Water by CVAAS EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

MET-T-CCMS-WT Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

NH3-F-WT Water Ammonia in Water by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

Reference Information

NO3-IC-WT	Water	Nitrate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-COL-WT	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is deteremined colourimetrically after persulphate digestion of the sample.

PH-BF	Water	pH	APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

PH-WT	Water	pH	APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011). Holdtime for samples under this regulation is 28 days

RA226-MMER-FC	Water	Ra226 by Alpha Scint, MDC=0.01 Bq/L	EPA 903.1
SO4-IC-N-WT	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-BF	Water	Total Dissolved Solids	APHA 2540C

A well-mixed sample is filtered though glass fibres filter. A known volume of the filtrate is evaporated and dried at 180 +/- 2C for 1hr.

SOLIDS-TDS-WT	Water	Total Dissolved Solids	APHA 2540C

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

SOLIDS-TSS-BF	Water	Suspended solids	APHA 2540 D-Gravimetric

A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104 +/- 1C for a minimum of four hours or until a constant weight is achieved.

SOLIDS-TSS-WT	Water	Suspended solids	APHA 2540 D-Gravimetric

A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104–1°C for a minimum of four hours or until a constant weight is achieved.

TKN-WT	Water	Total Kjeldahl Nitrogen	APHA 4500-Norg D

This analysis is carried out using procedures adapted from APHA Method 4500-Norg "Nitrogen (Organic)". Total Kjeldahl Nitrogen is determined by sample digestion at 380 Celsius with analysis using an automated colorimetric method.

TOC-WT	Water	Total Organic Carbon	APHA 5310B

Sample is injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic cabon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.

TURBIDITY-BF	Water	Turbidity	APHA 2130 B

Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.

TURBIDITY-WT	Water	Turbidity	APHA 2130 B

Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.

** 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
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA
FC	ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
BF	ALS ENVIRONMENTAL - BAFFIN ISLAND, NUNAVUT, CANADA

Chain of Custody Numbers:

Reference Information

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 weight of sample
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

Workorder: L2356892 Report Date: 21-OCT-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ALK-WT	**Water**							
Batch R4857597								
WG3179309-4 DUP		**WG3179309-3**						
Alkalinity, Total (as CaCO3)		86	85		mg/L	1.0	20	02-OCT-19
WG3179309-2 LCS								
Alkalinity, Total (as CaCO3)			101.5		%		85-115	02-OCT-19
WG3179309-1 MB								
Alkalinity, Total (as CaCO3)			<10		mg/L		10	02-OCT-19
CL-IC-N-WT	**Water**							
Batch R4857755								
WG3179166-14 DUP		**WG3179166-13**						
Chloride (Cl)		3.86	3.84		mg/L	0.4	20	02-OCT-19
WG3179166-12 LCS								
Chloride (Cl)			101.9		%		90-110	02-OCT-19
WG3179166-11 MB								
Chloride (Cl)			<0.50		mg/L		0.5	02-OCT-19
WG3179166-15 MS		**WG3179166-13**						
Chloride (Cl)			99.0		%		75-125	02-OCT-19
CN-TOT-WT	**Water**							
Batch R4857913								
WG3180527-3 DUP		**L2357043-2**						
Cyanide, Total		0.025	0.037	J	mg/L	0.013	0.04	03-OCT-19
WG3180527-2 LCS								
Cyanide, Total			102.1		%		80-120	02-OCT-19
WG3180527-1 MB								
Cyanide, Total			<0.0020		mg/L		0.002	02-OCT-19
WG3180527-4 MS		**L2357043-2**						
Cyanide, Total			89.7		%		70-130	03-OCT-19
DOC-WT	**Water**							
Batch R4857987								
WG3180102-3 DUP		**L2356715-1**						
Dissolved Organic Carbon		3.30	3.51		mg/L	6.1	20	03-OCT-19
WG3180102-2 LCS								
Dissolved Organic Carbon			106.0		%		80-120	03-OCT-19
WG3180102-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	03-OCT-19
WG3180102-4 MS		**L2356715-1**						
Dissolved Organic Carbon			102.2		%		70-130	03-OCT-19
EC-WT	**Water**							

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
EC-WT	**Water**							
Batch R4857597								
WG3179309-4 DUP		**WG3179309-3**						
Conductivity		2090	2080		umhos/cm	0.5	10	02-OCT-19
WG3179309-2 LCS								
Conductivity			100.2		%		90-110	02-OCT-19
WG3179309-1 MB								
Conductivity			<3.0		umhos/cm		3	02-OCT-19
F-IC-N-WT	**Water**							
Batch R4857755								
WG3179166-14 DUP		**WG3179166-13**						
Fluoride (F)		0.390	0.389		mg/L	0.3	20	02-OCT-19
WG3179166-12 LCS								
Fluoride (F)			103.0		%		90-110	02-OCT-19
WG3179166-11 MB								
Fluoride (F)			<0.020		mg/L		0.02	02-OCT-19
WG3179166-15 MS		**WG3179166-13**						
Fluoride (F)			99.3		%		75-125	02-OCT-19
HG-D-CVAA-WT	**Water**							
Batch R4855218								
WG3179168-3 DUP		**L2356892-1**						
Mercury (Hg)-Dissolved		<0.0000050	<0.000005(	RPD-NA	mg/L	N/A	20	02-OCT-19
WG3179168-2 LCS								
Mercury (Hg)-Dissolved			102.0		%		80-120	02-OCT-19
WG3179168-1 MB								
Mercury (Hg)-Dissolved			<0.000005(		mg/L		0.000005	02-OCT-19
WG3179168-4 MS		**L2356892-2**						
Mercury (Hg)-Dissolved			104.4		%		70-130	02-OCT-19
HG-T-CVAA-WT	**Water**							
Batch R4855211								
WG3179150-4 DUP		**WG3179150-3**						
Mercury (Hg)-Total		<0.0000050	<0.000005(	RPD-NA	mg/L	N/A	20	02-OCT-19
WG3179150-2 LCS								
Mercury (Hg)-Total			96.9		%		80-120	02-OCT-19
WG3179150-1 MB								
Mercury (Hg)-Total			<0.000005(		mg/L		0.000005	02-OCT-19
WG3179150-6 MS		**WG3179150-5**						
Mercury (Hg)-Total			101.2		%		70-130	02-OCT-19
MET-T-CCMS-WT	**Water**							

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4854170								
WG3179173-4 DUP		**WG3179173-3**						
Aluminum (Al)-Total		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	02-OCT-19
Antimony (Sb)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	02-OCT-19
Arsenic (As)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	02-OCT-19
Barium (Ba)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	02-OCT-19
Beryllium (Be)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	02-OCT-19
Bismuth (Bi)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	02-OCT-19
Boron (B)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	02-OCT-19
Cadmium (Cd)-Total		<0.0000050	<0.000005(	RPD-NA	mg/L	N/A	20	02-OCT-19
Calcium (Ca)-Total		<0.050	<0.050	RPD-NA	mg/L	N/A	20	02-OCT-19
Chromium (Cr)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	02-OCT-19
Cesium (Cs)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	02-OCT-19
Cobalt (Co)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	02-OCT-19
Copper (Cu)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	02-OCT-19
Iron (Fe)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	02-OCT-19
Lead (Pb)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	02-OCT-19
Lithium (Li)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	02-OCT-19
Magnesium (Mg)-Total		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	02-OCT-19
Manganese (Mn)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	02-OCT-19
Molybdenum (Mo)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	02-OCT-19
Nickel (Ni)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	02-OCT-19
Phosphorus (P)-Total		<0.050	<0.050	RPD-NA	mg/L	N/A	20	02-OCT-19
Potassium (K)-Total		<0.050	<0.050	RPD-NA	mg/L	N/A	20	02-OCT-19
Rubidium (Rb)-Total		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	02-OCT-19
Selenium (Se)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	02-OCT-19
Silicon (Si)-Total		<0.10	<0.10	RPD-NA	mg/L	N/A	20	02-OCT-19
Silver (Ag)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	02-OCT-19
Sodium (Na)-Total		<0.050	<0.050	RPD-NA	mg/L	N/A	20	02-OCT-19
Strontium (Sr)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	02-OCT-19
Sulfur (S)-Total		<0.50	<0.50	RPD-NA	mg/L	N/A	25	02-OCT-19
Thallium (Tl)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	02-OCT-19
Tellurium (Te)-Total		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	02-OCT-19
Thorium (Th)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	25	02-OCT-19
Tin (Sn)-Total		<0.00010	<0.00010		mg/L			02-OCT-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4854170								
WG3179173-4 DUP		**WG3179173-3**						
Tin (Sn)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	02-OCT-19
Titanium (Ti)-Total		<0.00030	<0.00030	RPD-NA	mg/L	N/A	20	02-OCT-19
Tungsten (W)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	02-OCT-19
Uranium (U)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	02-OCT-19
Vanadium (V)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	02-OCT-19
Zinc (Zn)-Total		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	02-OCT-19
Zirconium (Zr)-Total		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	02-OCT-19
WG3179173-2 LCS								
Aluminum (Al)-Total			103.6		%		80-120	02-OCT-19
Antimony (Sb)-Total			101.1		%		80-120	02-OCT-19
Arsenic (As)-Total			98.7		%		80-120	02-OCT-19
Barium (Ba)-Total			99.7		%		80-120	02-OCT-19
Beryllium (Be)-Total			95.9		%		80-120	02-OCT-19
Bismuth (Bi)-Total			96.5		%		80-120	02-OCT-19
Boron (B)-Total			93.0		%		80-120	02-OCT-19
Cadmium (Cd)-Total			95.4		%		80-120	02-OCT-19
Calcium (Ca)-Total			95.8		%		80-120	02-OCT-19
Chromium (Cr)-Total			99.6		%		80-120	02-OCT-19
Cesium (Cs)-Total			96.1		%		80-120	02-OCT-19
Cobalt (Co)-Total			97.0		%		80-120	02-OCT-19
Copper (Cu)-Total			95.7		%		80-120	02-OCT-19
Iron (Fe)-Total			96.4		%		80-120	02-OCT-19
Lead (Pb)-Total			99.6		%		80-120	02-OCT-19
Lithium (Li)-Total			95.9		%		80-120	02-OCT-19
Magnesium (Mg)-Total			106.9		%		80-120	02-OCT-19
Manganese (Mn)-Total			100.5		%		80-120	02-OCT-19
Molybdenum (Mo)-Total			96.7		%		80-120	02-OCT-19
Nickel (Ni)-Total			95.8		%		80-120	02-OCT-19
Phosphorus (P)-Total			102.6		%		70-130	02-OCT-19
Potassium (K)-Total			98.4		%		80-120	02-OCT-19
Rubidium (Rb)-Total			99.6		%		80-120	02-OCT-19
Selenium (Se)-Total			98.8		%		80-120	02-OCT-19
Silicon (Si)-Total			100.1		%		60-140	02-OCT-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4854170								
WG3179173-2 LCS								
Silver (Ag)-Total			95.8		%		80-120	02-OCT-19
Sodium (Na)-Total			104.7		%		80-120	02-OCT-19
Strontium (Sr)-Total			101.5		%		80-120	02-OCT-19
Sulfur (S)-Total			96.5		%		80-120	02-OCT-19
Thallium (Tl)-Total			97.4		%		80-120	02-OCT-19
Tellurium (Te)-Total			95.3		%		80-120	02-OCT-19
Thorium (Th)-Total			97.1		%		70-130	02-OCT-19
Tin (Sn)-Total			98.4		%		80-120	02-OCT-19
Titanium (Ti)-Total			98.3		%		80-120	02-OCT-19
Tungsten (W)-Total			96.2		%		80-120	02-OCT-19
Uranium (U)-Total			93.5		%		80-120	02-OCT-19
Vanadium (V)-Total			101.1		%		80-120	02-OCT-19
Zinc (Zn)-Total			96.4		%		80-120	02-OCT-19
Zirconium (Zr)-Total			93.6		%		80-120	02-OCT-19
WG3179173-1 MB								
Aluminum (Al)-Total			<0.0050		mg/L		0.005	02-OCT-19
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	02-OCT-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	02-OCT-19
Barium (Ba)-Total			<0.00010		mg/L		0.0001	02-OCT-19
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	02-OCT-19
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	02-OCT-19
Boron (B)-Total			<0.010		mg/L		0.01	02-OCT-19
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	02-OCT-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	02-OCT-19
Chromium (Cr)-Total			<0.00050		mg/L		0.0005	02-OCT-19
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	02-OCT-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	02-OCT-19
Copper (Cu)-Total			<0.0010		mg/L		0.001	02-OCT-19
Iron (Fe)-Total			<0.010		mg/L		0.01	02-OCT-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	02-OCT-19
Lithium (Li)-Total			<0.0010		mg/L		0.001	02-OCT-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	02-OCT-19
Manganese (Mn)-Total			<0.00050		mg/L		0.0005	02-OCT-19
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	02-OCT-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4854170								
WG3179173-1 MB								
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	02-OCT-19
Phosphorus (P)-Total			<0.050		mg/L		0.05	02-OCT-19
Potassium (K)-Total			<0.050		mg/L		0.05	02-OCT-19
Rubidium (Rb)-Total			<0.00020		mg/L		0.0002	02-OCT-19
Selenium (Se)-Total			<0.000050		mg/L		0.00005	02-OCT-19
Silicon (Si)-Total			<0.10		mg/L		0.1	02-OCT-19
Silver (Ag)-Total			<0.000050		mg/L		0.00005	02-OCT-19
Sodium (Na)-Total			<0.050		mg/L		0.05	02-OCT-19
Strontium (Sr)-Total			<0.0010		mg/L		0.001	02-OCT-19
Sulfur (S)-Total			<0.50		mg/L		0.5	02-OCT-19
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	02-OCT-19
Tellurium (Te)-Total			<0.00020		mg/L		0.0002	02-OCT-19
Thorium (Th)-Total			<0.00010		mg/L		0.0001	02-OCT-19
Tin (Sn)-Total			<0.00010		mg/L		0.0001	02-OCT-19
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	02-OCT-19
Tungsten (W)-Total			<0.00010		mg/L		0.0001	02-OCT-19
Uranium (U)-Total			<0.000010		mg/L		0.00001	02-OCT-19
Vanadium (V)-Total			<0.00050		mg/L		0.0005	02-OCT-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	02-OCT-19
Zirconium (Zr)-Total			<0.00020		mg/L		0.0002	02-OCT-19
WG3179173-5 MS		**WG3179173-3**						
Aluminum (Al)-Total			100.4		%		70-130	02-OCT-19
Antimony (Sb)-Total			101.1		%		70-130	02-OCT-19
Arsenic (As)-Total			98.9		%		70-130	02-OCT-19
Barium (Ba)-Total			98.2		%		70-130	02-OCT-19
Beryllium (Be)-Total			97.5		%		70-130	02-OCT-19
Bismuth (Bi)-Total			97.4		%		70-130	02-OCT-19
Boron (B)-Total			95.9		%		70-130	02-OCT-19
Cadmium (Cd)-Total			98.9		%		70-130	02-OCT-19
Calcium (Ca)-Total			98.1		%		70-130	02-OCT-19
Chromium (Cr)-Total			99.9		%		70-130	02-OCT-19
Cesium (Cs)-Total			95.8		%		70-130	02-OCT-19
Cobalt (Co)-Total			98.8		%		70-130	02-OCT-19
Copper (Cu)-Total			99.3		%		70-130	02-OCT-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4854170								
WG3179173-5 MS		**WG3179173-3**						
Iron (Fe)-Total			98.4		%		70-130	02-OCT-19
Lead (Pb)-Total			101.9		%		70-130	02-OCT-19
Lithium (Li)-Total			97.7		%		70-130	02-OCT-19
Magnesium (Mg)-Total			106.9		%		70-130	02-OCT-19
Manganese (Mn)-Total			103.3		%		70-130	02-OCT-19
Molybdenum (Mo)-Total			95.3		%		70-130	02-OCT-19
Nickel (Ni)-Total			97.5		%		70-130	02-OCT-19
Phosphorus (P)-Total			103.3		%		70-130	02-OCT-19
Potassium (K)-Total			98.3		%		70-130	02-OCT-19
Rubidium (Rb)-Total			100.8		%		70-130	02-OCT-19
Selenium (Se)-Total			100.3		%		70-130	02-OCT-19
Silicon (Si)-Total			99.4		%		70-130	02-OCT-19
Silver (Ag)-Total			96.2		%		70-130	02-OCT-19
Sodium (Na)-Total			105.7		%		70-130	02-OCT-19
Strontium (Sr)-Total			100.7		%		70-130	02-OCT-19
Sulfur (S)-Total			99.8		%		70-130	02-OCT-19
Thallium (Tl)-Total			99.4		%		70-130	02-OCT-19
Tellurium (Te)-Total			93.3		%		70-130	02-OCT-19
Thorium (Th)-Total			95.3		%		70-130	02-OCT-19
Tin (Sn)-Total			96.3		%		70-130	02-OCT-19
Titanium (Ti)-Total			99.9		%		70-130	02-OCT-19
Tungsten (W)-Total			97.7		%		70-130	02-OCT-19
Uranium (U)-Total			94.6		%		70-130	02-OCT-19
Vanadium (V)-Total			101.3		%		70-130	02-OCT-19
Zinc (Zn)-Total			96.6		%		70-130	02-OCT-19
Zirconium (Zr)-Total			93.6		%		70-130	02-OCT-19
NH3-F-WT	**Water**							
Batch R4856571								
WG3179170-15 DUP		**L2356892-2**						
Ammonia, Total (as N)		<0.010	<0.010	RPD-NA	mg/L	N/A	20	02-OCT-19
WG3179170-19 DUP		**L2356009-15**						
Ammonia, Total (as N)		0.035	0.039		mg/L	11	20	02-OCT-19
WG3179170-14 LCS								
Ammonia, Total (as N)			101.2		%		85-115	02-OCT-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NH3-F-WT	**Water**							
Batch R4856571								
WG3179170-18 LCS								
Ammonia, Total (as N)			103.1		%		85-115	02-OCT-19
WG3179170-13 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	02-OCT-19
WG3179170-17 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	02-OCT-19
WG3179170-16 MS		**L2356892-2**						
Ammonia, Total (as N)			99.2		%		75-125	02-OCT-19
WG3179170-20 MS		**L2356009-15**						
Ammonia, Total (as N)			91.7		%		75-125	02-OCT-19
NO3-IC-WT	**Water**							
Batch R4857755								
WG3179166-14 DUP		**WG3179166-13**						
Nitrate (as N)		2.43	2.42		mg/L	0.7	20	02-OCT-19
WG3179166-12 LCS								
Nitrate (as N)			101.2		%		90-110	02-OCT-19
WG3179166-11 MB								
Nitrate (as N)			<0.020		mg/L		0.02	02-OCT-19
WG3179166-15 MS		**WG3179166-13**						
Nitrate (as N)			97.4		%		75-125	02-OCT-19
P-T-COL-WT	**Water**							
Batch R4858093								
WG3180097-3 DUP		**L2355119-2**						
Phosphorus, Total		0.0119	0.0092	J	mg/L	0.0027	0.006	03-OCT-19
WG3180097-2 LCS								
Phosphorus, Total			97.0		%		80-120	03-OCT-19
WG3180097-1 MB								
Phosphorus, Total			<0.0030		mg/L		0.003	03-OCT-19
WG3180097-4 MS		**L2355119-2**						
Phosphorus, Total			105.2		%		70-130	03-OCT-19
PH-BF	**Water**							
Batch R4851198								
WG3177985-2 DUP		**L2356874-1**						
pH		7.16	7.16	J	pH units	0.00	0.2	01-OCT-19
WG3177985-1 LCS								
pH			7.01		pH units		6.9-7.1	01-OCT-19
PH-WT	**Water**							

Quality Control Report

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PH-WT	**Water**							
Batch R4857597								
WG3179309-4 DUP		**WG3179309-3**						
pH		7.26	7.23	J	pH units	0.03	0.2	02-OCT-19
WG3179309-2 LCS								
pH			7.01		pH units		6.9-7.1	02-OCT-19
SO4-IC-N-WT	**Water**							
Batch R4857755								
WG3179166-14 DUP		**WG3179166-13**						
Sulfate (SO4)		56.4	56.5		mg/L	0.0	20	02-OCT-19
WG3179166-12 LCS								
Sulfate (SO4)			102.2		%		90-110	02-OCT-19
WG3179166-11 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	02-OCT-19
WG3179166-15 MS		**WG3179166-13**						
Sulfate (SO4)			99.1		%		75-125	02-OCT-19
SOLIDS-TDS-BF	**Water**							
Batch R4851401								
WG3178028-3 DUP		**L2356940-1**						
Total Dissolved Solids		3130	3180		mg/L	1.7	20	01-OCT-19
WG3178028-2 LCS								
Total Dissolved Solids			104.5		%		85-115	01-OCT-19
WG3178028-1 MB								
Total Dissolved Solids			<20		mg/L		20	01-OCT-19
SOLIDS-TDS-WT	**Water**							
Batch R4857823								
WG3179646-3 DUP		**L2354869-2**						
Total Dissolved Solids		275	276		mg/L	0.4	20	02-OCT-19
WG3179646-2 LCS								
Total Dissolved Solids			98.6		%		85-115	02-OCT-19
WG3179646-1 MB								
Total Dissolved Solids			<10		mg/L		10	02-OCT-19
SOLIDS-TSS-BF	**Water**							
Batch R4851221								
WG3178016-3 DUP		**L2356874-2**						
Total Suspended Solids		72.0	73.0		mg/L	1.4	25	01-OCT-19
WG3178016-2 LCS								
Total Suspended Solids			101.0		%		85-115	01-OCT-19
WG3178016-1 MB								

Quality Control Report

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Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SOLIDS-TSS-BF	**Water**							
Batch R4851221								
WG3178016-1 MB								
Total Suspended Solids			<2.0		mg/L		2	01-OCT-19
SOLIDS-TSS-WT	**Water**							
Batch R4857622								
WG3179644-3 DUP		**L2355710-11**						
Total Suspended Solids		386	404		mg/L	4.6	20	03-OCT-19
WG3179644-2 LCS								
Total Suspended Solids			100.5		%		85-115	03-OCT-19
WG3179644-1 MB								
Total Suspended Solids			<2.0		mg/L		2	03-OCT-19
TKN-WT	**Water**							
Batch R4858209								
WG3179864-3 DUP		**WG3179864-5**						
Total Kjeldahl Nitrogen		0.50	0.57		mg/L	12	20	03-OCT-19
WG3179864-2 LCS								
Total Kjeldahl Nitrogen			95.2		%		75-125	03-OCT-19
WG3179864-1 MB								
Total Kjeldahl Nitrogen			<0.15		mg/L		0.15	03-OCT-19
WG3179864-4 MS		**WG3179864-5**						
Total Kjeldahl Nitrogen			99.3		%		70-130	03-OCT-19
TOC-WT	**Water**							
Batch R4855629								
WG3179001-3 DUP		**L2353445-1**						
Total Organic Carbon		4.68	4.62		mg/L	1.3	20	02-OCT-19
WG3179001-2 LCS								
Total Organic Carbon			106.1		%		80-120	02-OCT-19
WG3179001-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	02-OCT-19
WG3179001-4 MS		**L2353445-1**						
Total Organic Carbon			94.0		%		70-130	02-OCT-19
TURBIDITY-BF	**Water**							
Batch R4851213								
WG3177999-3 DUP		**L2356874-1**						
Turbidity		14.2	13.9		NTU	2.1	15	01-OCT-19
WG3177999-2 LCS								
Turbidity			114.0		%		85-115	01-OCT-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TURBIDITY-BF	**Water**							
Batch R4851213								
WG3177999-1 MB								
Turbidity			<0.10		NTU		0.1	01-OCT-19
TURBIDITY-WT	**Water**							
Batch R4858080								
WG3180753-3 DUP		**L2358675-2**						
Turbidity		8.40	8.64		NTU	2.8	15	03-OCT-19
WG3180753-2 LCS								
Turbidity			103.0		%		85-115	03-OCT-19
WG3180753-1 MB								
Turbidity			<0.10		NTU		0.1	03-OCT-19

Quality Control Report

Workorder: L2356892 Report Date: 21-OCT-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

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

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Quality Control Report

Workorder: L2356892 Report Date: 21-OCT-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Turbidity							
	2	30-SEP-19 09:20	03-OCT-19 14:30	48	77	hours	EHT

Legend & Qualifier Definitions:

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR: Exceeded ALS recommended hold time prior to sample receipt.
EHTL: Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT: Exceeded ALS recommended hold time prior to analysis.
Rec. HT: ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2356892 were received on 30-SEP-19 15:00.

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.

Friday, October 18, 2019

Rick Hawthorne
ALS Environmental
60 Northland Rd, Unit 1
Waterloo Canada, ON N2V 2B8

Re: ALS Workorder: 1910087
Project Name:
Project Number: L2356892

Dear Mr. Hawthorne:

Two water samples were received from ALS Environmental, on 10/3/2019. The samples were scheduled for the following analysis:

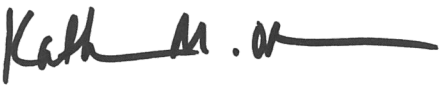
Radium-226

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,



ALS Environmental
Katie M. OBrien
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
AIHA	214884
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280

1910087

Radium-226:
The samples were prepared and analyzed according to the current revision of SOP 783.

All acceptance criteria were met.

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1910087
Client Name: ALS Environmental
Client Project Name:
Client Project Number: L2356892
Client PO Number: L2356892

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
L2356892-1	1910087-1		WATER	30-Sep-19	
L2356892-2	1910087-2		WATER	30-Sep-19	

ALS Environmental

Subcontract Request Form

1910087

Subcontract To:

ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
225 COMMERCE DRIVE
FORT COLLINS,CO 80524

NOTES: Please reference on final report and invoice: PO# *L2356892*
ALS requires QC data to be provided with your final results.

Please see enclosed 2 sample(s) in 2 Container(s)

	SAMPLE NUMBER	ANALYTICAL REQUIRED	DATE SAMPLED / DUE DATE	Priority Flag
1	**L2356892-1 MS-08**		9/ 30/ 2019	E
		Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	10/22/2019	
2	**L2356892-2 MS-0802**		9/ 30/ 2019	E
		Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	10/22/2019	

Subcontract Info Contact: Mary-Lynn Pike (519) 886-6910
Analysis and reporting info contact: Rick Hawthorne
60 NORTHLAND ROAD, UNIT 1
WATERLOO,ON N2V 2B8
Phone: (519) 886-6910 Email: Rick.Hawthorne@alsglobal.com

Please email confirmation of receipt to: **Rick.Hawthorne@alsglobal.com**

Shipped By: _____ Date Shipped: _____
Received By: Emily Ayers Date Received: 10·03·19 1005
Verified By: _____ Date Verified: _____
Temperature: _____

Sample Integrity Issues: _____

ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: ALS-Waterloo Workorder No: 1910087

Project Manager: KMO Initials: Eur Date: 10-03-19

1.	Are airbills / shipping documents present and/or removable?	DROP OFF	(YES)	NO
2.	Are custody seals on **shipping** containers intact?	(NONE)	YES	NO *
3.	Are custody seals on **sample** containers intact?	(NONE)	YES	NO *
4.	Is there a COC (chain-of-custody) present?		(YES)	NO *
5.	Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)		(YES)	NO *
6.	Are short-hold samples present?		YES	(NO)
7.	Are all samples within holding times for the requested analyses?		(YES)	NO *
8.	Were all sample containers received intact? (not broken or leaking)		(YES)	NO *
9.	Is there sufficient sample for the requested analyses?		(YES)	NO *
10.	Are all samples in the proper containers for the requested analyses?		(YES)	NO *
11.	Are all aqueous samples preserved correctly, if required? (excluding volatiles)	N/A	(YES)	NO *
12.	Are all aqueous non-preserved samples pH 4-9?	(N/A)	YES	NO *
13.	Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm (1/4 inch) diameter? (i.e. size of green pea)	(N/A)	YES	NO
14.	Were the samples shipped on ice?		(YES)	NO
15.	Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: #1 (#3) #4	(RAD ONLY)	YES	NO

Cooler #:	1							
Temperature (°C):	11.8							
No. of custody seals on cooler:	0							
DOT Survey/ Acceptance Information — External µR/hr reading:	12							
Background µR/hr reading:	14							

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? **YES / NO / NA** (If no, see Form 008.)

*** Please provide details here for NO responses to gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.**

All client bottle ID's vs ALS lab ID's double-checked by: Eur

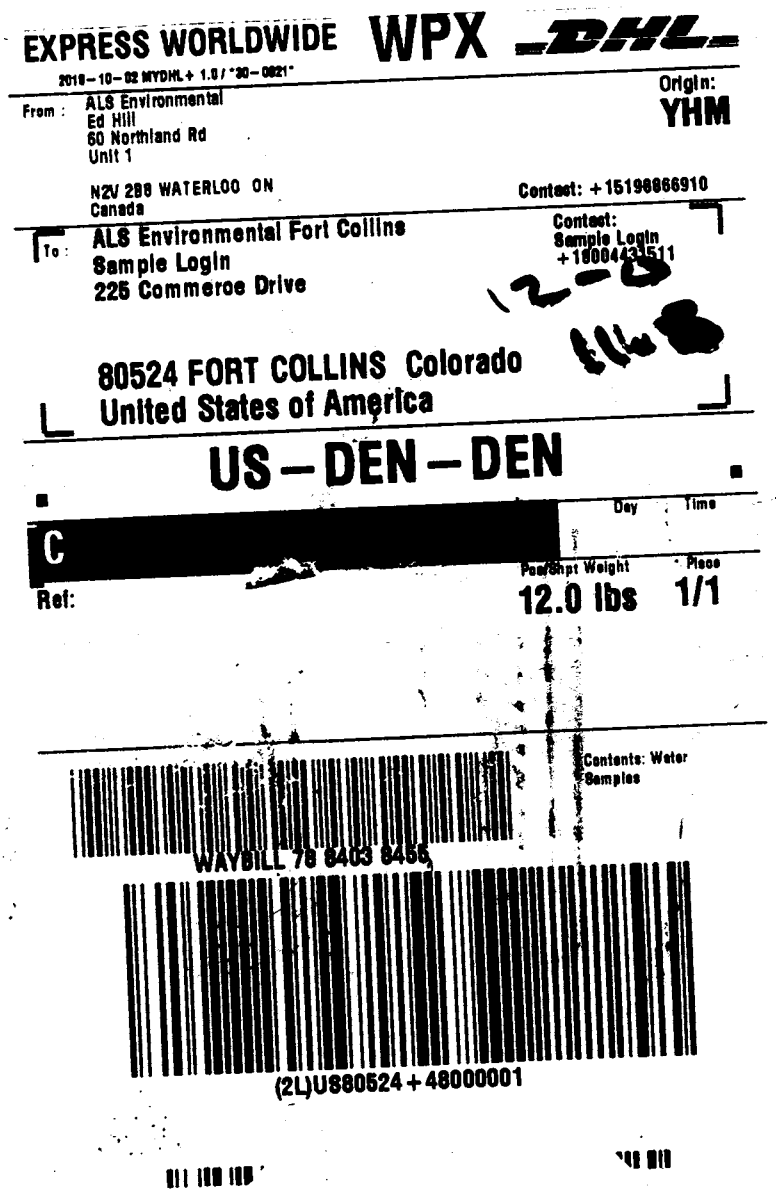
If applicable, was the client contacted? **YES / NO / NA** Contact: _____ Date/Time: _____

Project Manager Signature / Date: 10/4/19

Form 201r27.xls
(02/11/2019)

*IR Gun #1, VWR SN 170560549
*IR Gun #3, VWR SN 170647571
*IR Gun #4, Oakton, SN 2372220101-0002

1910087



EXPRESS WORLDWIDE WPX DHL

2018-10-02 MYDHL+ 1.0 / *30-0821*

From : ALS Environmental
Ed Hill
60 Northland Rd
Unit 1

N2V 2B8 WATERLOO ON
Canada

Origin:
YHM

Contact: +15198866910

To : ALS Environmental Fort Collins
Sample Login
225 Commerce Drive

Contact:
Sample Login
+18004431511

12-8

80524 FORT COLLINS Colorado
United States of America

US-DEN-DEN

C

Day Time

Ref:

Pce Shpt Weight 12.0 lbs

Piece 1/1

Contents: Water Samples

WAYBILL 78 8403 8456

(2L)US80524+48000001

Client:	ALS Environmental	**Date:**	*18-Oct-19*
Project:	L2356892	**Work Order:**	1910087
Sample ID:	L2356892-1	**Lab ID:**	1910087-1
Legal Location:		**Matrix:**	WATER
Collection Date:	9/30/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **10/8/2019**		PrepBy: **TRW**
Ra-226	0.0047 (+/- 0.0045)	Y1,U	0.0068	BQ/l	NA	10/17/2019 14:05
Carr: BARIUM	*100*	Y1	*40-110*	*%REC*	DL = NA	10/17/2019 14:05

Client:	ALS Environmental	**Date:**	*18-Oct-19*
Project:	L2356892	**Work Order:**	1910087
Sample ID:	L2356892-2	**Lab ID:**	1910087-2
Legal Location:		**Matrix:**	WATER
Collection Date:	9/30/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**			Prep Date: **10/8/2019**	PrepBy: **TRW**
Ra-226	**0.018 (+/- 0.0082)**	Y1	**0.0078**	**BQ/l**	NA	10/17/2019 14:05
Carr: BARIUM	*100*	Y1	*40-110*	*%REC*	DL = NA	10/17/2019 14:05

Client:	ALS Environmental	**Date:**	*18-Oct-19*
Project:	L2356892	**Work Order:**	1910087
Sample ID:	L2356892-2	**Lab ID:**	1910087-2
Legal Location:		**Matrix:**	WATER
Collection Date:	9/30/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed

Explanation of Qualifiers

Radiochemistry:

- "Report Limit" is the MDC

U or ND - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

Y2 - Chemical Yield outside default limits.

W - DER is greater than Warning Limit of 1.42

* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.
# - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.
G - Sample density differs by more than 15% of LCS density.
D - DER is greater than Control Limit

M - Requested MDC not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS, Matrix Spike Recovery within control limits.

N - Matrix Spike Recovery outside control limits

NC - Not Calculated for duplicate results less than 5 times MDC

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

Inorganics:

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).

U or ND - Indicates that the compound was analyzed for but not detected.

E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.

M - Duplicate injection precision was not met.

N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.

Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.

* - Duplicate analysis (relative percent difference) not within control limits.

S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

Organics:

U or ND - Indicates that the compound was analyzed for but not detected.

B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.

E - Analyte concentration exceeds the upper level of the calibration range.

J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).

A - A tentatively identified compound is a suspected aldol-condensation product.

X - The analyte was diluted below an accurate quantitation level.

* - The spike recovery is equal to or outside the control criteria used.

+ - The relative percent difference (RPD) equals or exceeds the control criteria.

G - A pattern resembling gasoline was detected in this sample.

D - A pattern resembling diesel was detected in this sample.

M - A pattern resembling motor oil was detected in this sample.

C - A pattern resembling crude oil was detected in this sample.

4 - A pattern resembling JP-4 was detected in this sample.

5 - A pattern resembling JP-5 was detected in this sample.

H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.

L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.

Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
- gasoline
- JP-8
- diesel
- mineral spirits
- motor oil
- Stoddard solvent
- bunker C

Batch ID: **RE191008-2-1** Instrument ID **Alpha Scin** Method: **Radium-226 by Radon Emanation**

LCS Sample ID: **RE191008-2** Units: **BQ/l** Analysis Date: **10/17/2019 14:40**
Client ID: Run ID: **RE191008-2A** Prep Date: **10/8/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.58 (+/- 0.393)	0.0155	1.72		91.6	67-120					P,Y1,M3
Carr: BARIUM	16500		16380		101	40-110					Y1

LCSD Sample ID: **RE191008-2** Units: **BQ/l** Analysis Date: **10/17/2019 14:40**
Client ID: Run ID: **RE191008-2A** Prep Date: **10/8/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.49 (+/- 0.373)	0.0178	1.72		86.7	67-120		1.58	0.2	2.1	P,Y1,M3
Carr: BARIUM	16500		16390		101	40-110		16500			Y1

MB Sample ID: **RE191008-2** Units: **BQ/l** Analysis Date: **10/17/2019 14:40**
Client ID: Run ID: **RE191008-2A** Prep Date: **10/8/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	0.0023 (+/- 0.0027)	0.0041									Y1,U
Carr: BARIUM	16600		16380		102	40-110					Y1

The following samples were analyzed in this batch: 1910087-1 1910087-2

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

L2356892-COFC

COC Number: 19

Report To	Contact and company name below will appear on the final report
Company:	Baffinland Iron Mines Corp.
Contact:	Wiliam Bowden and Connor Devereaux
Phone:	647-253-0596 EXT 6016
	Company address below will appear on the final report
Street:	2275 Upper Middle Rd. E., Suite #300
City/Province:	Oakville, ON
Postal Code:	L6H 0C3
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	
Contact:	

Report Fo	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	bimcore@alsglobal.com
Email 2	
Email 3	

Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	ap@baffinland.com
Email 2	commercial@baffinland.com

Project Information	
ALS Account # / Quote #:	23642 /Q42455
Job #:	MS-08 Eff Characterization
PO / AFE:	4500057496
LSD:	

Oil and Gas Required Fields (client use)	
AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only): L2356892 **ALS Contact:** **Sampler:** KB/AZ

se confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☐ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
4 day [P4]	☐	1 Business day [E1]	☐
3 day [P3]	☐	Same Day, Weekend or Statutory holiday [E0]	☑
2 day [P2]	☐		

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	F/P	BIM-MMER-EFF	Cyanide	Number of Containers
	MS-08	30-Sep-19	9:20	Water		E0	E0	8
	MS-0802	30-Sep-19	9:20	Water		E0	E0	8

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human drinking water use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			12.8		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released By: Kendra Button	Date: 30-Sep-19	Time: 14:00	Received by:	Date:	Time:	Received by: AP	Date: 2-Oct-19	Time: 9:15

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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 specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Baffinland Iron Mine's Corporation (Oakville)
ATTN: William Bowden/Connor Devereaux
2275 Upper Middle Rd. E.
Suite #300
Oakville ON L6H 0C3

Date Received: 01-OCT-19
Report Date: 24-OCT-19 13:49 (MT)
Version: FINAL REV. 2

Client Phone: 647-253-0596

Certificate of Analysis

Lab Work Order #: L2356925

Project P.O. #: 4500057496
Job Reference: MS-08 REFERENCE AND EXPOSURE
C of C Numbers:
Legal Site Desc:

Comments: ADDITIONAL 02-OCT-19 09:49

24-OCT-2019 With Full Package reporting

Rick Hawthorne
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2356925-1 MS-08-DS Sampled By: AZ/LM on 30-SEP-19 @ 12:50 Matrix: WATER							
Physical Tests							
Conductivity	170		3.0	umhos/cm		05-OCT-19	R4860539
Hardness (as CaCO3)	73.2	HTC	0.50	mg/L		04-OCT-19	
pH	7.94		0.10	pH units		01-OCT-19	R4851198
Total Suspended Solids	3.2		2.0	mg/L		01-OCT-19	R4851221
Total Dissolved Solids	96		20	mg/L		01-OCT-19	R4851401
Turbidity	3.38		0.10	NTU		01-OCT-19	R4851213
Anions and Nutrients							
Alkalinity, Total (as CaCO3)	72		10	mg/L		05-OCT-19	R4860539
Ammonia, Total (as N)	0.013		0.010	mg/L		07-OCT-19	R4860725
Chloride (Cl)	6.98		0.50	mg/L		04-OCT-19	R4859139
Fluoride (F)	0.025		0.020	mg/L		04-OCT-19	R4859139
Nitrate (as N)	0.074		0.020	mg/L		04-OCT-19	R4859139
Total Kjeldahl Nitrogen	<0.15		0.15	mg/L	07-OCT-19	07-OCT-19	R4860925
Phosphorus, Total	0.0073		0.0030	mg/L	04-OCT-19	07-OCT-19	R4860606
Sulfate (SO4)	6.80		0.30	mg/L		04-OCT-19	R4859139
Organic / Inorganic Carbon							
Dissolved Carbon Filtration Location	LAB					04-OCT-19	R4859597
Dissolved Organic Carbon	2.31		0.50	mg/L	04-OCT-19	07-OCT-19	R4860638
Total Organic Carbon	2.42		0.50	mg/L		07-OCT-19	R4860639
Total Metals							
Aluminum (Al)-Total	0.144		0.0050	mg/L	04-OCT-19	04-OCT-19	R4859637
Antimony (Sb)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Arsenic (As)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Barium (Ba)-Total	0.00999		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Beryllium (Be)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Boron (B)-Total	<0.010		0.010	mg/L	04-OCT-19	04-OCT-19	R4859637
Cadmium (Cd)-Total	<0.0000050		0.0000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Calcium (Ca)-Total	14.7		0.050	mg/L	04-OCT-19	04-OCT-19	R4859637
Cesium (Cs)-Total	0.000019		0.000010	mg/L	04-OCT-19	04-OCT-19	R4859637
Chromium (Cr)-Total	<0.00050		0.00050	mg/L	04-OCT-19	04-OCT-19	R4859637
Cobalt (Co)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Copper (Cu)-Total	0.0012		0.0010	mg/L	04-OCT-19	04-OCT-19	R4859637
Iron (Fe)-Total	0.140		0.010	mg/L	04-OCT-19	04-OCT-19	R4859637
Lead (Pb)-Total	0.000128		0.000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Lithium (Li)-Total	<0.0010		0.0010	mg/L	04-OCT-19	04-OCT-19	R4859637
Magnesium (Mg)-Total	8.88		0.0050	mg/L	04-OCT-19	04-OCT-19	R4859637
Manganese (Mn)-Total	0.00469		0.00050	mg/L	04-OCT-19	04-OCT-19	R4859637
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		07-OCT-19	R4860448
Molybdenum (Mo)-Total	0.000286		0.000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Nickel (Ni)-Total	0.00072		0.00050	mg/L	04-OCT-19	04-OCT-19	R4859637
Phosphorus (P)-Total	<0.050		0.050	mg/L	04-OCT-19	04-OCT-19	R4859637

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2356925-1 MS-08-DS Sampled By: AZ/LM on 30-SEP-19 @ 12:50 Matrix: WATER							
Total Metals							
Potassium (K)-Total	1.01		0.050	mg/L	04-OCT-19	04-OCT-19	R4859637
Rubidium (Rb)-Total	0.00156		0.00020	mg/L	04-OCT-19	04-OCT-19	R4859637
Selenium (Se)-Total	<0.000050		0.000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Silicon (Si)-Total	1.26		0.10	mg/L	04-OCT-19	04-OCT-19	R4859637
Silver (Ag)-Total	<0.000050		0.000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Sodium (Na)-Total	2.95		0.050	mg/L	04-OCT-19	04-OCT-19	R4859637
Strontium (Sr)-Total	0.0147		0.0010	mg/L	04-OCT-19	04-OCT-19	R4859637
Sulfur (S)-Total	2.38		0.50	mg/L	04-OCT-19	04-OCT-19	R4859637
Tellurium (Te)-Total	<0.00020		0.00020	mg/L	04-OCT-19	04-OCT-19	R4859637
Thallium (Tl)-Total	<0.000010		0.000010	mg/L	04-OCT-19	04-OCT-19	R4859637
Thorium (Th)-Total	0.00012		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Tin (Sn)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Titanium (Ti)-Total	0.00799		0.00030	mg/L	04-OCT-19	04-OCT-19	R4859637
Tungsten (W)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Uranium (U)-Total	0.00331		0.000010	mg/L	04-OCT-19	04-OCT-19	R4859637
Vanadium (V)-Total	<0.00050		0.00050	mg/L	04-OCT-19	04-OCT-19	R4859637
Zinc (Zn)-Total	<0.0030		0.0030	mg/L	04-OCT-19	04-OCT-19	R4859637
Zirconium (Zr)-Total	0.00031		0.00020	mg/L	04-OCT-19	04-OCT-19	R4859637
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					04-OCT-19	R4859193
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	04-OCT-19	07-OCT-19	R4860451
Radiological Parameters							
Ra-226	<0.0080		0.0080	Bq/L	10-OCT-19	21-OCT-19	R4851666
L2356925-2 MS-08-US Sampled By: AZ/LM on 30-SEP-19 @ 13:20 Matrix: WATER							
Physical Tests							
Conductivity	167		3.0	umhos/cm		05-OCT-19	R4860539
Hardness (as CaCO3)	72.2	HTC	0.50	mg/L		04-OCT-19	
pH	7.97		0.10	pH units		01-OCT-19	R4851198
Total Suspended Solids	2.4		2.0	mg/L		01-OCT-19	R4851221
Total Dissolved Solids	107		20	mg/L		01-OCT-19	R4851401
Turbidity	3.32		0.10	NTU		01-OCT-19	R4851213
Anions and Nutrients							
Alkalinity, Total (as CaCO3)	73		10	mg/L		05-OCT-19	R4860539
Ammonia, Total (as N)	<0.010		0.010	mg/L		07-OCT-19	R4860725
Chloride (Cl)	7.20		0.50	mg/L		04-OCT-19	R4859139
Fluoride (F)	0.027		0.020	mg/L		04-OCT-19	R4859139
Nitrate (as N)	0.074		0.020	mg/L		04-OCT-19	R4859139
Total Kjeldahl Nitrogen	<0.15		0.15	mg/L	07-OCT-19	07-OCT-19	R4860925
Phosphorus, Total	0.0084		0.0030	mg/L	04-OCT-19	07-OCT-19	R4860606
Sulfate (SO4)	4.48		0.30	mg/L		04-OCT-19	R4859139

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2356925-2 MS-08-US Sampled By: AZ/LM on 30-SEP-19 @ 13:20 Matrix: WATER							
Anions and Nutrients							
Organic / Inorganic Carbon							
Dissolved Carbon Filtration Location	LAB					04-OCT-19	R4859597
Dissolved Organic Carbon	2.24		0.50	mg/L	04-OCT-19	07-OCT-19	R4860638
Total Organic Carbon	2.47		0.50	mg/L		07-OCT-19	R4860639
Total Metals							
Aluminum (Al)-Total	0.123		0.0050	mg/L	04-OCT-19	04-OCT-19	R4859637
Antimony (Sb)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Arsenic (As)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Barium (Ba)-Total	0.0102		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Beryllium (Be)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Boron (B)-Total	<0.010		0.010	mg/L	04-OCT-19	04-OCT-19	R4859637
Cadmium (Cd)-Total	<0.0000050		0.0000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Calcium (Ca)-Total	14.7		0.050	mg/L	04-OCT-19	04-OCT-19	R4859637
Cesium (Cs)-Total	0.000019		0.000010	mg/L	04-OCT-19	04-OCT-19	R4859637
Chromium (Cr)-Total	<0.00050		0.00050	mg/L	04-OCT-19	04-OCT-19	R4859637
Cobalt (Co)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Copper (Cu)-Total	0.0011		0.0010	mg/L	04-OCT-19	04-OCT-19	R4859637
Iron (Fe)-Total	0.121		0.010	mg/L	04-OCT-19	04-OCT-19	R4859637
Lead (Pb)-Total	0.000099		0.000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Lithium (Li)-Total	<0.0010		0.0010	mg/L	04-OCT-19	04-OCT-19	R4859637
Magnesium (Mg)-Total	8.62		0.0050	mg/L	04-OCT-19	04-OCT-19	R4859637
Manganese (Mn)-Total	0.00215		0.00050	mg/L	04-OCT-19	04-OCT-19	R4859637
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		07-OCT-19	R4860448
Molybdenum (Mo)-Total	0.000289		0.000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Nickel (Ni)-Total	0.00055		0.00050	mg/L	04-OCT-19	04-OCT-19	R4859637
Phosphorus (P)-Total	<0.050		0.050	mg/L	04-OCT-19	04-OCT-19	R4859637
Potassium (K)-Total	1.02		0.050	mg/L	04-OCT-19	04-OCT-19	R4859637
Rubidium (Rb)-Total	0.00151		0.00020	mg/L	04-OCT-19	04-OCT-19	R4859637
Selenium (Se)-Total	<0.000050		0.000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Silicon (Si)-Total	1.24		0.10	mg/L	04-OCT-19	04-OCT-19	R4859637
Silver (Ag)-Total	<0.000050		0.000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Sodium (Na)-Total	3.13		0.050	mg/L	04-OCT-19	04-OCT-19	R4859637
Strontium (Sr)-Total	0.0148		0.0010	mg/L	04-OCT-19	04-OCT-19	R4859637
Sulfur (S)-Total	1.66		0.50	mg/L	04-OCT-19	04-OCT-19	R4859637
Tellurium (Te)-Total	<0.00020		0.00020	mg/L	04-OCT-19	04-OCT-19	R4859637
Thallium (Tl)-Total	<0.000010		0.000010	mg/L	04-OCT-19	04-OCT-19	R4859637
Thorium (Th)-Total	0.00013		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Tin (Sn)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Titanium (Ti)-Total	0.00718		0.00030	mg/L	04-OCT-19	04-OCT-19	R4859637
Tungsten (W)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2356925-2 MS-08-US Sampled By: AZ/LM on 30-SEP-19 @ 13:20 Matrix: WATER							
Total Metals							
Uranium (U)-Total	0.00358		0.000010	mg/L	04-OCT-19	04-OCT-19	R4859637
Vanadium (V)-Total	<0.00050		0.00050	mg/L	04-OCT-19	04-OCT-19	R4859637
Zinc (Zn)-Total	<0.0030		0.0030	mg/L	04-OCT-19	04-OCT-19	R4859637
Zirconium (Zr)-Total	0.00034		0.00020	mg/L	04-OCT-19	04-OCT-19	R4859637
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					04-OCT-19	R4859193
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	04-OCT-19	07-OCT-19	R4860451
Radiological Parameters							
Ra-226	<0.0069		0.0069	Bq/L	10-OCT-19	21-OCT-19	R4851666
L2356925-3 MS-08-US02 Sampled By: AZ/LM on 30-SEP-19 @ 13:20 Matrix: WATER							
Physical Tests							
Conductivity	<3.0		3.0	umhos/cm		05-OCT-19	R4860539
Hardness (as CaCO3)	<0.50	HTC	0.50	mg/L		04-OCT-19	
pH	6.13		0.10	pH units		01-OCT-19	R4851198
Total Suspended Solids	<2.0		2.0	mg/L		01-OCT-19	R4851221
Total Dissolved Solids	24		20	mg/L		01-OCT-19	R4851401
Turbidity	<0.10		0.10	NTU		01-OCT-19	R4851213
Anions and Nutrients							
Alkalinity, Total (as CaCO3)	<10		10	mg/L		05-OCT-19	R4860539
Ammonia, Total (as N)	<0.010		0.010	mg/L		07-OCT-19	R4860725
Chloride (Cl)	<0.50		0.50	mg/L		04-OCT-19	R4859139
Fluoride (F)	<0.020		0.020	mg/L		04-OCT-19	R4859139
Nitrate (as N)	<0.020		0.020	mg/L		04-OCT-19	R4859139
Total Kjeldahl Nitrogen	<0.15		0.15	mg/L	07-OCT-19	07-OCT-19	R4860925
Phosphorus, Total	<0.0030		0.0030	mg/L	04-OCT-19	07-OCT-19	R4860606
Sulfate (SO4)	<0.30		0.30	mg/L		04-OCT-19	R4859139
Organic / Inorganic Carbon							
Dissolved Carbon Filtration Location	LAB					04-OCT-19	R4859597
Dissolved Organic Carbon	<0.50		0.50	mg/L	04-OCT-19	07-OCT-19	R4860638
Total Organic Carbon	0.72		0.50	mg/L		07-OCT-19	R4860639
Total Metals							
Aluminum (Al)-Total	<0.0050		0.0050	mg/L	04-OCT-19	04-OCT-19	R4859637
Antimony (Sb)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Arsenic (As)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Barium (Ba)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Beryllium (Be)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Boron (B)-Total	<0.010		0.010	mg/L	04-OCT-19	04-OCT-19	R4859637
Cadmium (Cd)-Total	<0.0000050		0.0000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Calcium (Ca)-Total	<0.050		0.050	mg/L	04-OCT-19	04-OCT-19	R4859637

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2356925-3 MS-08-US02 Sampled By: AZ/LM on 30-SEP-19 @ 13:20 Matrix: WATER							
Total Metals							
Cesium (Cs)-Total	<0.000010		0.000010	mg/L	04-OCT-19	04-OCT-19	R4859637
Chromium (Cr)-Total	<0.00050		0.00050	mg/L	04-OCT-19	04-OCT-19	R4859637
Cobalt (Co)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Copper (Cu)-Total	<0.0010		0.0010	mg/L	04-OCT-19	04-OCT-19	R4859637
Iron (Fe)-Total	<0.010		0.010	mg/L	04-OCT-19	04-OCT-19	R4859637
Lead (Pb)-Total	<0.000050		0.000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Lithium (Li)-Total	<0.0010		0.0010	mg/L	04-OCT-19	04-OCT-19	R4859637
Magnesium (Mg)-Total	<0.0050		0.0050	mg/L	04-OCT-19	04-OCT-19	R4859637
Manganese (Mn)-Total	<0.00050		0.00050	mg/L	04-OCT-19	04-OCT-19	R4859637
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		07-OCT-19	R4860448
Molybdenum (Mo)-Total	<0.000050		0.000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Nickel (Ni)-Total	<0.00050		0.00050	mg/L	04-OCT-19	04-OCT-19	R4859637
Phosphorus (P)-Total	<0.050		0.050	mg/L	04-OCT-19	04-OCT-19	R4859637
Potassium (K)-Total	<0.050		0.050	mg/L	04-OCT-19	04-OCT-19	R4859637
Rubidium (Rb)-Total	<0.00020		0.00020	mg/L	04-OCT-19	04-OCT-19	R4859637
Selenium (Se)-Total	<0.000050		0.000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Silicon (Si)-Total	<0.10		0.10	mg/L	04-OCT-19	04-OCT-19	R4859637
Silver (Ag)-Total	<0.000050		0.000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Sodium (Na)-Total	<0.050		0.050	mg/L	04-OCT-19	04-OCT-19	R4859637
Strontium (Sr)-Total	<0.0010		0.0010	mg/L	04-OCT-19	04-OCT-19	R4859637
Sulfur (S)-Total	<0.50		0.50	mg/L	04-OCT-19	04-OCT-19	R4859637
Tellurium (Te)-Total	<0.00020		0.00020	mg/L	04-OCT-19	04-OCT-19	R4859637
Thallium (Tl)-Total	<0.000010		0.000010	mg/L	04-OCT-19	04-OCT-19	R4859637
Thorium (Th)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Tin (Sn)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Titanium (Ti)-Total	<0.00030		0.00030	mg/L	04-OCT-19	04-OCT-19	R4859637
Tungsten (W)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Uranium (U)-Total	<0.000010		0.000010	mg/L	04-OCT-19	04-OCT-19	R4859637
Vanadium (V)-Total	<0.00050		0.00050	mg/L	04-OCT-19	04-OCT-19	R4859637
Zinc (Zn)-Total	<0.0030		0.0030	mg/L	04-OCT-19	04-OCT-19	R4859637
Zirconium (Zr)-Total	<0.00020		0.00020	mg/L	04-OCT-19	04-OCT-19	R4859637
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					04-OCT-19	R4859193
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	04-OCT-19	07-OCT-19	R4860451
Radiological Parameters							
Ra-226	<0.0066		0.0066	Bq/L	10-OCT-19	21-OCT-19	R4851666

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

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Calcium (Ca)-Total	MS-B	L2356925-1, -2, -3
Matrix Spike	Iron (Fe)-Total	MS-B	L2356925-1, -2, -3
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2356925-1, -2, -3
Matrix Spike	Silicon (Si)-Total	MS-B	L2356925-1, -2, -3
Matrix Spike	Sodium (Na)-Total	MS-B	L2356925-1, -2, -3
Matrix Spike	Strontium (Sr)-Total	MS-B	L2356925-1, -2, -3
Matrix Spike	Uranium (U)-Total	MS-B	L2356925-1, -2, -3

Sample Parameter Qualifier key listed:

Qualifier	Description
HTC	Hardness was calculated from Total Ca and/or Mg concentrations and may be biased high (dissolved Ca/Mg results unavailable).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-WT	Water	Alkalinity, Total (as CaCO3)	EPA 310.2

This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.

CL-IC-N-WT	Water	Chloride by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

DOC-WT	Water	Dissolved Organic Carbon	APHA 5310B

Sample is filtered through a 0.45um filter, then injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic carbon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.

EC-SCREEN-WT	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

EC-WT	Water	Conductivity	APHA 2510 B

Water samples can be measured directly by immersing the conductivity cell into the sample.

F-IC-N-WT	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-WT	Water	Hardness	APHA 2340 B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-WT	Water	Dissolved Mercury in Water by CVAAS	EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

HG-T-CVAA-WT	Water	Total Mercury in Water by CVAAS	EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

MET-T-CCMS-WT	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental

Reference Information

Protection Act (July 1, 2011).

NH3-F-WT	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO3-IC-WT	Water	Nitrate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-COL-WT	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is deteremined colourimetrically after persulphate digestion of the sample.

PH-BF	Water	pH	APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

RA226-MMER-FC	Water	Ra226 by Alpha Scint, MDC=0.01 Bq/L	EPA 903.1
SO4-IC-N-WT	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-BF	Water	Total Dissolved Solids	APHA 2540C

A well-mixed sample is filtered though glass fibres filter. A known volume of the filtrate is evaporated and dried at 180 +/- 2C for 1hr.

SOLIDS-TSS-BF	Water	Suspended solids	APHA 2540 D-Gravimetric

A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104 +/- 1C for a minimum of four hours or until a constant weight is achieved.

TKN-WT	Water	Total Kjeldahl Nitrogen	APHA 4500-Norg D

This analysis is carried out using procedures adapted from APHA Method 4500-Norg "Nitrogen (Organic)". Total Kjeldahl Nitrogen is determined by sample digestion at 380 Celsius with analysis using an automated colorimetric method.

TOC-WT	Water	Total Organic Carbon	APHA 5310B

Sample is injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic cabon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.

TURBIDITY-BF	Water	Turbidity	APHA 2130 B

Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.

** 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
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA
FC	ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
BF	ALS ENVIRONMENTAL - BAFFIN ISLAND, NUNAVUT, CANADA

Chain of Custody Numbers:

Reference Information

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 weight of sample
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

Workorder: L2356925 Report Date: 24-OCT-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3

Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ALK-WT	**Water**							
Batch R4860539								
WG3183018-4 DUP		**WG3183018-3**						
Alkalinity, Total (as CaCO3)		<10	<10	RPD-NA	mg/L	N/A	20	05-OCT-19
WG3183018-2 LCS								
Alkalinity, Total (as CaCO3)			105.3		%		85-115	05-OCT-19
WG3183018-1 MB								
Alkalinity, Total (as CaCO3)			<10		mg/L		10	05-OCT-19
CL-IC-N-WT	**Water**							
Batch R4859139								
WG3181734-24 DUP		**WG3181734-23**						
Chloride (Cl)		6.98	6.98		mg/L	0.0	20	04-OCT-19
WG3181734-22 LCS								
Chloride (Cl)			102.1		%		90-110	04-OCT-19
WG3181734-21 MB								
Chloride (Cl)			<0.50		mg/L		0.5	04-OCT-19
WG3181734-25 MS		**WG3181734-23**						
Chloride (Cl)			100.1		%		75-125	04-OCT-19
DOC-WT	**Water**							
Batch R4860638								
WG3182797-3 DUP		**L2356925-1**						
Dissolved Organic Carbon		2.31	2.05		mg/L	12	20	07-OCT-19
WG3182797-2 LCS								
Dissolved Organic Carbon			107.3		%		80-120	07-OCT-19
WG3182797-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	07-OCT-19
WG3182797-4 MS		**L2356925-1**						
Dissolved Organic Carbon			102.6		%		70-130	07-OCT-19
EC-WT	**Water**							
Batch R4860539								
WG3183018-4 DUP		**WG3183018-3**						
Conductivity		<3.0	<3.0	RPD-NA	umhos/cm	N/A	10	05-OCT-19
WG3183018-2 LCS								
Conductivity			100.5		%		90-110	05-OCT-19
WG3183018-1 MB								
Conductivity			<3.0		umhos/cm		3	05-OCT-19
F-IC-N-WT	**Water**							

Quality Control Report

Workorder: L2356925 Report Date: 24-OCT-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3

Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F-IC-N-WT	**Water**							
Batch R4859139								
WG3181734-24 DUP		**WG3181734-23**						
Fluoride (F)		0.025	0.025		mg/L	0.1	20	04-OCT-19
WG3181734-22 LCS								
Fluoride (F)			103.8		%		90-110	04-OCT-19
WG3181734-21 MB								
Fluoride (F)			<0.020		mg/L		0.02	04-OCT-19
WG3181734-25 MS		**WG3181734-23**						
Fluoride (F)			101.9		%		75-125	04-OCT-19
HG-D-CVAA-WT	**Water**							
Batch R4860451								
WG3182354-3 DUP		**L2357716-1**						
Mercury (Hg)-Dissolved		<0.0000050	<0.000005C	RPD-NA	mg/L	N/A	20	07-OCT-19
WG3182354-2 LCS								
Mercury (Hg)-Dissolved			99.8		%		80-120	07-OCT-19
WG3182354-1 MB								
Mercury (Hg)-Dissolved			<0.000005C		mg/L		0.000005	07-OCT-19
WG3182354-4 MS		**L2357716-2**						
Mercury (Hg)-Dissolved			95.8		%		70-130	07-OCT-19
HG-T-CVAA-WT	**Water**							
Batch R4860448								
WG3182348-3 DUP		**L2357716-1**						
Mercury (Hg)-Total		<0.0000050	<0.000005C	RPD-NA	mg/L	N/A	20	07-OCT-19
WG3182348-2 LCS								
Mercury (Hg)-Total			98.3		%		80-120	07-OCT-19
WG3182348-1 MB								
Mercury (Hg)-Total			<0.000005C		mg/L		0.000005	07-OCT-19
WG3182348-4 MS		**L2357716-2**						
Mercury (Hg)-Total			98.8		%		70-130	07-OCT-19
MET-T-CCMS-WT	**Water**							
Batch R4859637								
WG3182336-4 DUP		**WG3182336-3**						
Aluminum (Al)-Total		0.118	0.114		mg/L	3.4	20	04-OCT-19
Antimony (Sb)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	04-OCT-19
Arsenic (As)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	04-OCT-19
Barium (Ba)-Total		0.0112	0.0109		mg/L	2.4	20	04-OCT-19
Beryllium (Be)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	04-OCT-19
Bismuth (Bi)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	04-OCT-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4859637								
WG3182336-4 DUP		**WG3182336-3**						
Boron (B)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	04-OCT-19
Cadmium (Cd)-Total		<0.0000050	<0.000005(	RPD-NA	mg/L	N/A	20	04-OCT-19
Calcium (Ca)-Total		16.5	16.5		mg/L	0.4	20	04-OCT-19
Chromium (Cr)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	04-OCT-19
Cesium (Cs)-Total		0.000014	0.000015		mg/L	4.3	20	04-OCT-19
Cobalt (Co)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	04-OCT-19
Copper (Cu)-Total		<0.0010	0.0010	RPD-NA	mg/L	N/A	20	04-OCT-19
Iron (Fe)-Total		0.117	0.115		mg/L	2.2	20	04-OCT-19
Lead (Pb)-Total		0.000077	0.000080		mg/L	4.1	20	04-OCT-19
Lithium (Li)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	04-OCT-19
Magnesium (Mg)-Total		10.2	10.1		mg/L	1.0	20	04-OCT-19
Manganese (Mn)-Total		0.00247	0.00246		mg/L	0.2	20	04-OCT-19
Molybdenum (Mo)-Total		0.000321	0.000323		mg/L	0.8	20	04-OCT-19
Nickel (Ni)-Total		0.00058	0.00057		mg/L	1.0	20	04-OCT-19
Phosphorus (P)-Total		<0.050	<0.050	RPD-NA	mg/L	N/A	20	04-OCT-19
Potassium (K)-Total		1.09	1.09		mg/L	0.1	20	04-OCT-19
Rubidium (Rb)-Total		0.00154	0.00158		mg/L	2.1	20	04-OCT-19
Selenium (Se)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	04-OCT-19
Silicon (Si)-Total		1.26	1.29		mg/L	2.6	20	04-OCT-19
Silver (Ag)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	04-OCT-19
Sodium (Na)-Total		3.41	3.39		mg/L	0.5	20	04-OCT-19
Strontium (Sr)-Total		0.0167	0.0167		mg/L	0.2	20	04-OCT-19
Sulfur (S)-Total		2.64	2.70		mg/L	2.2	25	04-OCT-19
Thallium (Tl)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	04-OCT-19
Tellurium (Te)-Total		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	04-OCT-19
Thorium (Th)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	25	04-OCT-19
Tin (Sn)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	04-OCT-19
Titanium (Ti)-Total		0.00541	0.00550		mg/L	1.5	20	04-OCT-19
Tungsten (W)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	04-OCT-19
Uranium (U)-Total		0.00415	0.00407		mg/L	2.0	20	04-OCT-19
Vanadium (V)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	04-OCT-19
Zinc (Zn)-Total		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	04-OCT-19
Zirconium (Zr)-Total		0.00026	0.00028		mg/L			04-OCT-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
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Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4859637								
WG3182336-4 DUP		**WG3182336-3**						
Zirconium (Zr)-Total		0.00026	0.00028		mg/L	5.3	20	04-OCT-19
WG3182336-2 LCS								
Aluminum (Al)-Total			106.5		%		80-120	04-OCT-19
Antimony (Sb)-Total			103.5		%		80-120	04-OCT-19
Arsenic (As)-Total			100.9		%		80-120	04-OCT-19
Barium (Ba)-Total			104.0		%		80-120	04-OCT-19
Beryllium (Be)-Total			100.9		%		80-120	04-OCT-19
Bismuth (Bi)-Total			98.0		%		80-120	04-OCT-19
Boron (B)-Total			98.7		%		80-120	04-OCT-19
Cadmium (Cd)-Total			102.5		%		80-120	04-OCT-19
Calcium (Ca)-Total			100.1		%		80-120	04-OCT-19
Chromium (Cr)-Total			102.0		%		80-120	04-OCT-19
Cesium (Cs)-Total			99.3		%		80-120	04-OCT-19
Cobalt (Co)-Total			101.5		%		80-120	04-OCT-19
Copper (Cu)-Total			101.0		%		80-120	04-OCT-19
Iron (Fe)-Total			101.2		%		80-120	04-OCT-19
Lead (Pb)-Total			100.9		%		80-120	04-OCT-19
Lithium (Li)-Total			99.9		%		80-120	04-OCT-19
Magnesium (Mg)-Total			102.4		%		80-120	04-OCT-19
Manganese (Mn)-Total			102.1		%		80-120	04-OCT-19
Molybdenum (Mo)-Total			101.4		%		80-120	04-OCT-19
Nickel (Ni)-Total			99.9		%		80-120	04-OCT-19
Phosphorus (P)-Total			106.9		%		70-130	04-OCT-19
Potassium (K)-Total			103.1		%		80-120	04-OCT-19
Rubidium (Rb)-Total			105.0		%		80-120	04-OCT-19
Selenium (Se)-Total			99.4		%		80-120	04-OCT-19
Silicon (Si)-Total			105.9		%		60-140	04-OCT-19
Silver (Ag)-Total			102.5		%		80-120	04-OCT-19
Sodium (Na)-Total			101.8		%		80-120	04-OCT-19
Strontium (Sr)-Total			102.1		%		80-120	04-OCT-19
Sulfur (S)-Total			102.9		%		80-120	04-OCT-19
Thallium (Tl)-Total			99.3		%		80-120	04-OCT-19
Tellurium (Te)-Total			100.8		%		80-120	04-OCT-19
Thorium (Th)-Total			98.0		%		70-130	04-OCT-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4859637								
WG3182336-2 LCS								
Tin (Sn)-Total			101.0		%		80-120	04-OCT-19
Titanium (Ti)-Total			98.3		%		80-120	04-OCT-19
Tungsten (W)-Total			100.5		%		80-120	04-OCT-19
Uranium (U)-Total			101.6		%		80-120	04-OCT-19
Vanadium (V)-Total			103.3		%		80-120	04-OCT-19
Zinc (Zn)-Total			99.2		%		80-120	04-OCT-19
Zirconium (Zr)-Total			101.2		%		80-120	04-OCT-19
WG3182336-1 MB								
Aluminum (Al)-Total			<0.0050		mg/L		0.005	04-OCT-19
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	04-OCT-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	04-OCT-19
Barium (Ba)-Total			<0.00010		mg/L		0.0001	04-OCT-19
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	04-OCT-19
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	04-OCT-19
Boron (B)-Total			<0.010		mg/L		0.01	04-OCT-19
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	04-OCT-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	04-OCT-19
Chromium (Cr)-Total			<0.00050		mg/L		0.0005	04-OCT-19
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	04-OCT-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	04-OCT-19
Copper (Cu)-Total			<0.0010		mg/L		0.001	04-OCT-19
Iron (Fe)-Total			<0.010		mg/L		0.01	04-OCT-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	04-OCT-19
Lithium (Li)-Total			<0.0010		mg/L		0.001	04-OCT-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	04-OCT-19
Manganese (Mn)-Total			<0.00050		mg/L		0.0005	04-OCT-19
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	04-OCT-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	04-OCT-19
Phosphorus (P)-Total			<0.050		mg/L		0.05	04-OCT-19
Potassium (K)-Total			<0.050		mg/L		0.05	04-OCT-19
Rubidium (Rb)-Total			<0.00020		mg/L		0.0002	04-OCT-19
Selenium (Se)-Total			<0.000050		mg/L		0.00005	04-OCT-19
Silicon (Si)-Total			<0.10		mg/L		0.1	04-OCT-19
Silver (Ag)-Total			<0.000050		mg/L		0.00005	04-OCT-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4859637								
WG3182336-1 MB								
Sodium (Na)-Total			<0.050		mg/L		0.05	04-OCT-19
Strontium (Sr)-Total			<0.0010		mg/L		0.001	04-OCT-19
Sulfur (S)-Total			<0.50		mg/L		0.5	04-OCT-19
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	04-OCT-19
Tellurium (Te)-Total			<0.00020		mg/L		0.0002	04-OCT-19
Thorium (Th)-Total			<0.00010		mg/L		0.0001	04-OCT-19
Tin (Sn)-Total			<0.00010		mg/L		0.0001	04-OCT-19
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	04-OCT-19
Tungsten (W)-Total			<0.00010		mg/L		0.0001	04-OCT-19
Uranium (U)-Total			<0.000010		mg/L		0.00001	04-OCT-19
Vanadium (V)-Total			<0.00050		mg/L		0.0005	04-OCT-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	04-OCT-19
Zirconium (Zr)-Total			<0.00020		mg/L		0.0002	04-OCT-19
WG3182336-5 MS		**WG3182336-6**						
Aluminum (Al)-Total			90.4		%		70-130	04-OCT-19
Antimony (Sb)-Total			98.3		%		70-130	04-OCT-19
Arsenic (As)-Total			95.7		%		70-130	04-OCT-19
Barium (Ba)-Total			91.9		%		70-130	04-OCT-19
Beryllium (Be)-Total			94.8		%		70-130	04-OCT-19
Bismuth (Bi)-Total			90.8		%		70-130	04-OCT-19
Boron (B)-Total			92.9		%		70-130	04-OCT-19
Cadmium (Cd)-Total			94.9		%		70-130	04-OCT-19
Calcium (Ca)-Total			N/A	MS-B	%		-	04-OCT-19
Chromium (Cr)-Total			96.5		%		70-130	04-OCT-19
Cesium (Cs)-Total			95.9		%		70-130	04-OCT-19
Cobalt (Co)-Total			94.9		%		70-130	04-OCT-19
Copper (Cu)-Total			93.1		%		70-130	04-OCT-19
Iron (Fe)-Total			N/A	MS-B	%		-	04-OCT-19
Lead (Pb)-Total			94.3		%		70-130	04-OCT-19
Lithium (Li)-Total			91.4		%		70-130	04-OCT-19
Magnesium (Mg)-Total			N/A	MS-B	%		-	04-OCT-19
Manganese (Mn)-Total			94.5		%		70-130	04-OCT-19
Molybdenum (Mo)-Total			96.8		%		70-130	04-OCT-19
Nickel (Ni)-Total			93.1		%		70-130	04-OCT-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4859637								
WG3182336-5 MS		**WG3182336-6**						
Phosphorus (P)-Total			104.2		%		70-130	04-OCT-19
Potassium (K)-Total			93.6		%		70-130	04-OCT-19
Rubidium (Rb)-Total			95.8		%		70-130	04-OCT-19
Selenium (Se)-Total			94.7		%		70-130	04-OCT-19
Silicon (Si)-Total			N/A	MS-B	%		-	04-OCT-19
Silver (Ag)-Total			95.9		%		70-130	04-OCT-19
Sodium (Na)-Total			N/A	MS-B	%		-	04-OCT-19
Strontium (Sr)-Total			N/A	MS-B	%		-	04-OCT-19
Sulfur (S)-Total			93.4		%		70-130	04-OCT-19
Thallium (Tl)-Total			91.6		%		70-130	04-OCT-19
Tellurium (Te)-Total			91.9		%		70-130	04-OCT-19
Thorium (Th)-Total			95.1		%		70-130	04-OCT-19
Tin (Sn)-Total			96.3		%		70-130	04-OCT-19
Titanium (Ti)-Total			94.8		%		70-130	04-OCT-19
Tungsten (W)-Total			95.7		%		70-130	04-OCT-19
Uranium (U)-Total			N/A	MS-B	%		-	04-OCT-19
Vanadium (V)-Total			97.5		%		70-130	04-OCT-19
Zinc (Zn)-Total			90.2		%		70-130	04-OCT-19
Zirconium (Zr)-Total			93.6		%		70-130	04-OCT-19
NH3-F-WT	**Water**							
Batch R4860725								
WG3183728-3 DUP		**L2357716-1**						
Ammonia, Total (as N)		<0.010	<0.010	RPD-NA	mg/L	N/A	20	07-OCT-19
WG3183728-2 LCS								
Ammonia, Total (as N)			99.9		%		85-115	07-OCT-19
WG3183728-1 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	07-OCT-19
WG3183728-4 MS		**L2357716-1**						
Ammonia, Total (as N)			104.4		%		75-125	07-OCT-19
NO3-IC-WT	**Water**							
Batch R4859139								
WG3181734-24 DUP		**WG3181734-23**						
Nitrate (as N)		0.073	0.074		mg/L	0.3	20	04-OCT-19
WG3181734-22 LCS								
Nitrate (as N)			101.5				90-110	

Quality Control Report

Workorder: L2356925 Report Date: 24-OCT-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3

Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO3-IC-WT	**Water**							
Batch R4859139								
WG3181734-22 LCS								
Nitrate (as N)			101.5		%		90-110	04-OCT-19
WG3181734-21 MB								
Nitrate (as N)			<0.020		mg/L		0.02	04-OCT-19
WG3181734-25 MS		**WG3181734-23**						
Nitrate (as N)			98.8		%		75-125	04-OCT-19
P-T-COL-WT	**Water**							
Batch R4860606								
WG3182577-3 DUP		**L2356925-1**						
Phosphorus, Total		0.0073	0.0071		mg/L	3.3	20	07-OCT-19
WG3182577-2 LCS								
Phosphorus, Total			100.1		%		80-120	07-OCT-19
WG3182577-1 MB								
Phosphorus, Total			<0.0030		mg/L		0.003	07-OCT-19
WG3182577-4 MS		**L2356925-1**						
Phosphorus, Total			89.2		%		70-130	07-OCT-19
PH-BF	**Water**							
Batch R4851198								
WG3177985-2 DUP		**L2356874-1**						
pH		7.16	7.16	J	pH units	0.00	0.2	01-OCT-19
WG3177985-1 LCS								
pH			7.01		pH units		6.9-7.1	01-OCT-19
SO4-IC-N-WT	**Water**							
Batch R4859139								
WG3181734-24 DUP		**WG3181734-23**						
Sulfate (SO4)		6.79	6.80		mg/L	0.0	20	04-OCT-19
WG3181734-22 LCS								
Sulfate (SO4)			102.6		%		90-110	04-OCT-19
WG3181734-21 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	04-OCT-19
WG3181734-25 MS		**WG3181734-23**						
Sulfate (SO4)			101.2		%		75-125	04-OCT-19
SOLIDS-TDS-BF	**Water**							
Batch R4851401								
WG3178028-3 DUP		**L2356940-1**						
Total Dissolved Solids		3130	3180		mg/L	1.7	20	01-OCT-19
WG3178028-2 LCS								

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SOLIDS-TDS-BF	**Water**							
Batch R4851401								
WG3178028-2 LCS								
Total Dissolved Solids			104.5		%		85-115	01-OCT-19
WG3178028-1 MB								
Total Dissolved Solids			<20		mg/L		20	01-OCT-19
SOLIDS-TSS-BF	**Water**							
Batch R4851221								
WG3178016-3 DUP		**L2356874-2**						
Total Suspended Solids		72.0	73.0		mg/L	1.4	25	01-OCT-19
WG3178016-2 LCS								
Total Suspended Solids			101.0		%		85-115	01-OCT-19
WG3178016-1 MB								
Total Suspended Solids			<2.0		mg/L		2	01-OCT-19
TKN-WT	**Water**							
Batch R4860925								
WG3183637-3 DUP		**L2357716-1**						
Total Kjeldahl Nitrogen		<0.15	<0.15	RPD-NA	mg/L	N/A	20	07-OCT-19
WG3183637-2 LCS								
Total Kjeldahl Nitrogen			100.3		%		75-125	07-OCT-19
WG3183637-1 MB								
Total Kjeldahl Nitrogen			<0.15		mg/L		0.15	07-OCT-19
WG3183637-4 MS		**L2357716-1**						
Total Kjeldahl Nitrogen			88.9		%		70-130	07-OCT-19
TOC-WT	**Water**							
Batch R4860639								
WG3183590-3 DUP		**L2356925-1**						
Total Organic Carbon		2.42	2.45		mg/L	1.1	20	07-OCT-19
WG3183590-2 LCS								
Total Organic Carbon			106.7		%		80-120	07-OCT-19
WG3183590-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	07-OCT-19
WG3183590-4 MS		**L2356925-1**						
Total Organic Carbon			101.6		%		70-130	07-OCT-19
TURBIDITY-BF	**Water**							
Batch R4851213								
WG3177999-3 DUP		**L2356874-1**						
Turbidity		14.2	13.9		NTU	2.1	15	01-OCT-19
WG3177999-2 LCS								

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TURBIDITY-BF	**Water**							
Batch R4851213								
WG3177999-2 LCS								
Turbidity			114.0		%		85-115	01-OCT-19
WG3177999-1 MB								
Turbidity			<0.10		NTU		0.1	01-OCT-19

Quality Control Report

Workorder: L2356925 Report Date: 24-OCT-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

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

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Quality Control Report

Workorder: L2356925 Report Date: 24-OCT-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Organic / Inorganic Carbon							
Dissolved Organic Carbon							
	1	30-SEP-19 12:50	04-OCT-19 18:00	3	4	days	EHT
	2	30-SEP-19 13:20	04-OCT-19 18:00	3	4	days	EHT
	3	30-SEP-19 13:20	04-OCT-19 18:00	3	4	days	EHT

Legend & Qualifier Definitions:

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR: Exceeded ALS recommended hold time prior to sample receipt.
EHTL: Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT: Exceeded ALS recommended hold time prior to analysis.
Rec. HT: ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2356925 were received on 01-OCT-19 06:00.

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.

Tuesday, October 22, 2019

Rick Hawthorne
ALS Environmental
60 Northland Rd, Unit 1
Waterloo Canada, ON N2V 2B8

Re: ALS Workorder: 1910177
Project Name:
Project Number: L2356925

Dear Mr. Hawthorne:

Three water samples were received from ALS Environmental, on 10/8/2019. The samples were scheduled for the following analysis:

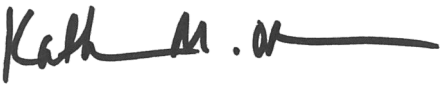
Radium-226

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,



ALS Environmental
Katie M. OBrien
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
AIHA	214884
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280

1910177

Radium-226:
The samples were prepared and analyzed according to the current revision of SOP 783.

All acceptance criteria were met.

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1910177
Client Name: ALS Environmental
Client Project Name:
Client Project Number: L2356925
Client PO Number: L2356925

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
L2356925-1	1910177-1		WATER	30-Sep-19	
L2356925-2	1910177-2		WATER	30-Sep-19	
L2356925-3	1910177-3		WATER	30-Sep-19	

ALS Environmental

L2356925

WATERLOO

1a10177

Subcontract Request Form

Subcontract To:

ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
225 COMMERCE DRIVE
FORT COLLINS,CO 80524

NOTES: Please reference on final report and invoice: PO# *L2356925*
ALS requires QC data to be provided with your final results.

Please see enclosed 3 sample(s) in 3 Container(s)

SAMPLE NUMBER	ANALYTICAL REQUIRED	DATE SAMPLED / DUE DATE	Priority Flag
L2356925-1 MS-08-DS		9/ 30/ 2019	E
1	Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	10/22/2019	
L2356925-2 MS-08-US		9/ 30/ 2019	E
2	Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	10/22/2019	
L2356925-3 MS-08-US02		9/ 30/ 2019	E
3	Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	10/22/2019	

Subcontract Info Contact: Mary-Lynn Pike (519) 886-6910
Analysis and reporting info contact: Rick Hawthorne
60 NORTHLAND ROAD, UNIT 1
WATERLOO,ON N2V 2B8
Phone: (519) 886-6910 Email: Rick.Hawthorne@alsglobal.com

Please email confirmation of receipt to: **Rick.Hawthorne@alsglobal.com**

Shipped By: _____ Date Shipped: _____

Received By: _____ Date Received: 10/8/19 12:50

Verified By: _____ Date Verified: _____

Temperature: _____

Sample Integrity Issues: _____

ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: ALS Waterloo Workorder No: 1910177

Project Manager: KMD Initials: TEM Date: 10/8/19

1.	Are airbills / shipping documents present and/or removable?	DROP OFF	YES	NO
2.	Are custody seals on **shipping** containers intact?	NONE	YES	NO *
3.	Are custody seals on **sample** containers intact?	NONE	YES	NO *
4.	Is there a COC (chain-of-custody) present?		YES	NO *
5.	Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)		YES	NO *
6.	Are short-hold samples present?		YES	NO
7.	Are all samples within holding times for the requested analyses?		YES	NO *
8.	Were all sample containers received intact? (not broken or leaking)		YES	NO *
9.	Is there sufficient sample for the requested analyses?		YES	NO *
10.	Are all samples in the proper containers for the requested analyses?		YES	NO *
11.	Are all aqueous samples preserved correctly, if required? (excluding volatiles)	N/A	YES	NO *
12.	Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm (1/4 inch) diameter? (i.e. size of green pea)	N/A	YES	NO
13.	Were the samples shipped on ice?		YES	NO
14.	Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: #1 (#3) #4	RAD ONLY	YES	NO

Cooler #:	1							
Temperature (°C):	5.7							
No. of custody seals on cooler:	0							
DOT Survey/ Acceptance Information — External µR/hr reading:	12							
Background µR/hr reading:	13							

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? YES / NO / NA (If no, see Form 008.)

*** Please provide details here for NO responses to gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.**

All client bottle ID's vs ALS lab ID's double-checked by: TEM

If applicable, was the client contacted? **YES / NO / NA** Contact: _____ Date/Time: _____

Project Manager Signature / Date: 10/9/19

Form 201r28.xls
(10/07/2019)

*IR Gun #1, VWR SN 170560549
*IR Gun #3, VWR SN 170647571
*IR Gun #4, Oakton, SN 2372220101-0002

1910177

12-0
5.4

EXPRESS WORLDWIDE **WPX** DHL

2019-10-07 DCV8 3.0.1 / *12-1403*

80524 FORT COLLINS, UNITED STATES OF AMERICA

Origin: YHM

US-DEN-DEN

C

Day Time

Date: 2019-10-07

Pce/Shpt Weight 24.2 LB

Piece 1/1

Content Description
Water Sample

WAYBILL 74 1380 5184

(2L)US80524+48000001

(J) JD01 4600 0071 2459 3321

Client:	ALS Environmental	**Date:**	*22-Oct-19*
Project:	L2356925	**Work Order:**	1910177
Sample ID:	L2356925-1	**Lab ID:**	1910177-1
Legal Location:		**Matrix:**	WATER
Collection Date:	9/30/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **10/10/2019**		PrepBy: **TRW**
Ra-226	0.0066 (+/- 0.0056)	U	0.008	BQ/l	NA	10/21/2019 13:40
Carr: BARIUM	*96.4*		*40-110*	*%REC*	DL = NA	10/21/2019 13:40

Client:	ALS Environmental	**Date:**	*22-Oct-19*
Project:	L2356925	**Work Order:**	1910177
Sample ID:	L2356925-2	**Lab ID:**	1910177-2
Legal Location:		**Matrix:**	WATER
Collection Date:	9/30/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **10/10/2019**		PrepBy: **TRW**
Ra-226	0.0047 (+/- 0.0047)	U	0.0069	BQ/l	NA	10/21/2019 13:40
Carr: BARIUM	*94.3*		*40-110*	*%REC*	DL = NA	10/21/2019 13:40

Client:	ALS Environmental	**Date:**	*22-Oct-19*
Project:	L2356925	**Work Order:**	1910177
Sample ID:	L2356925-3	**Lab ID:**	1910177-3
Legal Location:		**Matrix:**	WATER
Collection Date:	9/30/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **10/10/2019**		PrepBy: **TRW**
Ra-226	0.00044 (+/- 0.0034)	U	0.0066	BQ/l	NA	10/21/2019 13:40
Carr: BARIUM	*97.4*		*40-110*	*%REC*	DL = NA	10/21/2019 13:40

Client:	ALS Environmental	**Date:**	*22-Oct-19*
Project:	L2356925	**Work Order:**	1910177
Sample ID:	L2356925-3	**Lab ID:**	1910177-3
Legal Location:		**Matrix:**	WATER
Collection Date:	9/30/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed

Explanation of Qualifiers

Radiochemistry:

- "Report Limit" is the MDC

U or ND - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

Y2 - Chemical Yield outside default limits.

W - DER is greater than Warning Limit of 1.42

* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.
# - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.
G - Sample density differs by more than 15% of LCS density.
D - DER is greater than Control Limit

M - Requested MDC not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS, Matrix Spike Recovery within control limits.

N - Matrix Spike Recovery outside control limits

NC - Not Calculated for duplicate results less than 5 times MDC

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

Inorganics:

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).

U or ND - Indicates that the compound was analyzed for but not detected.

E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.

M - Duplicate injection precision was not met.

N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.

Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.

* - Duplicate analysis (relative percent difference) not within control limits.

S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

Organics:

U or ND - Indicates that the compound was analyzed for but not detected.

B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.

E - Analyte concentration exceeds the upper level of the calibration range.

J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).

A - A tentatively identified compound is a suspected aldol-condensation product.

X - The analyte was diluted below an accurate quantitation level.

* - The spike recovery is equal to or outside the control criteria used.

+ - The relative percent difference (RPD) equals or exceeds the control criteria.

G - A pattern resembling gasoline was detected in this sample.

D - A pattern resembling diesel was detected in this sample.

M - A pattern resembling motor oil was detected in this sample.

C - A pattern resembling crude oil was detected in this sample.

4 - A pattern resembling JP-4 was detected in this sample.

5 - A pattern resembling JP-5 was detected in this sample.

H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.

L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.

Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
- gasoline
- JP-8
- diesel
- mineral spirits
- motor oil
- Stoddard solvent
- bunker C

QC BATCH REPORT

Batch ID: **RE191010-1-1** Instrument ID **Alpha Scin** Method: **Radium-226 by Radon Emanation**

LCS Sample ID: **RE191010-1** Units: **BQ/l** Analysis Date: **10/21/2019 14:15**

Client ID: Run ID: **RE191010-1A** Prep Date: **10/10/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.85 (+/- 0.461)	0.00675	1.72		108	67-120					P
Carr: BARIUM	16800		17940		93.7	40-110					

LCSD Sample ID: **RE191010-1** Units: **BQ/l** Analysis Date: **10/21/2019 14:15**

Client ID: Run ID: **RE191010-1A** Prep Date: **10/10/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.71 (+/- 0.427)	0.0152	1.72		99.2	67-120		1.85	0.2	2.1	P,M3
Carr: BARIUM	17300		17930		96.6	40-110		16800			

MB Sample ID: **RE191010-1** Units: **BQ/l** Analysis Date: **10/21/2019 14:15**

Client ID: Run ID: **RE191010-1A** Prep Date: **10/10/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	0.00045 (+/- 0.0030)	0.0059									U
Carr: BARIUM	17800		17930		99.1	40-110					

The following samples were analyzed in this batch: 1910177-1 1910177-2 1910177-3

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here
(lab use only)

COC Number: 15 -

Report To	Contact and company name below will appear on the final report
Company:	Baffinland Iron Mines Corp.
Contact:	Wiliam Bowden and Connor Devereaux
Phone:	647-253-0596 EXT 6016
	Company address below will appear on the final report
Street:	2275 Upper Middle Rd. E., Suite #300
City/Province:	Oakville, ON
Postal Code:	L6H 0C3
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report ☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax bimcore@alsglobal.com
Email 2
Email 3

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax ap@baffinland.com
Email 2 commercial@baffinland.com

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☐ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4] ☐ | 3 day [P3] ☐ | 2 day [P2] ☐

EMERGENCY: 1 Business day [E1] ☐ | Same Day, Weekend or Statutory holiday [E0] ☑

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information

ALS Account # / Quote #:	23642 /Q42455
Job #:	MS-08 Reference and Exposure
PO / AFE:	4500057496
LSD:	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only) L2356925 | **ALS Contact:** | **Sampler:** AZ/LM

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	BIM-MMER-EFF	F/P	Number of Containers
	MS-08-DS	30-Sep-19	12:50	Water	E0		7
	MS-08-US	30-Sep-19	13:20	Water	E0		7
	MS-08-US02	30-Sep-19	13:20	Water	E0		7

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human drinking water use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ | SIF Observations Yes ☐ No ☐
Ice Packs ☐ | Ice Cubes ☐ | Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES ºC			FINAL COOLER TEMPERATURES ºC		
	7				

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Kendra Button	Release Date: 1-Oct-19	Time: 6:30	Received by:	Date:	Time:	Received by:J. Streeter	Date:OCT 1/19	Time:6:30AM

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

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 specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Baffinland Iron Mine's Corporation (Oakville)
ATTN: William Bowden/Connor Devereaux
2275 Upper Middle Rd. E.
Suite #300
Oakville ON L6H 0C3

Date Received: 01-OCT-19
Report Date: 24-OCT-19 13:52 (MT)
Version: FINAL

Client Phone: 647-253-0596

Certificate of Analysis

Lab Work Order #: L2357232

Project P.O. #: 4500057496
Job Reference: MS-08 WT TOX
C of C Numbers:
Legal Site Desc:

Comments: ADDITIONAL 02-OCT-19 09:46

Rick Hawthorne
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2357232-1 MS-08 Sampled By: KB/LM on 01-OCT-19 @ 09:15 Matrix: WATER							
Physical Tests							
Conductivity	5040		3.0	umhos/cm		03-OCT-19	R4858920
Hardness (as CaCO3)	3990		1.3	mg/L		03-OCT-19	
pH	8.79		0.10	pH units		02-OCT-19	R4853590
Total Suspended Solids	6.0		2.0	mg/L		01-OCT-19	R4853597
Total Dissolved Solids	5620		20	mg/L		02-OCT-19	R4854358
Turbidity	4.52		0.10	NTU		02-OCT-19	R4853592
Anions and Nutrients							
Acidity (as CaCO3)	2.3		2.0	mg/L		06-OCT-19	R4860194
Alkalinity, Total (as CaCO3)	39		10	mg/L		03-OCT-19	R4858920
Ammonia, Total (as N)	3.79	DLHC	0.10	mg/L		03-OCT-19	R4858766
Chloride (Cl)	17.2	DLDS	5.0	mg/L		03-OCT-19	R4858736
Fluoride (F)	<0.20	DLDS	0.20	mg/L		03-OCT-19	R4858736
Nitrate (as N)	16.7	DLDS	0.20	mg/L		03-OCT-19	R4858736
Total Kjeldahl Nitrogen	4.38		0.15	mg/L	03-OCT-19	04-OCT-19	R4859216
Phosphorus, Total	<0.0030		0.0030	mg/L	03-OCT-19	04-OCT-19	R4858789
Sulfate (SO4)	4070	DLDS	3.0	mg/L		03-OCT-19	R4858736
Cyanides							
Cyanide, Total	0.0128		0.0020	mg/L		03-OCT-19	R4857839
Organic / Inorganic Carbon							
Dissolved Carbon Filtration Location	LAB					03-OCT-19	R4858483
Dissolved Organic Carbon	3.82		0.50	mg/L	03-OCT-19	04-OCT-19	R4858934
Total Organic Carbon	4.16		0.50	mg/L		04-OCT-19	R4858932
Total Metals							
Aluminum (Al)-Total	0.082	DLHC	0.050	mg/L	03-OCT-19	03-OCT-19	R4857778
Antimony (Sb)-Total	<0.0010	DLHC	0.0010	mg/L	03-OCT-19	03-OCT-19	R4857778
Arsenic (As)-Total	<0.0010	DLHC	0.0010	mg/L	03-OCT-19	03-OCT-19	R4857778
Barium (Ba)-Total	0.0120	DLHC	0.0010	mg/L	03-OCT-19	03-OCT-19	R4857778
Beryllium (Be)-Total	<0.0010	DLHC	0.0010	mg/L	03-OCT-19	03-OCT-19	R4857778
Bismuth (Bi)-Total	<0.00050	DLHC	0.00050	mg/L	03-OCT-19	03-OCT-19	R4857778
Boron (B)-Total	<0.10	DLHC	0.10	mg/L	03-OCT-19	03-OCT-19	R4857778
Cadmium (Cd)-Total	<0.000050	DLHC	0.000050	mg/L	03-OCT-19	03-OCT-19	R4857778
Calcium (Ca)-Total	507	DLHC	0.50	mg/L	03-OCT-19	03-OCT-19	R4857778
Cesium (Cs)-Total	<0.00010	DLHC	0.00010	mg/L	03-OCT-19	03-OCT-19	R4857778
Chromium (Cr)-Total	<0.0050	DLHC	0.0050	mg/L	03-OCT-19	03-OCT-19	R4857778
Cobalt (Co)-Total	0.0050	DLHC	0.0010	mg/L	03-OCT-19	03-OCT-19	R4857778
Copper (Cu)-Total	<0.010	DLHC	0.010	mg/L	03-OCT-19	03-OCT-19	R4857778
Iron (Fe)-Total	0.42	DLHC	0.10	mg/L	03-OCT-19	03-OCT-19	R4857778
Lead (Pb)-Total	<0.00050	DLHC	0.00050	mg/L	03-OCT-19	03-OCT-19	R4857778
Lithium (Li)-Total	0.030	DLHC	0.010	mg/L	03-OCT-19	03-OCT-19	R4857778
Magnesium (Mg)-Total	664	DLHC	0.050	mg/L	03-OCT-19	03-OCT-19	R4857778
Manganese (Mn)-Total	1.12	DLHC	0.0050	mg/L	03-OCT-19	03-OCT-19	R4857778
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		04-OCT-19	R4858970

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2357232-1 MS-08 Sampled By: KB/LM on 01-OCT-19 @ 09:15 Matrix: WATER							
Total Metals							
Molybdenum (Mo)-Total	0.00141	DLHC	0.00050	mg/L	03-OCT-19	03-OCT-19	R4857778
Nickel (Ni)-Total	0.0071	DLHC	0.0050	mg/L	03-OCT-19	03-OCT-19	R4857778
Phosphorus (P)-Total	<0.50	DLHC	0.50	mg/L	03-OCT-19	03-OCT-19	R4857778
Potassium (K)-Total	6.91	DLHC	0.50	mg/L	03-OCT-19	03-OCT-19	R4857778
Rubidium (Rb)-Total	0.0082	DLHC	0.0020	mg/L	03-OCT-19	03-OCT-19	R4857778
Selenium (Se)-Total	0.00642	DLHC	0.00050	mg/L	03-OCT-19	03-OCT-19	R4857778
Silicon (Si)-Total	<1.0	DLHC	1.0	mg/L	03-OCT-19	03-OCT-19	R4857778
Silver (Ag)-Total	<0.00050	DLHC	0.00050	mg/L	03-OCT-19	03-OCT-19	R4857778
Sodium (Na)-Total	6.41	DLHC	0.50	mg/L	03-OCT-19	03-OCT-19	R4857778
Strontium (Sr)-Total	1.58	DLHC	0.010	mg/L	03-OCT-19	03-OCT-19	R4857778
Sulfur (S)-Total	1350	DLHC	5.0	mg/L	03-OCT-19	03-OCT-19	R4857778
Tellurium (Te)-Total	<0.0020	DLHC	0.0020	mg/L	03-OCT-19	03-OCT-19	R4857778
Thallium (Tl)-Total	<0.00010	DLHC	0.00010	mg/L	03-OCT-19	03-OCT-19	R4857778
Thorium (Th)-Total	<0.0010	DLHC	0.0010	mg/L	03-OCT-19	03-OCT-19	R4857778
Tin (Sn)-Total	<0.0010	DLHC	0.0010	mg/L	03-OCT-19	03-OCT-19	R4857778
Titanium (Ti)-Total	0.0037	DLHC	0.0030	mg/L	03-OCT-19	03-OCT-19	R4857778
Tungsten (W)-Total	<0.0010	DLHC	0.0010	mg/L	03-OCT-19	03-OCT-19	R4857778
Uranium (U)-Total	0.00190	DLHC	0.00010	mg/L	03-OCT-19	03-OCT-19	R4857778
Vanadium (V)-Total	<0.0050	DLHC	0.0050	mg/L	03-OCT-19	03-OCT-19	R4857778
Zinc (Zn)-Total	<0.030	DLHC	0.030	mg/L	03-OCT-19	03-OCT-19	R4857778
Zirconium (Zr)-Total	<0.0020	DLHC	0.0020	mg/L	03-OCT-19	03-OCT-19	R4857778
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					04-OCT-19	R4858748
Dissolved Metals Filtration Location	FIELD					03-OCT-19	R4857747
Aluminum (Al)-Dissolved	<0.050	DLHC	0.050	mg/L	03-OCT-19	03-OCT-19	R4857779
Antimony (Sb)-Dissolved	<0.0010	DLHC	0.0010	mg/L	03-OCT-19	03-OCT-19	R4857779
Arsenic (As)-Dissolved	<0.0010	DLHC	0.0010	mg/L	03-OCT-19	03-OCT-19	R4857779
Barium (Ba)-Dissolved	0.0117	DLHC	0.0010	mg/L	03-OCT-19	03-OCT-19	R4857779
Beryllium (Be)-Dissolved	<0.0010	DLHC	0.0010	mg/L	03-OCT-19	03-OCT-19	R4857779
Bismuth (Bi)-Dissolved	<0.00050	DLHC	0.00050	mg/L	03-OCT-19	03-OCT-19	R4857779
Boron (B)-Dissolved	<0.10	DLHC	0.10	mg/L	03-OCT-19	03-OCT-19	R4857779
Cadmium (Cd)-Dissolved	<0.000050	DLHC	0.000050	mg/L	03-OCT-19	03-OCT-19	R4857779
Calcium (Ca)-Dissolved	509	DLHC	0.50	mg/L	03-OCT-19	03-OCT-19	R4857779
Cesium (Cs)-Dissolved	<0.00010	DLHC	0.00010	mg/L	03-OCT-19	03-OCT-19	R4857779
Chromium (Cr)-Dissolved	<0.0050	DLHC	0.0050	mg/L	03-OCT-19	03-OCT-19	R4857779
Cobalt (Co)-Dissolved	0.0046	DLHC	0.0010	mg/L	03-OCT-19	03-OCT-19	R4857779
Copper (Cu)-Dissolved	0.0050	DLHC	0.0020	mg/L	03-OCT-19	03-OCT-19	R4857779
Iron (Fe)-Dissolved	<0.10	DLHC	0.10	mg/L	03-OCT-19	03-OCT-19	R4857779
Lead (Pb)-Dissolved	<0.00050	DLHC	0.00050	mg/L	03-OCT-19	03-OCT-19	R4857779
Lithium (Li)-Dissolved	0.033	DLHC	0.010	mg/L	03-OCT-19	03-OCT-19	R4857779
Magnesium (Mg)-Dissolved	661	DLHC	0.050	mg/L	03-OCT-19	03-OCT-19	R4857779

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2357232-1 MS-08 Sampled By: KB/LM on 01-OCT-19 @ 09:15 Matrix: WATER							
Dissolved Metals							
Manganese (Mn)-Dissolved	1.10	DLHC	0.0050	mg/L	03-OCT-19	03-OCT-19	R4857779
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	04-OCT-19	04-OCT-19	R4858972
Molybdenum (Mo)-Dissolved	0.00156	DLHC	0.00050	mg/L	03-OCT-19	03-OCT-19	R4857779
Nickel (Ni)-Dissolved	0.0067	DLHC	0.0050	mg/L	03-OCT-19	03-OCT-19	R4857779
Phosphorus (P)-Dissolved	<0.50	DLHC	0.50	mg/L	03-OCT-19	03-OCT-19	R4857779
Potassium (K)-Dissolved	6.97	DLHC	0.50	mg/L	03-OCT-19	03-OCT-19	R4857779
Rubidium (Rb)-Dissolved	0.0079	DLHC	0.0020	mg/L	03-OCT-19	03-OCT-19	R4857779
Selenium (Se)-Dissolved	0.00690	DLHC	0.00050	mg/L	03-OCT-19	03-OCT-19	R4857779
Silicon (Si)-Dissolved	<0.50	DLHC	0.50	mg/L	03-OCT-19	03-OCT-19	R4857779
Silver (Ag)-Dissolved	<0.00050	DLHC	0.00050	mg/L	03-OCT-19	03-OCT-19	R4857779
Sodium (Na)-Dissolved	6.41	DLHC	0.50	mg/L	03-OCT-19	03-OCT-19	R4857779
Strontium (Sr)-Dissolved	1.63	DLHC	0.010	mg/L	03-OCT-19	03-OCT-19	R4857779
Sulfur (S)-Dissolved	1370	DLHC	5.0	mg/L	03-OCT-19	03-OCT-19	R4857779
Tellurium (Te)-Dissolved	<0.0020	DLHC	0.0020	mg/L	03-OCT-19	03-OCT-19	R4857779
Thallium (Tl)-Dissolved	<0.00010	DLHC	0.00010	mg/L	03-OCT-19	03-OCT-19	R4857779
Thorium (Th)-Dissolved	<0.0010	DLHC	0.0010	mg/L	03-OCT-19	03-OCT-19	R4857779
Tin (Sn)-Dissolved	<0.0010	DLHC	0.0010	mg/L	03-OCT-19	03-OCT-19	R4857779
Titanium (Ti)-Dissolved	<0.0030	DLHC	0.0030	mg/L	03-OCT-19	03-OCT-19	R4857779
Tungsten (W)-Dissolved	<0.0010	DLHC	0.0010	mg/L	03-OCT-19	03-OCT-19	R4857779
Uranium (U)-Dissolved	0.00185	DLHC	0.00010	mg/L	03-OCT-19	03-OCT-19	R4857779
Vanadium (V)-Dissolved	<0.0050	DLHC	0.0050	mg/L	03-OCT-19	03-OCT-19	R4857779
Zinc (Zn)-Dissolved	<0.010	DLHC	0.010	mg/L	03-OCT-19	03-OCT-19	R4857779
Zirconium (Zr)-Dissolved	<0.0020	DLHC	0.0020	mg/L	03-OCT-19	03-OCT-19	R4857779
Radiological Parameters							
Ra-226	0.018		0.0035	Bq/L	08-OCT-19	17-OCT-19	R4851666

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

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2357232-1
Matrix Spike	Lithium (Li)-Dissolved	MS-B	L2357232-1
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2357232-1
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L2357232-1
Matrix Spike	Potassium (K)-Dissolved	MS-B	L2357232-1
Matrix Spike	Rubidium (Rb)-Dissolved	MS-B	L2357232-1
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2357232-1
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2357232-1
Matrix Spike	Sulfur (S)-Dissolved	MS-B	L2357232-1
Matrix Spike	Uranium (U)-Dissolved	MS-B	L2357232-1
Matrix Spike	Calcium (Ca)-Total	MS-B	L2357232-1
Matrix Spike	Iron (Fe)-Total	MS-B	L2357232-1
Matrix Spike	Lithium (Li)-Total	MS-B	L2357232-1
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2357232-1
Matrix Spike	Manganese (Mn)-Total	MS-B	L2357232-1
Matrix Spike	Potassium (K)-Total	MS-B	L2357232-1
Matrix Spike	Rubidium (Rb)-Total	MS-B	L2357232-1
Matrix Spike	Sodium (Na)-Total	MS-B	L2357232-1
Matrix Spike	Strontium (Sr)-Total	MS-B	L2357232-1
Matrix Spike	Sulfur (S)-Total	MS-B	L2357232-1
Matrix Spike	Uranium (U)-Total	MS-B	L2357232-1
Matrix Spike	Ammonia, Total (as N)	MS-B	L2357232-1
Matrix Spike	Phosphorus, Total	MS-B	L2357232-1

Sample Parameter Qualifier key listed:

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACY-TITR-TB	Water	Acidity	APHA 2310 B modified

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

ALK-WT	Water	Alkalinity, Total (as CaCO3)	EPA 310.2

This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.

CL-IC-N-WT	Water	Chloride by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

CN-TOT-WT	Water	Cyanide, Total	ISO 14403-2

Total cyanide is determined by the combination of UV digestion and distillation. Cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

When using this method, high levels of thiocyanate in samples can cause false positives at ~1-2% of the thiocyanate concentration. For samples with detectable cyanide analyzed by this method, ALS recommends analysis for thiocyanate to check for this potential interference

DOC-WT	Water	Dissolved Organic Carbon	APHA 5310B

Sample is filtered through a 0.45um filter, then injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic carbon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.

EC-SCREEN-WT	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Reference Information

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

EC-WT	Water	Conductivity	APHA 2510 B

Water samples can be measured directly by immersing the conductivity cell into the sample.

F-IC-N-WT	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-WT	Water	Hardness	APHA 2340 B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-WT	Water	Dissolved Mercury in Water by CVAAS	EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

HG-T-CVAA-WT	Water	Total Mercury in Water by CVAAS	EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

MET-D-CCMS-WT	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

MET-T-CCMS-WT	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

NH3-F-WT	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO3-IC-WT	Water	Nitrate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-COL-WT	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is deteremined colourimetrically after persulphate digestion of the sample.

PH-BF	Water	pH	APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

RA226-MMER-FC	Water	Ra226 by Alpha Scint, MDC=0.01 Bq/L	EPA 903.1

SO4-IC-N-WT	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Reference Information

SOLIDS-TDS-BF	Water	Total Dissolved Solids	APHA 2540C

A well-mixed sample is filtered though glass fibres filter. A known volume of the filtrate is evaporated and dried at 180 +/- 2C for 1hr.

SOLIDS-TSS-BF	Water	Suspended solids	APHA 2540 D-Gravimetric

A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104 +/- 1C for a minimum of four hours or until a constant weight is achieved.

TKN-WT	Water	Total Kjeldahl Nitrogen	APHA 4500-Norg D

This analysis is carried out using procedures adapted from APHA Method 4500-Norg "Nitrogen (Organic)". Total Kjeldahl Nitrogen is determined by sample digestion at 380 Celsius with analysis using an automated colorimetric method.

TOC-WT	Water	Total Organic Carbon	APHA 5310B

Sample is injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic cabon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.

TURBIDITY-BF	Water	Turbidity	APHA 2130 B

Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.

** 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
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA
FC	ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
TB	ALS ENVIRONMENTAL - THUNDER BAY, ONTARIO, CANADA
BF	ALS ENVIRONMENTAL - BAFFIN ISLAND, NUNAVUT, 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 weight of sample
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

Workorder: L2357232 Report Date: 24-OCT-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACY-TITR-TB	**Water**							
Batch R4860194								
WG3183287-8 LCS								
Acidity (as CaCO3)			94.7		%		85-115	06-OCT-19
WG3183287-7 MB								
Acidity (as CaCO3)			<2.0		mg/L		2	06-OCT-19
ALK-WT	**Water**							
Batch R4858920								
WG3181643-4 DUP		**WG3181643-3**						
Alkalinity, Total (as CaCO3)		39	39		mg/L	0.6	20	03-OCT-19
WG3181643-2 LCS								
Alkalinity, Total (as CaCO3)			104.4		%		85-115	03-OCT-19
WG3181643-1 MB								
Alkalinity, Total (as CaCO3)			<10		mg/L		10	03-OCT-19
CL-IC-N-WT	**Water**							
Batch R4858736								
WG3180434-14 DUP		**L2358193-2**						
Chloride (Cl)		1.07	1.07		mg/L	0.5	20	03-OCT-19
WG3180434-12 LCS								
Chloride (Cl)			102.0		%		90-110	03-OCT-19
WG3180434-11 MB								
Chloride (Cl)			<0.50		mg/L		0.5	03-OCT-19
WG3180434-15 MS		**L2358193-2**						
Chloride (Cl)			99.4		%		75-125	03-OCT-19
CN-TOT-WT	**Water**							
Batch R4857839								
WG3177861-3 DUP		**L2355354-9**						
Cyanide, Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	03-OCT-19
WG3177861-2 LCS								
Cyanide, Total			97.4		%		80-120	03-OCT-19
WG3177861-1 MB								
Cyanide, Total			<0.0020		mg/L		0.002	03-OCT-19
WG3177861-4 MS		**L2355354-9**						
Cyanide, Total			96.8		%		70-130	03-OCT-19
DOC-WT	**Water**							
Batch R4858934								
WG3181358-3 DUP		**L2357232-1**						
Dissolved Organic Carbon		3.82	3.99		mg/L	4.3	20	04-OCT-19
WG3181358-2 LCS								

Quality Control Report

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2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
DOC-WT	**Water**							
Batch R4858934								
WG3181358-2 LCS								
Dissolved Organic Carbon			105.8		%		80-120	04-OCT-19
WG3181358-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	04-OCT-19
WG3181358-4 MS		**L2357232-1**						
Dissolved Organic Carbon			106.2		%		70-130	04-OCT-19
EC-WT	**Water**							
Batch R4858920								
WG3181643-4 DUP		**WG3181643-3**						
Conductivity		5040	5030		umhos/cm	0.2	10	03-OCT-19
WG3181643-2 LCS								
Conductivity			101.4		%		90-110	03-OCT-19
WG3181643-1 MB								
Conductivity			<3.0		umhos/cm		3	03-OCT-19
F-IC-N-WT	**Water**							
Batch R4858736								
WG3180434-14 DUP		**L2358193-2**						
Fluoride (F)		0.042	0.043		mg/L	1.5	20	03-OCT-19
WG3180434-12 LCS								
Fluoride (F)			103.5		%		90-110	03-OCT-19
WG3180434-11 MB								
Fluoride (F)			<0.020		mg/L		0.02	03-OCT-19
WG3180434-15 MS		**L2358193-2**						
Fluoride (F)			99.8		%		75-125	03-OCT-19
HG-D-CVAA-WT	**Water**							
Batch R4858972								
WG3181846-4 DUP		**WG3181846-3**						
Mercury (Hg)-Dissolved		<0.0000050	<0.000005(	RPD-NA	mg/L	N/A	20	04-OCT-19
WG3181846-2 LCS								
Mercury (Hg)-Dissolved			109.0		%		80-120	04-OCT-19
WG3181846-1 MB								
Mercury (Hg)-Dissolved			<0.000005(		mg/L		0.000005	04-OCT-19
WG3181846-6 MS		**WG3181846-5**						
Mercury (Hg)-Dissolved			108.8		%		70-130	04-OCT-19
HG-T-CVAA-WT	**Water**							

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-T-CVAA-WT	**Water**							
Batch R4858970								
WG3181845-4 DUP		**WG3181845-3**						
Mercury (Hg)-Total		<0.0000050	<0.000005C	RPD-NA	mg/L	N/A	20	04-OCT-19
WG3181845-2 LCS								
Mercury (Hg)-Total			106.0		%		80-120	04-OCT-19
WG3181845-1 MB								
Mercury (Hg)-Total			<0.000005C		mg/L		0.000005	04-OCT-19
WG3181845-6 MS		**WG3181845-5**						
Mercury (Hg)-Total			97.3		%		70-130	04-OCT-19
MET-D-CCMS-WT	**Water**							
Batch R4857779								
WG3180561-4 DUP		**WG3180561-3**						
Aluminum (Al)-Dissolved		<0.050	<0.050	RPD-NA	mg/L	N/A	20	03-OCT-19
Antimony (Sb)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	03-OCT-19
Arsenic (As)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	03-OCT-19
Barium (Ba)-Dissolved		0.0117	0.0118		mg/L	0.5	20	03-OCT-19
Beryllium (Be)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	03-OCT-19
Bismuth (Bi)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	03-OCT-19
Boron (B)-Dissolved		<0.10	<0.10	RPD-NA	mg/L	N/A	20	03-OCT-19
Cadmium (Cd)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	03-OCT-19
Calcium (Ca)-Dissolved		509	495		mg/L	2.9	20	03-OCT-19
Cesium (Cs)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	03-OCT-19
Chromium (Cr)-Dissolved		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	03-OCT-19
Cobalt (Co)-Dissolved		0.0046	0.0045		mg/L	2.5	20	03-OCT-19
Copper (Cu)-Dissolved		0.0050	0.0047		mg/L	6.7	20	03-OCT-19
Iron (Fe)-Dissolved		<0.10	<0.10	RPD-NA	mg/L	N/A	20	03-OCT-19
Lead (Pb)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	03-OCT-19
Lithium (Li)-Dissolved		0.033	0.030		mg/L	9.0	20	03-OCT-19
Magnesium (Mg)-Dissolved		661	651		mg/L	1.5	20	03-OCT-19
Manganese (Mn)-Dissolved		1.10	1.09		mg/L	1.5	20	03-OCT-19
Molybdenum (Mo)-Dissolved		0.00156	0.00160		mg/L	2.6	20	03-OCT-19
Nickel (Ni)-Dissolved		0.0067	0.0066		mg/L	1.8	20	03-OCT-19
Phosphorus (P)-Dissolved		<0.50	<0.50	RPD-NA	mg/L	N/A	20	03-OCT-19
Potassium (K)-Dissolved		6.97	6.84		mg/L	1.8	20	03-OCT-19
Rubidium (Rb)-Dissolved		0.0079	0.0080		mg/L	1.8	20	03-OCT-19
Selenium (Se)-Dissolved		0.00690	0.00635		mg/L	8.3	20	03-OCT-19

Quality Control Report

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2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4857779								
WG3180561-4 DUP		**WG3180561-3**						
Silicon (Si)-Dissolved		<0.50	<0.50	RPD-NA	mg/L	N/A	20	03-OCT-19
Silver (Ag)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	03-OCT-19
Sodium (Na)-Dissolved		6.41	6.30		mg/L	1.8	20	03-OCT-19
Strontium (Sr)-Dissolved		1.63	1.59		mg/L	2.7	20	03-OCT-19
Sulfur (S)-Dissolved		1370	1350		mg/L	1.8	20	03-OCT-19
Tellurium (Te)-Dissolved		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	03-OCT-19
Thallium (Tl)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	03-OCT-19
Thorium (Th)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	03-OCT-19
Tin (Sn)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	03-OCT-19
Titanium (Ti)-Dissolved		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	03-OCT-19
Tungsten (W)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	03-OCT-19
Uranium (U)-Dissolved		0.00185	0.00186		mg/L	0.2	20	03-OCT-19
Vanadium (V)-Dissolved		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	03-OCT-19
Zinc (Zn)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	03-OCT-19
Zirconium (Zr)-Dissolved		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	03-OCT-19
WG3180561-2 LCS								
Aluminum (Al)-Dissolved			107.8		%		80-120	03-OCT-19
Antimony (Sb)-Dissolved			100.7		%		80-120	03-OCT-19
Arsenic (As)-Dissolved			103.2		%		80-120	03-OCT-19
Barium (Ba)-Dissolved			99.2		%		80-120	03-OCT-19
Beryllium (Be)-Dissolved			98.7		%		80-120	03-OCT-19
Bismuth (Bi)-Dissolved			98.0		%		80-120	03-OCT-19
Boron (B)-Dissolved			98.3		%		80-120	03-OCT-19
Cadmium (Cd)-Dissolved			105.7		%		80-120	03-OCT-19
Calcium (Ca)-Dissolved			99.1		%		80-120	03-OCT-19
Cesium (Cs)-Dissolved			98.3		%		80-120	03-OCT-19
Chromium (Cr)-Dissolved			105.9		%		80-120	03-OCT-19
Cobalt (Co)-Dissolved			104.1		%		80-120	03-OCT-19
Copper (Cu)-Dissolved			102.7		%		80-120	03-OCT-19
Iron (Fe)-Dissolved			100.7		%		80-120	03-OCT-19
Lead (Pb)-Dissolved			102.9		%		80-120	03-OCT-19
Lithium (Li)-Dissolved			95.7		%		80-120	03-OCT-19
Magnesium (Mg)-Dissolved			111.1		%		80-120	03-OCT-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4857779								
WG3180561-2 LCS								
Manganese (Mn)-Dissolved			104.4		%		80-120	03-OCT-19
Molybdenum (Mo)-Dissolved			96.1		%		80-120	03-OCT-19
Nickel (Ni)-Dissolved			102.6		%		80-120	03-OCT-19
Phosphorus (P)-Dissolved			108.5		%		80-120	03-OCT-19
Potassium (K)-Dissolved			100.9		%		80-120	03-OCT-19
Rubidium (Rb)-Dissolved			107.6		%		80-120	03-OCT-19
Selenium (Se)-Dissolved			103.3		%		80-120	03-OCT-19
Silicon (Si)-Dissolved			103.6		%		60-140	03-OCT-19
Silver (Ag)-Dissolved			95.6		%		80-120	03-OCT-19
Sodium (Na)-Dissolved			108.8		%		80-120	03-OCT-19
Strontium (Sr)-Dissolved			100.5		%		80-120	03-OCT-19
Sulfur (S)-Dissolved			102.6		%		80-120	03-OCT-19
Tellurium (Te)-Dissolved			95.3		%		80-120	03-OCT-19
Thallium (Tl)-Dissolved			100.1		%		80-120	03-OCT-19
Thorium (Th)-Dissolved			102.2		%		80-120	03-OCT-19
Tin (Sn)-Dissolved			105.4		%		80-120	03-OCT-19
Titanium (Ti)-Dissolved			101.7		%		80-120	03-OCT-19
Tungsten (W)-Dissolved			98.6		%		80-120	03-OCT-19
Uranium (U)-Dissolved			97.1		%		80-120	03-OCT-19
Vanadium (V)-Dissolved			106.3		%		80-120	03-OCT-19
Zinc (Zn)-Dissolved			102.3		%		80-120	03-OCT-19
Zirconium (Zr)-Dissolved			96.3		%		80-120	03-OCT-19
WG3180561-1 MB								
Aluminum (Al)-Dissolved			<0.0050		mg/L		0.005	03-OCT-19
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	03-OCT-19
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	03-OCT-19
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	03-OCT-19
Beryllium (Be)-Dissolved			<0.00010		mg/L		0.0001	03-OCT-19
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	03-OCT-19
Boron (B)-Dissolved			<0.010		mg/L		0.01	03-OCT-19
Cadmium (Cd)-Dissolved			<0.000005(		mg/L		0.000005	03-OCT-19
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	03-OCT-19
Cesium (Cs)-Dissolved			<0.000010		mg/L		0.00001	03-OCT-19
Chromium (Cr)-Dissolved			<0.00050		mg/L		0.0005	03-OCT-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4857779								
WG3180561-1 MB								
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	03-OCT-19
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	03-OCT-19
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	03-OCT-19
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	03-OCT-19
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	03-OCT-19
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	03-OCT-19
Manganese (Mn)-Dissolved			<0.00050		mg/L		0.0005	03-OCT-19
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	03-OCT-19
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	03-OCT-19
Phosphorus (P)-Dissolved			<0.050		mg/L		0.05	03-OCT-19
Potassium (K)-Dissolved			<0.050		mg/L		0.05	03-OCT-19
Rubidium (Rb)-Dissolved			<0.00020		mg/L		0.0002	03-OCT-19
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	03-OCT-19
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	03-OCT-19
Silver (Ag)-Dissolved			<0.000050		mg/L		0.00005	03-OCT-19
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	03-OCT-19
Strontium (Sr)-Dissolved			<0.0010		mg/L		0.001	03-OCT-19
Sulfur (S)-Dissolved			<0.50		mg/L		0.5	03-OCT-19
Tellurium (Te)-Dissolved			<0.00020		mg/L		0.0002	03-OCT-19
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	03-OCT-19
Thorium (Th)-Dissolved			<0.00010		mg/L		0.0001	03-OCT-19
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	03-OCT-19
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	03-OCT-19
Tungsten (W)-Dissolved			<0.00010		mg/L		0.0001	03-OCT-19
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	03-OCT-19
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	03-OCT-19
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	03-OCT-19
Zirconium (Zr)-Dissolved			<0.00020		mg/L		0.0002	03-OCT-19
WG3180561-5 MS		**WG3180561-3**						
Aluminum (Al)-Dissolved			89.9		%		70-130	03-OCT-19
Antimony (Sb)-Dissolved			92.6		%		70-130	03-OCT-19
Arsenic (As)-Dissolved			100.5		%		70-130	03-OCT-19
Beryllium (Be)-Dissolved			91.1		%		70-130	03-OCT-19
Bismuth (Bi)-Dissolved			90.3		%		70-130	03-OCT-19

Quality Control Report

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Oakville ON L6H 0C3
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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4857779								
WG3180561-5 MS		**WG3180561-3**						
Cadmium (Cd)-Dissolved			89.7		%		70-130	03-OCT-19
Calcium (Ca)-Dissolved			N/A	MS-B	%		-	03-OCT-19
Cesium (Cs)-Dissolved			91.7		%		70-130	03-OCT-19
Chromium (Cr)-Dissolved			100.1		%		70-130	03-OCT-19
Iron (Fe)-Dissolved			79.7		%		70-130	03-OCT-19
Lead (Pb)-Dissolved			93.9		%		70-130	03-OCT-19
Lithium (Li)-Dissolved			N/A	MS-B	%		-	03-OCT-19
Magnesium (Mg)-Dissolved			N/A	MS-B	%		-	03-OCT-19
Manganese (Mn)-Dissolved			N/A	MS-B	%		-	03-OCT-19
Molybdenum (Mo)-Dissolved			82.1		%		70-130	03-OCT-19
Nickel (Ni)-Dissolved			72.8		%		70-130	03-OCT-19
Phosphorus (P)-Dissolved			106.7		%		70-130	03-OCT-19
Potassium (K)-Dissolved			N/A	MS-B	%		-	03-OCT-19
Rubidium (Rb)-Dissolved			N/A	MS-B	%		-	03-OCT-19
Selenium (Se)-Dissolved			89.5		%		70-130	03-OCT-19
Silver (Ag)-Dissolved			85.9		%		70-130	03-OCT-19
Sodium (Na)-Dissolved			N/A	MS-B	%		-	03-OCT-19
Strontium (Sr)-Dissolved			N/A	MS-B	%		-	03-OCT-19
Sulfur (S)-Dissolved			N/A	MS-B	%		-	03-OCT-19
Tellurium (Te)-Dissolved			86.1		%		70-130	03-OCT-19
Thallium (Tl)-Dissolved			93.4		%		70-130	03-OCT-19
Thorium (Th)-Dissolved			92.0		%		70-130	03-OCT-19
Tin (Sn)-Dissolved			96.2		%		70-130	03-OCT-19
Titanium (Ti)-Dissolved			97.2		%		70-130	03-OCT-19
Tungsten (W)-Dissolved			95.3		%		70-130	03-OCT-19
Uranium (U)-Dissolved			N/A	MS-B	%		-	03-OCT-19
Vanadium (V)-Dissolved			102.9		%		70-130	03-OCT-19
Zinc (Zn)-Dissolved			92.6		%		70-130	03-OCT-19
Zirconium (Zr)-Dissolved			91.9		%		70-130	03-OCT-19
MET-T-CCMS-WT	**Water**							
Batch R4857778								
WG3180546-4 DUP		**WG3180546-3**						
Aluminum (Al)-Total		0.082	0.096		mg/L	16	20	03-OCT-19
Antimony (Sb)-Total		<0.0010	<0.0010					

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4857778								
WG3180546-4 DUP		**WG3180546-3**						
Antimony (Sb)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	03-OCT-19
Arsenic (As)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	03-OCT-19
Barium (Ba)-Total		0.0120	0.0124		mg/L	3.9	20	03-OCT-19
Beryllium (Be)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	03-OCT-19
Bismuth (Bi)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	03-OCT-19
Boron (B)-Total		<0.10	<0.10	RPD-NA	mg/L	N/A	20	03-OCT-19
Cadmium (Cd)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	03-OCT-19
Calcium (Ca)-Total		507	514		mg/L	1.4	20	03-OCT-19
Chromium (Cr)-Total		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	03-OCT-19
Cesium (Cs)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	03-OCT-19
Cobalt (Co)-Total		0.0050	0.0056		mg/L	9.9	20	03-OCT-19
Copper (Cu)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	03-OCT-19
Iron (Fe)-Total		0.42	0.44		mg/L	4.3	20	03-OCT-19
Lead (Pb)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	03-OCT-19
Lithium (Li)-Total		0.030	0.031		mg/L	2.0	20	03-OCT-19
Magnesium (Mg)-Total		664	696		mg/L	4.7	20	03-OCT-19
Manganese (Mn)-Total		1.12	1.17		mg/L	4.6	20	03-OCT-19
Molybdenum (Mo)-Total		0.00141	0.00150		mg/L	6.0	20	03-OCT-19
Nickel (Ni)-Total		0.0071	0.0108	J	mg/L	0.0037	0.01	03-OCT-19
Phosphorus (P)-Total		<0.50	<0.50	RPD-NA	mg/L	N/A	20	03-OCT-19
Potassium (K)-Total		6.91	7.28		mg/L	5.2	20	03-OCT-19
Rubidium (Rb)-Total		0.0082	0.0089		mg/L	8.4	20	03-OCT-19
Selenium (Se)-Total		0.00642	0.00677		mg/L	5.4	20	03-OCT-19
Silicon (Si)-Total		<1.0	<1.0	RPD-NA	mg/L	N/A	20	03-OCT-19
Silver (Ag)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	03-OCT-19
Sodium (Na)-Total		6.41	6.70		mg/L	4.4	20	03-OCT-19
Strontium (Sr)-Total		1.58	1.64		mg/L	3.7	20	03-OCT-19
Sulfur (S)-Total		1350	1420		mg/L	4.8	25	03-OCT-19
Thallium (Tl)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	03-OCT-19
Tellurium (Te)-Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	03-OCT-19
Thorium (Th)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	25	03-OCT-19
Tin (Sn)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	03-OCT-19
Titanium (Ti)-Total		0.0037	0.0033		mg/L			03-OCT-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4857778								
WG3180546-4 DUP		**WG3180546-3**						
Titanium (Ti)-Total		0.0037	0.0033		mg/L	10	20	03-OCT-19
Tungsten (W)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	03-OCT-19
Uranium (U)-Total		0.00190	0.00192		mg/L	1.2	20	03-OCT-19
Vanadium (V)-Total		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	03-OCT-19
Zinc (Zn)-Total		<0.030	<0.030	RPD-NA	mg/L	N/A	20	03-OCT-19
Zirconium (Zr)-Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	03-OCT-19
WG3180546-2 LCS								
Aluminum (Al)-Total			103.5		%		80-120	03-OCT-19
Antimony (Sb)-Total			97.8		%		80-120	03-OCT-19
Arsenic (As)-Total			97.5		%		80-120	03-OCT-19
Barium (Ba)-Total			96.1		%		80-120	03-OCT-19
Beryllium (Be)-Total			91.3		%		80-120	03-OCT-19
Bismuth (Bi)-Total			90.9		%		80-120	03-OCT-19
Boron (B)-Total			89.6		%		80-120	03-OCT-19
Cadmium (Cd)-Total			99.9		%		80-120	03-OCT-19
Calcium (Ca)-Total			94.2		%		80-120	03-OCT-19
Chromium (Cr)-Total			98.5		%		80-120	03-OCT-19
Cesium (Cs)-Total			95.1		%		80-120	03-OCT-19
Cobalt (Co)-Total			97.4		%		80-120	03-OCT-19
Copper (Cu)-Total			96.7		%		80-120	03-OCT-19
Iron (Fe)-Total			95.0		%		80-120	03-OCT-19
Lead (Pb)-Total			95.2		%		80-120	03-OCT-19
Lithium (Li)-Total			90.5		%		80-120	03-OCT-19
Magnesium (Mg)-Total			102.0		%		80-120	03-OCT-19
Manganese (Mn)-Total			99.1		%		80-120	03-OCT-19
Molybdenum (Mo)-Total			92.0		%		80-120	03-OCT-19
Nickel (Ni)-Total			96.8		%		80-120	03-OCT-19
Phosphorus (P)-Total			98.2		%		70-130	03-OCT-19
Potassium (K)-Total			95.9		%		80-120	03-OCT-19
Rubidium (Rb)-Total			99.2		%		80-120	03-OCT-19
Selenium (Se)-Total			99.0		%		80-120	03-OCT-19
Silicon (Si)-Total			98.6		%		60-140	03-OCT-19
Silver (Ag)-Total			92.0		%		80-120	03-OCT-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4857778								
WG3180546-2 LCS								
Sodium (Na)-Total			104.1		%		80-120	03-OCT-19
Strontium (Sr)-Total			99.7		%		80-120	03-OCT-19
Sulfur (S)-Total			92.6		%		80-120	03-OCT-19
Thallium (Tl)-Total			94.8		%		80-120	03-OCT-19
Tellurium (Te)-Total			90.8		%		80-120	03-OCT-19
Thorium (Th)-Total			95.5		%		70-130	03-OCT-19
Tin (Sn)-Total			97.2		%		80-120	03-OCT-19
Titanium (Ti)-Total			96.3		%		80-120	03-OCT-19
Tungsten (W)-Total			93.2		%		80-120	03-OCT-19
Uranium (U)-Total			91.0		%		80-120	03-OCT-19
Vanadium (V)-Total			100.4		%		80-120	03-OCT-19
Zinc (Zn)-Total			94.8		%		80-120	03-OCT-19
Zirconium (Zr)-Total			91.6		%		80-120	03-OCT-19
WG3180546-1 MB								
Aluminum (Al)-Total			<0.0050		mg/L		0.005	03-OCT-19
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	03-OCT-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	03-OCT-19
Barium (Ba)-Total			<0.00010		mg/L		0.0001	03-OCT-19
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	03-OCT-19
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	03-OCT-19
Boron (B)-Total			<0.010		mg/L		0.01	03-OCT-19
Cadmium (Cd)-Total			<0.000005C		mg/L		0.000005	03-OCT-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	03-OCT-19
Chromium (Cr)-Total			<0.00050		mg/L		0.0005	03-OCT-19
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	03-OCT-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	03-OCT-19
Copper (Cu)-Total			<0.0010		mg/L		0.001	03-OCT-19
Iron (Fe)-Total			<0.010		mg/L		0.01	03-OCT-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	03-OCT-19
Lithium (Li)-Total			<0.0010		mg/L		0.001	03-OCT-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	03-OCT-19
Manganese (Mn)-Total			<0.00050		mg/L		0.0005	03-OCT-19
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	03-OCT-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	03-OCT-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4857778								
WG3180546-1 MB								
Phosphorus (P)-Total			<0.050		mg/L		0.05	03-OCT-19
Potassium (K)-Total			<0.050		mg/L		0.05	03-OCT-19
Rubidium (Rb)-Total			<0.00020		mg/L		0.0002	03-OCT-19
Selenium (Se)-Total			<0.000050		mg/L		0.00005	03-OCT-19
Silicon (Si)-Total			<0.10		mg/L		0.1	03-OCT-19
Silver (Ag)-Total			<0.000050		mg/L		0.00005	03-OCT-19
Sodium (Na)-Total			<0.050		mg/L		0.05	03-OCT-19
Strontium (Sr)-Total			<0.0010		mg/L		0.001	03-OCT-19
Sulfur (S)-Total			<0.50		mg/L		0.5	03-OCT-19
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	03-OCT-19
Tellurium (Te)-Total			<0.00020		mg/L		0.0002	03-OCT-19
Thorium (Th)-Total			<0.00010		mg/L		0.0001	03-OCT-19
Tin (Sn)-Total			<0.00010		mg/L		0.0001	03-OCT-19
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	03-OCT-19
Tungsten (W)-Total			<0.00010		mg/L		0.0001	03-OCT-19
Uranium (U)-Total			<0.000010		mg/L		0.00001	03-OCT-19
Vanadium (V)-Total			<0.00050		mg/L		0.0005	03-OCT-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	03-OCT-19
Zirconium (Zr)-Total			<0.00020		mg/L		0.0002	03-OCT-19
WG3180546-5 MS		**WG3180546-3**						
Aluminum (Al)-Total			108.9		%		70-130	03-OCT-19
Antimony (Sb)-Total			98.3		%		70-130	03-OCT-19
Arsenic (As)-Total			103.3		%		70-130	03-OCT-19
Barium (Ba)-Total			105.3		%		70-130	03-OCT-19
Beryllium (Be)-Total			94.7		%		70-130	03-OCT-19
Bismuth (Bi)-Total			93.6		%		70-130	03-OCT-19
Boron (B)-Total			90.1		%		70-130	03-OCT-19
Cadmium (Cd)-Total			99.5		%		70-130	03-OCT-19
Calcium (Ca)-Total			N/A	MS-B	%		-	03-OCT-19
Chromium (Cr)-Total			103.7		%		70-130	03-OCT-19
Cesium (Cs)-Total			97.2		%		70-130	03-OCT-19
Cobalt (Co)-Total			104.1		%		70-130	03-OCT-19
Copper (Cu)-Total			101.5		%		70-130	03-OCT-19
Iron (Fe)-Total			N/A	MS-B	%		-	03-OCT-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4857778								
WG3180546-5 MS		**WG3180546-3**						
Lead (Pb)-Total			95.4		%		70-130	03-OCT-19
Lithium (Li)-Total			N/A	MS-B	%		-	03-OCT-19
Magnesium (Mg)-Total			N/A	MS-B	%		-	03-OCT-19
Manganese (Mn)-Total			N/A	MS-B	%		-	03-OCT-19
Molybdenum (Mo)-Total			98.0		%		70-130	03-OCT-19
Nickel (Ni)-Total			101.8		%		70-130	03-OCT-19
Phosphorus (P)-Total			98.6		%		70-130	03-OCT-19
Potassium (K)-Total			N/A	MS-B	%		-	03-OCT-19
Rubidium (Rb)-Total			N/A	MS-B	%		-	03-OCT-19
Selenium (Se)-Total			106.8		%		70-130	03-OCT-19
Silicon (Si)-Total			108.3		%		70-130	03-OCT-19
Silver (Ag)-Total			90.0		%		70-130	03-OCT-19
Sodium (Na)-Total			N/A	MS-B	%		-	03-OCT-19
Strontium (Sr)-Total			N/A	MS-B	%		-	03-OCT-19
Sulfur (S)-Total			N/A	MS-B	%		-	03-OCT-19
Thallium (Tl)-Total			95.5		%		70-130	03-OCT-19
Tellurium (Te)-Total			84.7		%		70-130	03-OCT-19
Thorium (Th)-Total			90.4		%		70-130	03-OCT-19
Tin (Sn)-Total			98.7		%		70-130	03-OCT-19
Titanium (Ti)-Total			93.8		%		70-130	03-OCT-19
Tungsten (W)-Total			101.0		%		70-130	03-OCT-19
Uranium (U)-Total			N/A	MS-B	%		-	03-OCT-19
Vanadium (V)-Total			108.0		%		70-130	03-OCT-19
Zinc (Zn)-Total			100.9		%		70-130	03-OCT-19
Zirconium (Zr)-Total			87.0		%		70-130	03-OCT-19
NH3-F-WT	**Water**							
Batch R4858766								
WG3181797-15 DUP		**L2357232-1**						
Ammonia, Total (as N)		3.79	3.77		mg/L	0.4	20	03-OCT-19
WG3181797-14 LCS								
Ammonia, Total (as N)			99.5		%		85-115	03-OCT-19
WG3181797-13 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	03-OCT-19
WG3181797-16 MS		**L2357232-1**						

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NH3-F-WT	**Water**							
Batch R4858766								
WG3181797-16 MS		**L2357232-1**						
Ammonia, Total (as N)			N/A	MS-B	%		-	03-OCT-19
NO3-IC-WT	**Water**							
Batch R4858736								
WG3180434-14 DUP		**L2358193-2**						
Nitrate (as N)		<0.020	<0.020	RPD-NA	mg/L	N/A	20	03-OCT-19
WG3180434-12 LCS								
Nitrate (as N)			101.4		%		90-110	03-OCT-19
WG3180434-11 MB								
Nitrate (as N)			<0.020		mg/L		0.02	03-OCT-19
WG3180434-15 MS		**L2358193-2**						
Nitrate (as N)			96.8		%		75-125	03-OCT-19
P-T-COL-WT	**Water**							
Batch R4858789								
WG3181368-3 DUP		**L2356976-1**						
Phosphorus, Total		0.331	0.328		mg/L	0.9	20	04-OCT-19
WG3181368-2 LCS								
Phosphorus, Total			98.7		%		80-120	04-OCT-19
WG3181368-1 MB								
Phosphorus, Total			<0.0030		mg/L		0.003	04-OCT-19
WG3181368-4 MS		**L2356976-1**						
Phosphorus, Total			N/A	MS-B	%		-	04-OCT-19
PH-BF	**Water**							
Batch R4853590								
WG3178736-2 DUP		**L2356948-1**						
pH		6.82	6.83	J	pH units	0.01	0.2	02-OCT-19
WG3178736-1 LCS								
pH			7.02		pH units		6.9-7.1	02-OCT-19
SO4-IC-N-WT	**Water**							
Batch R4858736								
WG3180434-14 DUP		**L2358193-2**						
Sulfate (SO4)		12.0	12.0		mg/L	0.1	20	03-OCT-19
WG3180434-12 LCS								
Sulfate (SO4)			102.4		%		90-110	03-OCT-19
WG3180434-11 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	03-OCT-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SO4-IC-N-WT	**Water**							
Batch R4858736								
WG3180434-15 MS		**L2358193-2**						
Sulfate (SO4)			100.7		%		75-125	03-OCT-19
SOLIDS-TDS-BF	**Water**							
Batch R4854358								
WG3178747-3 DUP		**L2356948-3**						
Total Dissolved Solids		519	463		mg/L	11	20	02-OCT-19
WG3178747-2 LCS								
Total Dissolved Solids			97.5		%		85-115	02-OCT-19
WG3178747-1 MB								
Total Dissolved Solids			<20		mg/L		20	02-OCT-19
SOLIDS-TSS-BF	**Water**							
Batch R4853597								
WG3178742-3 DUP		**L2357326-1**						
Total Suspended Solids		122	124		mg/L	1.6	25	01-OCT-19
WG3178742-2 LCS								
Total Suspended Solids			98.4		%		85-115	01-OCT-19
WG3178742-1 MB								
Total Suspended Solids			<2.0		mg/L		2	01-OCT-19
TKN-WT	**Water**							
Batch R4859216								
WG3181133-3 DUP		**L2355174-4**						
Total Kjeldahl Nitrogen		0.20	0.21		mg/L	7.8	20	04-OCT-19
WG3181133-2 LCS								
Total Kjeldahl Nitrogen			107.3		%		75-125	04-OCT-19
WG3181133-1 MB								
Total Kjeldahl Nitrogen			<0.15		mg/L		0.15	04-OCT-19
WG3181133-4 MS		**L2355174-4**						
Total Kjeldahl Nitrogen			102.2		%		70-130	04-OCT-19
TOC-WT	**Water**							
Batch R4858932								
WG3181671-3 DUP		**L2357232-1**						
Total Organic Carbon		4.16	4.25		mg/L	2.1	20	04-OCT-19
WG3181671-2 LCS								
Total Organic Carbon			106.3		%		80-120	04-OCT-19
WG3181671-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	04-OCT-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TOC-WT	**Water**							
Batch R4858932								
WG3181671-4 MS		**L2357232-1**						
Total Organic Carbon			104.4		%		70-130	04-OCT-19
TURBIDITY-BF	**Water**							
Batch R4853592								
WG3178737-3 DUP		**L2357383-1**						
Turbidity		4.36	4.34		NTU	0.5	15	02-OCT-19
WG3178737-2 LCS								
Turbidity			110.0		%		85-115	02-OCT-19
WG3178737-1 MB								
Turbidity			<0.10		NTU		0.1	02-OCT-19

Quality Control Report

Workorder: L2357232 Report Date: 24-OCT-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

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

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

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.

Monday, October 21, 2019

Rick Hawthorne
ALS Environmental
60 Northland Rd, Unit 1
Waterloo Canada, ON N2V 2B8

Re: ALS Workorder: 1910111
Project Name:
Project Number: L2357232

Dear Mr. Hawthorne:

One water sample was received from ALS Environmental, on 10/4/2019. The sample was scheduled for the following analysis:

Radium-226

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,

ALS Environmental
Katie M. OBrien
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
AIHA	214884
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280

1910111

Radium-226:
The sample was prepared and analyzed according to the current revision of SOP 783.

All acceptance criteria were met.

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1910111
Client Name: ALS Environmental
Client Project Name:
Client Project Number: L2357232
Client PO Number: L2357232

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
L2357232-1	1910111-1		WATER	01-Oct-19	

1910111

L2357232

WATERLOO

ALS Environmental

Subcontract Request Form

Subcontract To:

ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
225 COMMERCE DRIVE
FORT COLLINS,CO 80524

NOTES: Please reference on final report and invoice: PO# *L2357232*
ALS requires QC data to be provided with your final results.

Please see enclosed 1 **sample(s) in** 1 **Container(s)**

SAMPLE NUMBER	ANALYTICAL REQUIRED	DATE SAMPLED / DUE DATE	Priority Flag
L2357232-1 MS-08		10/ 1/ 2019	E
(1)	Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	10/22/2019	

Subcontract Info Contact: Mary-Lynn Pike (519) 886-6910
Analysis and reporting info contact: Rick Hawthorne
60 NORTHLAND ROAD, UNIT 1
WATERLOO,ON N2V 2B8
Phone: (519) 886-6910 Email: Rick.Hawthorne@alsglobal.com

Please email confirmation of receipt to: **Rick.Hawthorne@alsglobal.com**

Shipped By: _____ Date Shipped: _____

Received By: C Trumble Date Received: 10-4-19 13:15

Verified By: _____ Date Verified: _____

Temperature: _____

Sample Integrity Issues: _____

ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: ALS-Waterloo Workorder No: 1910111

Project Manager: KO Initials: CDK Date: 10-4-19

1.	Are airbills / shipping documents present and/or removable?	DROP OFF	YES	NO
2.	Are custody seals on **shipping** containers intact?	NONE	YES	NO *
3.	Are custody seals on **sample** containers intact?	NONE	YES	NO *
4.	Is there a COC (chain-of-custody) present?		YES	NO *
5.	Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)		YES	NO *
6.	Are short-hold samples present?		YES	NO
7.	Are all samples within holding times for the requested analyses?		YES	NO *
8.	Were all sample containers received intact? (not broken or leaking)		YES	NO *
9.	Is there sufficient sample for the requested analyses?		YES	NO *
10.	Are all samples in the proper containers for the requested analyses?		YES	NO *
11.	Are all aqueous samples preserved correctly, if required? (excluding volatiles)	N/A	YES	NO *
12.	Are all aqueous non-preserved samples pH 4-9?	N/A	YES	NO *
13.	Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm (1/4 inch) diameter? (i.e. size of green pea)	N/A	YES	NO
14.	Were the samples shipped on ice?		YES	NO
15.	Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: #1 (#3) #4	RAD ONLY	YES	NO

Cooler #:	1							
Temperature (°C):	2.6							
No. of custody seals on cooler:	2							
DOT Survey/ Acceptance Information — External µR/hr reading:	12							
Background µR/hr reading:	13							

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? (YES) / NO / NA (If no, see Form 008.)

*** Please provide details here for NO responses to gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.**

All ice was melted.

All client bottle ID's vs ALS lab ID's double-checked by: EE

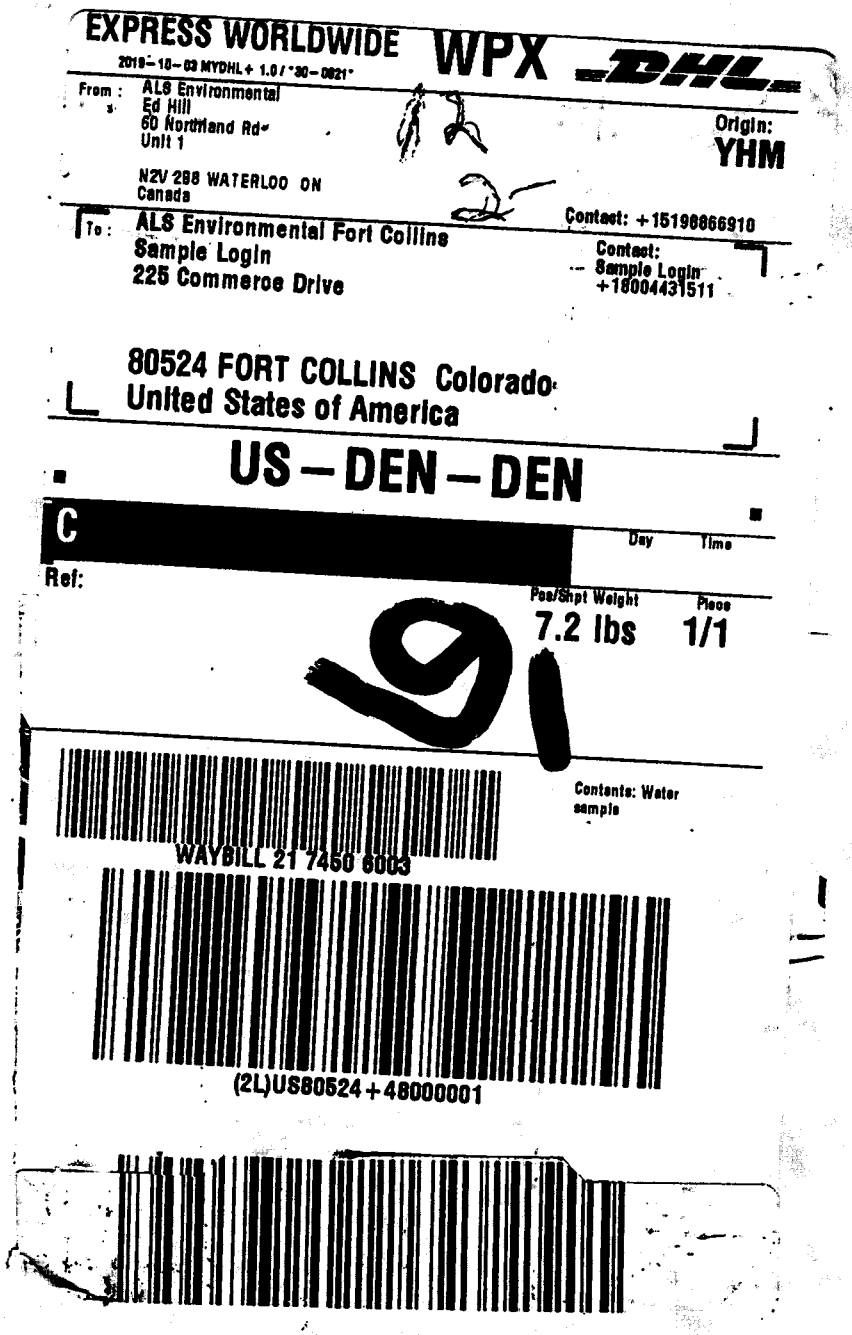
If applicable, was the client contacted? YES / NO / NA Contact: _____ Date/Time: _____

Project Manager Signature / Date: 10/7/19

Form 201r27.xls
(02/11/2019)

*IR Gun #1, VWR SN 170560549
*IR Gun #3, VWR SN 170647571
*IR Gun #4, Oakton, SN 2372220101-0002

1910111


EXPRESS WORLDWIDE
WPX
DHL
2019-10-03 MYDHL+ 1.0 / *30-0821*
From :
ALS Environmental
Ed Hill
60 Northland Rd
Unit 1
N2V 2B8 WATERLOO ON
Canada
Origin:
YHM
Contact: +15196866910
To :
ALS Environmental Fort Collins
Sample Login
225 Commerce Drive
Contact:
Sample Login
+18004431511
80524 FORT COLLINS Colorado
United States of America
US-DEN-DEN
C
Day
Time
Ref:
Pce/Shpt Weight
7.2 lbs
Piece
1/1
191
Contents: Water sample
WAYBILL 21 7450 6003
(2L)US80524+48000001

Client:	ALS Environmental	**Date:**	*21-Oct-19*
Project:	L2357232	**Work Order:**	1910111
Sample ID:	L2357232-1	**Lab ID:**	1910111-1
Legal Location:		**Matrix:**	WATER
Collection Date:	10/1/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **10/8/2019**		PrepBy: **TRW**
Ra-226	**0.018 (+/- 0.0075)**		**0.0035**	**BQ/l**	NA	10/17/2019 14:05
Carr: BARIUM	*99.8*		*40-110*	*%REC*	DL = NA	10/17/2019 14:05

Client:	ALS Environmental	**Date:**	*21-Oct-19*
Project:	L2357232	**Work Order:**	1910111
Sample ID:	L2357232-1	**Lab ID:**	1910111-1
Legal Location:		**Matrix:**	WATER
Collection Date:	10/1/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed

Explanation of Qualifiers

Radiochemistry:

- "Report Limit" is the MDC

U or ND - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

Y2 - Chemical Yield outside default limits.

W - DER is greater than Warning Limit of 1.42

* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.
# - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.
G - Sample density differs by more than 15% of LCS density.
D - DER is greater than Control Limit

M - Requested MDC not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS, Matrix Spike Recovery within control limits.

N - Matrix Spike Recovery outside control limits

NC - Not Calculated for duplicate results less than 5 times MDC

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

Inorganics:

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).

U or ND - Indicates that the compound was analyzed for but not detected.

E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.

M - Duplicate injection precision was not met.

N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.

Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.

* - Duplicate analysis (relative percent difference) not within control limits.

S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

Organics:

U or ND - Indicates that the compound was analyzed for but not detected.

B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.

E - Analyte concentration exceeds the upper level of the calibration range.

J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).

A - A tentatively identified compound is a suspected aldol-condensation product.

X - The analyte was diluted below an accurate quantitation level.

* - The spike recovery is equal to or outside the control criteria used.

+ - The relative percent difference (RPD) equals or exceeds the control criteria.

G - A pattern resembling gasoline was detected in this sample.

D - A pattern resembling diesel was detected in this sample.

M - A pattern resembling motor oil was detected in this sample.

C - A pattern resembling crude oil was detected in this sample.

4 - A pattern resembling JP-4 was detected in this sample.

5 - A pattern resembling JP-5 was detected in this sample.

H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.

L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.

Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
- gasoline
- JP-8
- diesel
- mineral spirits
- motor oil
- Stoddard solvent
- bunker C

QC BATCH REPORT

Batch ID: **RE191008-2-1** Instrument ID **Alpha Scin** Method: **Radium-226 by Radon Emanation**

LCS Sample ID: **RE191008-2** Units: **BQ/l** Analysis Date: **10/17/2019 14:40**

Client ID: Run ID: **RE191008-2A** Prep Date: **10/8/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.58 (+/- 0.393)	0.0155	1.72		91.6	67-120					P,Y1,M3
Carr: BARIUM	16500		16380		101	40-110					Y1

LCSD Sample ID: **RE191008-2** Units: **BQ/l** Analysis Date: **10/17/2019 14:40**

Client ID: Run ID: **RE191008-2A** Prep Date: **10/8/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.49 (+/- 0.373)	0.0178	1.72		86.7	67-120		1.58	0.2	2.1	P,Y1,M3
Carr: BARIUM	16500		16390		101	40-110		16500			Y1

MB Sample ID: **RE191008-2** Units: **BQ/l** Analysis Date: **10/17/2019 14:40**

Client ID: Run ID: **RE191008-2A** Prep Date: **10/8/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	0.0023 (+/- 0.0027)	0.0041									Y1,U
Carr: BARIUM	16600		16380		102	40-110					Y1

The following samples were analyzed in this batch: 1910111-1

AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

TOXICITY TEST REPORT

Daphnia magna
EPS 1/RM/14

Work Order : 240458
Sample Number : 60925

SAMPLE IDENTIFICATION

Company :	ALS Laboratory Group, Waterloo	Date Collected :	2019-10-01
Location :	Waterloo ON	Time Collected :	09:15
Job Number :	L2357232-1	Date Received :	2019-10-03
Substance :	L2357232-1 MS-08	Time Received :	11:00
Sampling Method :	Grab	Temperature on Receipt :	6.0 °C
Sampled By :	KB/LM	Date Tested :	2019-10-03
Sample Description :	Clear, light yellow, odourless.		

Test Method : Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna* . Environment Canada EPS 1/RM/14 (Second Edition, December 2000, with February 2016 amendments).

48-HOUR TEST RESULTS

Substance	Effect	Value
Control	Mean Immobility	0.0 %
	Mean Mortality	0.0 %
100%	Mean Immobility	0.0 %
	Mean Mortality	0.0 %

The results reported relate only to the sample tested and as received.

TEST ORGANISM

Species :	*Daphnia magna*	Time to First Brood :	8.2 days
Organism Batch :	Dm19-19	Average Brood Size :	40.1 young
Culture Mortality :	1.9% (previous 7 days)		

TEST CONDITIONS

Sample Treatment :	None	Number of Replicates :	3
pH Adjustment :	None	Organisms / Replicate :	10
Pre-aeration Rate :	~30 mL/min/L	Organisms / Test Level :	30
Pre-aeration Time :	30 minutes	Organism Loading Rate :	15.0 mL/organism
Test Aeration :	None	Impaired Control Organisms :	0.0%
Hardness Adjustment :	None	Test Method Deviation(s) :	None

REFERENCE TOXICANT DATA

Toxicant :	Sodium Chloride	Historical Mean LC50 :	6.4 g/L
Date Tested :	2019-10-01	Warning Limits (± 2SD) :	5.8 - 7.1 g/L
LC50 :	6.9 g/L	Organism Batch :	Dm19-19
95% Confidence Limits :	6.4 - 7.4 g/L	Analyst(s) :	KJW, SV
Statistical Method :	Linear Regression (MLE)		

COMMENTS

All test validity criteria as specified in the test method were satisfied.

Date : 2019-10-08
yyyy-mm-dd

Approved By : *Project Manager*

Work Order : 240458
Sample Number : 60925

TEST DATA

	pH	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	Temperature (°C)	O_2 Saturation (%)*	Hardness (as $CaCO_3$)
Initial Water Chemistry (100%) :	8.7	10.4	5030	20.0	123	468 mg/L

0 HOURS

Date & Time 2019-10-03 14:45
Analyst(s) : SV/KJW (SV)

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O_2	Conductivity	Temperature	O_2 Saturation (%)*	Hardness
100	A	0	0	8.6	9.2	5040	20.0	108	468
100	B	0	0	8.6	9.2	5040	20.0	108	468
100	C	0	0	8.6	9.2	5040	20.0	108	468
Control	A	0	0	8.5	8.6	763	20.0	100	220
Control	B	0	0	8.5	8.6	763	20.0	100	220
Control	C	0	0	8.5	8.6	763	20.0	100	220

Notes:

24 HOURS

Date & Time 2019-10-04 14:45
Analyst(s) : KJW (SV)

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O_2	Conductivity	Temperature
100	A	–	0	–	–	–	20.0
100	B	–	1	–	–	–	20.0
100	C	–	0	–	–	–	20.0
Control	A	–	0	–	–	–	20.0
Control	B	–	0	–	–	–	20.0
Control	C	–	0	–	–	–	20.0

Notes: Test organisms in the 100% concentration appeared to be adhered to gas bubbles on the sides and bottom of the test chamber.

48 HOURS

Date & Time 2019-10-05 14:45
Analyst(s) : SV

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O_2	Conductivity	Temperature
100	A	0	0	7.8	8.1	5030	20.0
100	B	0	0	7.9	8.3	5020	20.0
100	C	0	0	7.8	8.3	5020	20.0
Control	A	0	0	8.5	8.4	777	20.0
Control	B	0	0	8.5	8.4	778	20.0
Control	C	0	0	8.5	8.5	789	20.0

Notes: Test organisms in the 100% concentration appeared to be adhered to gas bubbles on the sides and bottom of the test chamber. SV

Number immobile does not include number dead.

– = not measured/not required
* adjusted for temperature and barometric pressure

Test Data Reviewed By : JL
Date : 2019-10-07

AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

TOXICITY TEST REPORT

Rainbow Trout
EPS 1/RM/13

Work Order : 240458
Sample Number : 60925

SAMPLE IDENTIFICATION

Company :	ALS Laboratory Group, Waterloo	Date Collected :	2019-10-01
Location :	Waterloo ON	Time Collected :	09:15
Job Number :	L2357232-1	Date Received :	2019-10-03
Substance :	L2357232-1 MS-08	Time Received :	11:00
Sampling Method :	Grab	Temperature on Receipt :	6.0 °C
Sampled By :	KB/LM	Date Tested :	2019-10-03
Sample Description :	Clear, light yellow, odourless.		

Test Method(s) : Reference Method for Determining Acute Lethality of Liquid Effluents to Rainbow Trout. Environment Canada, EPS 1/RM/13 (2nd Edition, December 2000, with May 2007 and February 2016 amendments).

96-HOUR TEST RESULTS

Substance	Effect	Value
Control	Mean Impairment	0.0 %
	Mean Mortality	0.0 %
100%	Mean Impairment	0.0 %
	Mean Mortality	0.0 %

The results reported relate only to the sample tested and as received.

TEST ORGANISM

Test Organism :	*Oncorhynchus mykiss*	Average Fork Length (± 2 SD) :	39.8 mm (±2.3)
Organism Batch :	T19-18	Range of Fork Lengths :	38 - 42 mm
Control Sample Size :	10	Average Wet Weight (± 2 SD) :	0.49 g (±0.12)
Cumulative stock tank mortality rate :	0.1% (previous 7 days)	Range of Wet Weights :	0.38 - 0.58 g
Control organisms showing stress :	0 (at test completion)	Organism Loading Rate :	0.2 g/L

TEST CONDITIONS

Sample Treatment :	None	Volume Tested (L) :	21
pH Adjustment :	None	Number of Replicates :	1
Test Aeration :	Yes	Organisms Per Replicate :	10
Pre-aeration/Aeration Rate :	6.5 ± 1 mL/min/L	Organisms Per Test Level :	10
Total Pre-Aeration Time :	120 minutes	Test Method Deviation(s) :	None

REFERENCE TOXICANT DATA

Toxicant :	Potassium Chloride	Date Tested :	2019-10-01
Organism Batch :	T19-18	Historical Mean LC50 :	3769 mg/L
LC50 :	3375 mg/L	Warning Limits (± 2SD) :	3141 - 4522 mg/L
95% Confidence Limits :	3021 - 3683 mg/L	Analyst(s) :	KP, ALC, AW
Statistical Method :	Linear Regression (MLE)		

COMMENTS

•All test validity criteria as specified in the test method were satisfied.

Date : 2019-10-08
yyyy-mm-dd

Approved By : *Project Manager*

Work Order : 240458
Sample Number : 60925

TEST DATA

	pH	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	Temperature (°C)	O_2 Saturation (%)*
Initial Water Chemistry (100%) :	8.9	10.6	5085	14.0	111
After 30 min pre-aeration :	8.7	9.5	5070	14.0	101

0 HOURS

Date & Time 2019-10-03 14:30
Analyst(s) : MDH

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature	O_2 Saturation*
100%	0	0	8.6	9.3	5072	14.5	100
Control	0	0	8.2	9.3	793	15.0	98

Notes:

24 HOURS

Date & Time 2019-10-04 14:30
Analyst(s) : MDH

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	–	–	–	15.0
Control	0	0	–	–	–	15.0

Notes:

48 HOURS

Date & Time 2019-10-05 14:30
Analyst(s) : AW

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	–	–	–	15.0
Control	0	0	–	–	–	15.0

Notes:

72 HOURS

Date & Time 2019-10-06 14:30
Analyst(s) : AW

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	–	–	–	15.0
Control	0	0	–	–	–	15.0

Notes:

96 HOURS

Date & Time 2019-10-07 14:30
Analyst(s) : ALC(TL)

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	7.5	9.5	5087	14.5
Control	0	0	8.2	9.7	743	14.5

Notes:

"–" = not measured/not required
Number impaired does not include number dead.
* adjusted for temperature and barometric pressure

Test Data Reviewed By : JL
Date : 2019-10-07

CHAIN OF CUSTODY RECORD

AQUATOX

AquaTox Work Order No: 240458

Shipping Address: AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, Ontario Canada N0B 2J0

Voice: (519) 763-4412 **Fax:** (519) 763-4419

P.O. Number:	4500057496
Field Sampler Name (print):	KB/LM
Signature:	
Affiliation:	Baffinland Iron Mine / ALS Environmental
Sample Storage (prior to shipping):	
Custody Relinquished by:	Kendra Button
Date/Time Shipped:	01-Oct-19/19:00

Client:	ALS Environmental c/o Baffinland Iron Mine Quote # (2019): 162705399-19
Phone:	(519) 886-6910
Fax:	(519) 886-9047
Contact:	Rick Hawthorne (ALS) / Martina Rendas (Aquatox)

Sample Identification					Analyses Requested									Sample Method and Volume		
Date Collected (yyyy-mm-dd)	Time Collected (e.g. 14:30, 24 hr clock)	Sample Name (L255732-1)	AquaTox Sample Number	Temp. on arrival	Rainbow Trout Single Concentration	Rainbow Trout LC50	*Daphnia magna* Single Concentration	*Daphnia magna* LC50	Fathead Minnow Survival & Growth	*Ceriodaphnia dubia* Survival & Reproduction	*Lemna minor* Growth	*Pseudokirchneriella subcapitata* Growth	Other (please specify below)	Grab	Composite	# of Containers and Volume (eg. 2 x 1L, 3 x 10L, etc.)
2019-10-01	09:15	MS-08	60925	6.0	✓		✓							✓		2 x 10LCarboy

For Lab Use Only

Received By: SV/CG/NG/ALC
Date: 2019-10-03
Time: 11:00
Storage Location:
Storage Temp (°C):

Please list any special requests or instructions:

Rush TAT, pH required, daily updates.
Report Distribution: bimcore@alsglobal.com, rick.hawthorne@alsglobal.com

L2357232

WATERLOO

ALS Environmental

Subcontract Request Form

Subcontract To:

AQUATOX TESTING AND CONSULTING
11B NICHOLAS BEAVER ROAD
RR3
GUELPH,ON N1H 6H9

NOTES: Please reference on final report and invoice: PO# *L2357232*
ALS requires QC data to be provided with your final results.

Please see enclosed 1 **sample(s) in** 0 **Container(s)**

SAMPLE NUMBER	ANALYTICAL REQUIRED	DATE SAMPLED / DUE DATE	Priority Flag
L2357232-1 MS-08		10/1/2019	**E**
	Special Request Aquatox (SPECIAL REQUEST2-AQT 14)	10/8/2019	
	Special Request Aquatox (SPECIAL REQUEST-AQT 14)	10/8/2019	

Subcontract Info Contact: Mary-Lynn Pike (519) 886-6910
Analysis and reporting info contact: Rick Hawthorne
60 NORTHLAND ROAD, UNIT 1
WATERLOO,ON N2V 2B8
Phone: (519) 886-6910 Email: Rick.Hawthorne@alsglobal.com

Please email confirmation of receipt to: **Rick.Hawthorne@alsglobal.com**

Shipped By: _____ Date Shipped: _____

Received By: _____ Date Received: _____

Verified By: _____ Date Verified: _____

Temperature: _____

Sample Integrity Issues: _____

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2357232-COFC

COC Number: 15 -

Page 1 of 1

Report To	Contact and company name below will appear on the final report
Company:	Baffinland Iron Mines Corp.
Contact:	Wiliam Bowden and Connor Devereaux
Phone:	647-253-0596 EXT 6016
	Company address below will appear on the final report
Street:	2275 Upper Middle Rd. E., Suite #300
City/Province:	Oakville, ON
Postal Code:	L6H 0C3
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)

Quality Control (QC) Report with Report ☑ YES ☐ NO

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax bimcore@alsglobal.com

Email 2

Email 3

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax ap@baffinland.com

Email 2 commercial@baffinland.com

Project Information

ALS Account # / Quote #:	23642 /Q42455
Job #:	MS-08 WT TOX
PO / AFE:	4500057496
LSD:	
ALS Lab Work Order # (lab use only)	L2357232

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	
ALS Contact:	Sampler: KB/LM

Select Service Level: ☐ Contact your AM to confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☐ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
	4 day [P4] ☐		1 Business day [E1] ☑
	3 day [P3] ☐		Same Day, Weekend or Statutory holiday [E0] ☑
	2 day [P2] ☐		

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	F/P	BIM-MMER-WT	Group 3	Number of Containers
	MS-08	1-Oct-19	9:15	Water		E0	E1	12

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human drinking water use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

1 extra gen chem included.

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☑ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			12.2		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released By: Kendra Button	Date: 01-Oct-19	Time: 13:10	Received by:	Date:	Time:	Received by:	Date: 30CT19	Time: 900

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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 specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Baffinland Iron Mine's Corporation (Oakville)
ATTN: William Bowden/Connor Devereaux
2275 Upper Middle Rd. E.
Suite #300
Oakville ON L6H 0C3

Date Received: 01-OCT-19
Report Date: 24-OCT-19 13:53 (MT)
Version: FINAL

Client Phone: 647-253-0596

Certificate of Analysis

Lab Work Order #: L2357716

Project P.O. #: 4500057496
Job Reference: MS-08 REFERENCE AND EXPOSURE
C of C Numbers:
Legal Site Desc:

Comments: ADDITIONAL 02-OCT-19 09:37

Rick Hawthorne
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2357716-1 MS-08-DS Sampled By: KB/CD on 01-OCT-19 @ 17:30 Matrix: WATER							
Physical Tests							
Conductivity	199		3.0	umhos/cm		05-OCT-19	R4860731
Hardness (as CaCO3)	83.0	HTC	0.50	mg/L		04-OCT-19	
pH	8.08		0.10	pH units		02-OCT-19	R4853590
Total Suspended Solids	2.8		2.0	mg/L		01-OCT-19	R4853597
Total Dissolved Solids	90	DLDS	13	mg/L		06-OCT-19	R4860417
Turbidity	3.36	PEHT	0.10	NTU		05-OCT-19	R4860048
Anions and Nutrients							
Alkalinity, Total (as CaCO3)	85		10	mg/L		05-OCT-19	R4860731
Ammonia, Total (as N)	<0.010		0.010	mg/L		07-OCT-19	R4860725
Chloride (Cl)	8.20		0.50	mg/L		04-OCT-19	R4859139
Fluoride (F)	0.027		0.020	mg/L		04-OCT-19	R4859139
Nitrate (as N)	0.082		0.020	mg/L		04-OCT-19	R4859139
Total Kjeldahl Nitrogen	<0.15		0.15	mg/L	07-OCT-19	07-OCT-19	R4860925
Phosphorus, Total	0.0050		0.0030	mg/L	04-OCT-19	07-OCT-19	R4860606
Sulfate (SO4)	7.65		0.30	mg/L		04-OCT-19	R4859139
Organic / Inorganic Carbon							
Dissolved Carbon Filtration Location	LAB					04-OCT-19	R4859599
Dissolved Organic Carbon	1.60		0.50	mg/L	04-OCT-19	07-OCT-19	R4860640
Total Organic Carbon	2.19		0.50	mg/L		07-OCT-19	R4860639
Total Metals							
Aluminum (Al)-Total	0.118		0.0050	mg/L	04-OCT-19	04-OCT-19	R4859637
Antimony (Sb)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Arsenic (As)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Barium (Ba)-Total	0.0112		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Beryllium (Be)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Boron (B)-Total	<0.010		0.010	mg/L	04-OCT-19	04-OCT-19	R4859637
Cadmium (Cd)-Total	<0.0000050		0.0000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Calcium (Ca)-Total	16.5		0.050	mg/L	04-OCT-19	04-OCT-19	R4859637
Cesium (Cs)-Total	0.000014		0.000010	mg/L	04-OCT-19	04-OCT-19	R4859637
Chromium (Cr)-Total	<0.00050		0.00050	mg/L	04-OCT-19	04-OCT-19	R4859637
Cobalt (Co)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Copper (Cu)-Total	<0.0010		0.0010	mg/L	04-OCT-19	04-OCT-19	R4859637
Iron (Fe)-Total	0.117		0.010	mg/L	04-OCT-19	04-OCT-19	R4859637
Lead (Pb)-Total	0.000077		0.000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Lithium (Li)-Total	<0.0010		0.0010	mg/L	04-OCT-19	04-OCT-19	R4859637
Magnesium (Mg)-Total	10.2		0.0050	mg/L	04-OCT-19	04-OCT-19	R4859637
Manganese (Mn)-Total	0.00247		0.00050	mg/L	04-OCT-19	04-OCT-19	R4859637
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		07-OCT-19	R4860448
Molybdenum (Mo)-Total	0.000321		0.000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Nickel (Ni)-Total	0.00058		0.00050	mg/L	04-OCT-19	04-OCT-19	R4859637
Phosphorus (P)-Total	<0.050		0.050	mg/L	04-OCT-19	04-OCT-19	R4859637

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2357716-1 MS-08-DS Sampled By: KB/CD on 01-OCT-19 @ 17:30 Matrix: WATER							
Total Metals							
Potassium (K)-Total	1.09		0.050	mg/L	04-OCT-19	04-OCT-19	R4859637
Rubidium (Rb)-Total	0.00154		0.00020	mg/L	04-OCT-19	04-OCT-19	R4859637
Selenium (Se)-Total	<0.000050		0.000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Silicon (Si)-Total	1.26		0.10	mg/L	04-OCT-19	04-OCT-19	R4859637
Silver (Ag)-Total	<0.000050		0.000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Sodium (Na)-Total	3.41		0.050	mg/L	04-OCT-19	04-OCT-19	R4859637
Strontium (Sr)-Total	0.0167		0.0010	mg/L	04-OCT-19	04-OCT-19	R4859637
Sulfur (S)-Total	2.64		0.50	mg/L	04-OCT-19	04-OCT-19	R4859637
Tellurium (Te)-Total	<0.00020		0.00020	mg/L	04-OCT-19	04-OCT-19	R4859637
Thallium (Tl)-Total	<0.000010		0.000010	mg/L	04-OCT-19	04-OCT-19	R4859637
Thorium (Th)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Tin (Sn)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Titanium (Ti)-Total	0.00541		0.00030	mg/L	04-OCT-19	04-OCT-19	R4859637
Tungsten (W)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Uranium (U)-Total	0.00415		0.000010	mg/L	04-OCT-19	04-OCT-19	R4859637
Vanadium (V)-Total	<0.00050		0.00050	mg/L	04-OCT-19	04-OCT-19	R4859637
Zinc (Zn)-Total	<0.0030		0.0030	mg/L	04-OCT-19	04-OCT-19	R4859637
Zirconium (Zr)-Total	0.00026		0.00020	mg/L	04-OCT-19	04-OCT-19	R4859637
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					04-OCT-19	R4859193
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	04-OCT-19	07-OCT-19	R4860451
Radiological Parameters							
Ra-226	0.0094		0.0046	Bq/L	10-OCT-19	21-OCT-19	R4851666
L2357716-2 MS-08-US Sampled By: KB/CD on 01-OCT-19 @ 18:00 Matrix: WATER							
Physical Tests							
Conductivity	192		3.0	umhos/cm		05-OCT-19	R4860731
Hardness (as CaCO3)	81.1	HTC	0.50	mg/L		04-OCT-19	
pH	8.08		0.10	pH units		02-OCT-19	R4853590
Total Suspended Solids	2.0		2.0	mg/L		01-OCT-19	R4853597
Total Dissolved Solids	85	DLDS	13	mg/L		06-OCT-19	R4860417
Turbidity	1.88	PEHT	0.10	NTU		05-OCT-19	R4860048
Anions and Nutrients							
Alkalinity, Total (as CaCO3)	85		10	mg/L		05-OCT-19	R4860731
Ammonia, Total (as N)	<0.010		0.010	mg/L		07-OCT-19	R4860725
Chloride (Cl)	8.41		0.50	mg/L		04-OCT-19	R4859139
Fluoride (F)	0.030		0.020	mg/L		04-OCT-19	R4859139
Nitrate (as N)	0.074		0.020	mg/L		04-OCT-19	R4859139
Total Kjeldahl Nitrogen	<0.15		0.15	mg/L	07-OCT-19	07-OCT-19	R4860925
Phosphorus, Total	0.0042		0.0030	mg/L	04-OCT-19	07-OCT-19	R4860606
Sulfate (SO4)	5.26		0.30	mg/L		04-OCT-19	R4859139

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2357716-2 MS-08-US Sampled By: KB/CD on 01-OCT-19 @ 18:00 Matrix: WATER							
Anions and Nutrients							
Organic / Inorganic Carbon							
Dissolved Carbon Filtration Location	LAB					04-OCT-19	R4859599
Dissolved Organic Carbon	1.68		0.50	mg/L	04-OCT-19	07-OCT-19	R4860640
Total Organic Carbon	2.22		0.50	mg/L		07-OCT-19	R4860639
Total Metals							
Aluminum (Al)-Total	0.0844		0.0050	mg/L	04-OCT-19	04-OCT-19	R4859637
Antimony (Sb)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Arsenic (As)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Barium (Ba)-Total	0.0111		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Beryllium (Be)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Boron (B)-Total	<0.010		0.010	mg/L	04-OCT-19	04-OCT-19	R4859637
Cadmium (Cd)-Total	<0.0000050		0.0000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Calcium (Ca)-Total	16.6		0.050	mg/L	04-OCT-19	04-OCT-19	R4859637
Cesium (Cs)-Total	0.000011		0.000010	mg/L	04-OCT-19	04-OCT-19	R4859637
Chromium (Cr)-Total	<0.00050		0.00050	mg/L	04-OCT-19	04-OCT-19	R4859637
Cobalt (Co)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Copper (Cu)-Total	0.0010		0.0010	mg/L	04-OCT-19	04-OCT-19	R4859637
Iron (Fe)-Total	0.066		0.010	mg/L	04-OCT-19	04-OCT-19	R4859637
Lead (Pb)-Total	0.000062		0.000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Lithium (Li)-Total	<0.0010		0.0010	mg/L	04-OCT-19	04-OCT-19	R4859637
Magnesium (Mg)-Total	9.63		0.0050	mg/L	04-OCT-19	04-OCT-19	R4859637
Manganese (Mn)-Total	0.00121		0.00050	mg/L	04-OCT-19	04-OCT-19	R4859637
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		07-OCT-19	R4860448
Molybdenum (Mo)-Total	0.000364		0.000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Nickel (Ni)-Total	<0.00050		0.00050	mg/L	04-OCT-19	04-OCT-19	R4859637
Phosphorus (P)-Total	<0.050		0.050	mg/L	04-OCT-19	04-OCT-19	R4859637
Potassium (K)-Total	1.10		0.050	mg/L	04-OCT-19	04-OCT-19	R4859637
Rubidium (Rb)-Total	0.00161		0.00020	mg/L	04-OCT-19	04-OCT-19	R4859637
Selenium (Se)-Total	<0.000050		0.000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Silicon (Si)-Total	1.31		0.10	mg/L	04-OCT-19	04-OCT-19	R4859637
Silver (Ag)-Total	<0.000050		0.000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Sodium (Na)-Total	3.68		0.050	mg/L	04-OCT-19	04-OCT-19	R4859637
Strontium (Sr)-Total	0.0170		0.0010	mg/L	04-OCT-19	04-OCT-19	R4859637
Sulfur (S)-Total	1.92		0.50	mg/L	04-OCT-19	04-OCT-19	R4859637
Tellurium (Te)-Total	<0.00020		0.00020	mg/L	04-OCT-19	04-OCT-19	R4859637
Thallium (Tl)-Total	<0.000010		0.000010	mg/L	04-OCT-19	04-OCT-19	R4859637
Thorium (Th)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Tin (Sn)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Titanium (Ti)-Total	0.00375		0.00030	mg/L	04-OCT-19	04-OCT-19	R4859637
Tungsten (W)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2357716-2 MS-08-US Sampled By: KB/CD on 01-OCT-19 @ 18:00 Matrix: WATER							
Total Metals							
Uranium (U)-Total	0.00450		0.000010	mg/L	04-OCT-19	04-OCT-19	R4859637
Vanadium (V)-Total	<0.00050		0.00050	mg/L	04-OCT-19	04-OCT-19	R4859637
Zinc (Zn)-Total	<0.0030		0.0030	mg/L	04-OCT-19	04-OCT-19	R4859637
Zirconium (Zr)-Total	0.00026		0.00020	mg/L	04-OCT-19	04-OCT-19	R4859637
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					04-OCT-19	R4859193
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	04-OCT-19	07-OCT-19	R4860451
Radiological Parameters							
Ra-226	0.0081		0.0059	Bq/L	10-OCT-19	21-OCT-19	R4851666

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

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Calcium (Ca)-Total	MS-B	L2357716-1, -2
Matrix Spike	Iron (Fe)-Total	MS-B	L2357716-1, -2
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2357716-1, -2
Matrix Spike	Silicon (Si)-Total	MS-B	L2357716-1, -2
Matrix Spike	Sodium (Na)-Total	MS-B	L2357716-1, -2
Matrix Spike	Strontium (Sr)-Total	MS-B	L2357716-1, -2
Matrix Spike	Uranium (U)-Total	MS-B	L2357716-1, -2

Sample Parameter Qualifier key listed:

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
HTC	Hardness was calculated from Total Ca and/or Mg concentrations and may be biased high (dissolved Ca/Mg results unavailable).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
PEHT	Parameter Exceeded Recommended Holding Time Prior to Analysis

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-WT	Water	Alkalinity, Total (as CaCO3)	EPA 310.2

This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.

CL-IC-N-WT	Water	Chloride by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

DOC-WT	Water	Dissolved Organic Carbon	APHA 5310B

Sample is filtered through a 0.45um filter, then injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic carbon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.

EC-SCREEN-WT	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

EC-WT	Water	Conductivity	APHA 2510 B

Water samples can be measured directly by immersing the conductivity cell into the sample.

F-IC-N-WT	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-WT	Water	Hardness	APHA 2340 B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-WT	Water	Dissolved Mercury in Water by CVAAS	EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

HG-T-CVAA-WT	Water	Total Mercury in Water by CVAAS	EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

MET-T-CCMS-WT	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Reference Information

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

NH3-F-WT	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO3-IC-WT	Water	Nitrate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-COL-WT	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is deteremined colourimetrically after persulphate digestion of the sample.

PH-BF	Water	pH	APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

RA226-MMER-FC	Water	Ra226 by Alpha Scint, MDC=0.01 Bq/L	EPA 903.1
SO4-IC-N-WT	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-WT	Water	Total Dissolved Solids	APHA 2540C

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

SOLIDS-TSS-BF	Water	Suspended solids	APHA 2540 D-Gravimetric

A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104 +/- 1C for a minimum of four hours or until a constant weight is achieved.

TKN-WT	Water	Total Kjeldahl Nitrogen	APHA 4500-Norg D

This analysis is carried out using procedures adapted from APHA Method 4500-Norg "Nitrogen (Organic)". Total Kjeldahl Nitrogen is determined by sample digestion at 380 Celsius with analysis using an automated colorimetric method.

TOC-WT	Water	Total Organic Carbon	APHA 5310B

Sample is injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic cabon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.

TURBIDITY-WT	Water	Turbidity	APHA 2130 B

Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.

** 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
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA
FC	ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
BF	ALS ENVIRONMENTAL - BAFFIN ISLAND, NUNAVUT, CANADA

Chain of Custody Numbers:

Reference Information

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 weight of sample
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

Workorder: L2357716 Report Date: 24-OCT-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ALK-WT	**Water**							
Batch R4860731								
WG3183025-4 DUP		**WG3183025-3**						
Alkalinity, Total (as CaCO3)		85	85		mg/L	0.4	20	05-OCT-19
WG3183025-2 LCS								
Alkalinity, Total (as CaCO3)			106.0		%		85-115	05-OCT-19
WG3183025-1 MB								
Alkalinity, Total (as CaCO3)			<10		mg/L		10	05-OCT-19
CL-IC-N-WT	**Water**							
Batch R4859139								
WG3181734-24 DUP		**WG3181734-23**						
Chloride (Cl)		6.98	6.98		mg/L	0.0	20	04-OCT-19
WG3181734-22 LCS								
Chloride (Cl)			102.1		%		90-110	04-OCT-19
WG3181734-21 MB								
Chloride (Cl)			<0.50		mg/L		0.5	04-OCT-19
WG3181734-25 MS		**WG3181734-23**						
Chloride (Cl)			100.1		%		75-125	04-OCT-19
DOC-WT	**Water**							
Batch R4860640								
WG3182798-7 DUP		**L2356948-1**						
Dissolved Organic Carbon		14.2	14.8		mg/L	4.0	20	07-OCT-19
WG3182798-6 LCS								
Dissolved Organic Carbon			96.4		%		80-120	07-OCT-19
WG3182798-5 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	07-OCT-19
WG3182798-8 MS		**L2356948-1**						
Dissolved Organic Carbon			93.6		%		70-130	07-OCT-19
EC-WT	**Water**							
Batch R4860731								
WG3183025-4 DUP		**WG3183025-3**						
Conductivity		199	196		umhos/cm	1.4	10	05-OCT-19
WG3183025-2 LCS								
Conductivity			100.4		%		90-110	05-OCT-19
WG3183025-1 MB								
Conductivity			<3.0		umhos/cm		3	05-OCT-19
F-IC-N-WT	**Water**							

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F-IC-N-WT	**Water**							
Batch R4859139								
WG3181734-24 DUP		**WG3181734-23**						
Fluoride (F)		0.025	0.025		mg/L	0.1	20	04-OCT-19
WG3181734-22 LCS								
Fluoride (F)			103.8		%		90-110	04-OCT-19
WG3181734-21 MB								
Fluoride (F)			<0.020		mg/L		0.02	04-OCT-19
WG3181734-25 MS		**WG3181734-23**						
Fluoride (F)			101.9		%		75-125	04-OCT-19
HG-D-CVAA-WT	**Water**							
Batch R4860451								
WG3182354-3 DUP		**L2357716-1**						
Mercury (Hg)-Dissolved		<0.0000050	<0.000005C	RPD-NA	mg/L	N/A	20	07-OCT-19
WG3182354-2 LCS								
Mercury (Hg)-Dissolved			99.8		%		80-120	07-OCT-19
WG3182354-1 MB								
Mercury (Hg)-Dissolved			<0.000005C		mg/L		0.000005	07-OCT-19
WG3182354-4 MS		**L2357716-2**						
Mercury (Hg)-Dissolved			95.8		%		70-130	07-OCT-19
HG-T-CVAA-WT	**Water**							
Batch R4860448								
WG3182348-3 DUP		**L2357716-1**						
Mercury (Hg)-Total		<0.0000050	<0.000005C	RPD-NA	mg/L	N/A	20	07-OCT-19
WG3182348-2 LCS								
Mercury (Hg)-Total			98.3		%		80-120	07-OCT-19
WG3182348-1 MB								
Mercury (Hg)-Total			<0.000005C		mg/L		0.000005	07-OCT-19
WG3182348-4 MS		**L2357716-2**						
Mercury (Hg)-Total			98.8		%		70-130	07-OCT-19
MET-T-CCMS-WT	**Water**							
Batch R4859637								
WG3182336-4 DUP		**WG3182336-3**						
Aluminum (Al)-Total		0.118	0.114		mg/L	3.4	20	04-OCT-19
Antimony (Sb)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	04-OCT-19
Arsenic (As)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	04-OCT-19
Barium (Ba)-Total		0.0112	0.0109		mg/L	2.4	20	04-OCT-19
Beryllium (Be)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	04-OCT-19
Bismuth (Bi)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	04-OCT-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4859637								
WG3182336-4 DUP		**WG3182336-3**						
Boron (B)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	04-OCT-19
Cadmium (Cd)-Total		<0.0000050	<0.000005(	RPD-NA	mg/L	N/A	20	04-OCT-19
Calcium (Ca)-Total		16.5	16.5		mg/L	0.4	20	04-OCT-19
Chromium (Cr)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	04-OCT-19
Cesium (Cs)-Total		0.000014	0.000015		mg/L	4.3	20	04-OCT-19
Cobalt (Co)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	04-OCT-19
Copper (Cu)-Total		<0.0010	0.0010	RPD-NA	mg/L	N/A	20	04-OCT-19
Iron (Fe)-Total		0.117	0.115		mg/L	2.2	20	04-OCT-19
Lead (Pb)-Total		0.000077	0.000080		mg/L	4.1	20	04-OCT-19
Lithium (Li)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	04-OCT-19
Magnesium (Mg)-Total		10.2	10.1		mg/L	1.0	20	04-OCT-19
Manganese (Mn)-Total		0.00247	0.00246		mg/L	0.2	20	04-OCT-19
Molybdenum (Mo)-Total		0.000321	0.000323		mg/L	0.8	20	04-OCT-19
Nickel (Ni)-Total		0.00058	0.00057		mg/L	1.0	20	04-OCT-19
Phosphorus (P)-Total		<0.050	<0.050	RPD-NA	mg/L	N/A	20	04-OCT-19
Potassium (K)-Total		1.09	1.09		mg/L	0.1	20	04-OCT-19
Rubidium (Rb)-Total		0.00154	0.00158		mg/L	2.1	20	04-OCT-19
Selenium (Se)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	04-OCT-19
Silicon (Si)-Total		1.26	1.29		mg/L	2.6	20	04-OCT-19
Silver (Ag)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	04-OCT-19
Sodium (Na)-Total		3.41	3.39		mg/L	0.5	20	04-OCT-19
Strontium (Sr)-Total		0.0167	0.0167		mg/L	0.2	20	04-OCT-19
Sulfur (S)-Total		2.64	2.70		mg/L	2.2	25	04-OCT-19
Thallium (Tl)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	04-OCT-19
Tellurium (Te)-Total		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	04-OCT-19
Thorium (Th)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	25	04-OCT-19
Tin (Sn)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	04-OCT-19
Titanium (Ti)-Total		0.00541	0.00550		mg/L	1.5	20	04-OCT-19
Tungsten (W)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	04-OCT-19
Uranium (U)-Total		0.00415	0.00407		mg/L	2.0	20	04-OCT-19
Vanadium (V)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	04-OCT-19
Zinc (Zn)-Total		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	04-OCT-19
Zirconium (Zr)-Total		0.00026	0.00028		mg/L			04-OCT-19

Quality Control Report

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2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4859637								
WG3182336-4 DUP		**WG3182336-3**						
Zirconium (Zr)-Total		0.00026	0.00028		mg/L	5.3	20	04-OCT-19
WG3182336-2 LCS								
Aluminum (Al)-Total			106.5		%		80-120	04-OCT-19
Antimony (Sb)-Total			103.5		%		80-120	04-OCT-19
Arsenic (As)-Total			100.9		%		80-120	04-OCT-19
Barium (Ba)-Total			104.0		%		80-120	04-OCT-19
Beryllium (Be)-Total			100.9		%		80-120	04-OCT-19
Bismuth (Bi)-Total			98.0		%		80-120	04-OCT-19
Boron (B)-Total			98.7		%		80-120	04-OCT-19
Cadmium (Cd)-Total			102.5		%		80-120	04-OCT-19
Calcium (Ca)-Total			100.1		%		80-120	04-OCT-19
Chromium (Cr)-Total			102.0		%		80-120	04-OCT-19
Cesium (Cs)-Total			99.3		%		80-120	04-OCT-19
Cobalt (Co)-Total			101.5		%		80-120	04-OCT-19
Copper (Cu)-Total			101.0		%		80-120	04-OCT-19
Iron (Fe)-Total			101.2		%		80-120	04-OCT-19
Lead (Pb)-Total			100.9		%		80-120	04-OCT-19
Lithium (Li)-Total			99.9		%		80-120	04-OCT-19
Magnesium (Mg)-Total			102.4		%		80-120	04-OCT-19
Manganese (Mn)-Total			102.1		%		80-120	04-OCT-19
Molybdenum (Mo)-Total			101.4		%		80-120	04-OCT-19
Nickel (Ni)-Total			99.9		%		80-120	04-OCT-19
Phosphorus (P)-Total			106.9		%		70-130	04-OCT-19
Potassium (K)-Total			103.1		%		80-120	04-OCT-19
Rubidium (Rb)-Total			105.0		%		80-120	04-OCT-19
Selenium (Se)-Total			99.4		%		80-120	04-OCT-19
Silicon (Si)-Total			105.9		%		60-140	04-OCT-19
Silver (Ag)-Total			102.5		%		80-120	04-OCT-19
Sodium (Na)-Total			101.8		%		80-120	04-OCT-19
Strontium (Sr)-Total			102.1		%		80-120	04-OCT-19
Sulfur (S)-Total			102.9		%		80-120	04-OCT-19
Thallium (Tl)-Total			99.3		%		80-120	04-OCT-19
Tellurium (Te)-Total			100.8		%		80-120	04-OCT-19
Thorium (Th)-Total			98.0		%		70-130	04-OCT-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4859637								
WG3182336-2 LCS								
Tin (Sn)-Total			101.0		%		80-120	04-OCT-19
Titanium (Ti)-Total			98.3		%		80-120	04-OCT-19
Tungsten (W)-Total			100.5		%		80-120	04-OCT-19
Uranium (U)-Total			101.6		%		80-120	04-OCT-19
Vanadium (V)-Total			103.3		%		80-120	04-OCT-19
Zinc (Zn)-Total			99.2		%		80-120	04-OCT-19
Zirconium (Zr)-Total			101.2		%		80-120	04-OCT-19
WG3182336-1 MB								
Aluminum (Al)-Total			<0.0050		mg/L		0.005	04-OCT-19
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	04-OCT-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	04-OCT-19
Barium (Ba)-Total			<0.00010		mg/L		0.0001	04-OCT-19
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	04-OCT-19
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	04-OCT-19
Boron (B)-Total			<0.010		mg/L		0.01	04-OCT-19
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	04-OCT-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	04-OCT-19
Chromium (Cr)-Total			<0.00050		mg/L		0.0005	04-OCT-19
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	04-OCT-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	04-OCT-19
Copper (Cu)-Total			<0.0010		mg/L		0.001	04-OCT-19
Iron (Fe)-Total			<0.010		mg/L		0.01	04-OCT-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	04-OCT-19
Lithium (Li)-Total			<0.0010		mg/L		0.001	04-OCT-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	04-OCT-19
Manganese (Mn)-Total			<0.00050		mg/L		0.0005	04-OCT-19
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	04-OCT-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	04-OCT-19
Phosphorus (P)-Total			<0.050		mg/L		0.05	04-OCT-19
Potassium (K)-Total			<0.050		mg/L		0.05	04-OCT-19
Rubidium (Rb)-Total			<0.00020		mg/L		0.0002	04-OCT-19
Selenium (Se)-Total			<0.000050		mg/L		0.00005	04-OCT-19
Silicon (Si)-Total			<0.10		mg/L		0.1	04-OCT-19
Silver (Ag)-Total			<0.000050		mg/L		0.00005	04-OCT-19

Quality Control Report

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Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4859637								
WG3182336-1 MB								
Sodium (Na)-Total			<0.050		mg/L		0.05	04-OCT-19
Strontium (Sr)-Total			<0.0010		mg/L		0.001	04-OCT-19
Sulfur (S)-Total			<0.50		mg/L		0.5	04-OCT-19
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	04-OCT-19
Tellurium (Te)-Total			<0.00020		mg/L		0.0002	04-OCT-19
Thorium (Th)-Total			<0.00010		mg/L		0.0001	04-OCT-19
Tin (Sn)-Total			<0.00010		mg/L		0.0001	04-OCT-19
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	04-OCT-19
Tungsten (W)-Total			<0.00010		mg/L		0.0001	04-OCT-19
Uranium (U)-Total			<0.000010		mg/L		0.00001	04-OCT-19
Vanadium (V)-Total			<0.00050		mg/L		0.0005	04-OCT-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	04-OCT-19
Zirconium (Zr)-Total			<0.00020		mg/L		0.0002	04-OCT-19
WG3182336-5 MS		**WG3182336-6**						
Aluminum (Al)-Total			90.4		%		70-130	04-OCT-19
Antimony (Sb)-Total			98.3		%		70-130	04-OCT-19
Arsenic (As)-Total			95.7		%		70-130	04-OCT-19
Barium (Ba)-Total			91.9		%		70-130	04-OCT-19
Beryllium (Be)-Total			94.8		%		70-130	04-OCT-19
Bismuth (Bi)-Total			90.8		%		70-130	04-OCT-19
Boron (B)-Total			92.9		%		70-130	04-OCT-19
Cadmium (Cd)-Total			94.9		%		70-130	04-OCT-19
Calcium (Ca)-Total			N/A	MS-B	%		-	04-OCT-19
Chromium (Cr)-Total			96.5		%		70-130	04-OCT-19
Cesium (Cs)-Total			95.9		%		70-130	04-OCT-19
Cobalt (Co)-Total			94.9		%		70-130	04-OCT-19
Copper (Cu)-Total			93.1		%		70-130	04-OCT-19
Iron (Fe)-Total			N/A	MS-B	%		-	04-OCT-19
Lead (Pb)-Total			94.3		%		70-130	04-OCT-19
Lithium (Li)-Total			91.4		%		70-130	04-OCT-19
Magnesium (Mg)-Total			N/A	MS-B	%		-	04-OCT-19
Manganese (Mn)-Total			94.5		%		70-130	04-OCT-19
Molybdenum (Mo)-Total			96.8		%		70-130	04-OCT-19
Nickel (Ni)-Total			93.1		%		70-130	04-OCT-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4859637								
WG3182336-5 MS		**WG3182336-6**						
Phosphorus (P)-Total			104.2		%		70-130	04-OCT-19
Potassium (K)-Total			93.6		%		70-130	04-OCT-19
Rubidium (Rb)-Total			95.8		%		70-130	04-OCT-19
Selenium (Se)-Total			94.7		%		70-130	04-OCT-19
Silicon (Si)-Total			N/A	MS-B	%		-	04-OCT-19
Silver (Ag)-Total			95.9		%		70-130	04-OCT-19
Sodium (Na)-Total			N/A	MS-B	%		-	04-OCT-19
Strontium (Sr)-Total			N/A	MS-B	%		-	04-OCT-19
Sulfur (S)-Total			93.4		%		70-130	04-OCT-19
Thallium (Tl)-Total			91.6		%		70-130	04-OCT-19
Tellurium (Te)-Total			91.9		%		70-130	04-OCT-19
Thorium (Th)-Total			95.1		%		70-130	04-OCT-19
Tin (Sn)-Total			96.3		%		70-130	04-OCT-19
Titanium (Ti)-Total			94.8		%		70-130	04-OCT-19
Tungsten (W)-Total			95.7		%		70-130	04-OCT-19
Uranium (U)-Total			N/A	MS-B	%		-	04-OCT-19
Vanadium (V)-Total			97.5		%		70-130	04-OCT-19
Zinc (Zn)-Total			90.2		%		70-130	04-OCT-19
Zirconium (Zr)-Total			93.6		%		70-130	04-OCT-19
NH3-F-WT	**Water**							
Batch R4860725								
WG3183728-3 DUP		**L2357716-1**						
Ammonia, Total (as N)		<0.010	<0.010	RPD-NA	mg/L	N/A	20	07-OCT-19
WG3183728-2 LCS								
Ammonia, Total (as N)			99.9		%		85-115	07-OCT-19
WG3183728-1 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	07-OCT-19
WG3183728-4 MS		**L2357716-1**						
Ammonia, Total (as N)			104.4		%		75-125	07-OCT-19
NO3-IC-WT	**Water**							
Batch R4859139								
WG3181734-24 DUP		**WG3181734-23**						
Nitrate (as N)		0.073	0.074		mg/L	0.3	20	04-OCT-19
WG3181734-22 LCS								
Nitrate (as N)			101.5				90-110	

Quality Control Report

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Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO3-IC-WT	**Water**							
Batch R4859139								
WG3181734-22 LCS								
Nitrate (as N)			101.5		%		90-110	04-OCT-19
WG3181734-21 MB								
Nitrate (as N)			<0.020		mg/L		0.02	04-OCT-19
WG3181734-25 MS		**WG3181734-23**						
Nitrate (as N)			98.8		%		75-125	04-OCT-19
P-T-COL-WT	**Water**							
Batch R4860606								
WG3182577-3 DUP		**L2356925-1**						
Phosphorus, Total		0.0073	0.0071		mg/L	3.3	20	07-OCT-19
WG3182577-2 LCS								
Phosphorus, Total			100.1		%		80-120	07-OCT-19
WG3182577-1 MB								
Phosphorus, Total			<0.0030		mg/L		0.003	07-OCT-19
WG3182577-4 MS		**L2356925-1**						
Phosphorus, Total			89.2		%		70-130	07-OCT-19
PH-BF	**Water**							
Batch R4853590								
WG3178736-2 DUP		**L2356948-1**						
pH		6.82	6.83	J	pH units	0.01	0.2	02-OCT-19
WG3178736-1 LCS								
pH			7.02		pH units		6.9-7.1	02-OCT-19
SO4-IC-N-WT	**Water**							
Batch R4859139								
WG3181734-24 DUP		**WG3181734-23**						
Sulfate (SO4)		6.79	6.80		mg/L	0.0	20	04-OCT-19
WG3181734-22 LCS								
Sulfate (SO4)			102.6		%		90-110	04-OCT-19
WG3181734-21 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	04-OCT-19
WG3181734-25 MS		**WG3181734-23**						
Sulfate (SO4)			101.2		%		75-125	04-OCT-19
SOLIDS-TDS-WT	**Water**							
Batch R4860417								
WG3183481-3 DUP		**L2357716-1**						
Total Dissolved Solids		90	78		mg/L	14	20	06-OCT-19
WG3183481-2 LCS								

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SOLIDS-TDS-WT	**Water**							
Batch R4860417								
WG3183481-2 LCS								
Total Dissolved Solids			95.3		%		85-115	06-OCT-19
WG3183481-1 MB								
Total Dissolved Solids			<10		mg/L		10	06-OCT-19
SOLIDS-TSS-BF	**Water**							
Batch R4853597								
WG3178742-3 DUP		**L2357326-1**						
Total Suspended Solids		122	124		mg/L	1.6	25	01-OCT-19
WG3178742-2 LCS								
Total Suspended Solids			98.4		%		85-115	01-OCT-19
WG3178742-1 MB								
Total Suspended Solids			<2.0		mg/L		2	01-OCT-19
TKN-WT	**Water**							
Batch R4860925								
WG3183637-3 DUP		**L2357716-1**						
Total Kjeldahl Nitrogen		<0.15	<0.15	RPD-NA	mg/L	N/A	20	07-OCT-19
WG3183637-2 LCS								
Total Kjeldahl Nitrogen			100.3		%		75-125	07-OCT-19
WG3183637-1 MB								
Total Kjeldahl Nitrogen			<0.15		mg/L		0.15	07-OCT-19
WG3183637-4 MS		**L2357716-1**						
Total Kjeldahl Nitrogen			88.9		%		70-130	07-OCT-19
TOC-WT	**Water**							
Batch R4860639								
WG3183590-3 DUP		**L2356925-1**						
Total Organic Carbon		2.42	2.45		mg/L	1.1	20	07-OCT-19
WG3183590-2 LCS								
Total Organic Carbon			106.7		%		80-120	07-OCT-19
WG3183590-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	07-OCT-19
WG3183590-4 MS		**L2356925-1**						
Total Organic Carbon			101.6		%		70-130	07-OCT-19
TURBIDITY-WT	**Water**							
Batch R4860048								
WG3183230-3 DUP		**L2358825-1**						
Turbidity		207	216		NTU	4.3	15	05-OCT-19
WG3183230-2 LCS								

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TURBIDITY-WT	**Water**							
Batch R4860048								
WG3183230-2 LCS								
Turbidity			102.0		%		85-115	05-OCT-19
WG3183230-1 MB								
Turbidity			<0.10		NTU		0.1	05-OCT-19

Quality Control Report

Workorder: L2357716 Report Date: 24-OCT-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

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

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Quality Control Report

Workorder: L2357716 Report Date: 24-OCT-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Turbidity							
	1	01-OCT-19 17:30	05-OCT-19 00:00	48	78	hours	EHT
	2	01-OCT-19 18:00	05-OCT-19 00:00	48	78	hours	EHT

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2357716 were received on 01-OCT-19 20:20.

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.

Tuesday, October 22, 2019

Rick Hawthorne
ALS Environmental
60 Northland Rd, Unit 1
Waterloo Canada, ON N2V 2B8

Re: ALS Workorder: 1910179
Project Name:
Project Number: L2357716

Dear Mr. Hawthorne:

Two water samples were received from ALS Environmental, on 10/8/2019. The samples were scheduled for the following analysis:

Radium-226

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,

ALS Environmental
Katie M. OBrien
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
AIHA	214884
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280

1910179

Radium-226:
The samples were prepared and analyzed according to the current revision of SOP 783.

All acceptance criteria were met.

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1910179
Client Name: ALS Environmental
Client Project Name:
Client Project Number: L2357716
Client PO Number: L2357716

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
L2357716-1	1910179-1		WATER	01-Oct-19	
L2357716-2	1910179-2		WATER	01-Oct-19	

ALS Environmental

L2357716

WATERLOO

1 2 1 0 7 9 -

Subcontract Request Form

Subcontract To:

ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
225 COMMERCE DRIVE
FORT COLLINS,CO 80524

NOTES: Please reference on final report and invoice: PO# *L2357716*
ALS requires QC data to be provided with your final results.

Please see enclosed 2 sample(s) in 2 Container(s)

SAMPLE NUMBER	ANALYTICAL REQUIRED	DATE SAMPLED / DUE DATE	Priority Flag
L2357716-1 MS-08-DS		10/ 1/ 2019	
	Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	10/22/2019	
L2357716-2 MS-08-US		10/ 1/ 2019	
	Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	10/22/2019	

Subcontract Info Contact: Mary-Lynn Pike (519) 886-6910
Analysis and reporting info contact: Rick Hawthorne
60 NORTHLAND ROAD, UNIT 1
WATERLOO,ON N2V 2B8
Phone: (519) 886-6910 Email: Rick.Hawthorne@alsglobal.com

Please email confirmation of receipt to: Rick.Hawthorne@alsglobal.com

Shipped By: _____ Date Shipped: _____

Received By: _____ Date Received: 10/8/19 12:00

Verified By: _____ Date Verified: _____

Temperature: _____

Sample Integrity Issues: _____

ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: ALS Waterloo Workorder No: L2401279

Project Manager: KMD Initials: TEM Date: 10/3/19

1.	Are airbills / shipping documents present and/or removable?	DROP OFF	YES	NO
2.	Are custody seals on **shipping** containers intact?	NONE	YES	NO *
3.	Are custody seals on **sample** containers intact?	NONE	YES	NO *
4.	Is there a COC (chain-of-custody) present?		YES	NO *
5.	Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)		YES	NO *
6.	Are short-hold samples present?		YES	NO
7.	Are all samples within holding times for the requested analyses?		YES	NO *
8.	Were all sample containers received intact? (not broken or leaking)		YES	NO *
9.	Is there sufficient sample for the requested analyses?		YES	NO *
10.	Are all samples in the proper containers for the requested analyses?		YES	NO *
11.	Are all aqueous samples preserved correctly, if required? (excluding volatiles)	N/A	YES	NO *
12.	Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm (1/4 inch) diameter? (i.e. size of green pea)	N/A	YES	NO
13.	Were the samples shipped on ice?		YES	NO
14.	Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: #1 #3 #4	RAD ONLY	YES	NO

Cooler #:	1								
Temperature (°C):	5.7								
No. of custody seals on cooler:	0								
DOT Survey/ Acceptance Information — External µR/hr reading:	12								
Background µR/hr reading:	13								

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? YES / NO / NA (If no, see Form 008.)

*** Please provide details here for NO responses to gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.**

All client bottle ID's vs ALS lab ID's double-checked by: TEM

If applicable, was the client contacted? YES / NO / NA Contact: _____ Date/Time: _____

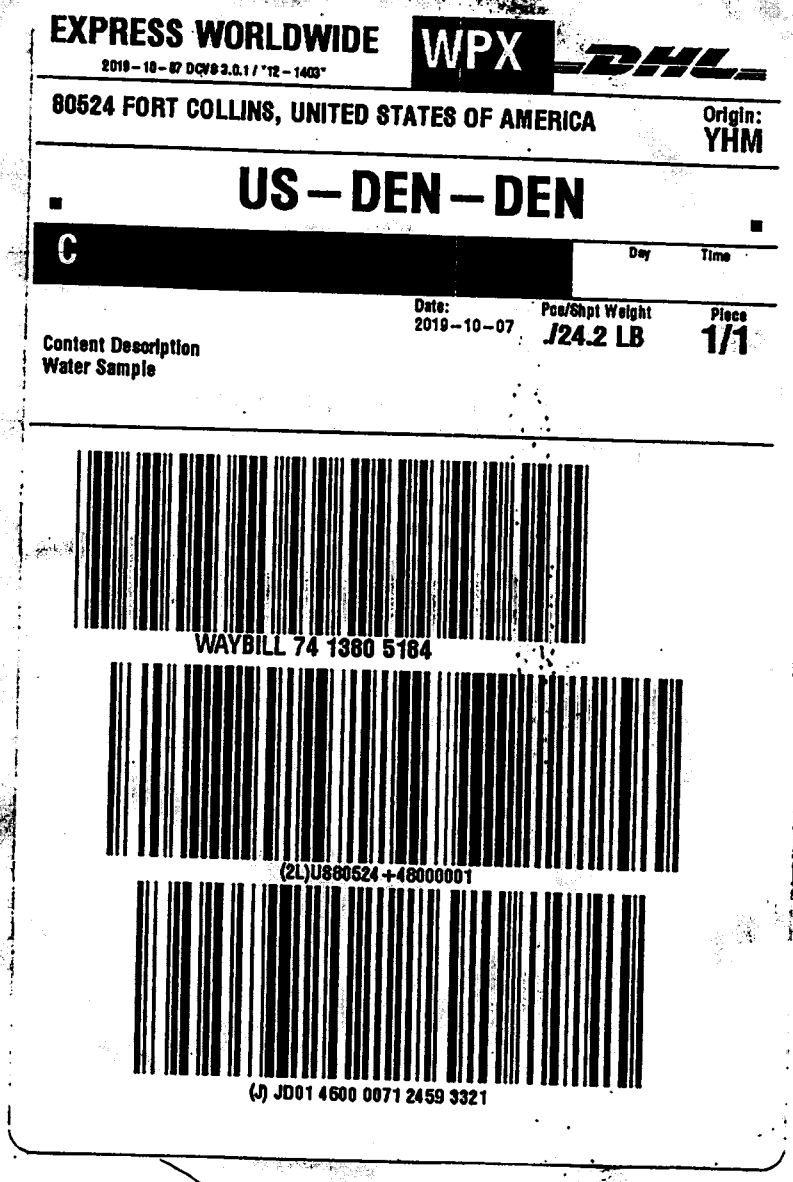
Project Manager Signature / Date: 10/9/19

Form 201r28.xls
(10/07/2019)

*IR Gun #1, VWR SN 170560549
*IR Gun #3, VWR SN 170647571
*IR Gun #4, Oakton, SN 2372220101-0002

1410179

12-0
5.4



EXPRESS WORLDWIDE

2019-10-07 DCV8 2.0.1 / "12-1403"

WPX

DHL

80524 FORT COLLINS, UNITED STATES OF AMERICA

Origin: YHM

US-DEN-DEN

C

Day Time

Date: 2019-10-07

Pce/Shpt Weight 24.2 LB

Piece 1/1

Content Description
Water Sample

WAYBILL 74 1380 5184

(2L)US80524+48000001

(J) JD01 4600 0071 2459 3321

Client:	ALS Environmental	**Date:**	*22-Oct-19*
Project:	L2357716	**Work Order:**	1910179
Sample ID:	L2357716-1	**Lab ID:**	1910179-1
Legal Location:		**Matrix:**	WATER
Collection Date:	10/1/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1			**SOP 783**		Prep Date: **10/10/2019**	PrepBy: **TRW**
Ra-226	**0.0094 (+/- 0.0053)**		**0.0046**	**BQ/l**	NA	10/21/2019 13:40
Carr: BARIUM	*89.1*		*40-110*	*%REC*	DL = NA	10/21/2019 13:40

Client:	ALS Environmental	**Date:**	*22-Oct-19*
Project:	L2357716	**Work Order:**	1910179
Sample ID:	L2357716-2	**Lab ID:**	1910179-2
Legal Location:		**Matrix:**	WATER
Collection Date:	10/1/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1			**SOP 783**		Prep Date: **10/10/2019**	PrepBy: **TRW**
Ra-226	**0.0081 (+/- 0.0051)**		**0.0059**	**BQ/l**	NA	10/21/2019 13:40
Carr: BARIUM	*94*		*40-110*	*%REC*	DL = NA	10/21/2019 13:40

Client:	ALS Environmental	**Date:**	*22-Oct-19*
Project:	L2357716	**Work Order:**	1910179
Sample ID:	L2357716-2	**Lab ID:**	1910179-2
Legal Location:		**Matrix:**	WATER
Collection Date:	10/1/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed

Explanation of Qualifiers

Radiochemistry:

- "Report Limit" is the MDC

U or ND - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

Y2 - Chemical Yield outside default limits.

W - DER is greater than Warning Limit of 1.42

* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.
# - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.
G - Sample density differs by more than 15% of LCS density.
D - DER is greater than Control Limit

M - Requested MDC not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS, Matrix Spike Recovery within control limits.

N - Matrix Spike Recovery outside control limits

NC - Not Calculated for duplicate results less than 5 times MDC

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

Inorganics:

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).

U or ND - Indicates that the compound was analyzed for but not detected.

E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.

M - Duplicate injection precision was not met.

N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.

Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.

* - Duplicate analysis (relative percent difference) not within control limits.

S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

Organics:

U or ND - Indicates that the compound was analyzed for but not detected.

B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.

E - Analyte concentration exceeds the upper level of the calibration range.

J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).

A - A tentatively identified compound is a suspected aldol-condensation product.

X - The analyte was diluted below an accurate quantitation level.

* - The spike recovery is equal to or outside the control criteria used.

+ - The relative percent difference (RPD) equals or exceeds the control criteria.

G - A pattern resembling gasoline was detected in this sample.

D - A pattern resembling diesel was detected in this sample.

M - A pattern resembling motor oil was detected in this sample.

C - A pattern resembling crude oil was detected in this sample.

4 - A pattern resembling JP-4 was detected in this sample.

5 - A pattern resembling JP-5 was detected in this sample.

H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.

L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.

Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
- gasoline
- JP-8
- diesel
- mineral spirits
- motor oil
- Stoddard solvent
- bunker C

QC BATCH REPORT

Batch ID: **RE191010-1-1** Instrument ID **Alpha Scin** Method: **Radium-226 by Radon Emanation**

LCS Sample ID: **RE191010-1** Units: **BQ/l** Analysis Date: **10/21/2019 14:15**

Client ID: Run ID: **RE191010-1A** Prep Date: **10/10/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.85 (+/- 0.461)	0.00675	1.72		108	67-120					P
Carr: BARIUM	16800		17940		93.7	40-110					

LCSD Sample ID: **RE191010-1** Units: **BQ/l** Analysis Date: **10/21/2019 14:15**

Client ID: Run ID: **RE191010-1A** Prep Date: **10/10/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.71 (+/- 0.427)	0.0152	1.72		99.2	67-120		1.85	0.2	2.1	P,M3
Carr: BARIUM	17300		17930		96.6	40-110		16800			

MB Sample ID: **RE191010-1** Units: **BQ/l** Analysis Date: **10/21/2019 14:15**

Client ID: Run ID: **RE191010-1A** Prep Date: **10/10/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	0.00045 (+/- 0.0030)	0.0059									U
Carr: BARIUM	17800		17930		99.1	40-110					

The following samples were analyzed in this batch: 1910179-1 1910179-2

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2357716-COFC

COC Number: 15 -

Report To	Contact and company name below will appear on the final report
Company:	Baffinland Iron Mines Corp.
Contact:	Wiliam Bowden and Connor Devereaux
Phone:	647-253-0596 EXT 6016
	Company address below will appear on the final report
Street:	2275 Upper Middle Rd. E., Suite #300
City/Province:	Oakville, ON
Postal Code:	L6H 0C3
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	
Contact:	

Report Format

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)

Quality Control (QC) Report with Report ☑ YES ☐ NO

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax bimcore@alsglobal.com

Email 2

Email 3

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax ap@baffinland.com

Email 2 commercial@baffinland.com

Project Information

ALS Account # / Quote #:	23642 /Q42455
Job #:	MS-08 Reference and Exposure
PO / AFE:	4500057496
LSD:	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only) L2357716

ALS Contact: **Sampler:** KB/CD

Confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☐ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4] ☐ | 3 day [P3] ☐ | 2 day [P2] ☐

EMERGENCY: 1 Business day [E1] ☐ | Same Day, Weekend or Statutory holiday [E0] ☑

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	BIM-MMER-EFF	F/P	Number of Containers
	MS-08-DS	1-Oct-19	17:30	Water	E0		7
	MS-08-US	1-Oct-19	18:00	Water	E0		7

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human drinking water use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			9.5		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Kendra Button	Release Date: 1-Oct-19	Time: 19:00	Received by: Marc Guindon	Date: oct.1/2019	Time: 7:30pm	Received by:	Date: 4-Oct 19	Time: 11:00

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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 specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

APPENDIX D

SAMPLING PROGRAM – QA/QC CONTROL PLAN

Baffinland Iron Mines Corporation

Sampling Program – Quality Assurance and Quality Control Plan

BAF-PH1-830-P16-0001

Rev 3

Prepared By: Kendra Button
Department: Environment
Title: Environmental Coordinator
Date: March 31, 2020
Signature:

Approved By: Connor Devereaux
Department: Environment
Title: Environmental Superintendent
Date: March 31, 2020
Signature:

DOCUMENT REVISION RECORD

Issue Date MM/DD/YY	Revision	Prepared By	Approved By	Issue Purpose
01/15/14	0	JM	EM	Approved for Use
03/14/16	1	WB	EM	Approved for Use
03/29/17	2	KB	WM	Approved for Use
03/31/20	3			Approved for Use

TRACK CHANGES TABLE

Index of Major Changes/Modifications in Revision 3

Item No.	Description of Change	Relevant Section
1	Updated roles & responsibilities to ensure format consistency with the Project's other management plans.	Section 3.0
2	Updated Baffinland's Corporate Policies section to ensure format consistency with the Project's other management plans.	Section 2.0
3	Updated groundwater sampling protocols to reflect current monitoring program.	Section 4.3.4
4	Updated training requirements for environmental staff involved with environmental monitoring programs.	Section 11.0

TABLE OF CONTENTS

List of Tables

List of Appendices

1 INTRODUCTION

As required by Baffinland Iron Mines Corporation's (Baffinland) Type 'A' Water Licence No. 2AM-MRY1325 – Amendment No. 1 (Type 'A' Water Licence), issued by the Nunavut Water Board (NWB), the Sampling Program – Quality Assurance and Quality Control Plan (this Plan) has been updated to reflect current operations at the Mary River Project (the Project). This Plan is a living document and will be revised, as required, based on changes to operations, QA/QC procedures and protocols. Updates to this Plan will be completed in accordance with the Project's water licences issued by the NWB, Commercial Lease – Q13C301 (Commercial Lease) between Baffinland and the QIA, the Project Certificate No. 005 (Project Certificate) issued by the Nunavut Impact Review Board (NIRB), applicable regulations (e.g. Metal & Diamond Mining Effluent Regulations; MDMER) and any subsequent requirements which may be issued.

In accordance with the Type 'A' Water Licence, this QA/QC Plan has been prepared following the general recommendations presented in *Quality Assurance (QA) and Quality Control (QC) Guidelines for use by Class "A" Licensees in Meeting SNP Requirements and for Submission of a QA/QC Plan (*INAC, 1996).

1.1 PURPOSE AND SCOPE

The purpose of this Plan is to identify Baffinland's framework for accurate and effective QA/QC management by providing instruction for standardised field sampling and laboratory analytical procedures.

For the purposes of this report, QA/QC is defined as:

- ***Quality Assurance*** - System of activities used to achieve quality control.
- ***Quality Control*** - Set of best practice methods and procedures used to ensure quality of data in terms of precision, accuracy and reliability.

The QA/QC best practices outlined in this management plan are designed to provide guidance to field staff and analytical laboratories in order to maintain a high level of confidence in the water quality, soil, sediment and benthic data generated from Project Sites.

1.2 REGULATORY REQUIREMENTS

This Plan is regulated by the NWB and is subject to Baffinland's Type 'A' Water Licence 2AM-MRY1325, as amended, which provides specific terms and conditions for the management of QA/QC for the Project's water quality monitoring programs. To provide a more comprehensive QA/QC framework for the Project's aquatic ecosystem monitoring programs, other applicable requirements have been included in this Plan, such as the MDMER and sediment quality and benthic invertebrate monitoring components of the Project's Aquatic Effects Monitoring Plan (AEMP).

1.3 RELATIONSHIPS TO OTHER MANAGEMENT PLANS

This Plan is intended for use in conjunction with the following Plans:

- Aquatic Effects Monitoring Plan (BAF-PH1-830-P16-0039)
- Environmental Protection Plan (BAF-PH1-830-P16-0008)
- Fresh Water Supply, Sewage and Wastewater Management Plan (BAF-PH1-830-P16-0010)
- Surface Water and Aquatic Ecosystem Management Plan (BAF-PH1-830-P16-0026)
- Roads Management Plan (BAF-PH1-830-P16-0023)

2 BAFFINLAND'S CORPORATE POLICIES

Baffinland's Sustainable Development Policy (BAF-PH1-800-POL-0002) identifies Baffinland's commitment internally and to the public to operate in a manner that is environmentally responsible, safe, fiscally responsible and respectful of the cultural values and legal rights of the Inuit. The Sustainable Development Policy is provided in Appendix A.

Baffinland's Health, Safety and Environment Policy (BAF-PH1-800-POL-0001) is the Company's commitment to achieve a safe, health and environmentally responsible workplace. The policy is provided in Appendix A.

All employees and contractors are expected to comply with the contents of both policies.

3 ROLES AND RESPONSIBIITIES

3.1.1 SENIOR DIRECTOR – HEALTH, SAFETY, ENVIRONMENT, SECURITY AND TRAINING

- Reports to the Chief Executive Officer
- Provides general operational oversight for programs related to health, safety, environment, security and training.

3.1.2 MANAGER – HEALH, SAFETY, ENVIRONMENT AND SECURITY

- Reports to the Senior Director – Health, Safety, Environment, Security and Training
- Provides operational oversight and leadership for health, safety, environment and security related activities and programs.

3.1.3 ENVIRONMENTAL SUPERINTENDENT

- Reports to the Manager – Health, Safety, Environment and Security
- Serves as the onsite lead for all environmental monitoring programs.
- Responsible for ensuring this Plan is up-to-date and reflects current Project operations and regulatory requirements.

3.1.4 ENVIRONMENTAL COORDINATOR

- Reports to the Environmental Superintendent
- Responsible for ensuring environmental monitoring programs adhere to this Plan.
- Reviewing this Plan with all environmental technicians and providing the necessary training as required.
- Conducting in-field audits of sampling methodology and QA/QC analysis on samples and data collected.
- Management of field notes, analytical results and environmental database.

3.1.5 ENVIRONMENTAL TECHNICIAN

- Reports to the Environmental Coordinator
- Responsible for being familiar with this Plan and adhering to the relevant protocols while conducting environmental monitoring programs and managing samples.

4 WATER SAMPLE COLLECTION

4.1 GENERAL

The samples will be collected following the general recommendations presented in *Quality Assurance (QA) and Quality Control (QC) Guidelines for use by Class "A" Licensees in Meeting SNP Requirements and for Submission of a QA/QC Plan* (INAC, 1996).

A summary of recommended water sample containers, sample volumes, sample preservatives and maximum sample holding times is presented in Table 9.1. Laboratory parameters such as pH, turbidity, BOD, nitrite, nitrate, total phosphorus, faecal coliforms, chlorophyll-a and pheophytin typically have maximum sample storage times varying from four (4) to 72 hours. Sampling programs and associated logistics will be planned ahead of time to ensure samples collected are analyzed within the appropriate holding time. Similarly, every effort will be made to prevent inadvertent freezing of water samples (due to on-site climatic conditions) which could affect analytical results for parameters. Exceptions to these protocols will be documented.

Required water sample analyses for each of the Project's water quality monitoring stations are documented in the following documents:

- Type 'A' Water Licence
- MDMER
- Aquatic Effects Monitoring Plan (BAF-PH1-830-P16-0039)

4.2 WATER QUALITY MONITORING LOCATIONS

This Plan addresses the collection of water quality samples at the Project, including the:

1. Collection of surface water samples from Project area lakes, streams and rivers.
2. Collection of groundwater samples from piezometer monitoring wells.
3. Collection of effluent samples from Project water treatment facilities (e.g. sewage, oily water, etc.).
4. Collection of drinking water samples from camp potable water sources.
5. Collection of stormwater/runoff samples from ore processing and stockpiling facilities.
6. Collection of stormwater/runoff samples from waste rock management facilities.
7. Collection of stormwater/runoff samples from mining areas (e.g. Deposit No. 1).
8. Collection of stormwater samples from Project fuel and waste containment areas.
9. Collection of stormwater from sumps at maintenance shops.
10. Collection of surface water samples downstream of Project areas (e.g. landfills, quarries, etc.)
11. Collection of surface water samples representative of general site drainage before, during and after construction at Project areas.

Locations and sampling frequency for designated water quality monitoring stations are presented in the Surface Water and Aquatic Ecosystem Management Plan (BAF-PH1-830-P16-0026), Aquatic Effects Monitoring Plan (BAF-PH1-830-P16-0039), Roads Management Plan (BAF-PH1-830-P16-0023) and the Fresh Water Supply, Sewage and Wastewater Management Plan (BAF-PH1-830-P16-0010).

4.3 WATER SAMPLING METHODS AND EQUIPMENT

4.3.1 GENERAL SAMPLING PROCEDURES

General water sampling procedures are as follows:

1. Sampler will wear a fresh pair of disposable nitrile gloves for each sampling event.
2. A new sample bottle(s) will be used at each monitoring station. Sample bottles will not be re-used.
3. Sampling will be carried out by either: i) rinsing the sample bottle with source water three (3) times before immersing the sample bottle to fill it (after which preservative is added, as required), or ii) if the sample bottles are provided pre-charged with preservatives then it is generally convenient to transfer water samples from the source to the sample bottle using a large transfer bottle. The transfer bottle will be provided by the lab and will be rinsed in the source water three (3) times before filling the sample bottle. Different transfer bottles will be used for different sample types (e.g. sewage effluent, hydrocarbon impacted stormwater) and will be replaced on a regular basis.
4. Rinse water will be disposed of so that it does not contaminate the source water where the sample will be collected (e.g. downstream of the sampling location, or on the shore or berm edge).
5. Bottles labeled as “certified sterile” do not need to be rinsed.
6. For samples requiring preservatives, the sample bottle will be filled to the top (or to the indicator line marked on the bottle), the preservative will be added and the bottle securely sealed. Note that for some volatile contaminants (e.g. BTEX), the sample bottle must be filled with zero headspace.
7. Care will be taken to avoid disturbance of sediments and inclusion of disturbed suspended solids in the sample.
8. Sample details (e.g. date, sample ID and analysis) will be clearly marked on the bottle in permanent ink.
9. For dissolved metals analyses, the water sample will be filtered in the field while sampling using a 0.45µm disposable filter and syringe. A fresh syringe and filter must be used at each monitoring station. In the event that the sample cannot be filtered in the field, the sample will be promptly filtered at the on-site lab. Such exceptions will be documented in the field notes.
10. All samples will be sealed by ensuring their lids are tightly secured before placing the bottles into the coolers. Glass bottles will be protected with bubble wrap or other cushioning material.
11. All field parameters, notes, photo references and general observations shall be recorded in a notebook or log sheet to later be uploaded to Baffinland’s environmental database.
12. All samples will be placed in an iced cooler as soon as possible after collection.

4.3.1.1 SAMPLE PRESERVATION

Sample bottles and preservative will be stored under clean conditions on site. Sample bottles will have the appropriate volume of preservative added in the field immediately after sample collection to minimize chemical alterations. Alternatively, sample bottles will be supplied by the analytical laboratory with preservatives already added. Ensure that the preservative container does not come in contact with the sample or inside of the sample bottle/lid. If a water sample requires filtration (e.g., analysis of dissolved metals), preservative must be added following filtration.

4.3.2 LAKE SAMPLING

For water quality monitoring in lakes, a depth sampler will be used (e.g. a 'Van Dorn' or 'Kemmerer'). Generally, depth samplers consist of a clear polycarbonate sample tube with two spring mounted rubber bungs, one located at each end. The depth sampler is lowered to the correct depth attached to a cord, whereupon a metal weight is released. The weight slides down the cord and strikes a release mechanism button which releases the two bungs and seals both ends of the tube. The water sample is then pulled back to the surface.

Depth samplers that are used will be suitable for collection of water samples for ultra-low metals analyses (e.g. have acrylic or PVC construction and silicone seals).

For depth sampling, the following considerations will be taken into account to ensure sample QA/QC:

1. Sampling station locations will be dependent upon the monitoring program objectives and the lake dimensions. When sampling from a watercraft all efforts will be made to anchor the boat stationary. Map coordinates for lake sampling stations will be recorded using a handheld GPS unit.
2. A vertical stratification profile (if required), profiling in-situ water quality measurements (e.g. pH, temperature, dissolved oxygen, conductivity and turbidity), will be determined using a water quality multi-meter (e.g. YSI Sonde) equipped with a long cord with metre intervals marked on it.
3. Depending upon the purpose of the monitoring program, water quality samples may be collected from the different stratified layers. The depth sampler must be slowly lowered in the 'open' position until it reaches the required depth.
4. The depth sampler will be held at this depth temporarily to allow flushing of water inside the apparatus.
5. The metal weight (messenger) will be released (to activate the closing mechanism) and the depth sampler will be pulled back to the surface. Field measurements can be taken at depth.
6. When collecting samples close to the lake bed care must be taken to ensure that the depth sampler does not disturb lake bed sediments. When possible, staff will reference the station's recorded depth from previous years to gain an understanding of station's depth.
7. Depending upon the lake area and depth, multiple sampling stations will likely be required to adequately characterize lake water quality.

4.3.3 RIVER SAMPLING

Depending upon the size of the water body, river sampling methods are the same as those presented in Sections 4.3.1 and 4.3.2. To avoid inclusion of floating detritus in the sample, the sample bottle must be fully immersed in the water column. Care will be taken to ensure that disturbed sediments are not included in the sample.

For river sampling, the additional following considerations will be taken into account to ensure sample QA/QC:

1. Grasp the bottle well below the neck and remove the lid, taking care not to touch the inside of the lid.
2. Facing upstream, plunge the bottle beneath the surface of the water to a depth of 20 cm (if possible) with the opening facing downward, then tilt the bottle opening upward into the current to fill.
3. Once the bottle is full, remove the bottle from the water in one motion by forcing the opening upward and into the current and seal the bottle securely.

When selecting water quality monitoring station locations on rivers, care will be taken where a tributary joins a river, since complete mixing of the two waters may not be achieved within several hundred metres downstream of the confluence (or further). When in doubt, vertical profile monitoring across the river's width using a field parameter such as pH, temperature or conductivity will be used to assess if complete mixing has occurred.

4.3.4 GROUNDWATER SAMPLING

Groundwater at the Project will be monitored using drive-point piezometers, HDPE tubing and peristaltic pumps. Groundwater wells will be established by advancing drive-point piezometers by hand to the depth of refusal (e.g. permafrost) or other known confining layer, both in the known or assumed up-gradient (e.g. reference) and down-gradient (e.g. exposure) area of interest. Consideration must be given to the depth of the active layer, therefore groundwater samples will be collected during late August to early September, such that samples are near the depth of the active layer (approx. 1 to 2 metres). Where hydrocarbon impacts are known or suspected, samples will be collected across various depths to assess for the presence of, and capture, potential non-aqueous phase liquids (NAPL). Sampling procedures outlined in this section consider the shallow and discontinuous nature of high arctic groundwater regimes observed at the Project.

General groundwater sampling procedures are as follows:

1. Installation of the piezometer/groundwater well will be completed the day before the sampling date. This will ensure the groundwater well has sufficient time to charge and fill up with groundwater.

2. Before sampling a well, the well will be purged for the appropriate volume, outlined in the sampling program documentation. A YSI flow cell will be used to during the purge to gauge when parameters (e.g. pH, conductivity, turbidity) have stabilized.
3. Groundwater samples will be collected, preserved, stored and submitted for analysis as outlined in Section 4.3.1.
4. A field notebook will be used document the groundwater sampling program, including any deviations from established protocols.

4.3.5 METAL & DIAMOND MINING EFFLUENT REGULATIONS (MDMER)

Water samples from stations that fall under MDMER must be taken from a designated sampling port which the mine does no longer exercise control over the quality of discharge. Samples taken from these designated ports can be composite samples or grab samples.

The general sampling procedures of Section 4.3.1 should be followed, and the additional considerations will be taken into account to ensure MDMER QA/QC is met:

1. MDMER sampling should be performed by trained personnel, and if possible a second person should be present for verification purposes.
2. Notification must be given ahead of time to a certified laboratory to ensure MDMER acute lethality and sub-lethal toxicity samples can be analysed.
3. In-situ water quality monitoring will accompany all external samples taken (refer to Section 4.3.6)
4. After collecting samples and preserving as needed, a chain of custody (COC) seal shall be applied to each bottle cap.
5. All sampling activities, notes, flow volumes, photo references and general observations shall be kept in a dedicated MDMER field log book.
6. MDMER samples shall be sent to the certified laboratory with their own COC and should not be combined with samples from other monitoring programs.

For more information and technical guidance, Environment and Climate Change Canada's 2001 *Guidance Document for the Sampling and Analysis of Metal Mining Effluents* should be consulted.

4.3.6 SAMPLING FOR TOXICITY TESTING

Sampling for lethal toxicity testing is a condition of the Type 'A' Water Licence for various monitoring programs. Sub-lethal toxicity testing is a condition of Environmental Effects Monitoring (EEM) under the Metal & Diamond Mining Effluent Regulations (MDMER). Depending upon the objectives of the toxicity testing, variables that will require confirmation prior to testing include:

- Type of effluent sample to be collected (e.g. instantaneous grab sample vs. composite sample)
- Type of dilution water to be used by the certified laboratory (e.g. standard synthetic laboratory dilution water, receiving water collected upstream of the discharge, etc.).
- Preferred test organism (e.g. *Daphnia magna* and/or Rainbow Trout)

Details concerning laboratory methods are presented in Appendix D. For further details concerning acute lethality testing refer to Environment Canada (2002) and USEPA (2002). For further details concerning sub-lethal testing refer to Environment Canada (2012).

4.3.7 IN-SITU WATER QUALITY

Measurement of field parameters (e.g. temperature, pH, conductivity, redox potential, or dissolved oxygen, etc.), where warranted, will be carried out for each sample at the time of sampling. The required set of field parameters will vary according to sample type and monitoring objectives. The exact methods used for monitoring field parameters will depend upon the type of monitoring probes being used. Environmental staff will read and be familiar with the instruction manual for the equipment being used on site, and follow manufacturer's instructions for specifics on proper calibration, use, storage, and maintenance.

Environmental staff will rinse the monitoring probe three (3) times with the water to be monitored before immersing the probe in the water. Environmental staff will ensure that the probe being used has had sufficient time to equilibrate in the water before the reading is taken. This is generally regarded as the point at which the reading has stabilized.

Field parameter data will be recorded in the appropriate program field form designed for this purpose and saved electronically. A copy of the data will be retained on site.

4.3.7.1 MONITORING PROBE CALIBRATION

Monitoring probes will be stored and calibrated in accordance with manufacturers' instructions. All probes will be calibrated regularly per sampling program requirements and a written record of the calibration results will be maintained on site. Environmental staff will ensure that calibration solutions are of the correct specification and that they have not passed their expiry date (if applicable). Monitoring probes will be stored as per manufacturers' recommendations.

5 SEDIMENT & SOIL SAMPLE COLLECTION

For a complete list of the required sample analyses at pre-established sediment monitoring stations refer to the Aquatic Effects Monitoring Plan (BAF-PH1-830-P16-0039). Sediment and soil sampling programs and associated logistics will be planned ahead of time to ensure samples collected are analyzed within the appropriate holding time. A summary of recommended sediment and soil sample containers, sample volumes, and maximum sample holding times is presented in Table 9.1. Field observations and any exceptions to established protocols (e.g. exceedance of holding time) will be documented.

5.1 SEDIMENT & SOIL MONITORING LOCATIONS

This Plan addresses the collection of sediment and soil samples at the Project, including the:

1. Collection of sediment samples from Project area lakes, streams and rivers.

2. Collection of soil samples from Project fuel and waste facilities.
3. Collection of soil samples from Project landfarm facilities.
4. Collection of soil samples to inform remediation and reclamation projects.
5. Collection of soil samples to evaluate spills and releases.

5.2 SEDIMENT & SOIL SAMPLING METHODS AND EQUIPMENT

Sediment samples specified under the Project's Aquatic Effects Monitoring Plan (BAF-PH1-830-P16-0039) are characterised by the following procedures.

5.2.1 GENERAL SAMPLING PROCEDURES

Generally, sampling procedures will consist of the following:

1. Sampler will wear a fresh pair of disposable nitrile gloves for each sampling event.
2. A fresh sample bottle(s) will be used at each monitoring station. Sample bottles will not be re-used.
3. Sample details (e.g. date, sample ID and analysis) will be clearly marked on the sample jar in permanent ink.
4. All samples will be sealed by ensuring their lids are tightly secured before placing the bottles into the coolers.
5. All samples will be placed in an iced cooler as soon as possible after collection.

5.2.2 RIVER AND GRAB SAMPLING

The collection of river and grab samples will follow the general procedures stated in Section 5.2.1 and will entail the following additional QA/QC considerations:

1. Sampling station locations will be dependent upon the monitoring program objectives and the sample location.
2. A clean spatula or spoon will be utilized to obtain a representative sample of the sediment for analyses.
3. If composite samples are required by the monitoring program, a sterile container will be utilised to deposit and homogenize the subsamples, until the composite sample is fully mixed. The composite sample will then be transferred to the identified sample jars by alternating aliquots.
4. The quantity and holding time of samples obtained will depend on the prescribed analysis.

5.2.3 LAKE SAMPLING

For monitoring of sediment character and quality in lakes, a depth sampler will be used. The preferred sample apparatus for lake sediment samples are gravity percussion corers, since they allow for retrieval and analysis of sediment profiles. A *Petite Ponar* can also be used but will not provide sediment profiles. Generally, forms of gravity percussion corers consist of a clear polycarbonate sample core tube attached

to a weighted upper head assembly and a seal mechanism. The top two centimeters of sediment from the core samples will be retained for laboratory analysis unless sampling objectives state otherwise.

Sediment lake sampling procedures will follow the general procedures stated in Section 5.2.1 and the following additional QA/QC considerations for a gravity percussion corer:

1. Sampling station locations will be dependent upon the monitoring program objectives and the lake dimensions. When sampling from a watercraft all efforts will be made to anchor the boat stationary. Map coordinates for all lake sampling station locations will be recorded using a handheld GPS unit.
2. The corer will be positioned perpendicular to the water surface prior to release. The penetration depth of the core tube is affected by the depth of water, angle of corer deployment and substrate type.
3. Once the corer is embedded in the substrate, the stainless steel messenger will be sent down the corer rope to release the ball-type seal. This seal creates a vacuum in the core tube, retaining the sampled sediment.
4. Upon retrieval, the bottom of the core tube will be plugged using an extruding plug prior to breaking the air-water interface. This procedure will prevent sample loss.
5. An extruding apparatus will be used to force the extruding plug through the core tube moving the sediment sample to the end of tube allowing the top two centimetres to be scooped out and placed in a clean stainless steel bowl for sample homogenisation.
6. Multiple core samples (generally three or more) are required per sample station to obtain the required sample volume. The multiple core samples are homogenized in the stainless steel bowl, removing any excess water or debris.
7. The sample containers will be filled by alternating aliquots between each of the containers.
8. After the top two centimeters are retained, the remaining, unused sediments within the core tube will be placed into a bucket and only released once all core sampling is complete at that particular station.
9. Depending upon the lake area and depth, multiple sampling stations will likely be required to adequately characterize lake sediment quality.

6 BENTHIC INVERTEBRATES SAMPLE COLLECTION

For a complete list of required analyses at pre-established monitoring stations, see Baffinland's Aquatic Effects Monitoring Plan (BAF-PH1-830-P16-0039). Samples will be submitted to an analytical laboratory for processing and taxonomic identification. Laboratory methods for benthic invertebrate samples will be in accordance with guidance provided by EC, 2012. Field observations and parameters if warranted should be recorded during the collection of benthic invertebrate samples.

6.1 BENTHIC INVERTEBRATE MONITORING LOCATIONS

This Plan addresses the collection of benthic invertebrate samples at the Project, including the:

- Collection of benthic invertebrate samples from Project area and reference lakes, streams and rivers to determine potential mine related effects on benthic invertebrate communities.

6.2 BENTHIC INVERTEBRATE SAMPLING METHODS AND EQUIPMENT

Benthic Invertebrate samples follow the same general procedures outlined in Section 5.2.1. Benthic invertebrates can be collected from either depositional (lake) or erosional (stream) sample locations. A *Petite Ponar* is utilised when sampling depositional environments while a *Surber sampler* is utilised when sampling erosional environments. For a complete list of depositional and erosional sample methods refer to the Aquatic Effects Monitoring Plan (BAF-PH1-830-P16-0039). Benthic invertebrate samples will be carefully sieved through 500 µm mesh. All materials, including invertebrates, retained by the mesh will be transferred to labelled plastic jars and fixed with 10% buffered formalin. Fixed and labelled samples will be shipped to an analytical laboratory for processing and archiving.

7 QA/QC

For monitoring of QA/QC during sample collection and shipping, a set of QA/QC samples will be routinely submitted for analysis from prescribed sampling programs. Sampling programs will each have separate QA/QC samples submitted with the regular water samples. Descriptions of the QA/QC samples that will be used are presented on Table 7.1. Ten percent of all samples will consist of field blanks, travel blanks and field duplicates. For example, a monitoring program with 30 samples would consist of 27 monitoring samples and 3 QA/QC samples. Equipment blanks, if required, are performed on an as needed basis to ensure sampling equipment is properly maintained and free of contaminants, and do not count towards the ten percent of QA/QC samples.

7.1 SAMPLING PROGRAMS WITH MULTIPLE SAMPLING STATIONS

For sampling programs with multiple sampling locations (SNP, AEMP), QA/QC samples will be performed randomly to avoid bias, and care will be taken to ensure that the same stations are not sampled repeatedly for QA/QC samples.

7.2 SAMPLING PROGRAMS WITH LIMITED SAMPLING STATIONS

Sampling programs with limited sampling stations (e.g. MDMER) will require at least one QA/QC sample per sampling round. A field duplicate, field blank or travel blank must be taken during each sampling session. This may result in over sampling for QA/QC, but will ensure there is sufficient data to identify any anomalies.

7.3 QA/QC ANALYSIS

In the interest of transparency, the analytical laboratories will also be instructed to report the results of their own in-house QA/QC testing (e.g. results of random replicate analyses of submitted samples).

The results of QA/QC analyses will be routinely reviewed by Baffinland or their designate, and any anomalous results will be promptly investigated with the assistance of the analytical laboratory. Once the reason for the anomalous results is identified, Baffinland will ensure that operating procedures of field staff and/or the analytical laboratory will be altered in order to address the issue. Compliance monitoring and data management for water license sampling will be conducted by Baffinland, with the assistance of a designate as required.

TABLE 7-1 – QA/QC SAMPLE TYPES – PURPOSE, DESCRIPTION AND FREQENCY

QA/QC Sample Type	Purpose	Description	Frequency	Prepared By
Field blank	Identification of potential contaminants arising from sample collection. The field blank bottle is filled with laboratory deionized water in the field and is handled in the same way as regular sample bottles. The bottle is then submitted as a routine sample.	Bottle contains prefilled deionized water. Bottle is handled the same as one would handle the samples.	Ten percent of all samples collected will be QA/QC.	Analytical laboratory
Travel blank	Identification of potential contaminants arising from sample storage, shipping and laboratory handling. The travel blank accompanies the samples to the laboratory but is not taken out into the field, or opened.	Sealed bottle containing deionized water provided by analytical laboratory.	Ten percent of all samples collected will be QA/QC.	Analytical laboratory
Blind Field duplicate	Assesses sample variability and precision of laboratory analytical methods. Collected from a randomly selected location, split from a homogenized sample and analyzed separately in the laboratory. The duplicate samples are handled and analyzed in an identical manner in the laboratory.	Duplicate sample selected at random. A large sterile bottle is used to collect the water. Water is then poured equally into two sets of pre-labelled bottles. Duplicate samples labelled with a unique ID such that the analytical laboratory cannot determine the matching sample ID.	Ten percent of all samples collected will be QA/QC.	Field Staff
Equipment blank	Assesses cross contamination from field water sampling equipment (e.g. Kemmerer). Rinse deionized water through water sampling equipment and transfer to sample bottles.	Bottle contains deionized water that has been rinsed through the sampling equipment.	Collected prior and after completion of sampling program (if required/ as needed). Not included in the ten percent calculation of other QA/QC samples.	Field Staff

8 SAMPLE MANAGEMENT

8.1 SAMPLE LABELING

Accurate sample labelling is essential for subsequent interpretation of field data. Ensure that labels are legible and written with permanent ink (pen, marker, etc.). For a complete list of the predetermined sample labels at monitoring stations, please refer to the Type 'A' Water Licence and Aquatic Effects Monitoring Plan (BAF-PH1-830-P16-0039).

A consistent format for identifying samples must be followed if a predetermined sample label does not exist in order to facilitate accurate sample tracking and to ensure sample labels are interpreted in the same manner by all personnel involved in the program.

Samples must be uniquely identified with the following information:

- Sample ID
- Collection date and time
- Project identifier
- Company name

8.2 SAMPLE STORAGE AND HANDLING

Physical, chemical and biochemical reactions may take place in the sample container between the time of sample collection and laboratory analysis. Samples will be placed in iced coolers and shipped to the analytical laboratory as soon as possible after collection, consulting stipulated analytical holding times, to minimize these changes. Samples that are not shipped offsite the same day that they are collected will be refrigerated until they are ready to be shipped offsite in coolers. Coolers and sample bottles will be kept clean and free of debris to prevent sample contamination during shipment. Care will be taken to ensure that bottles are stored upright and are packed securely within the cooler; glass bottles should be wrapped in bubble wrap. Preferably, leak-proof ice packs will be used for cooling the samples. If loose ice is used, ice should be securely sealed in plastic bags to prevent leakage of melt water.

Biological samples (e.g. benthic invertebrates) preserved using formalin or Lugol's solution can be held at room temperature until submission to the analytical laboratory.

8.3 SAMPLE SUBMISSION AND CHAIN OF CUSTODY

A chain of custody (COC) form will accompany all samples being submitted to ensure that the required analyses are completed, and to confirm receipt of samples by the laboratory (see example form presented in Appendix B). Prior to shipment, samples should be carefully prepared for shipping and sample bottles listed on the COC must be reconciled with what has physically been placed in the shipping container. The collection of samples that are time sensitive needs to coincide with shipping schedules, travel time to the

laboratory, and laboratory business hours. A record of all COCs submitted for analysis must be kept on site. Information on the COC form will include:

1. Project name and project assignment number.
2. Address of analytical laboratory, name of contact person and contact details.
3. Contact details and name of sampler.
4. Date and time of sampling.
5. Whether the sample has been filtered, or whether laboratory filtration is required.
6. List of sample I.D.'s, sample type (e.g. lake water, sewage effluent, etc.), number of sample bottles per sample and analysis requested.
7. Urgency of analysis (e.g. rush or normal). For rush samples the analytical laboratory should be notified ahead of time.
8. Whether sample contains preservative and if so, what preservative and when it was added.
9. Submission date and time.
10. Comments on any unusual conditions and other important information.

9 LABORATORY ANALYSIS

9.1 LABORATORY ACCREDITATION

Laboratory analysis of samples is performed by an on-site accredited analytical laboratory and an off-site accredited analytical laboratory. The on-site laboratory is operated by ALS Canada LTD. and is located at the Mine Site. A select set of basic analytical parameters (e.g. pH, TSS, turbidity etc.), are performed by the on-site laboratory. The off-site laboratory, ALS Environmental, located in Waterloo, ON, run by ALS Canada Ltd. performs the majority of analyses required. Toxicity testing is performed by Aquatox Testing & Consulting Inc, located in Guelph, ON. Details of ALS analytical laboratory licencing and accreditation are presented in Appendix C.

9.2 ANALYTICAL DETECTION LIMITS

ALS Limits of Reporting (LORs) are established using rigorous experimental and statistical procedures that begin with the determination of the Method Detection Limit (MDL) at 99% confidence. When detected at or above the MDL, ALS test results are considered to be qualitatively accurate, and a parameter can be reported with 99% confidence as being present in the sample.

It should be noted that on occasion, a loss of analytical sensitivity can be encountered due to excessively high concentrations of parameters within a sample or lack of provided sample matrix. If this is encountered, Baffinland or their designate will work with the analytical laboratory to try and resolve the problem and new samples will be taken if required. The detection limits on ALS analytical reports contains the LOR. The LOR may be the MDL as calculated, or a higher value. Required analytical laboratory detection limits are provided in Appendix D.

9.3 LABORATORY ANALYTICAL METHODS

Analytical methods used by the analytical laboratories for water analyses generally conform to the standard methods outlined in *Standard Methods for the Examination of Water and Wastewater* (APHA et al, 1989). Standard analytical methods for available analyses through ALS Environmental are provided in Appendix D.

9.4 ANALYTICAL LABORATORY QA/QC PROCEDURES

ALS Environmental adheres to a designated QA/QC Management System which includes documentation and document control, staff training and internal audits. The practices exceed accreditation requirements for high confidence in data reliability utilising but not limited to:

- Use of calibration verification standards and drift control standards.
- Use of surrogate standards and internal standards.
- Replicate analyses and blanks on submitted samples.

- Use of standard reference materials (SRM's) and matrix spikes.
  Standards Data Quality objectives are established for each QC sample, based on a combination of reference method objectives, customer requirements and historical test method performance. Where applicable, prescriptive elements of reference methods take precedence over internal

Further details on the analytical laboratories in-house QA/QC protocols are presented in Appendix E.

9.5 SUMMARY OF ANALYTICAL PROCEDURES

TABLE 9-1 – ANALYTES, WATER & SOIL SAMPLE VOLUMES, PRESERVATIVES & HOLDING TIMES

Inorganics	Analysis[1]	Water Container	Water Preservation	Additional Notes	Soil Container	Water / Soil Holding Time
ROUTINE INORGANICS AND PHYSICALS	Acidity and Alkalinity	0.5-1 L Plastic			125-250 mL Jar or Bag	14 Days / NA
	Anions (Br, Cl, SO4, F) and Electrical Conductivity	0.5-1 L Plastic			125-250 mL Jar or Bag	28 Days [7] / Unlimited
	Bromate[19], Chlorate and Chlorite	125 mL Plastic	EDA (Ethylenediamine)		NA	28 Days (Chlorite 14 Days) / NA
	BOD, Colour and Turbidity	0.5-1 L Plastic			NA	2-4 Days [8] / NA
	COD and Phenols (4AAP)	125-250 mL Glass	1:1 Sulfuric Acid (H_2SO_4)		NA	28 Days / NA
	Cyanide, Total ,Weak Acid Dissociable,Free	145 mL Plastic	6N NaOH		125-250 mL Jar or Bag	14 Days / 14 Days
	Dissolved Oxygen	300 mL BOD bottle	1 each; $MnSO_4$ & alkaline iodide azide pillows		NA	8 Hours[20] / NA
	Dissolved or Total Inorganic Carbon (DIC or TIC)	125-250 mL Glass	.	Field Filter for Dissolved	125-250 mL Jar or Bag	14 Days / 28 Days
	Dissolved or Total Organic Carbon (DOC or TOC)	125-250 mL Glass	1:1 Sulfuric Acid (H_2SO_4)	Field Filter for Dissolved	125-250 mL Jar or Bag	28 Days / 28 Days
	Flashpoint	2 x 100-250 mL Amber Glass		Zero Headspace	125-250 mL Jar	7 Days / 7 Days
	pH	0.5-1 L Plastic			125-250 mL Jar or Bag	0.25 Hours / 30 Days [9]
	Solids (TS, TSS, TDS)	0.5-1 L Plastic			NA	7 Days / NA
	Sulfide	125 - 150 mL Plastic	Zinc Acetate & 6N NaOH		125-250 mL Jar or Bag	7 Days / 7 Days
	Sulfite	125 mL Plastic			NA	0.25 Hours / NA
NUTRIENTS	Ammonia Nitrogen	250 mL Glass or Plastic	1:1 Sulfuric Acid (H_2SO_4)		125-250 mL Jar or Bag	28 Days / 72 Hours
	Nitrate or Nitrite Nitrogen (and Ammonia unpreserved)	0.5-1 L Plastic			NA	2-7 Days [10] / 72 Hours
	Nitrogen, Kjeldahl, Organic, Total or Dissolved	250 mL Glass or Plastic	1:1 Sulfuric Acid (H_2SO_4)	Field Filter for Dissolved	NA	28 Days / NA
	Nutrients, Available (N,P,K,S)	NA			125-250 mL Jar or Bag	NA / 3 Days [11]
	Phosphorus, Reactive (orthophosphate)	0.5-1 L Plastic			NA	2-7 Days [12] / NA
	Phosphorus, Total Dissolved	250 mL Glass or Plastic	1:1 Sulfuric Acid (H_2SO_4)	Field Filter for Dissolved	NA	28 Days / NA
	Phosphorus, Total	250 mL Glass or Plastic	1:1 Sulfuric Acid (H_2SO_4)		NA	28 Days / NA
METALS	Chromium VI (Hexavalent)	125 mL Plastic	50 % NaOH (BC MoE) or 6N NaOH + Ammonium Buffer (OMoE)		125-250 mL Jar or Bag	28 Days / 30 Days
	Mercury, Methyl	250 mL FLPE	1:1 Hydrochloric Acid (HCl)[21]	Field Filter for Dissolved	125-250 mL Jar or Bag	6 Months / 28 Days
	Mercury, Total or Dissolved	40 mL Glass Vial	1:1 Hydrochloric Acid (HCl)	Field Filter for Dissolved	125-250 mL Jar or Bag	28 Days / 28 Days
	Metals, Total or Dissolved	125-250 mL Plastic	1:3 Nitric Acid (HNO_3) to pH<2	Field Filter for Dissolved	125-250 mL Jar or Bag	6 Months / 6 Months
Organics						
HYDRO-CARBONS	F1, Volatile Organic Compounds (VOCs), THMs, 1,4-Dioxane, Volatile Petroleum Hydrocarbons (VPH)	2 or 3 x 40 mL Glass Vials [2]	Sodium Bisulfate [4]	Zero Headspace	Field Methanol Kit [6]	14 Days / 40 Days [13]
		2 or 3 x 40 mL Glass Vials [2]	Sodium Bisulfate [4]	Zero Headspace	Hermetic Sampler kit [6]	14 Days / 48 Hours
	CCME CWS F1, BTEX	2 or 3 x 40 mL Glass Vials [2]	Sodium Bisulfate [4]	Zero Headspace	125 - 500 mL Jar	14 Days / 7 Days
	CCME CWS F2-F4	2 x 60 mL Amber Glass Vials [3]	Sodium Bisulfate		125 - 500 mL Jar	14 Days [14] / 14 Days
	EPH or LEPH/HEPH	2 x 250 mL Amber Glass with Septa Cap	Sodium Bisulfate		125 - 500 mL Jar	14 Days / 14 Days
	Polycyclic Aromatic Hydrocarbons (PAHs)	2 x 0.25 - 1 L Amber Glass [5]	Sodium Bisulfate		125 - 500 mL Jar	14 Days / 14 Days
	Oil & Grease or Mineral Oil & Grease	2 x 0.25 - 1 L Glass	1:1 HCl or H_2SO_4		125 - 500 mL Jar	28 Days / 28 Days
	Alcohols	2 x 40 mL Glass Vials		Zero Headspace	125 - 500 mL Jar	7 Days / 7 Days
	Alkanolamines (MEA, DEA, DIPA)	250 mL Amber Glass			125 - 500 mL Jar	7 Days / 14 Days
	AOX	40 - 250 mL Amber Glass	1:3 Nitric Acid (HNO_3) to pH<2		125 - 500 mL Jar	6 months [15] / 28 Days
	C1 - C5 Gases	3 x 40 mL Blue Septa Vials	Sodium Bisulfate [4]	Zero Headspace	NA	14 Days / NA
	Dioxins and Furans, PBDE and PBB	2 x 1 L Amber Glass			125 - 500 mL Jar	Unlimited / Unlimited
	Formaldehyde/Aldehydes	2 x 40 mL Amber Glass Vials [2]	Ammonium Chloride+Copper Sulfate	Zero Headspace	125 - 500 mL Jar	7 Days / 5 Days
	Glycols	2 x 40 mL Amber Glass Vials			125 - 500 mL Jar	7 Days / 14 Days
	Hormones and Steroids	1 L Plastic			NA	28 Days / NA
TRACE ORGANICS	Naphthenic Acids	2 x 250 mL Amber Glass			125 - 500 mL Jar	14 Days / 14 Days
	Nitroaromatics and Nitrosamines (Explosives)	1 L Amber Glass			125 - 500 mL Jar	7 Days / 14 Days
	Nonylphenol & Ethoxylates, Bisphenol A (BPA)	1 L Amber Glass			125 - 500 mL Jar	28 Days / 14 Days
	PCB	2 x 0.25 - 1 L Amber Glass			125 - 500 mL Jar	Unlimited / Unlimited [16]
	Perfluorinated Chemicals (PFCs), PFOS, PFOA	1 L Plastic (PTFE free)			125-250 mL Jar or Bag	14 Days / 14 Days
	Phenolics, Chlorinated and Non-Chlorinated	2 x 0.5 - 1 L Amber Glass	Ascorbic Acid & Sodium Bisulfate [4]		125 - 500 mL Jar	14 Days / 14 Days
	Priority Pollutants (EPA 625 list) or SVOCs	2 x 1 L Amber Glass			125 - 500 mL Jar	7 Days / 14 Days [17]
	Resin Acids & Fatty Acids	2 x 0.5 - 1 L Amber Glass	Ascorbic Acid & NaOH		125 mL Jar	14 Days / 14 Days
	Sulfolane	2 x 0.5 - 1 L Amber Glass	Sodium Bisulfate [4]		125 mL Jar	14 Days / 14 Days
PESTICIDE RESIDUES	Carbamate Pesticides	1 L Amber Glass	Use Sodium Thiosulfate if chlorinated		125 - 500 mL Jar	7 Days / 14 Days

Inorganics	Analysis[1]	Water Container	Water Preservation	Additional Notes	Soil Container	Water / Soil Holding Time
	Glyphosate / AMPA	1 L Plastic	Use Sodium Thiosulfate if chlorinated		125 - 500 mL Jar	14 Days / 14 Days
	Herbicides, Acidic	2 x 1 L Amber Glass	Sodium Bisulfate [4]		125 - 500 mL Jar	14 Days / 14 Days
	Organochlorine or Organophosphate Pesticides	2 x 1 L Amber Glass			125 - 500 mL Jar	7 Days / 14 Days
	Soil Sterilant Scan	1 L Amber Glass			250 g Poly Bag	7 Days / 14 Days
Micro						
MICRO-BIOLOGICAL	Coliforms-Fecal, Total, E-coli & HPC	100 - 300 mL Sterilized Plastic	Sodium Thiosulfate		500 mL Sterilized Jar	24-48 Hours [18] (24 - HPC) / NA
	Microtox	1 L Amber Glass			125-250 mL Jar or Bag	3 Days / 3 Days

1. Additional analyses with the same container type and preservation may be possible - consult the lab for details.

2. The number of 40 mL glass vials required (2 or 3) for BTEX & VOC varies by lab based on instrumentation. Consult the lab for details.

3. Please fill to the top of the marked line on the 60 mL Amber Glass Vials.

4. Use Sodium Thiosulfate instead of Sodium Bisulfate if sample is chlorinated.

5. OMoE has no preservation requirement for PAHs. 2 X 250 mL Amber Glass required for BC MoE and OMoE. For AB and SK and for Alkylated PAHs, ALS requires 2 x 1 L Amber Glass.

6. Soil sampling options depend on soil location and condition of soil. Field Methanol Kit consists of one 5g TerraCore® sampler or similar sampling device, two pre-weighed 40 mL glass vials with methanol preservative and a 125mL soil jar for moisture. Hermetic sampler kit consists of a T-handle, two 5g hermetic samplers and a 125mL soil jar for moisture. One additional parameter, such as metals or hydrocarbons can also be obtained from the 125mL soil jar.

7. 4 Days hold time for Electrical Conductivity only as per Ontario MISA.

8. 3 Days hold time for British Columbia as per BC Ministry of Environment (BC MoE), 4 Days hold time as per OMoE.

9. pH in water should be taken in the field as per BC MoE, 4 Days hold time for Ontario MISA and 28 Days hold time for OMoE. 30 Days hold time as received for pH in soil as per OMoE. One year hold time once soil is dried.

10. 3 Days hold time as per BC MoE, 5 Days hold time as per Ontario MISA and 7 Days hold time as per OMoE.

11. 3 Days hold time until received. Unlimited hold time once soil is dried.

12. 3 Days hold time as per BC MoE and 7 Days hold time as per OMoE.

13. 40 Days hold time as per BC MoE and 14 Days hold time as per OMoE. Recovered methanol extract from laboratory has a 40 Days hold time as per OMoE.

14. 40 Days hold time as per OMoE.

15 14 Days hold time as per Ontario MISA.

16. 14 Days hold time as per OMoE. Consult lab for container size if limited sample volume is available.

17. 14 Days hold time for water and 60 Days hold time for soil as per OMoE. Ontario labs require 2 x 250 mL Amber Glass + 500 mL Amber Glass.

18. 30 Hours hold time as per BC Drinking Water Regulation and 48 Hours as per OMoE.

19. Bromate alone does not require preservative.

20. 15 Minutes hold time as per OMoE - Field measurement by meter is recommended.

21. Use 1:1 Sulfuric Acid (H_2SO_4) for preservation of marine or brackish samples.

SEPTEMBER 2015 BACK

10 DATA MANAGEMENT AND REPORTING

10.1 DATA MANAGEMENT

All sample data collected by Baffinland or designate consultants from the various environmental programs required on Project sites will be stored electronically in a spreadsheet database (Microsoft Excel) or using alternative software designed specifically for environmental data management.

QA/QC measures relating to data validation will include the following**:**

1. Designation of a suitable person to act as the Database Manager (DM).
2. Upon receipt, laboratory analytical data will be reviewed by the DM to check for completeness, typos, outlying values, etc. The analytical laboratory will be immediately notified of any anomalous results.
3. At a suitable frequency (e.g. once per month) the spreadsheet database should be updated by the DM using: i) results provided in electronic format by the analytical laboratories, and ii) copies of the field parameter monitoring records forwarded from site
4. The DM will be responsible for ensuring that a third party (e.g. another staff member) carries out a QA/QC check on a minimum of ten percent of newly entered data.

11 TRAINING

Environment personnel performing environmental monitoring programs will be required to understand and be proficient in the protocols outlined in this Plan. Training will involve Environmental Coordinators conducting routine reviews of this Plan with environmental personnel and leading in-field training sessions. Environmental personnel will also be trained and proficient in the operation, calibration and maintenance of any necessary sampling equipment (e.g. YSI).

12 REFERENCES

1. APHA *et al*, 1989. Standard Methods for the Examination of Water and Wastewater; AHPA, AWWA and WPCF, 17th ed.
2. Environment Canada (EC). 2019 Metal and Diamond Mining Effluent Regulations. http://laws-lois.justice.gc.ca
3. Environment Canada (EC). 2001 Guidance Document for the Sampling and Analysis of Metal Mining Effluent. http://publications.gc.ca/collections/Collection/En49-24-1-39E.pdf
4. Environment Canada (EC). 2012. Metal mining technical guidance for Environmental Effects Monitoring. ISBN 978-1-100-20496-3.
5. Environment Canada, 2002. Metal Mining Guidance Document for Aquatic Environmental Effects Monitoring. http://www.ec.gc.ca/eem/English/MetalMining/Guidance/default.cfm.
6. INAC, 1996. Quality Assurance (QA) and Quality Control (QC) Guidelines for Use by Class "A" Licenses in Meeting SNP Requirements and for Submission of a QA/QC Plan. Prepared by Department of Indian and Northern Affairs Canada Water Resources Division and the Northwest Territories Water Board, July 1996.
7. Nunavut Water Board, 2013. Baffinland Iron Mines Corp. – Class A Water License No: 2AM-MRY1325. Issued by the Nunavut Water Board, 2013.
8. USEPA, 2002. Methods for Measuring the Acute Toxicity of Effluents and Receiving Waters to Freshwater and Marine Organisms; 5th Ed., USEPA, ref. No. EPA-821-R-02-012.

APPENDIX A

Baffinland Corporate Policies

Baffinland Iron Mines Corporation

Health, Safety and Environment Policy

BAF-PH1-800-POL-0001

Rev 3

Approved by: Brian Penney

Title: Chief Executive Officer

Date: May 3rd, 2019

Signature: 

DOCUMENT REVISION RECORD

Issue Date MM/DD/YY	Revision	Prepared By	Approved By	Issue Purpose
05/07/15	0	EM	TP	For Use
03/07/16	1	JS	BP	Minor edits
04/20/18	2	TS	SA/BP	Minor edits
05/03/19	3	TS	BP	Minor edits

This Baffinland Iron Mines Corporation Policy on Health, Safety and Environment is a statement of our commitment to achieving a safe, healthy and environmentally responsible workplace. We will not compromise this policy for the achievement of any other organizational goals.

We implement this Policy through the following commitments:

- Continual improvement of safety, occupational health and environmental performance
- Meeting or exceeding the requirements of regulations and company policies
- Integrating sustainable development principles into our decision-making processes
- Maintaining an effective Health, Safety and Environmental Management System
- Sharing and adopting improved technologies and best practices to prevent injuries, occupational illnesses and environmental impacts
- Engaging stakeholders through open and transparent communication.
- Efficiently using resources, and practicing responsible minimization, reuse, recycling and disposal of waste.
- Reclamation of lands to a condition acceptable to stakeholders.

Our commitment to provide the leadership and action necessary to accomplish this policy is exemplified by the following principles:

- As evidenced by our motto “Safety First, Always” and our actions Health and Safety of personnel and protection of the environment are values not priorities.
- All injuries, occupational illnesses and environmental impacts can be prevented.
- Employee involvement and active contribution through courageous leadership is essential for preventing injuries, occupational illnesses and environmental impacts.
- Working in a manner that is healthy, safe and environmentally sound is a condition of employment.
- All operating exposures can be safeguarded.
- Training employees to work in a manner that is healthy, safe and environmentally sound is essential.
- Prevention of personal injuries, occupational illnesses and environmental impacts is good business.
- Respect for the communities in which we operate is the basis for productive relationships.

We have a responsibility to provide a safe workplace and utilize systems of work to meet this goal. All employees must be clear in understanding the personal responsibilities and accountabilities in relation to the tasks we undertake.

The health and safety of all people working at our operation and responsible management of the environment are core values to Baffinland. In ensuring our overall profitability and business success every Baffinland and business partner employee working at our work sites is required to adhere to this Policy.

Brian Penney
Chief Executive Officer
May 2019

Baffinland Iron Mines Corporation

SUSTAINABLE DEVELOPMENT POLICY

BAF-PH1-800-POL-0002

Rev 1

Approved By: Brian Penney
Title: Chief Executive Officer
Date: March 7, 2016
Signature:

DOCUMENT REVISION RECORD

Issue Date MM/DD/YY	Revision	Prepared By	Approved By	Issue Purpose
05/07/15	0	EM	TP	For Use
03/07/16	1	JS	BP	Minor edits

At Baffinland Iron Mines Corporation (Baffinland), we are committed to conducting all aspects of our business in accordance with the principles of sustainable development & corporate responsibility and always with the needs of future generations in mind. Baffinland conducts its business in accordance with the Universal Declaration of Human Rights and ArcelorMittal's Human Rights Policy which applies to all employees and affiliates globally.

Everything we do is underpinned by our responsibility to protect the environment, to operate safely and fiscally responsibly and with utmost respect for the cultural values and legal rights of Inuit. We expect each and every employee, contractor, and visitor to demonstrate courageous leadership in personally committing to this policy through their actions. The Sustainable Development and Human Rights Policy is communicated to the public, all employees and contractors and it will be reviewed and revised as necessary on a regular basis. These four pillars form the foundation of our corporate responsibility strategy:

1. Health and Safety
2. Environment
3. Upholding Human Rights of Stakeholders
4. Transparent Governance

1.0 HEALTH AND SAFETY

- We strive to achieve the safest workplace for our employees and contractors; free from occupational injury and illness, where everyone goes home safe everyday of their working life. Why? Because our people are our greatest asset. Nothing is as important as their health and safety. Our motto is "Safety First, Always".
- We report, manage and learn from injuries, illnesses and high potential incidents to foster a workplace culture focused on safety and the prevention of incidents.
- We foster and maintain a positive culture of shared responsibility based on participation, behaviour, awareness and promoting active courageous leadership. We allow our employees and contractors the right to stop any work if and when they see something that is not safe.

2.0 ENVIRONMENT

- Baffinland employs a balance of the best scientific and traditional Inuit knowledge to safeguard the environment.
- Baffinland applies the principles of pollution prevention, waste reduction and continuous improvement to minimize ecosystem impacts, and facilitate biodiversity conservation.
- We continuously seek to use energy, raw materials and natural resources more efficiently and effectively. We strive to develop more sustainable practices.
- Baffinland ensures that an effective closure strategy is in place at all stages of project development to ensure reclamation objectives are met.

3.0 UPHOLDING HUMAN RIGHTS OF STAKEHOLDERS

- We respect human rights, the dignity of others and the diversity in our workforce. Baffinland honours and respects the unique cultural values and traditions of Inuit.
- Baffinland does not tolerate discrimination against individuals on the basis of race, colour, gender, religion, political opinion, nationality or social origin, or harassment of individuals freely employed.
- Baffinland contributes to the social, cultural and economic development of sustainable communities in the North Baffin Region.
- We honour our commitments by being sensitive to local needs and priorities through engagement with local communities, governments, employees and the public. We work in active partnership to create a shared understanding of relevant social, economic and environmental issues, and take their views into consideration when making decisions.
- We expect our employees and contractors, as well as community members, to bring human rights concerns to our attention through our external grievance mechanism and internal human resources channels. Baffinland is committed to engaging with our communities of interest on our human rights impacts and to reporting on our performance.

4.0 TRANSPARENT GOVERNANCE

- Baffinland will take steps to understand, evaluate and manage risks on a continuing basis, including those that may impact the environment, employees, contractors, local communities, customers and shareholders.
- Baffinland endeavours to ensure that adequate resources are available and that systems are in place to implement risk-based management systems, including defined standards and objectives for continuous improvement.
- We measure and review performance with respect to our safety, health, environmental, socio-economic commitments and set annual targets and objectives.
- Baffinland conducts all activities in compliance with the highest applicable legal & regulatory requirements and internal standards.
- We strive to employ our shareholder's capital effectively and efficiently and demonstrate honesty and integrity by applying the highest standards of ethical conduct.

4.1 FURTHER INFORMATION

Please refer to the following policies and documents for more information on Baffinland's commitment to operating in an environmentally and socially responsible manner:

Health, Safety and Environment Policy
Workplace Conduct Policy
Inuktitut in the Workplace Policy
Site Access Policy
Hunting and Fishing (Harvesting) Policy
Annual Report to Nunavut Impact Review Board

ArcelorMittal Canada Sustainability and Corporate Responsibility Report

If you have questions about Baffinland's commitment to upholding human rights, please direct them to contact@baffinland.com.

Brian Penney
Chief Executive Officer
March 2016

APPENDIX B

COC Example Forms

Chain of Custody (COC) / Analytical Request Form

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here
(lab use only)

COC Number: 17 -

Page of

Report To	Contact and company name below will appear on the final report
Company:	
Contact:	
Phone:	
Company address below will appear on the final report	
Street:	
City/Province:	
Postal Code:	

Report Format / Distribution
Select Report Format: ☐ PDF ☐ EXCEL ☐ EDD (DIGITAL)
Quality Control (QC) Report with Report ☐ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☐ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax
Email 2
Email 3

Invoice To	Same as Report To ☐ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☐ NO
Company:	
Contact:	

Invoice Distribution
Select Invoice Distribution: ☐ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax
Email 2

Project Information	**Oil and Gas Required Fields (client use)**	
ALS Account # / Quote #:	AFE/Cost Center:	PO#
Job #:	Major/Minor Code:	Routing Code:
PO / AFE:	Requisitioner:	
LSD:	Location:	

ALS Lab Work Order # (lab use only):	**ALS Contact:**	**Sampler:**

Select Service Level Below - Contact your AM to confirm all E&P TATs (surcharges may apply)

Regular [R] ☐ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): **4 day [P4-20%]** ☐ | **3 day [P3-25%]** ☐ | **2 day [P2-50%]** ☐

EMERGENCY: **1 Business day [E - 100%]** ☐ | **Same Day, Weekend or Statutory holiday [E2 -200% (Laboratory opening fees may apply)]** ☐

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

ALS Sample # (lab use only)	**Sample Identification and/or Coordinates** (This description will appear on the report)	**Date** (dd-mmm-yy)	**Time** (hh:mm)	**Sample Type**	**NUMBER OF CONTAINERS**	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below													**SAMPLES ON HOLD**	**SUSPECTED HAZARD (see Special Instructions)**

Drinking Water (DW) Samples[1] (client use)	**Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)**
Are samples taken from a Regulated DW System? ☐ YES ☐ NO	
Are samples for human consumption/ use? ☐ YES ☐ NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐		SIF Observations	Yes ☐	No ☐	
Ice Packs ☐	Ice Cubes ☐	Custody seal intact	Yes ☐	No ☐	
Cooling Initiated ☐					

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			

SHIPMENT RELEASE (client use)			**INITIAL SHIPMENT RECEPTION (lab use only)**			**FINAL SHIPMENT RECEPTION (lab use only)**		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

NOV 2018 FRONT

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 specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

APPENDIX C

Analytical Laboratory Accreditation and Licencing

Canadian Association for Laboratory Accreditation Inc.

CALA

Certificate of Accreditation

ALS Environmental (Waterloo)
ALS Canada Ltd.
60 Northland Rd.
Unit 1, Waterloo, Ontario

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).

Accreditation No.: A3149
Issued On: October 3, 2018
Accreditation Date: January 3, 2005
Expiry Date: April 2, 2021

Andrew M. Adams
President & CEO

CALA

CALA Directory of Laboratories

Membership Number: 3149
Laboratory Name: ALS Environmental (Waterloo)
Parent Institution: ALS Canada Ltd.
Address: 60 Northland Rd. Unit 1 Waterloo ON N2V 2B8
Contact: Ms. Amanda Lumsden
Phone: (519) 886-6910
Fax: (519) 886-9047
Email: amanda.ganouri-lumsden@alsglobal.com; linda.neimor@ALSGlobal.com

Standard: Conforms with requirements of ISO/IEC 17025
Clients Served: All Interested Parties
Revised On: December 18, 2018
Valid To: April 2, 2021

Scope of Accreditation

Air (Inorganic)
Fixed Gases - Air (180)
WT-TM-1703; modified from ASTM D1946-90 and EPA 3C
GC/FID & TCD
Carbon dioxide
Carbon monoxide
Methane
Nitrogen
Oxygen

Air (Organic)
Reduced Sulphur Compounds - Air (201)
WT-TM-1704; modified from ASTM 5504-12
GC-SCD - PASSIVATE CANISTER
2-Ethylthiophene
2-Methylthiophene
2,5-Dimethylthiophene
3-Methylthiophene
Butyl(t) mercaptan
Carbon disulfide
Carbonyl sulfide
Diethyl disulfide
Diethyl sulfide
Dimethyl disulfide
Dimethyl sulfide
Ethyl mercaptan
Ethyl methyl sulfide
Hydrogen Sulfide

† "OSDWA" indicates the appendix is used for the analysis of Ontario drinking water samples, which is subject to the rules and related regulations under the Ontario "Safe Drinking Water Act" (2002).

The list of tests and measurement capabilities for which a laboratory is accredited can change at any time due to circumstances such as scope extensions, voluntary withdrawal of tests by the laboratory and suspension. Scopes are published by the CALA via the Internet at http://www.cala.ca/cala_directories.html

Isobutyl mercaptan
Isopropyl mercaptan
Methyl mercaptan
n-Butyl mercaptan
Propyl mercaptan
sec-Butyl mercaptan
Tetrahydrothiophene
Thiophene

Air (Organic)

Volatile Organic Compounds (VOC) - Air (202)
WT-TM-1701; modified from EPA TO-15
GC-MS - PASSIVATE CANISTER

1,1-Dichloroethane
1,1-Dichloroethene
1,1,1-Trichloroethane
1,1,1,2-Tetrachloroethane
1,1,2-Trichloroethane
1,1,2,2-Tetrachloroethane
1,2-Dibromoethane
1,2-Dichlorobenzene
1,2-Dichloroethane
1,2-Dichloropropane
1,2,3-Trimethylbenzene
1,2,4-Trichlorobenzene
1,2,4-Trimethylbenzene
1,3-Butadiene
1,3-Dichlorobenzene
1,3,5-Trimethylbenzene
1,4-Dichlorobenzene
1,4-Dioxane (p-dioxane)
2-Chlorotoluene
2-Ethyltoluene
2-Hexanone (MBK)
2-Methylbutane
2-Methylpentane
3-Methylhexane
3-Methylpentane
4-Ethyltoluene
4-Isopropyltoluene
Acetone
Acetonitrile
Acrolein
Acrylonitrile
Aliphatic >C10-C12
Aliphatic >C12-C16
Aliphatic C6-C8
Aliphatic >C8-C10
Allyl chloride
Aromatic >C10-C12
Aromatic >C10-C16
Aromatic C6-C8
Aromatic >C8-C10
Benzene

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Benzyl chloride
Bromodichloromethane
Bromoform
Bromomethane
Butane
Carbon disulfide
Carbon tetrachloride
Chlorobenzene
Chlorodifluoromethane
Chloroethane
Chloroform
Chloromethane
cis-1,2-dichloroethene
cis-1,3-Dichloropropene
Cyclohexane
Dibromochloromethane
Dibromomethane
Dichlorodifluoromethane
Ethanol
Ethyl acetate
Ethylbenzene
F1
F2
Freon 113
Freon 114
Hexachlorobutadiene
Isooctane
Isoprene
Isopropyl alcohol
Isopropylbenzene
m,p-Xylene
Methyl ethyl ketone (MEK)
Methyl isobutyl ketone (MIBK)
Methyl methacrylate
Methylene chloride
n-Decane
n-Heptane
n-Hexane
n-Pentane
n-Propylbenzene
Naphthalene
Nonane
o-Xylene
Octane
Propylene
Styrene
t-Butyl alcohol
t-Butyl methyl ether (MTBE)
Tetrachloroethylene
Tetrahydrofuran
Toluene
Total C>10-C12
Total C>12-C16

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Total C>8-C10
Total C6-C8
trans-1,2-Dichloroethylene
trans-1,3-Dichloropropene
Trichloroethylene
Trichlorofluoromethane
Vinyl acetate
Vinyl bromide
Vinyl chloride

Air (Organic)

Volatile Organic Compounds (VOC) - Air (203)
WT-TM-1700; modified from EPA TO-17
GC-MS - SORBENT TUBE
1,1-Dichloroethane
1,1-Dichloroethene
1,1-Dichloropropene
1,1,1-Trichloroethane
1,1,2-Trichloroethane
1,1,2,2-Tetrachloroethane
1,2-Dibromoethane
1,2-Dichlorobenzene
1,2-Dichloroethane
1,2-Dichloropropane
1,2,3-Trichloropropane
1,2,4-Trichlorobenzene
1,2,4-Trimethylbenzene
1,3-Butadiene
1,3-Dichlorobenzene
1,3-Dichloropropane
1,3,5-Trimethylbenzene
1,4-Dichlorobenzene
1,4-Dioxane (p-dioxane)
2-Chlorotoluene
2-Methylnaphthalene
2,2-Dichloropropane
4-Chlorotoluene
4-Ethyltoluene
4-Isopropyltoluene
4-Phenylcyclohexene
Acetone
Allyl chloride
Benzene
Benzyl chloride
Bromochloromethane
Bromodichloromethane
Bromoform
Carbon tetrachloride
Chlorobenzene
Chloroethane
Chloroform
cis-1,2-dichloroethene
cis-1,3-Dichloropropene
Cyclohexane

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Decamethylcyclopentasiloxane
Decamethyltetrasiloxane
Decane
Dibromochloromethane
Dichlorodifluoromethane
Dodecamethylcyclohexasiloxane
Dodecamethylpentasiloxane
Ethyl acetate
Ethylbenzene
Heptane
Hexachloro-1,3-butadiene
Hexamethylcyclotrisiloxane
Hexamethyldisiloxane
Hexane
Isooctane
Isopropyla lcohol
m,p-Xylene
Methylene chloride
n-Butylbenzene
n-Propylbenzene
Naphthalene
Nonane
o-Xylene
Octamethylcyclotetrasiloxane
Octamethyltrisiloxane
Octane
sec-Butylbenzene
Styrene
tert-Butylbenzene
Tetrachloroethene
Tetrahydrofuran
Toluene
trans-1,2-Dichloroethylene
trans-1,3-Dichloropropene
Trichloroethene
Trichlorofluoromethane
Vinyl chloride

Biosolids (Microbiology)

Escherichia coli (E. coli) - Biosolids (087)
WT-TM-1200; modified from ON MOECC E3433
MEMBRANE FILTRATION (mFC-BCIG)
Escherichia coli (E. coli)

Biosolids (Organic)

Nonylphenol and Nonylphenol Ethoxylates - Biosolids (165)
WT-TM-1554; modified from JOURNAL OF CHROMATOGRAPHY A.849 (1999) 467-482
LC/MS - EXTRACTION
Bisphenol A
Nonylphenol Diethoxylate (NP2EO)
Nonylphenol Ethoxylates
Nonylphenol Monoethoxylates (NP1EO)
Nonylphenols
Octylphenol
Octylphenol Diethoxylate

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Octylphenol Monoethoxylate

Serum (Organic)
Perfluorinated Compounds (PFC) - Biomaterials [Serum] (196)
WT-TM-1565; J. ANALY. TOXICOL. 34: 400-410
LC-MS/MS
Perfluoro Decanesulfonate
Perfluoro Dodecanoic Acid
Perfluoro Hexanesulfonate
Perfluoro Nonanoic Acid
Perfluoro Octanesulfonate
Perfluoro Octanoic Acid
Perfluoro Tetradecanoic Acid
Perfluoro Undecanoic Acid

Soil
Particle Size Analysis (PSA) - Solids [Soil] (156)
WT-TM-1034; modified from SOIL SAMPLING & METHODS OF ANALYSIS CAN. SOCIETY OF SOIL SCIENCE (1993)
SEIVE
Particle Size

Soil
Perchlorate - Solids [Soil] (176)
WT-TM-1505; modified from EPA 6850
LC-MS/MS
Perchlorate

Soil
Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonate (PFOS) - Solids [Soil] (175)
WT-TM-1567; modified from ON MOECC E3506
LC-MS/MS
10:2 Fluorotelomer sulfonic acid (10:2 FTS)
4:2 Fluorotelomer sulfonic acid (4:2 FTS)
6:2 Fluorotelomer sulfonic acid (6:2 FTS)
8:2 Fluorotelomer sulfonic acid (8:2 FTS)
N-Ethyl perfluorooctane sulfonamide (EtFOSA)
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)
N-Ethyl perfluorooctanesulfonamidoethanol (EtFOSE)
N-Methyl perfluorooctane sulfonamide (MeFOSA)
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)
N-Methyl perfluorooctane sulfonamidoethanol (MeFOSE)
Perfluorobutane sulfonic acid (PFBs)
Perfluorobutanoic acid (PFBA)
Perfluorodecanesulfonate (PFDS)
Perfluorodecanoic acid (PFDA)
Perfluorododecanoic acid (PFDoA)
Perfluoroheptane sulfonic acid (PFHpS)
Perfluoroheptanoic acid (PFHpA)
Perfluorohexane sulfonic acid (PFHxS)
Perfluorohexanoic acid (PFHxA)
Perfluorononanoic acid (PFNA)
Perfluorooctane sulfonamide (PFOSA)
Perfluorooctane sulfonic acid (PFOS)
Perfluorooctanoic acid (PFOA)
Perfluoropentane sulfonic acid (PFPeS)
Perfluoropentanoic acid (PFPeA)

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Perfluorotetradecanoic acid (PFTeDA)
Perfluorotridecanoic acid (PFTrDA)
Perfluoroundecanoic acid (PFUndA)

Soil (Inorganic)
Hexavalent Chromium - Solids [Soil] (158)
WT-TM-1035; modified from EPA 1636 and EPA 3060
ION CHROMATOGRAPHY
Chromium (Hexavalent)

Soil (Inorganic)
Phenols - Solids [Soil] (170)
WT-TM-1027; modified from EPA 9066
COLORIMETRIC
Total Phenolics

Soil (Organic)
Pesticides - Soil (208)
WT-TM-1589; modified from ON MOECC E3501
LC-MS/MS
Atrazine
Atrazine-2-hydroxy
Atrazine-desethyl
Atrazine-desethyl-desisopropyl
Atrazine-desisopropyl
Azoxystrobin
Boscalid
Bromacil
Carbaryl
Chlorantraniliprole
DCPMU
Diuron
Fludioxonil
Imidacloprid
Linuron
Metalaxyl
Myclobutanil
Propiconazole
Pyraclostrobin
Simazine
Tebuthiuron
Trifloxystrobin
Triticonazole

Soil (Organic)
Phenoxy Acid Herbicides - Soil (210)
WT-TM-1591; modified from ON MOECC E3552
LC-MS/MS
2,4-D
2,4-DB
2,4,5-T
2,4,5-TP
Bromoxynil
Clopyralid
Dicamba
Dichlorprop
Dinoseb

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MCPA
MCPB
Mecoprop
Picloram
Triclopyr

Solids (Inorganic)
Ammonia - Solids [Soil] (096)
WT-TM-1013; modified from EPA 350.1
COLORIMETRIC
Ammonia-N

Solids (Inorganic)
Anions - Solids (136)
NA-TM-1001, NA-TM-1700; modified from EPA 1311 (PREPARATION) and EPA 300.1 (ANALYSIS)
ION CHROMATOGRAPHY - TCLP
Fluoride
Nitrate
Nitrite

Solids (Inorganic)
Anions - Solids [Sludge, Soil] (041)
NA-TM-1001, WT-TP-2013; modified from EPA 300.1
ION CHROMATOGRAPHY
Bromide
Chloride
Fluoride
Nitrate-N
Nitrite
Sulphate

Solids (Inorganic)
Conductivity - Solids [Soil] (109)
WT-TM-1010; modified from SM 2510 B
CONDUCTIVITY METER
Conductivity (25˚C)

Solids (Inorganic)
Cyanide - Solids [Soil] (079)
NA-TM-1003, WT-TP-2011; modified from ASTM D7237-10 and EPA 9013A and ISO 14403 and SM 4500-CN- I
AUTO COLOR - DIGESTION
Cyanide, Free
Cyanide (SAD)
Cyanide (WAD)

Solids (Inorganic)
Hot Water Soluble Boron - Solids [Soil] (186)
NA-TP-2010, WT-TM-1026; modified from EPA 6010C and SOIL SAMPLING & METHODS OF ANALYSIS, CARTER, 2008
ICP/OES
Boron (Hot Water Soluble)

Solids (Inorganic)
Mercury - Solids (139)
NA-TM-1005, NA-TM-1700; modified from EPA 1311 (PREPARATION) and EPA 1631E (ANALYSIS)
COLD VAPOUR AA - SPECTROMETRIC - TCLP
Mercury

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Solids (Inorganic)
Mercury - Solids [Compost, Sludge, Soil] (050)
NA-TM-1005, NA-TP-2004; modified from EPA 1631E and EPA 200.2
CVAAS
Mercury

Solids (Inorganic)
Metals - Solids (138)
NA-TM-1700, NA-TM-1002; modified from EPA 1311 (PREPARATION) and EPA 6020A (ANALYSIS)
ICP/MS - TCLP
Antimony
Arsenic
Barium
Beryllium
Bismuth
Boron
Cadmium
Calcium
Chromium
Iron
Lead
Lithium
Magnesium
Manganese
Potassium
Selenium
Silver
Sodium
Strontium
Sulphur
Thallium
Tin
Uranium
Zinc
Zirconium

Solids (Inorganic)
Metals - Solids [Compost, Sediment, Sludge, Soil] (006)
NA-TM-1002, NA-TP-2004; modified from EPA 200.2 and EPA 6020A
ICP/MS
Aluminum
Antimony
Arsenic
Barium
Beryllium
Bismuth
Boron
Cadmium
Calcium
Chromium
Cobalt
Copper
Iron
Lead
Lithium

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Magnesium
Manganese
Molybdenum
Nickel
Phosphorus
Potassium
Selenium
Silver
Sodium
Strontium
Sulphur
Thallium
Tin
Titanium
Uranium
Vanadium
Zinc

Solids (Inorganic)
Metals - Solids [Soil] (187)
WT-TM-1026, WT-TP-1012; modified from EPA 6010C and SOIL SAMPLING & METHODS OF ANALYSIS, CARTER 2ND EDITION, 2008, CHAP. 15.2.2
ICP/OES - FIXED RATIO EXTRACTION
Calcium
Magnesium
Sodium

Solids (Inorganic)
Moisture - Solids [Soil] (188)
WT-TM-1115; REFERENCE METHOD FOR THE CANADA-WIDE STANDARD FOR PERTROLEUM HYDROCARBONS IN SOIL - TIER 1 METHOD & ADDENDUM. CCME DECEMBER 2000. NO. 1310
GRAVIMETRIC
Percent Moisture

Solids (Inorganic)
Oil and Grease - Solids [Sludge, Soil] (031)
WT-TM-1100; modified from EPA 8015 and SM 5520 B and SM 5520 D and SM 5520 E and SM 5520 F
GRAVIMETRIC - EXTRACTION
Mineral Oil and Grease
Total Oil and Grease (Solvent Extractables)

Solids (Inorganic)
pH - Solids [Soil] (107)
WT-TM-1001; modified from SM 4500-H+ B
pH METER
pH

Solids (Inorganic)
Solids - Solids [Compost, Sediment, Sludge, Soil] (028)
WT-TM-1011; modified from SM 2540 B and SM 2540 E and SM 2540 G
GRAVIMETRIC
Fixed Solids
Total Solids
Volatile Solids

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Solids (Inorganic)
Total and Free Cyanide - Solids (140)
NA-TM-1700, NA-TM-1003; modified from ASTM D7237-10 (ANALYSIS) and EPA 1311 (PREPARATION) and ISO 14403 (ANALYSIS) and SM 4500-CN- I (ANALYSIS)
COLORIMETRIC - TCLP
Cyanide (SAD)
Cyanide (WAD)

Solids (Inorganic)
Total Organic Carbon (TOC) - Solids [Soil] (034)
WT-TM-1005; modified from SOIL SAMPLING & METHODS OF ANALYSIS, CARTER METHOD 21.3.2
WET OXIDATION-REDOX
Organic Carbon

Solids (Organic)
1,4-Dioxane - Solids [Soil] (173)
WT-TM-1406; modified from EPA 5021A and EPA 8260C
GC/MS - HEADSPACE
1,4-Dioxane (p-dioxane)

Solids (Organic)
Base Neutral Acid Extractables (BNA) - Solids (141)
NA-TM-1700, WT-TM-1300, WT-TM-1101; modified from EPA 1311 (PREPARATION) and EPA 8270 (ANALYSIS)
GC/MS - TCLP
2-Methylphenol (o-Cresol)
2,3,4,6-Tetrachlorophenol
2,4-Dichlorophenol
2,4-Dinitrotoluene
2,4,5-Trichlorophenol
2,4,6-Trichlorophenol
3/4-Methylphenol
Benzo(a)pyrene
Hexachlorobenzene
Hexachlorobutadiene
Hexachloroethane
Nitrobenzene
Pentachlorophenol

Solids (Organic)
Base Neutral Acid Extractables (BNA) - Solids [Sediment, Sludge, Soil] (016)
WT-TM-1101/WT-TM-1300; modified from EPA 3570C and EPA 8270D
GC/MS - EXTRACTION
1-Chloronaphthalene
1-Methylnaphthalene
1,2-Dichlorobenzene
1,2,4-Trichlorobenzene
1,3-Dichlorobenzene
1,4-Dichlorobenzene
2-Chloronaphthalene
2-Chlorophenol
2-Methylnaphthalene
2-Nitrophenol
2,3,4-Trichlorophenol
2,3,4,5-Tetrachlorophenol
2,3,4,6-Tetrachlorophenol
2,3,5-Trichlorophenol

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2,3,5,6-Tetrachlorophenol
2,4-Dichlorophenol
2,4-Dimethylphenol
2,4-Dinitrophenol
2,4-Dinitrotoluene
2,4,5-Trichlorophenol
2,4,6-Trichlorophenol
2,6-Dichlorophenol
2,6-Dinitrotoluene
3,3'-Dichlorobenzidene
4-Bromophenyl phenyl ether
4-Chloro-3-methyl phenol
4-Chloroaniline
4-Chlorophenyl phenyl ether
4-Nitrophenol
4,6-Dinitro-o-cresol
5-Nitroacenaphthylene
Acenaphthene
Acenaphthylene
Acridine
Anthracene
Benzo (a) anthracene
Benzo (a) pyrene
Benzo (b) fluoranthene
Benzo (g,h,i) perylene
Benzo (k) fluoranthene
Benzylbutyl phthalate
Biphenyl
Bis(2-chlorethoxy)methane
Bis(2-chloroethyl) ether
Bis(2-chloroisopropyl) ether
Bis(2-ethylhexyl) phthalate
Camphene
Chrysene
Di-n-butyl phthalate
Di-n-octyl phthalate
Dibenzo (a,h) anthracene
Diethyl phthalate
Dimethyl phthalate
Diphenyl ether
Fluoranthene
Fluorene
Hexachlorobenzene
Hexachlorobutadiene
Hexachlorocyclopentadiene
Hexachloroethane
Indeno (1,2,3 - cd) pyrene
Indole
Isophorone
m,p-Cresol
N-Nitrosodi-n-propylamine
Naphthalene
Nitrobenzene

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o-Cresol
p-Chloroaniline
Pentachlorophenol
Perylene
Phenanthrene
Phenol
Pyrene
Quinoline
Total Diphenylamine

Solids (Organic)
Energetics - Solids [Soil] (195)
WT-TM-1608; modified from EPA 8330A and EPA 8330B and U.S. EPA: EPA
HPLC/UV - EXTRACTION
1,3-Dinitrobenzene (1,3-DNB)
1,3,5-Trinitrobenzene (1,3,5-TNB)
2-Amino-4,6-dinitrotoluene (2-A-4,6-DNT)
2-Nitrotoluene (2-NT)
2,4-Dinitrotoluene (2,4-DNT)
2,4,6-Trinitrotoluene (2,4,6-TNT)
2,6-Dinitrotoluene (2,6-DNT)
3-Nitrotoluene (3-NT)
3,5-Dinitroaniline (3,5-DNA)
4-Amino-2,6-dinitrotoluene (4-A-DNT)
4-Nitrotoluene (4-NT)
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)
Methyl-2,4,6-trinitrophenylnitramine
Nitrobenzene
Nitroglycerin
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)
Pentaerythritol tetranitrate (PETN)

Solids (Organic)
Extractable Petroleum Hydrocarbons (EPH) - Solids [Soil] (110)
WT-TM-1406; modified from CCME CWS PETROLEUM HYDROCARBONS IN SOIL - TIER 1 METHOD and EPA 5021A and EPA 8260C
GC/FID - HEADSPACE
F1: C6-C10

Solids (Organic)
Organochlorine (OC) Pesticides - Solids [Soil] (020)
WT-TM-1102/WT-TM-1302; modified from EPA 3570C and EPA 8270D
GC/MS - EXTRACTION
Aldrin
alpha-BHC
alpha-Chlordane
beta-BHC
Chlordane
delta-BHC
Dieldrin
Endosulfan I
Endosulfan II
Endosulfan Sulfate
Endrin
Endrin Aldehyde
gamma-Chlordane

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Heptachlor
Heptachlor epoxide
Lindane
Mirex
o,p'-DDD
o,p'-DDE
o,p'-DDT
Oxychlordane
p,p'-DDD
p,p'-DDE
p,p'-DDT
p,p'-Methoxychlor

Solids (Organic)
Pesticides - Solids [Soil] (150)
WT-TM-1107, WT-TM-1302; modified from EPA 3570C and EPA 8270
GC/MS - EXTRACTION
Alachlor
Ametryn
Atrazine
Atrazine, desethyl
Azinphos-methyl
Bendiocarb
Bromoxynil
Carbaryl
Carbofuran
Chlorpyrifos
Cyanazine
Diazinon
Diclofop-methyl
Dimethoate
Malathion
Metolachlor
Metribuzin
Parathion
Phorate
Prometon
Prometryne
Propazine
Simazine
Temephos
Terbufos
Terbutryn
Triallate
Trifluralin

Solids (Organic)
Petroleum Hydrocarbons (PHC) - Solids [Soil] (065)
NA-TM-1100, WT-TM-1307; CCME CWS PETROLEUM HYDROCARBONS IN SOIL - TIER 1 METHOD
GC/FID - EXTRACTION
F2: C10-C16
F3: C16-C34
F4: C34-C50

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Solids (Organic)
Petroleum Hydrocarbons (PHC) - Solids [Soil] (071)
NA-TM-1100; CCME CWS PETROLEUM HYDROCARBONS IN SOIL - TIER 1 METHOD
GRAVIMETRIC
F4: Gravimetric

Solids (Organic)
Phenols - Solids [Soil] (204)
WT-TM-1593; modified from EPA 600/SR-97/027
LC-MS/MS
Phenol

Solids (Organic)
Polychlorinated Biphenyls (PCB) - Solids (137)
NA-TM-1700, WT-TM-1301, WT-TM-1105; modified from EPA 1311 (PREPARATION) and EPA 8270 (ANALYSIS)
GC/MS - TCLP
Aroclor 1242
Aroclor 1248
Aroclor 1254
Aroclor 1260
Total PCB

Solids (Organic)
Polychlorinated Biphenyls (PCB) - Solids [Soil] (018)
WT-TM-1105/WT-TM-1301; modified from EPA 3570C and EPA 8270D
GC/MS - EXTRACTION
Aroclor 1242
Aroclor 1248
Aroclor 1254
Aroclor 1260
Total PCB

Solids (Organic)
Pyridine - Solids (167)
WT-TM-1600, NA-TM-1700; modified from EPA 1311 (PREPARATION) and EPA 8260B (ANALYSIS)
GC/MS
Pyridine

Solids (Organic)
Sulfolane - Solids [Soil] (206)
WT-TM-1572; IN-HOUSE
LC-MS/MS
Sulfolane

Solids (Organic)
Volatile Organic Compounds (VOC) - Solids (182)
WT-TM-1017, WT-TM-1406; modified from EPA 1311 (PREPARATION) and EPA 8260 (ANALYSIS)
GC/MS - HEADSPACE - TCLP
1,1-Dichloroethylene
1,2-Dichlorobenzene
1,4-Dichlorobenzene
Benzene
Carbon tetrachloride
Chloroform
Dichloromethane
Ethylbenzene
m,p-Xylene

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Methyl ethyl ketone
o-Xylene
Tetrachloroethylene
Toluene

Solids (Organic)

Volatile Organic Compounds (VOC) - Solids [Soil] (112)
WT-TM-1406; modified from EPA 5021A and EPA 8260C
GC/MS - HEADSPACE
1,1-Dichloroethane
1,1-Dichloroethylene
1,1,1-Trichloroethane
1,1,1,2-Tetrachloroethane
1,1,2-Trichloroethane
1,1,2,2-Tetrachloroethane
1,2-Dibromomethane
1,2-Dichlorobenzene
1,2-Dichloroethane
1,2-Dichloropropane
1,3-Dichlorobenzene
1,4-Dichlorobenzene
2-Hexanone (MBK)
Acetone (2-Propanone)
Benzene
Bromodichloromethane
Bromoform
Bromomethane
Carbon disulfide
Carbon Tetrachloride
Chlorobenzene
Chlorodibromomethane
Chloroethane
Chloroform
Chloromethane
cis-1,2-Dichloroethylene
cis-1,3-Dichloropropene
Dibromochloromethane
Dibromomethane
Dichlorodifluoromethane
Dichloromethane
Ethylbenzene
Ethylene Dibromide
Hexane
m/p-xylene
Methyl ethyl ketone
Methyl isobutyl ketone
Methyl t-butyl ether
Methylene chloride
o-xylene
Styrene
Tetrachloroethane
Tetrachloroethylene
Toluene
trans-1,2-Dichloroethylene

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trans-1,3-Dichloropropene
Trichloroethylene
Trichlorofluoromethane
Vinyl chloride

Tissue (Organic)
Perfluorinated Compounds (PFC) - Tissue (198)
WT-TM-1568; modified from ANALYTICA CHIMICA ACTA (2008) 619:221-230
LC-MS/MS
2-(N-ethylperfluoro-1-Octanesulfonamide)-EtOH (N-EtFOSE)
2-(N-methylperfluoro-1-Octanesulfonamide)-Etoh (N-MeFOSE)
N-Ethylperfluoro-1-Octanesulfonamide (N-EtFOSA)
N-Methylperfluoro-1-Octanesulfonamide (N-MeFOSE)
Perfluoro Decanesulfonate (PFDS)
Perfluoro Heptanesulfonate (PFHpS)
Perfluoro Octanesulfonamide (PFOSA)
Perfluorobutanesulfonate (PFBS)
Perfluorobutanoic acid (PFBA)
Perfluorodecanoic acid (PFDA)
Perfluorodecanoic acid (PFDA)
Perfluorododecanoic acid (PFDoA)
Perfluoroheptanoic acid (PFHpA)
Perfluorohexanesulfonate (PFHxS)
Perfluorohexanoci Acid (PFHxA)
Perfluorononanoic acid (PFNA)
Perfluorooctane sulfonate (PFOS)
Perfluorooctanoic acid (PFOA)
Perfluoropentanoic acid (PFPeA)
Perfluorotetradecanoic acid (PFTeDA)
Perfluorotridecanoic acid (PFTrDA)

Water (Inorganic) OSDWA †
Alkalinity - Water (070)
WT-TM-1012; modified from SM 2320 B
MANUAL TITRATION
Alkalinity (pH 4.5)

Water (Inorganic) OSDWA †
Alkalinity - Water (094)
WT-TM-1032; modified from EPA 310.2
COLORIMETRIC
Alkalinity (pH 4.5)

Water (Inorganic) OSDWA †
Ammonia - Water (095)
WT-TM-1013; modified from EPA 350.1
COLORIMETRIC
Ammonia
Ammonia+Ammonium

Water (Inorganic) OSDWA †
Anions - Water [Wastewater] (003)
NA-TM-1001; modified from EPA 300.1
ION CHROMATOGRAPHY
Bromide
Chloride
Fluoride
Nitrate

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Nitrite
Sulfate

Water (Inorganic) OSDWA †
Biochemical Oxygen Demand (BOD) - Water (001)
WT-TM-1002; modified from SM 5210 B
D.O. METER
BOD (5 day)
CBOD (5 day)

Water (Inorganic) OSDWA †
Bromate - Water (114)
WT-TM-1503, WT-TM-1505; modified from EPA 6850
LC-MS/MS - EXTRACTION
Bromate

Water (Inorganic) OSDWA †
Carbon - Water (047)
WT-TM-1024; modified from SM 5310 B
IR - COMBUSTION
Organic Carbon

Water (Inorganic) OSDWA †
Chemical Oxygen Demand (COD) - Water (035)
WT-TM-1006; modified from SM 5220 D
REFLUX - COLORIMETRIC
COD

Water (Inorganic) OSDWA †
Chlorate and Chlorite - Water (211)
WT-TM-1044; EPA 300.1
ION CHROMATOGRAPHY
Chlorate
Chlorite

Water (Inorganic) OSDWA †
Chlorine - Water (074)
WT-TM-1021; modified from SM 4500-CL G
COLORIMETRIC
Free Chlorine
Total Chlorine

Water (Inorganic) OSDWA †
Colour - Water (097)
WT-TM-1014; modified from SM 2120 C
COLORIMETRIC
Apparent Colour
True Colour

Water (Inorganic) OSDWA †
Conductivity - Water (048)
WT-TM-1010; modified from EPA 9050A and SM 2510 B
CONDUCTIVITY METER
Conductivity (25˚C)

Water (Inorganic) OSDWA †
Conductivity - Water (108)
WT-TM-1028; modified from SM 2510 B
PC TITRATE
Conductivity (25˚C)

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Water (Inorganic) OSDWA †

Cyanate - Water (161)

WT-TM-1036; modified from SM 4500-CN- L and SM 4500-NH3 D

SELECTIVE ION ELECTRODE

Cyanate

Water (Inorganic) OSDWA †

Cyanide - Water [Wastewater] (004)

NA-TM-1003; modified from ASTM D7237-10 and ISO 14403 and SM 4500-CN- I

COLOR - DISTILLATION

Cyanide, Free

Cyanide (SAD)

Cyanide (WAD)

Water (Inorganic) OSDWA †

Dissolved Metals - Water (005)

NA-TM-1002, NA-TP-2002; modified from EPA 3030B and EPA 6020A

ICP/MS

Aluminum

Antimony

Arsenic

Barium

Beryllium

Bismuth

Boron

Cadmium

Calcium

Cesium

Chromium

Cobalt

Copper

Iron

Lead

Lithium

Magnesium

Manganese

Molybdenum

Nickel

Phosphorus

Potassium

Rubidium

Selenium

Silicon

Silver

Sodium

Strontium

Sulphur

Tellurium

Thallium

Thorium

Tin

Titanium

Tungsten

Uranium

Vanadium

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Zinc
Zirconium

Water (Inorganic) OSDWA †
Hexavalent Chromium - Water (157)
WT-TM-1035; modified from EPA 3060A and EPA 7199
ION CHROMATOGRAPHY
Hexavalent Chromium

Water (Inorganic) OSDWA †
Hydrogen Sulphide - Water (012)
WT-TM-1003; modified from SM 4500-S2- D and SM 4500-S2- E and SM 4500-S2- F
COLORIMETRIC
Sulphide

Water (Inorganic) OSDWA †
Mercury - Water [Wastewater] (049)
NA-TM-1005; modified from EPA 1631E
COLD VAPOUR AA - SPECTROMETRIC
Mercury

Water (Inorganic) OSDWA †
Oil and Grease - Water (033)
WT-TM-1100; modified from EPA 1664 and SM 5520 B and SM 5520 D and SM 5520 E and SM 5520 F
GRAVIMETRIC - EXTRACTION
Mineral Oil and Grease
Total Oil and Grease

Water (Inorganic) OSDWA †
Perchlorate - Water (168)
WT-TM-1505; modified from EPA 6850
LC-MS/MS - EXTRACTION
Perchlorate

Water (Inorganic) OSDWA †
pH - Water (026)
WT-TM-1001; modified from SM 4500-H+ B
pH - METER
pH

Water (Inorganic) OSDWA †
pH - Water (106)
WT-TM-1028; modified from SM 4500-H+ B
PC TITRATE
pH

Water (Inorganic) OSDWA †
Phenols - Water (009)
WT-TM-1027; modified from EPA 9066
COLORIMETRIC
Total Phenolics

Water (Inorganic) OSDWA †
Phosphorus - Water (098)
WT-TM-1025; modified from SM 4500-P B and SM 4500-P F
COLORIMETRIC
Phosphate

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Water (Inorganic) OSDWA †
Solids - Water (010)
WT-TM-1011; modified from SM 2540 D and SM 2540 E
GRAVIMETRIC
Total Suspended Solids
Volatile Suspended Solids

Water (Inorganic) OSDWA †
Solids - Water (056)
WT-TM-1011/NA-TM-1004; modified from SM 2540 B and SM 2540 C and SM 2540 E
GRAVIMETRIC
Total Dissolved Solids
Total Solids
Volatile Solids

Water (Inorganic)
Tannin and LIgnin - Water (181)
WT-TM-1015; modified from SM 5550 B
COLORIMETRIC - DISCRETE ANALYZER
Tannin and Lignin

Water (Inorganic)
Thiocyanate - Water (189)
WT-TM-1037; modified from SM 4500-CN- M
COLORIMETRIC - DISCRETE ANALYZER
Thiocyanate

Water (Inorganic) OSDWA †
Total Kjeldahl Nitrogen (TKN) - Water (099)
WT-TM-1041; modified from SM 4500-NORG D
COLORIMETRIC - DIGESTION
Total Kjeldahl Nitrogen

Water (Inorganic) OSDWA †
Total Metals - Water [Wastewater] (032)
NA-TM-1002, NA-TP-2001; modified from EPA 200.2 and EPA 6020B
ICP/MS
Aluminum
Antimony
Arsenic
Barium
Beryllium
Bismuth
Boron
Cadmium
Calcium
Cesium
Chromium
Cobalt
Copper
Iron
Lead
Lithium
Magnesium
Manganese
Molybdenum
Nickel
Phosphorus

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Potassium
Rubidium
Selenium
Silicon
Silver
Sodium
Strontium
Sulphur
Tellurium
Thallium
Thorium
Tin
Titanium
Tungsten
Uranium
Vanadium
Zinc
Zirconium

Water (Inorganic) OSDWA †
Total Phosphorus - Water (011)
WT-TM-1025; modified from SM 4500-P E and SM 4500-P F
AUTO COLOR - DIGESTION
Total Phosphorus

Water (Inorganic) OSDWA †
Turbidity - Water (024)
WT-TM-1004; modified from SM 2130 B
TURBIDIMETRIC
Turbidity

Water (Inorganic)
UV Transmittance - Water (190)
WT-TM-1033; modified from SM 5910
COLORIMETRIC
Transmittance, UV (254nm)

Water (Inorganic)
Volatile Organic Acids - Water (191)
WT-TM-1031; modified from SM 5560 C
DISTILLATION - TITRATION
Volatile Organic Acids (As Acetic)

Water (Microbiology) OSDWA †
Coliforms - Water (183)
NA-TM-1300; modified from SM 9215 E and SM 9223 B
MOST PROBABLE NUMBER (QUANTI-TRAY)
Escherichia coli (E. coli)
Total Coliforms

Water (Microbiology) OSDWA †
Escherichia coli (E. coli) - Water (052)
WT-TM-1200; modified from ON MOECC COMPARISON EVALUATION and SM 9222D
MEMBRANE FILTRATION (mFC-BCIG)
Escherichia coli (E. coli)

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Water (Microbiology) OSDWA †
Fecal (Thermotolerant) Coliforms - Water (051)
WT-TM-1200; modified from SM 9222 D
MEMBRANE FILTRATION (m FC)
Fecal (Thermotolerant) Coliforms

Water (Microbiology) OSDWA †
Fecal (Thermotolerant) Coliforms - Water (185)
NA-TM-1300; modified from SM 9215 E and SM 9223 B
MOST PROBABLE NUMBER (QUANTI-TRAY)
Fecal (Thermotolerant) Coliforms

Water (Microbiology) OSDWA †
Heterotrophic Plate Count (HPC) - Water (030)
WT-TM-1200; modified from SM 9215 D
MEMBRANE FILTRATION
Heterotrophic Plate Count (HPC)

Water (Microbiology) OSDWA †
Pseudomonas aeruginosa - Water (091)
WT-TM-1200; modified from SM 9213 E
MEMBRANE FILTRATION (mPAC)
Pseudomonas aeruginosa

Water (Microbiology) OSDWA †
Total Coliforms - Water (002)
WT-TM-1200; modified from SM 9222 B
MEMBRANE FILTRATION (m Endo)
Background Counts
Total Coliforms

Water (Organic) OSDWA †
1,4-Dioxane - Water (172)
WT-TM-1406; modified from EPA 5021A and EPA 8260C
GC/MS - HEADSPACE
1,4-Dioxane (p-dioxane)

Water (Organic) OSDWA †
Aldicarb and Diuron - Water (135)
WT-TM-1502; modified from ON MOECC E3436 and ON MOECC E3438
LC-MS/MS - EXTRACTION
Aldicarb
Diuron

Water (Organic) OSDWA †
Base Neutral Acid Extractables (BNA) - Water [Wastewater] (015)
WT-TM-1101/WT-TM-1300; modified from EPA 3510C and EPA 8270
GC/MS - EXTRACTION
1-Chloronaphthalene
1-Methylnaphthalene
1,2,3-Trichlorobenzene
1,2,4-Trichlorobenzene
1,3-Dichlorobenzene
2-Chloronaphthalene
2-Chlorophenol
2-Methylnaphthalene
2-Nitrophenol
2,3,4-Trichlorophenol
2,3,4,5-Tetrachlorophenol

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2,3,4,6-tetrachlorophenol
2,3,5-Trichlorophenol
2,3,5,6-Tetrachlorophenol
2,4-dichlorophenol
2,4-Dimethylphenol
2,4-Dinitrophenol
2,4-Dinitrotoluene
2,4,5-Trichlorophenol
2,4,6-trichlorophenol
2,6-Dichlorophenol
2,6-Dinitrotoluene
3,3'-Dichlorobenzidene
4-Bromophenyl phenyl ether
4-Chloro-3-methyl phenol
4-Chloroaniline
4-Chlorophenyl phenyl ether
4-Nitrophenol
4,6-Dinitro-o-cresol
5-Nitroacenaphthylene
Acenaphthene
Acenaphthylene
Acrdine
Anthracene
Benzo (a) anthracene
Benzo (a) pyrene
Benzo (b) fluoranthene
Benzo (g,h,i) perylene
Benzo (k) fluoranthene
Benzylbutyl phthalate
Biphenyl
Bis(2-chlorethoxy)methane
Bis(2-chloroethyl) ether
Bis(2-chloroisopropyl) ether
Bis(2-ethylhexyl) phthalate
Camphene
Chrysene
Di-n-butyl phthalate
Di-n-octyl phthalate
Dibenzo (a,h) anthracene
Diethyl phthalate
Dimethyl phthalate
Diphenyl ether
Fluoranthene
Fluorene
Hexachlorobenzene
Hexachlorobutadiene
Hexachlorocyclopentadiene
Hexachloroethane
Indeno (1,2,3 - cd) pyrene
Indole
Isophorone
m,p-Cresol
N-Nitrosodi-n-propylamine

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Naphthalene
Nitrobenzene
o-Cresol
p-Chloroaniline
Pentachlorophenol
Perylene
Phenanthrene
Phenol
Pyrene
Quinoline
Total Diphenylamine

Water (Organic) OSDWA †
Diquat and Paraquat - Water (134)
WT-TM-1506; modified from ON MOECC E3503
LC-MS/MS - EXTRACTION
Diquat
Paraquat

Water (Organic)
Energetics - Water (194)
WT-TM-1608; modified from EPA 8330A and EPA 8330B and U.S. EPA: EPA
HPLC/UV - EXTRACTION
1,3-Dinitrobenzene (1,3-DNB)
1,3,5-Trinitrobenzene (1,3,5-TNB)
2-Amino-4,6-dinitrotoluene (2-A-4,6-DNT)
2-Nitrotoluene (2-NT)
2,4-Dinitrotoluene (2,4-DNT)
2,4,6-Trinitrotoluene (2,4,6-TNT)
2,6-Dinitrotoluene (2,6-DNT)
3-Nitrotoluene (3-NT)
3,5-Dinitroaniline (3,5-DNA)
4-Amino-2,6-dinitrotoluene (4-A-DNT)
4-Nitrotoluene (4-NT)
Hexahydro-1,3,5-trinitro-1,3,5-triazine (RDX)
Methyl-2,4,6-trinitrophenylnitramine
Nitrobenzene
Nitroglycerin
Octahydro-1,3,5,7-tetranitro-1,3,5,7-tetrazocine (HMX)
Pentaerythritol tetranitrate (PETN)

Water (Organic) OSDWA †
Formaldehyde - Water (162)
WT-TM-1603; modified from EPA 556.1
GC/ECD
Formaldehyde

Water (Organic) OSDWA †
Glyphosate - Water (133)
WT-TM-1504; modified from ON MOECC E3500
LC-MS/MS - EXTRACTION
Glyphosate

Water (Organic) OSDWA †
Haloacetic Acids (HAA) - Water (163)
WT-TM-1604; modified from EPA 552.3
GC/ECD
Bromochloroacetic acid

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Bromodichloroacetic acid
Chlorodibromoacetic acid
Dalapon (2,2-Dichloropropionic Acid)
Dibromoacetic acid
Dichloroacetic acid
Monobromoacetic acid
Monochloroacetic acid
Tribromoacetic acid
Trichloroacetic acid

Water (Organic) OSDWA †
Hydrocarbons - Water (062)
WT-TM-1602; modified from EPA REGION 1, 2002
GC/FID - HEADSPACE
Ethane
Ethene
Methane

Water (Organic) OSDWA †
Neonicotinoids - Water (200)
WT-TM-1569; JOURNAL OF CHROMATOGRAPHY B, 879 (2011) 117-12
LC-MS/MS
Acetamiprid
Clothianidin
Imidacloprid
Nitenpyram
Sulfoxaflor
Thiacloprid
Thiamethoxam

Water (Organic) OSDWA †
Nitrilotriacetic Acid (NTA) - Water (036)
WT-TM-1007; modified from EPA 430.1
COLORIMETRIC
Nitrilotriacetic acid (NTA)

Water (Organic) OSDWA †
Nonylphenol and Nonylphenol Ethoxylates - Water (116)
WT-TM-1521; modified from JOURNAL OF CHROMATOGRAPHY A.849 (1999) 467-482
LC-MS/MS - EXTRACTION
Bisphenol A
Nonylphenol Diethoxylate (NP2EO)
Nonylphenol Ethoxylates
Nonylphenol Monoethoxylates (NP1EO)
Nonylphenols
Octylphenol
Octylphenol Diethoxylate
Octylphenol Monoethoxylate

Water (Organic) OSDWA †
Organochlorine (OC) Pesticides - Water [Wastewater] (019)
WT-TM-1102/WT-TM-1302; modified from EPA 3510C and EPA 8270
GC/MS - EXTRACTION
A -BHC
a - Chlordane
Aldrin
beta-BHC
delta-BHC

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Dieldrin
Endosulfan I
Endosulfan II
Endosulfan Sulfate
Endrin
Endrin Aldehyde
g - Chlordane
Heptachlor
Heptachlor Epoxide
Lindane (gamma-BHC)
Mirex
o,p' - DDT
o,p'-DDD
o,p'-DDE
Oxychlordane
p,p' - DDT
p,p' Methoxychlor
p,p'-DDD
p,p'-DDE

Water (Organic) OSDWA †

Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonate (PFOS) - Water (174)
WT-TM-1557; ON MOECC E3457

LC-MS/MS

10:2 Fluorotelomer sulfonic acid (10:2 FTS)
4:2 Fluorotelomer sulfonic acid (4:2 FTS)
6:2 Fluorotelomer sulfonic acid (6:2 FTS)
8:2 Fluorotelomer sulfonic acid (8:2 FTS)
N-Ethyl perfluorooctane sulfonamidoacetic acid (EtFOSAA)
N-Ethylperfluorooctane sulfonamide (EtFOSA)
N-Ethylperfluorooctane sulfonamidoethanol (EtFOSE)
N-Methyl perfluorooctane sulfonamidoacetic acid (MeFOSAA)
N-Methylperfluorooctane sulfonamide (MeFOSA)
N-Methylperfluorooctane sulfonamidoethanol (MeFOSE)
Perfluorobutane sulfonic acid (PFBs)
Perfluorobutanoic acid (PFBA)
Perfluorodecanesulfonate (PFDS)
Perfluorodecanoic acid (PFDA)
Perfluorododecanoic acid (PFDoA)
Perfluoroheptane sulfonic acid (PFHpS)
Perfluoroheptanoic acid (PFHpA)
Perfluorohexane sulfonic acid (PFHxS)
Perfluorohexanoic acid (PFHxA)
Perfluorononanoic acid (PFNA)
Perfluorooctane sulfonamide (PFOSA)
Perfluorooctane sulfonic acid (PFOS)
Perfluorooctanoic acid (PFOA)
Perfluoropentane sulfonic acid (PFPeS)
Perfluoropentanoic acid (PFPeA)
Perfluorotetradecanoic acid (PFTeDA)
Perfluorotridecanoic acid (PFTrDA)
Perfluoroundecanoic acid (PFUndA)

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Water (Organic) OSDWA †

Pesticides - Water (023)

WT-TM-1107/WT-TM-1109-/WT-TM-1302; modified from EPA 3510C and EPA 8270

GC/MS - EXTRACTION

- 2,4-dichlorophenoxyacetic acid
- 2,4-DP
- 2,4-TP
- 2,4,5-trichlorophenoxyacetic acid
- Alachlor
- Atrazine
- Azinphos-methyl
- Bendiocarb
- Bromoxynil
- Carbaryl
- Carbofuran
- Chlorpyrifos (ethyl)
- Cyanazine
- De-ethylated atrazine
- Diazinon
- Dicamba
- Diclofop-methyl (as free acid)
- Dimethoate
- Dinoseb
- Ethalfluralin
- Fluazifop-p-butyl
- Malathion
- MCPA
- Mecoprop
- Metolachlor
- Metribuzin
- Parathion (ethyl)
- Phorate
- Picloram
- Prometryne
- Simazine
- Temephos
- Terbufos
- Triallate
- Trifluralin

Water (Organic) OSDWA †

Pesticides - Water (207)

WT-TM-1589; modified from ON MOECC E3501

LC-MS/MS

- Atrazine
- Atrazine-2-hydroxy
- Atrazine-desethyl
- Atrazine-desethyl-desisopropyl
- Atrazine-desisopropyl
- Azoxystrobin
- Boscalid
- Bromacil
- Carbaryl
- Chlorantraniliprole

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Clothianidin
DCPMU
Diuron
Fludioxonil
Imidacloprid
Iprodione
Linuron
Metalaxyl
Myclobutanil
Propiconazole
Pyraclostrobin
Simazine
Tebuthiuron
Trifloxystrobin
Triticonazole

Water (Organic)
Pesticides - Water (213)
WT-TM-1575; IN-HOUSE
LC-MS/MS
Chlorothalonil
Chlorothalonil-4-Hydroxy

Water (Organic) OSDWA †
Petroleum Hydrocarbons (PHC) - Water (068)
NA-TM-1112; modified from CCME CWS PETROLEUM HYDROCARBONS IN SOIL - TIER 1 METHOD and EPA 3511
GC/FID - EXTRACTION
F2: C10-C16
F3: C16-C34
F4: C34-C50

Water (Organic) OSDWA †
Petroleum Hydrocarbons (PHC) - Water (069)
WT-TM-1112; modified from CCME CWS PETROLEUM HYDROCARBONS IN SOIL - TIER 1 METHOD and ON MOECC E3421
GRAVIMETRIC
F4G: C34-C50

Water (Organic) OSDWA †
Petroleum Hydrocarbons (PHC) - Water (111)
WT-TM-1406; modified from CCME CWS PETROLEUM HYDROCARBONS IN SOIL - TIER 1 METHOD and EPA 5021A and EPA 8260
GC/FID - HEADSPACE
F1: C6-C10

Water (Organic)
Phenoxy Acid Herbicides - Water (209)
WT-TM-1591; modified from ON MOECC E3552
LC-MS/MS
2,4-DB
2,4-Dichlorophenoxyacetic acid
2,4,5-TP
2,4,5-Trichlorophenoxyacetic acid
Bromoxynil
Clopyralid
Dicamba
Dichlorprop

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Dinoseb
MCPA
MCPB
Mecoprop
Picloram
Triclopyr

Water (Organic) OSDWA †

Polychlorinated Biphenyls (PCB) - Water [Wastewater] (017)
WT-TM-1105/WT-TM-1301; modified from EPA 3510C and EPA 8270
GC/MS - EXTRACTION
Aroclor 1242
Aroclor 1248
Aroclor 1254
Aroclor 1260
Total PCB

Water (Organic)

Polycyclic Aromatic Hydrocarbons (PAH) - Water (214)
WT-TM-1103, WT-TM-1311; modified from EPA 3510 and EPA 3570 and EPA 8270
GC/MS - EXTRACTION
1,3-Dinitropyrene
1,6-Dinitropyrene
1,8-Dinitropyrene
3-Methylcholanthrene
7-H-dibenzo(c,g)carbazole
Benzo(e)pyrene
Dibenz(a,h)acridine
Dibenz(a,j)acridine
Dibenzo(a,e)pyrene
Dibenzo(a,h)pyrene
Dibenzo(a,i)pyrene

Water (Organic)

Steroids and Hormones - Water (166)
WT-TM-1555; modified from JOURNAL OF CHROMATOGRAPHY B 879 (2011), 2998-3004
LC/MS - EXTRACTION
17a-Dihydroequilin
17a-Estradiol
17a-Ethinylestradiol
17b-Estradiol
Anderosterone
Androstendion
beta-Sitosterol
beta-Stigmastanol
Betamethasone
Campesterol
Cholestanol
Cholesterol
Coprostanol
Desmosterol
Desogestrel
Epicoprostanol
Equilenin
Equilin
Ergosterol

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Estradiol-3-benzoate
Estriol
Estrone
Mestranol
Norethindrone
Norgestrel
Progesterone
Stigmasterol
Testosterone

Water (Organic)
Sulfolane - Water (205)
WT-TM-1572; IN-HOUSE
LC-MS/MS
Sulfolane

Water (Organic) OSDWA †
Tetraethyl Lead - Water (159)
WT-TM-1308; modified from EPA 3510C and EPA 8270D
GC/MS - DIGESTION
Teraethyl lead

Water (Organic) OSDWA †
Volatile Organic Compounds (VOC) - Water (113)
WT-TM-1406; modified from EPA 5021A and EPA 8260C
GC/MS - HEADSPACE
1,1-Dichloroethane
1,1-Dichloroethylene
1,1-Dichloropropene
1,1,1-Trichloroethane
1,1,1,2-Tetrachloroethane
1,1,2-Trichloroethane
1,1,2,2-Tetrachloroethane
1,2-Dibromo-3-chloropropane (DBCP)
1,2-Dichlorobenzene
1,2-Dichloroethane
1,2-Dichloropropane
1,2,3-Trichlorobenzene
1,2,3-Trichloropropane
1,2,4-Trichlorobenzene
1,2,4-Trimethylbenzene
1,3-Dichlorobenzene
1,3-Dichloropropane
1,3,5-Trimethylbenzene
1,4-Dichlorobenzene
2-Chlorotoluene
2-Hexanone (MBK)
2,2-Dichloropropane
4-Chlorotoluene
Acetone (2-Propanone)
Benzene
Bromobenzene
Bromochloromethane
Bromodichloromethane
Bromoform
Bromomethane

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Carbon disulfide
Carbon Tetrachloride
Chlorobenzene
Chlorodibromomethane
Chloroethane
Chloroform
Chloromethane
cis-1,2-Dichloroethylene
cis-1,3-Dichloropropene
Dichlorodifluoromethane
Dichloromethane
Ethylbenzene
Ethylene Dibromide
Hexachlorobutadiene
Hexane
Isopropylbenzene
Isopropyltoluene
m/p-xylene
Methyl ethyl ketone
Methyl isobutyl ketone
Methyl t-butyl ether
n-Butylbenzene
n-Propylbenzene
Naphthalene
o-xylene
sec-Butylbenzene
Styrene
tert-Butylbenzene
Tetrachloroethylene
Toluene
trans-1,2-Dichloroethylene
trans-1,3-Dichloropropene
Trichloroethylene
Trichlorofluoromethane
Vinyl Chloride

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APPENDIX D

Laboratory Analytical Methods

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
Water-Field Tests			
Temperature, Client	Result supplied by Client	-50	Deg. C
Misc.-Field Tests			
Air volume	HYGIENE METHOD	0	
Waste-Sample Preparation			
Final pH	EPA 1311	0.10	pH units
Initial pH	EPA 1311	0.10	pH units
Water-Physical Tests			
Colour, Apparent	APHA 2120	2.0	CU
Colour, True	APHA 2120C	2.0	CU
Conductivity	APHA 2510 B	3.0	umhos/cm
Hardness (as CaCO3)	APHA 2340 B	0.50	mg/L
pH	APHA 4500 H-Electrode	0.10	pH units
Total Dissolved Solids	APHA 2540C	10	mg/L
Total Dissolved Solids	APHA 2540C	20	mg/L
Total Suspended Solids	APHA 2540 D-Gravimetric	2.0	mg/L
Turbidity	APHA 2130 B	0.10	NTU
Tissue-Physical Tests			
% Moisture	Puget Sound WQ Authority, Apr 1997	2.0	%
Soil-Physical Tests			
% Moisture	CCME PHC in Soil - Tier 1 (mod)	0.10	
% Moisture	CCME PHC in Soil - Tier 1 (mod)	0.25	%
Conductivity	MOEE E3138	0.0040	mS/cm
Grain Size Curve	ASTM D422-63		
Loss on Ignition @ 375 C	CSSS (1978) p. 160	1.0	%
Organic Matter	CSSS (1978) p. 160	1.0	%
pH	MOEE E3137A	0.10	pH units
pH (1:2 CaCl2)	CSSS 16.3 - 1:2 Extraction w/0.01M CaCl2	0.10	pH
pH (1:2 soil:water)	CSSS 16.2 - PH OF 1:2 WATER EXTRACT	0.10	pH
Soil-Particle Size			
% Clay	CSSS 55.3-Hydrometer	1.0	%
% Clay (<2um)	SSIR-51 Method 3.2.1	1.0	%
% Sand	CSSS 55.3-Hydrometer	1.0	%
% Sand (2.0mm - 0.05mm)	SSIR-51 Method 3.2.1	1.0	%
% Silt	CSSS 55.3-Hydrometer	1.0	%
% Silt (0.05mm - 2um)	SSIR-51 Method 3.2.1	1.0	%

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
Texture	CSSS 55.3-Hydrometer		
Texture	SSIR-51 Method 3.2.1		
Dustfall-Particulates			
Fixed Insoluble Dustfall	BCMOE DUSTFALLS	0.10	mg/dm2.day
Total Insoluble Dustfall	BCMOE DUSTFALLS	0.10	mg/dm2.day
Volatile Insoluble Dustfall	BCMOE DUSTFALLS	0.10	mg/dm2.day
Air-Asbestos/Quartz/Other Fibres			
Cristobalite	NIOSH 7500		
Soil-Leachable Anions & Nutrients			
Ammonia as N	EPA 350.1	10	mg/kg
Bromide	EPA 300.1	1.0	ug/g
Chloride	EPA 300.0	5.0	ug/g
Chloride	EPA 300.1	20	ug/g
Fluoride	EPA 300.1	1.0	ug/g
Nitrate-N	EPA 300.0	1.0	ug/g
Nitrate-N	EPA 300.1	1.0	ug/g
Nitrite-N	EPA 300.0	1.0	ug/g
Nitrite-N	EPA 300.1	1.0	ug/g
Orthophosphate-Dissolved (as P)	APHA 4500-P PHOSPHORUS	0.080	ug/g
Sulphate	EPA 300.1	20	ug/g
Total Kjeldahl Nitrogen	CSSS (2008) 22.2.3	0.020	%
Water-Anions and Nutrients			
Acidity (as CaCO3)	APHA 2310 B modified	2.0	mg/L
Alkalinity, Bicarbonate (as CaCO3)	APHA 2320B	2.0	mg/L
Alkalinity, Bicarbonate (as CaCO3)	EPA 310.2	10	mg/L
Alkalinity, Carbonate (as CaCO3)	APHA 2320B	2.0	mg/L
Alkalinity, Carbonate (as CaCO3)	EPA 310.2	10	mg/L
Alkalinity, Hydroxide (as CaCO3)	APHA 2320B	2.0	mg/L
Alkalinity, Hydroxide (as CaCO3)	EPA 310.2	10	mg/L
Alkalinity, Total (as CaCO3)	APHA 2320B	2.0	mg/L
Alkalinity, Total (as CaCO3)	EPA 310.2	10	mg/L
Unionized ammonia	CALCULATION	0.050	mg/L
Ammonia, Total (as N)	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC	0.010	mg/L
Bromate	EPA 6850	0.30	ug/L
Bromide (Br)	EPA 300.1 (mod)	0.10	mg/L
Chlorate	EPA 300.1 (mod)	0.050	mg/L

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
Chloride (Cl)	EPA 300.1 (mod)	0.50	mg/L
Chlorite	EPA 300.1 (mod)	0.050	mg/L
Fluoride (F)	EPA 300.1 (mod)	0.020	mg/L
Nitrate and Nitrite as N	APHA 4110 B	0.10	mg/L
Nitrate (as N)	EPA 300.1 (mod)	0.020	mg/L
Nitrite (as N)	EPA 300.1 (mod)	0.0010	mg/L
Nitrite (as N)	EPA 300.1 (mod)	0.0050	mg/L
Nitrite (as N)	EPA 300.1 (mod)	0.010	mg/L
Orthophosphate-Dissolved (as P)	APHA 4500-P PHOSPHORUS	0.0030	mg/L
Phosphorus, Total	APHA 4500-P PHOSPHORUS	0.0030	mg/L
Sulfate (SO4)	EPA 300.1 (mod)	0.30	mg/L
Sulphide (as S)	APHA 4500S2D	0.018	mg/L
Sulphide (as H2S)	Calculation	0.020	mg/L
Total Kjeldahl Nitrogen	APHA 4500-Norg D	0.15	mg/L
Soil-Anions and Nutrients			
Nitrate and Nitrite as N	APHA 4110 B	1.0	ug/g
Water-Cyanides			
Cyanide, Free	ASTM 7237	0.0020	mg/L
Cyanide, Total	ISO 14403-2	0.0020	mg/L
Soil-Cyanides			
Cyanide, Weak Acid Diss	MOE 3015/APHA 4500CN I-WAD	0.050	ug/g
Water-Organic / Inorganic Carbon			
Dissolved Carbon Filtration Location	APHA 5310B		
Dissolved Organic Carbon	APHA 5310B	0.50	mg/L
Total Organic Carbon	APHA 5310B	0.50	mg/L
Soil-Organic / Inorganic Carbon			
Fraction Organic Carbon	CARTER 21.3.2	0.0010	g/g
Inorganic Carbon	CSSS (2008) P216-217	0.050	%
Inorganic Carbon (as CaCO3 Equivalent)	Calculation	0.40	%
Total Carbon by Combustion	CSSS (2008) 21.2	0.05	%
Total Organic Carbon	CARTER 21.3.2	0.10	%
Total Organic Carbon	CSSS (2008) 21.2	0.050	%
Water-Inorganic Parameters			
Chloramines	APHA 4500-Cl B	0.070	mg/L
Chlorine, Free	SM 4500-CL G, EPA 330.5	0.050	mg/L
Chlorine, Total	APHA 4500-CL G	0.050	mg/L
Silicon (as SiO2)-Total	Calculation	0.10	mg/L

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
Soil-Plant Available Nutrients			
Available Nitrate-N	Alberta Ag / APHA 4500 NO3F	2.0	mg/kg
Available Phosphate-P	Comm. Soil Sci. Plant Anal, 25 (5&6)	2.0	mg/kg
Available Potassium	Comm. Soil Sci. Plant Anal, 25 (5&6)	20	mg/kg
Available Sulfate-S	REC METH SOIL ANAL - AB. AG(1988)	4.0	mg/kg
Soil-Saturated Paste Extractables			
% Saturation	CSSS 15.2-CALCULATION	1.0	%
Aluminum (Al)	Calculation	0.20	
Ammonia, Total (as N)	Calculation	1.0	
Boron (B)	Calculation	0.10	
Calcium (Ca)	CSSS CH15/EPA 6010B	5.0	mg/L
Calcium (Ca)	Calculation	0.50	
Calcium (Ca)	SW846 6010C	0.50	mg/L
Chloride (Cl)	CSSS 15.2.1; APHA 4500-Cl E	20	mg/L
Chloride (Cl)	Calculation	0.50	
Conductivity Sat. Paste	CSSS 15.2.1 & 15.3.1	0.010	dS/m
Iron (Fe)	Calculation	0.030	
Magnesium (Mg)	CSSS CH15/EPA 6010B	5.0	mg/L
Magnesium (Mg)	Calculation	0.10	
Magnesium (Mg)	SW846 6010C	0.50	mg/L
Manganese (Mn)	Calculation	0.0050	
Nitrate-N	Calculation	0.50	
Nitrite-N	Calculation	0.50	
Potassium (K)	CSSS CH15/EPA 6010B	5.0	mg/L
Potassium (K)	Calculation	0.10	
SAR	CSSS 15.4.4-Calculation	0.10	units
SAR	SW846 6010C	0.10	units
Sodium (Na)	CSSS CH15/EPA 6010B	5.0	mg/L
Sodium (Na)	Calculation	1.0	
Sodium (Na)	SW846 6010C	0.50	mg/L
Sulfate (SO4)	Calculation	0.50	
Sulfur (as SO4)	CSSS CH15/EPA 6010B	6.0	mg/L
Sulfur (as SO4)	Calculation	0.50	
Water-Bacteriological Tests			
E. Coli	SM 9222D	0	CFU/100 mL
Escherichia Coli	APHA 9223B	0	MPN/100 mL
Fecal Coliforms	SM 9222D	0	CFU/100 mL

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
Heterotrophic Plate Count	SM 9215D	0	CFU/mL
Total Coliforms	APHA 9223B	0	MPN/100 mL
Total Coliforms	SM 9222B	0	CFU/100 mL
Soil-Bacteriological Tests			
E. Coli	E3433	10	CFU/g dwt
Fecal Coliform	SM 9222D	10	CFU/g dwt
Tissue-Metals			
Aluminum (Al)	EPA 200.3/6020B (mod)	0.60	mg/kg wwt
Aluminum (Al)-Total	EPA 200.3/6020B	5.0	mg/kg
Antimony (Sb)	EPA 200.3/6020B (mod)	0.010	mg/kg wwt
Antimony (Sb)-Total	EPA 200.3/6020B	0.010	mg/kg
Arsenic (As)	EPA 200.3/6020B (mod)	0.010	mg/kg wwt
Arsenic (As)-Total	EPA 200.3/6020B	0.030	mg/kg
Barium (Ba)	EPA 200.3/6020B (mod)	0.020	mg/kg wwt
Barium (Ba)-Total	EPA 200.3/6020B	0.050	mg/kg
Beryllium (Be)	EPA 200.3/6020B (mod)	0.010	mg/kg wwt
Beryllium (Be)-Total	EPA 200.3/6020B	0.010	mg/kg
Bismuth (Bi)	EPA 200.3/6020B (mod)	0.0040	mg/kg wwt
Bismuth (Bi)-Total	EPA 200.3/6020B	0.010	mg/kg
Boron (B)	EPA 200.3/6020B (mod)	0.40	mg/kg wwt
Boron (B)-Total	EPA 200.3/6020B	1.0	mg/kg
Cadmium (Cd)	EPA 200.3/6020B (mod)	0.0040	mg/kg wwt
Cadmium (Cd)-Total	EPA 200.3/6020B	0.010	mg/kg
Calcium (Ca)	EPA 200.3/6020B (mod)	4.0	mg/kg wwt
Calcium (Ca)-Total	EPA 200.3/6020B	20	mg/kg
Cesium (Cs)	EPA 200.3/6020B (mod)	0.0040	mg/kg wwt
Cesium (Cs)-Total	EPA 200.3/6020B	0.0050	mg/kg
Chromium (Cr)	EPA 200.3/6020B (mod)	0.040	mg/kg wwt
Chromium (Cr)-Total	EPA 200.3/6020B	0.20	mg/kg
Cobalt (Co)	EPA 200.3/6020B (mod)	0.020	mg/kg wwt

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
Cobalt (Co)-Total	EPA 200.3/6020B	0.020	mg/kg
Copper (Cu)	EPA 200.3/6020B (mod)	0.040	mg/kg wwt
Copper (Cu)-Total	EPA 200.3/6020B	0.20	mg/kg
Iron (Fe)	EPA 200.3/6020B (mod)	1.0	mg/kg wwt
Iron (Fe)-Total	EPA 200.3/6020B	5.0	mg/kg
Lead (Pb)	EPA 200.3/6020B (mod)	0.0080	mg/kg wwt
Lead (Pb)-Total	EPA 200.3/6020B	0.050	mg/kg
Lithium (Li)	EPA 200.3/6020B (mod)	0.10	mg/kg wwt
Lithium (Li)-Total	EPA 200.3/6020B	0.50	mg/kg
Magnesium (Mg)	EPA 200.3/6020B (mod)	2.0	mg/kg wwt
Magnesium (Mg)-Total	EPA 200.3/6020B	2.0	mg/kg
Manganese (Mn)	EPA 200.3/6020B (mod)	0.020	mg/kg wwt
Manganese (Mn)-Total	EPA 200.3/6020B	0.050	mg/kg
Mercury (Hg)	EPA 200.3/1631E (mod)	0.0010	mg/kg wwt
Mercury (Hg)-Total	EPA 200.3, EPA 245.7	0.0050	mg/kg
Molybdenum (Mo)	EPA 200.3/6020B (mod)	0.020	mg/kg wwt
Molybdenum (Mo)-Total	EPA 200.3/6020B	0.040	mg/kg
Nickel (Ni)	EPA 200.3/6020B (mod)	0.040	mg/kg wwt
Nickel (Ni)-Total	EPA 200.3/6020B	0.20	mg/kg
Phosphorus (P)	EPA 200.3/6020B (mod)	4.0	mg/kg wwt
Phosphorus (P)-Total	EPA 200.3/6020B	10	mg/kg
Potassium (K)	EPA 200.3/6020B (mod)	4.0	mg/kg wwt
Potassium (K)-Total	EPA 200.3/6020B	20	mg/kg
Rubidium (Rb)-Total	EPA 200.3/6020B	0.050	mg/kg
Selenium (Se)	EPA 200.3/6020B (mod)	0.040	mg/kg wwt
Selenium (Se)-Total	EPA 200.3/6020B	0.10	mg/kg
Silver (Ag)	EPA 200.3/6020B (mod)	0.020	mg/kg wwt
Silver (Ag)-Total	EPA 200.3/6020B	0.0050	mg/kg
Sodium (Na)	EPA 200.3/6020B (mod)	4.0	mg/kg wwt
Sodium (Na)-Total	EPA 200.3/6020B	20	mg/kg
Strontium (Sr)	EPA 200.3/6020B (mod)	0.010	mg/kg wwt

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
Strontium (Sr)-Total	EPA 200.3/6020B	0.10	mg/kg
Sulfur (S)	EPA 200.3/6020B (mod)	20	mg/kg wwt
Tellurium (Te)	EPA 200.3/6020B (mod)	0.040	mg/kg wwt
Tellurium (Te)-Total	EPA 200.3/6020B	0.020	mg/kg
Thallium (Tl)	EPA 200.3/6020B (mod)	0.0060	mg/kg wwt
Thallium (Tl)-Total	EPA 200.3/6020B	0.0020	mg/kg
Thorium (Th)	EPA 200.3/6020B (mod)	0.010	mg/kg wwt
Tin (Sn)	EPA 200.3/6020B (mod)	0.020	mg/kg wwt
Tin (Sn)-Total	EPA 200.3/6020B	0.10	mg/kg
Titanium (Ti)	EPA 200.3/6020B (mod)	0.030	mg/kg wwt
Titanium (Ti)-Total	EPA 200.3/6020B	0.50	mg/kg
Uranium (U)	EPA 200.3/6020B (mod)	0.0020	mg/kg wwt
Uranium (U)-Total	EPA 200.3/6020B	0.0020	mg/kg
Vanadium (V)	EPA 200.3/6020B (mod)	0.010	mg/kg wwt
Vanadium (V)-Total	EPA 200.3/6020B	0.10	mg/kg
Zinc (Zn)	EPA 200.3/6020B (mod)	0.20	mg/kg wwt
Zinc (Zn)-Total	EPA 200.3/6020B	1.0	mg/kg
Zirconium (Zr)	EPA 200.3/6020B (mod)	0.60	mg/kg wwt
Zirconium (Zr)-Total	EPA 200.3/6020B	0.20	mg/kg
Soil-Metals			
Aluminum (Al)	EPA 200.2/6020A (mod)	50	mg/kg
Antimony (Sb)	EPA 200.2/6020A (mod)	1	mg/kg
Arsenic (As)	EPA 200.2/6020A (mod)	0.2	mg/kg
Arsenic (As)	EPA 200.2/6020A (mod)	1	mg/kg
Barium (Ba)	EPA 200.2/6020A (mod)	0.5	mg/kg
Barium (Ba)	EPA 200.2/6020A (mod)	1	mg/kg
Beryllium (Be)	EPA 200.2/6020A (mod)	0.5	mg/kg
Boron (B)	EPA 200.2/6020A (mod)	5	mg/kg
Boron (B), Hot Water Ext.	HW EXTR, EPA 6010B	0.10	ug/g
Cadmium (Cd)	EPA 200.2/6020A (mod)	0.5	mg/kg
Calcium (Ca)	EPA 200.2/6020A (mod)	50	mg/kg
Chromium (Cr)	EPA 200.2/6020A (mod)	1	mg/kg
Cobalt (Co)	EPA 200.2/6020A (mod)	1	mg/kg
Copper (Cu)	EPA 200.2/6020A (mod)	1	mg/kg

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
Iron (Fe)	EPA 200.2/6020A (mod)	50	mg/kg
Lead (Pb)	EPA 200.2/6020A (mod)	1	mg/kg
Magnesium (Mg)	EPA 200.2/6020A (mod)	20	mg/kg
Manganese (Mn)	EPA 200.2/6020A (mod)	1	mg/kg
Mercury (Hg)	EPA 200.2/1631E (mod)	0.0050	mg/kg
Molybdenum (Mo)	EPA 200.2/6020A (mod)	1	mg/kg
Nickel (Ni)	EPA 200.2/6020A (mod)	1	mg/kg
Phosphorus (P)	EPA 200.2/6020A (mod)	50	mg/kg
Potassium (K)	EPA 200.2/6020A (mod)	100	mg/kg
Selenium (Se)	EPA 200.2/6020A (mod)	1	mg/kg
Silver (Ag)	EPA 200.2/6020A (mod)	0.2	mg/kg
Sodium (Na)	EPA 200.2/6020A (mod)	100	mg/kg
Thallium (Tl)	EPA 200.2/6020A (mod)	0.05	mg/kg
Thallium (Tl)	EPA 200.2/6020A (mod)	0.5	mg/kg
Uranium (U)	EPA 200.2/6020A (mod)	1	mg/kg
Vanadium (V)	EPA 200.2/6020A (mod)	1	mg/kg
Zinc (Zn)	EPA 200.2/6020A (mod)	5	mg/kg
Dustfall-Metals			
Aluminum (Al)-Total	EPA 6020A	0.0050	mg/dm2.day
Antimony (Sb)-Total	EPA 6020A	0.00010	mg/dm2.day
Arsenic (As)-Total	EPA 6020A	0.0050	mg/dm2.day
Barium (Ba)-Total	EPA 6020A	0.00080	mg/dm2.day
Beryllium (Be)-Total	EPA 6020A	0.00050	mg/dm2.day
Bismuth (Bi)-Total	EPA 6020A	0.00050	mg/dm2.day
Boron (B)-Total	EPA 6020A	0.010	mg/dm2.day
Cadmium (Cd)-Total	EPA 6020A	0.00050	mg/dm2.day
Calcium (Ca)-Total	EPA 6020A	0.080	mg/dm2.day
Cesium (Cs)-Total	EPA 6020A	0.000050	mg/dm2.day
Chromium (Cr)-Total	EPA 6020A	0.00050	mg/dm2.day
Cobalt (Co)-Total	EPA 6020A	0.00010	mg/dm2.day
Copper (Cu)-Total	EPA 6020A	0.0010	mg/dm2.day
Interval	EPA 6020A	1	days

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
Interval	EPA SW846 7470A	1	days
Iron (Fe)-Total	EPA 6020A	0.0080	mg/dm2.day
Lead (Pb)-Total	EPA 6020A	0.000080	mg/dm2.day
Lithium (Li)-Total	EPA 6020A	0.0050	mg/dm2.day
Magnesium (Mg)-Total	EPA 6020A	0.0050	mg/dm2.day
Manganese (Mn)-Total	EPA 6020A	0.00030	mg/dm2.day
Mercury (Hg)-Total	EPA SW846 7470A	0.000050	mg/dm2.day
Molybdenum (Mo)-Total	EPA 6020A	0.000050	mg/dm2.day
Nickel (Ni)-Total	EPA 6020A	0.00050	mg/dm2.day
Phosphorus (P)-Total	EPA 6020A	0.050	mg/dm2.day
Potassium (K)-Total	EPA 6020A	0.050	mg/dm2.day
Rubidium (Rb)-Total	EPA 6020A	0.00010	mg/dm2.day
Selenium (Se)-Total	EPA 6020A	0.0010	mg/dm2.day
Silicon (Si)-Total	EPA 6020A	0.050	mg/dm2.day
Silver (Ag)-Total	EPA 6020A	0.000010	mg/dm2.day
Sodium (Na)-Total	EPA 6020A	0.050	mg/dm2.day
Strontium (Sr)-Total	EPA 6020A	0.00010	mg/dm2.day
Sulfur (S)-Total	EPA 6020A	0.50	mg/dm2.day
Tellurium (Te)-Total	EPA 6020A	0.00010	mg/dm2.day
Thallium (Tl)-Total	EPA 6020A	0.00010	mg/dm2.day
Thorium (Th)-Total	EPA 6020A	0.000050	mg/dm2.day
Tin (Sn)-Total	EPA 6020A	0.00010	mg/dm2.day
Titanium (Ti)-Total	EPA 6020A	0.010	mg/dm2.day
Tungsten (W)-Total	EPA 6020A	0.00010	mg/dm2.day
Uranium (U)-Total	EPA 6020A	0.000010	mg/dm2.day
Vanadium (V)-Total	EPA 6020A	0.0010	mg/dm2.day

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
Zinc (Zn)-Total	EPA 6020A	0.0030	mg/dm2.day
Zirconium (Zr)-Total	EPA 6020A	0.00050	mg/dm2.day
Water-Total Metals			
Aluminum (Al)-Total	EPA 200.2/6020A (mod)	0.005	mg/L
Aluminum (Al)-Total	EPA 200.2/6020A (mod)	0.01	mg/L
Aluminum (Al)-Total	EPA 6020A	10	ug/L
Antimony (Sb)-Total	EPA 200.2/6020A (mod)	0.0001	mg/L
Arsenic (As)-Total	EPA 200.2/6020A (mod)	0.0001	mg/L
Arsenic (As)-Total	EPA 6020A	1	ug/L
Barium (Ba)-Total	EPA 200.2/6020A (mod)	0.0001	mg/L
Barium (Ba)-Total	EPA 6020A	10	ug/L
Beryllium (Be)-Total	EPA 200.2/6020A (mod)	0.0001	mg/L
Bismuth (Bi)-Total	EPA 200.2/6020A (mod)	0.00005	mg/L
Boron (B)-Total	EPA 200.2/6020A (mod)	0.01	mg/L
Cadmium (Cd)-Total	EPA 200.2/6020A (mod)	0.000005	mg/L
Cadmium (Cd)-Total	EPA 6020A	0.1	ug/L
Calcium (Ca)	EPA 6020A	0.5	mg/L
Calcium (Ca)-Total	EPA 200.2/6020A (mod)	0.05	mg/L
Calcium (Ca)-Total	EPA 200.2/6020A (mod)	0.5	mg/L
Chromium (Cr)-Total	EPA 200.2/6020A (mod)	0.0005	mg/L
Chromium (Cr)-Total	EPA 6020A	1	ug/L
Cobalt (Co)-Total	EPA 200.2/6020A (mod)	0.0001	mg/L
Cobalt (Co)-Total	EPA 6020A	0.5	ug/L
Copper (Cu)-Total	EPA 200.2/6020A (mod)	0.0005	mg/L
Copper (Cu)-Total	EPA 200.2/6020A (mod)	0.001	mg/L
Copper (Cu)-Total	EPA 6020A	1	ug/L
Iron (Fe)-Total	EPA 200.2/6020A (mod)	0.01	mg/L
Iron (Fe)-Total	EPA 6020A	50	ug/L
Lead (Pb)-Total	EPA 200.2/6020A (mod)	0.00005	mg/L
Lead (Pb)-Total	EPA 6020A	1	ug/L
Lithium (Li)-Total	EPA 200.2/6020A (mod)	0.001	mg/L
Magnesium (Mg)	EPA 6020A	0.5	mg/L
Magnesium (Mg)-Total	EPA 200.2/6020A (mod)	0.005	mg/L
Magnesium (Mg)-Total	EPA 200.2/6020A (mod)	0.05	mg/L
Magnesium (Mg)-Total	EPA 200.2/6020A (mod)	0.1	mg/L
Manganese (Mn)-Total	EPA 200.2/6020A (mod)	0.0005	mg/L
Manganese (Mn)-Total	EPA 6020A	0.001	mg/L
Mercury	EPA 1631E (mod)	0.10	ug/L

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
Mercury (Hg)-Total	EPA 1631E (mod)	0.0000050	mg/L
Molybdenum (Mo)-Total	EPA 200.2/6020A (mod)	0.00005	mg/L
Molybdenum (Mo)-Total	EPA 6020A	0.5	ug/L
Nickel (Ni)-Total	EPA 200.2/6020A (mod)	0.0005	mg/L
Nickel (Ni)-Total	EPA 6020A	1	ug/L
Phosphorus (P)-Total	EPA 200.2/6020A (mod)	0.05	mg/L
Phosphorus (P)-Total	EPA 6020A	0.05	mg/L
Potassium (K)	EPA 6020A	1	mg/L
Potassium (K)-Total	EPA 200.2/6020A (mod)	0.05	mg/L
Selenium (Se)-Total	EPA 200.2/6020A (mod)	0.00005	mg/L
Selenium (Se)-Total	EPA 6020A	5	ug/L
Silicon (Si)-Total	EPA 200.2/6020A (mod)	0.1	mg/L
Silver (Ag)-Total	EPA 200.2/6020A (mod)	0.00005	mg/L
Silver (Ag)-Total	EPA 6020A	0.05	ug/L
Sodium (Na)	EPA 6020A	0.5	mg/L
Sodium (Na)-Total	EPA 200.2/6020A (mod)	0.05	mg/L
Strontium (Sr)-Total	EPA 200.2/6020A (mod)	0.001	mg/L
Thallium (Tl)-Total	EPA 200.2/6020A (mod)	0.00001	mg/L
Thallium (Tl)-Total	EPA 6020A	0.06	ug/L
Tin (Sn)-Total	EPA 200.2/6020A (mod)	0.0001	mg/L
Titanium (Ti)-Total	EPA 200.2/6020A (mod)	0.0003	mg/L
Tungsten (W)-Total	EPA 200.2/6020A (mod)	0.0001	mg/L
Uranium (U)-Total	EPA 200.2/6020A (mod)	0.00001	mg/L
Uranium (U)-Total	EPA 6020A	5	ug/L
Vanadium (V)-Total	EPA 200.2/6020A (mod)	0.0005	mg/L
Zinc (Zn)-Total	EPA 200.2/6020A (mod)	0.003	mg/L
Zinc (Zn)-Total	EPA 6020A	3	ug/L
Zirconium (Zr)-Total	EPA 200.2/6020A (mod)	0.0003	mg/L
Water-Total Metals (Undigested)			
Aluminum (Al)-Total	EPA SW-846 6020A	0.001	mg/L
Aluminum (Al)-Total	EPA SW-846 6020A	0.003	mg/L
Antimony (Sb)-Total	EPA SW-846 6020A	0.0001	mg/L
Arsenic (As)-Total	EPA SW-846 6020A	0.00003	mg/L
Arsenic (As)-Total	EPA SW-846 6020A	0.0001	mg/L
Barium (Ba)-Total	EPA SW-846 6020A	0.00005	mg/L
Beryllium (Be)-Total	EPA SW-846 6020A	0.0005	mg/L
Bismuth (Bi)-Total	EPA SW-846 6020A	0.0005	mg/L
Boron (B)-Total	EPA SW-846 6020A	0.01	mg/L
Cadmium (Cd)-Total	EPA SW-846 6020A	0.000005	mg/L

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
Cadmium (Cd)-Total	EPA SW-846 6020A	0.00001	mg/L
Calcium (Ca)-Total	EPA SW-846 6020A	0.02	mg/L
Calcium (Ca)-Total	EPA SW-846 6020A	0.05	mg/L
Chromium (Cr)-Total	EPA SW-846 6020A	0.0001	mg/L
Chromium (Cr)-Total	EPA SW-846 6020A	0.0005	mg/L
Cobalt (Co)-Total	EPA SW-846 6020A	0.00005	mg/L
Cobalt (Co)-Total	EPA SW-846 6020A	0.0001	mg/L
Copper (Cu)-Total	EPA SW-846 6020A	0.0002	mg/L
Copper (Cu)-Total	EPA SW-846 6020A	0.0005	mg/L
Iron (Fe)-Total	EPA SW-846 6020A	0.005	mg/L
Iron (Fe)-Total	EPA SW-846 6020A	0.03	mg/L
Lead (Pb)-Total	EPA SW-846 6020A	0.00003	mg/L
Lead (Pb)-Total	EPA SW-846 6020A	0.00005	mg/L
Lithium (Li)-Total	EPA SW-846 6020A	0.001	mg/L
Magnesium (Mg)-Total	EPA SW-846 6020A	0.005	mg/L
Magnesium (Mg)-Total	EPA SW-846 6020A	0.05	mg/L
Manganese (Mn)-Total	EPA SW-846 6020A	0.00007	mg/L
Molybdenum (Mo)-Total	EPA SW-846 6020A	0.00005	mg/L
Nickel (Ni)-Total	EPA SW-846 6020A	0.0001	mg/L
Nickel (Ni)-Total	EPA SW-846 6020A	0.0005	mg/L
Phosphorus (P)-Total	EPA SW-846 6020A	0.3	mg/L
Potassium (K)-Total	EPA SW-846 6020A	0.05	mg/L
Potassium (K)-Total	EPA SW-846 6020A	0.2	mg/L
Selenium (Se)-Total	EPA SW-846 6020A	0.00005	mg/L
Selenium (Se)-Total	EPA SW-846 6020A	0.001	mg/L
Silicon (Si)-Total	EPA SW-846 6020A	0.1	mg/L
Silver (Ag)-Total	EPA SW-846 6020A	0.00001	mg/L
Sodium (Na)-Total	EPA SW-846 6020A	0.02	mg/L
Sodium (Na)-Total	EPA SW-846 6020A	0.05	mg/L
Strontium (Sr)-Total	EPA SW-846 6020A	0.0001	mg/L
Thallium (Tl)-Total	EPA SW-846 6020A	0.00001	mg/L
Thallium (Tl)-Total	EPA SW-846 6020A	0.0001	mg/L
Tin (Sn)-Total	EPA SW-846 6020A	0.0001	mg/L
Titanium (Ti)-Total	EPA SW-846 6020A	0.01	mg/L
Uranium (U)-Total	EPA SW-846 6020A	0.00001	mg/L
Vanadium (V)-Total	EPA SW-846 6020A	0.001	mg/L
Zinc (Zn)-Total	EPA SW-846 6020A	0.001	mg/L
Zinc (Zn)-Total	EPA SW-846 6020A	0.003	mg/L
Water-Dissolved Metals			

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
Aluminum (Al)-Dissolved	APHA 3030B/6020A (mod)	0.005	mg/L
Aluminum (Al)-Dissolved	EPA SW-846 6020A	0.0006	mg/L
Aluminum (Al)-Dissolved	EPA SW-846 6020A	0.003	mg/L
Antimony (Sb)-Dissolved	EPA SW-846 6020A	0.0001	mg/L
Arsenic (As)-Dissolved	APHA 3030B/6020A (mod)	0.0001	mg/L
Arsenic (As)-Dissolved	EPA SW-846 6020A	0.00002	mg/L
Arsenic (As)-Dissolved	EPA SW-846 6020A	0.0001	mg/L
Barium (Ba)-Dissolved	EPA SW-846 6020A	0.00005	mg/L
Beryllium (Be)-Dissolved	EPA SW-846 6020A	0.0005	mg/L
Bismuth (Bi)-Dissolved	EPA SW-846 6020A	0.0005	mg/L
Boron (B)-Dissolved	EPA SW-846 6020A	0.01	mg/L
Cadmium (Cd)-Dissolved	APHA 3030B/6020A (mod)	0.00001	mg/L
Cadmium (Cd)-Dissolved	EPA SW-846 6020A	0.00001	mg/L
Calcium (Ca)-Dissolved	APHA 3030B/6020A (mod)	0.05	mg/L
Calcium (Ca)-Dissolved	APHA 3030B/6020A (mod)	0.5	mg/L
Calcium (Ca)-Dissolved	EPA SW-846 6020A	0.02	mg/L
Calcium (Ca)-Dissolved	EPA SW-846 6020A	0.05	mg/L
Chromium (Cr)-Dissolved	EPA SW-846 6020A	0.0005	mg/L
Cobalt (Co)-Dissolved	EPA SW-846 6020A	0.0001	mg/L
Copper (Cu)-Dissolved	APHA 3030B/6020A (mod)	0.0002	mg/L
Copper (Cu)-Dissolved	EPA SW-846 6020A	0.0001	mg/L
Copper (Cu)-Dissolved	EPA SW-846 6020A	0.0005	mg/L
Dissolved Mercury Filtration Location	EPA 1631E (mod)		
Dissolved Metals Filtration Location	APHA 3030B/6020A (mod)		
Iron (Fe)-Dissolved	APHA 3030B/6020A (mod)	0.01	mg/L
Iron (Fe)-Dissolved	EPA SW-846 6020A	0.001	mg/L
Iron (Fe)-Dissolved	EPA SW-846 6020A	0.03	mg/L
Lead (Pb)-Dissolved	APHA 3030B/6020A (mod)	0.00005	mg/L
Lead (Pb)-Dissolved	EPA SW-846 6020A	0.000009	mg/L
Lead (Pb)-Dissolved	EPA SW-846 6020A	0.00005	mg/L
Lithium (Li)-Dissolved	EPA SW-846 6020A	0.001	mg/L
Magnesium (Mg)-Dissolved	APHA 3030B/6020A (mod)	0.05	mg/L
Magnesium (Mg)-Dissolved	APHA 3030B/6020A (mod)	0.5	mg/L
Magnesium (Mg)-Dissolved	EPA SW-846 6020A	0.005	mg/L
Magnesium (Mg)-Dissolved	EPA SW-846 6020A	0.05	mg/L
Manganese (Mn)-Dissolved	APHA 3030B/6020A (mod)	0.0005	mg/L
Manganese (Mn)-Dissolved	EPA SW-846 6020A	0.00007	mg/L
Mercury (Hg)-Dissolved	EPA 1631E (mod)	0.0000050	mg/L
Molybdenum (Mo)-Dissolved	APHA 3030B/6020A (mod)	0.00005	mg/L

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
Molybdenum (Mo)-Dissolved	EPA SW-846 6020A	0.00005	mg/L
Nickel (Ni)-Dissolved	APHA 3030B/6020A (mod)	0.0005	mg/L
Nickel (Ni)-Dissolved	EPA SW-846 6020A	0.00009	mg/L
Nickel (Ni)-Dissolved	EPA SW-846 6020A	0.0005	mg/L
Potassium (K)-Dissolved	APHA 3030B/6020A (mod)	0.05	mg/L
Potassium (K)-Dissolved	EPA SW-846 6020A	0.05	mg/L
Potassium (K)-Dissolved	EPA SW-846 6020A	0.2	mg/L
Selenium (Se)-Dissolved	APHA 3030B/6020A (mod)	0.00005	mg/L
Selenium (Se)-Dissolved	EPA SW-846 6020A	0.00004	mg/L
Selenium (Se)-Dissolved	EPA SW-846 6020A	0.001	mg/L
Silicon (Si)-Dissolved	EPA SW-846 6020A	0.1	mg/L
Silver (Ag)-Dissolved	EPA SW-846 6020A	0.00001	mg/L
Sodium (Na)-Dissolved	APHA 3030B/6020A (mod)	0.5	mg/L
Sodium (Na)-Dissolved	EPA SW-846 6020A	0.02	mg/L
Sodium (Na)-Dissolved	EPA SW-846 6020A	0.05	mg/L
Strontium (Sr)-Dissolved	EPA SW-846 6020A	0.0001	mg/L
Thallium (Tl)-Dissolved	APHA 3030B/6020A (mod)	0.00001	mg/L
Thallium (Tl)-Dissolved	EPA SW-846 6020A	0.000002	mg/L
Thallium (Tl)-Dissolved	EPA SW-846 6020A	0.0001	mg/L
Tin (Sn)-Dissolved	EPA SW-846 6020A	0.0001	mg/L
Titanium (Ti)-Dissolved	EPA SW-846 6020A	0.01	mg/L
Uranium (U)-Dissolved	APHA 3030B/6020A (mod)	0.00001	mg/L
Uranium (U)-Dissolved	EPA SW-846 6020A	0.000007	mg/L
Uranium (U)-Dissolved	EPA SW-846 6020A	0.00001	mg/L
Vanadium (V)-Dissolved	EPA SW-846 6020A	0.001	mg/L
Zinc (Zn)-Dissolved	APHA 3030B/6020A (mod)	0.001	mg/L
Zinc (Zn)-Dissolved	EPA SW-846 6020A	0.0005	mg/L
Zinc (Zn)-Dissolved	EPA SW-846 6020A	0.003	mg/L
Water-Speciated Metals			
Chromium, Hexavalent	EPA 7199	0.00050	mg/L
Soil-Speciated Metals			
Chromium, Hexavalent	SW846 3060A/7199	0.20	ug/g
Waste-TCLP Extractables			
2,3,4,6-Tetrachlorophenol	SW846 8270	0.0050	mg/L
2,4,5-Trichlorophenol	SW846 8270	0.0050	mg/L
2,4,6-Tribromophenol	SW846 8270	1	
2,4,6-Trichlorophenol	SW846 8270	0.0050	mg/L
2,4-Dichlorophenol	SW846 8270	0.0050	mg/L

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
2,4-Dinitrotoluene	SW846 8270	0.0040	mg/L
2-Fluorobiphenyl	SW846 8270	1	
2-Methylphenol	SW846 8270	0.0050	mg/L
Aroclor 1242	SW846 8270	0.00020	mg/L
Aroclor 1248	SW846 8270	0.00020	mg/L
Aroclor 1254	SW846 8270	0.00020	mg/L
Aroclor 1260	SW846 8270	0.00020	mg/L
Benzo(a)pyrene	SW846 8270	0.00020	mg/L
Cresols (total)	SW846 8270	0.012	mg/L
Decachlorobiphenyl	SW846 8270	1	
Hexachlorobenzene	SW846 8270	0.0040	mg/L
Hexachlorobutadiene	SW846 8270	0.0040	mg/L
Hexachloroethane	SW846 8270	0.0040	mg/L
3&4-Methylphenol	SW846 8270	0.010	mg/L
Nitrobenzene	SW846 8270	0.0040	mg/L
Nitrobenzene d5	SW846 8270	1	
d14-Terphenyl	SW846 8270	1	
p-Terphenyl d14	SW846 8270	1	
Total PCBs	SW846 8270	0.00020	mg/L
Pentachlorophenol	SW846 8270	0.0050	mg/L
Pyridine	SW846 8260D	2.0	mg/L
Waste-TCLP Metals			
Arsenic (As)	EPA 6020B	0.05	mg/L
Barium (Ba)	EPA 6020B	0.5	mg/L
Cadmium (Cd)	EPA 6020B	0.005	mg/L
Chromium (Cr)	EPA 6020B	0.05	mg/L
Cobalt (Co)-Total	EPA 200.8	0.03	mg/L
Copper (Cu)-Total	EPA 200.8	0.5	mg/L
Lead (Pb)	EPA 6020B	0.05	mg/L
Mercury (Hg)	EPA 1631E	0.00010	mg/L
Molybdenum (Mo)-Total	EPA 200.8	0.05	mg/L
Nickel (Ni)-Total	EPA 200.8	0.1	mg/L
Thallium (Tl)-Total	EPA 200.8	5	mg/L
Uranium (U)	EPA 6020B	0.3	mg/L
Zinc (Zn)-Total	EPA 200.8	1	mg/L
Waste-TCLP VOCs			
1,1-Dichloroethylene	SW846 8260	0.025	mg/L
1,2-Dichlorobenzene	SW846 8260	0.025	mg/L

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
1,2-Dichloroethane	SW846 8260	0.025	mg/L
1,4-Dichlorobenzene	SW846 8260	0.025	mg/L
4-Bromofluorobenzene	SW846 8260	1	
Benzene	SW846 8260	0.025	mg/L
Carbon tetrachloride	SW846 8260	0.025	mg/L
Chlorobenzene	SW846 8260	0.025	mg/L
Chloroform	SW846 8260	0.10	mg/L
Methyl Ethyl Ketone	SW846 8260	1.0	mg/L
Dichloromethane	SW846 8260	0.50	mg/L
Tetrachloroethylene	SW846 8260	0.025	mg/L
Trichloroethylene	SW846 8260	0.025	mg/L
Vinyl chloride	SW846 8260	0.050	mg/L
Waste-Waste Characterizations			
Flash Point	ASTM D-93	30.0	Deg. C
Water-Aggregate Organics			
BOD	APHA 5210 B	2.0	mg/L
COD	APHA 5220 D	10	mg/L
Oil and Grease, Total	APHA 5520 B	5.0	mg/L
Mineral Oil and Grease	APHA 5520 B	2.5	mg/L
Phenols (4AAP)	EPA 9066	0.0010	mg/L
Soil-Aggregate Organics			
Oil and Grease, Total	APHA 5520 B	500	mg/kg
Phenols (4AAP)	EPA 9066	0.10	mg/kg
Waste-Volatile Organic Compounds			
4-Bromofluorobenzene	SW846 8260	1	
Dichlorobromomethane	SW846 8260	0.025	mg/L
Bromoform	SW846 8260	0.025	mg/L
Dibromochloromethane	SW846 8260	0.025	mg/L
Chloroform	SW846 8260	0.10	mg/L
Total THMs	SW846 8260	0.18	mg/L
Water-Volatile Organic Compounds			
1,1-dichloroethylene (vinylidene chlorid	SW846 8260	0.50	ug/L
1,2-Dichlorobenzene	SW846 8260	0.50	ug/L
1,2-Dichloroethane	SW846 8260	0.50	ug/L
1,4-Dichlorobenzene	SW846 8260	0.50	ug/L
1,4-Difluorobenzene	SW846 8260	1	%
1,4-Difluorobenzene	SW846 8260	1	
1,4-Difluorobenzene	SW846 8260 (511)	1	%

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
1,4-Difluorobenzene	SW846 8260 (HEADSPACE)	1	
4-Bromofluorobenzene	SW846 8260	1	%
4-Bromofluorobenzene	SW846 8260	1	
4-Bromofluorobenzene	SW846 8260 (511)	1	%
4-Bromofluorobenzene	SW846 8260 (HEADSPACE)	1	
Benzene	SW846 8260	0.50	ug/L
Benzene	SW846 8260 (511)	0.50	ug/L
Benzene	SW846 8260 (HEADSPACE)	0.5	ug/L
Carbon tetrachloride	SW846 8260	0.20	ug/L
Monochlorobenzene	SW846 8260	0.50	ug/L
Ethylbenzene	SW846 8260	0.50	ug/L
Ethylbenzene	SW846 8260 (511)	0.50	ug/L
Ethylbenzene	SW846 8260 (HEADSPACE)	0.5	ug/L
m+p-Xylenes	SW846 8260 (511)	0.40	ug/L
m/p-xylene	SW846 8260	1.0	ug/L
MTBE	SW846 8260	0.5	ug/L
Dichloromethane	SW846 8260	5.0	ug/L
o-Xylene	SW846 8260 (511)	0.30	ug/L
o-xylene	SW846 8260	0.50	ug/L
Tetrachloroethylene (perchloroethylene)	SW846 8260	0.50	ug/L
Toluene	SW846 8260	0.50	ug/L
Toluene	SW846 8260 (511)	0.50	ug/L
Toluene	SW846 8260 (HEADSPACE)	0.5	ug/L
Trichloroethylene	SW846 8260	0.50	ug/L
Vinyl chloride	SW846 8260	0.20	ug/L
Xylenes (Total)	SW846 8260	0.50	ug/L
Soil-Volatile Organic Compounds			
1,3-Dichloropropene (cis & trans)	SW8260B/SW8270C	0.0020	mg/kg
Water-Hydrocarbons			
2-Bromobenzotrifluoride	EPA 3511/CCME Tier 1	1	
2-Bromobenzotrifluoride	MOE DECPH-E3421/CCME TIER 1	1	
3,4-Dichlorotoluene	E3398/CCME TIER 1-HS	1	
3,4-Dichlorotoluene	E3421/CCME (HS)	1	
Chrom. to baseline at nC50	EPA 3511/CCME Tier 1		
Chrom. to baseline at nC50	MOE DECPH-E3421/CCME TIER 1		
F2-Naphth	CCME CWS-PHC, Pub #1310, Dec 2001-L	100	ug/L
F3-PAH	CCME CWS-PHC, Pub #1310, Dec 2001-L	250	ug/L
F2 (C10-C16)	EPA 3511/CCME Tier 1	100	ug/L

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
F2 (C10-C16)	MOE DECPH-E3421/CCME TIER 1	100	ug/L
F3 (C16-C34)	EPA 3511/CCME Tier 1	250	ug/L
F3 (C16-C34)	MOE DECPH-E3421/CCME TIER 1	250	ug/L
F4 (C34-C50)	EPA 3511/CCME Tier 1	250	ug/L
F4 (C34-C50)	MOE DECPH-E3421/CCME TIER 1	250	ug/L
Total Hydrocarbons (C6-C50)	CCME CWS-PHC, Pub #1310, Dec 2001-L	250	ug/L
F1 (C6-C10)	E3398/CCME TIER 1-HS	25	ug/L
F1 (C6-C10)	E3421/CCME (HS)	100	ug/L
F1-BTEX	CCME CWS-PHC, Pub #1310, Dec 2001-L	100	ug/L
Soil-Hydrocarbons			
2-Bromobenzotrifluoride	CCME Tier 1	1	
3,4-Dichlorotoluene	E3398/CCME TIER 1-HS	1	
Chrom. to baseline at nC50	CCME Tier 1		
F2-Naphth	CCME CWS-PHC, Pub #1310, Dec 2001-S	10	ug/g
F3-PAH	CCME CWS-PHC, Pub #1310, Dec 2001-S	50	ug/g
F2 (C10-C16)	CCME Tier 1	10	ug/g
F3 (C16-C34)	CCME Tier 1	50	ug/g
F4 (C34-C50)	CCME Tier 1	50	ug/g
Total Hydrocarbons (C6-C50)	CCME CWS-PHC, Pub #1310, Dec 2001-S	50	ug/g
F1 (C6-C10)	E3398/CCME TIER 1-HS	5.0	ug/g
F1-BTEX	CCME CWS-PHC, Pub #1310, Dec 2001-S	10	ug/g
Tissue-Polycyclic Aromatic Hydrocarbons			
1-Methyl Naphthalene	CARB 429	0	ng/g
1-Methylnaphthalene-d10	CARB 429	1.0	%
2-Methyl Naphthalene	CARB 429	0	ng/g
2-Methylnaphthalene-D10	CARB 429	1.0	%
Acenaphthene	CARB 429	0	ng/g
Acenaphthylene	CARB 429	0	ng/g
Acenaphthylene d8	CARB 429	1.0	%
Anthracene	CARB 429	0	ng/g
Anthracene-D10	CARB 429	1.0	%
Benz(a)anthracene-D12	CARB 429	1.0	%
Benz(a)anthracene	CARB 429	0	ng/g
Benzo(a)pyrene	CARB 429	0	ng/g
Benzo(a)pyrene d12	CARB 429	1.0	%
Benzo(b)fluoranthene	CARB 429	0	ng/g
Benzo(b)fluoranthene-D12	CARB 429	1.0	%
Benzo(e)pyrene	CARB 429	0	ng/g

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
Benzo(ghi)perylene	CARB 429	0	ng/g
Benzo(g,h,i)perylene d12	CARB 429	1.0	%
Benzo(k)fluoranthene	CARB 429	0	ng/g
Benzo(k)fluoranthene-D12	CARB 429	1.0	%
Biphenyl	CARB 429	0	ng/g
Chrysene	CARB 429	0	ng/g
Chrysene d12	CARB 429	1.0	%
Dibenz(a,h)anthracene-D14	CARB 429	1.0	%
Dibenzo(ah)anthracene	CARB 429	0	ng/g
Fluoranthene	CARB 429	0	ng/g
Fluoranthene d10	CARB 429	1.0	%
Fluorene	CARB 429	0	ng/g
Fluorene d10	CARB 429	1.0	%
Indeno(1,2,3,cd)pyrene-D12	CARB 429	1.0	%
Indeno(1,2,3 cd)pyrene	CARB 429	0	ng/g
Naphthalene	CARB 429	0	ng/g
Naphthalene d8	CARB 429	1.0	%
Perylene	CARB 429	0	ng/g
Perylene d12	CARB 429	1.0	%
Phenanthrene	CARB 429	0	ng/g
Phenanthrene d10	CARB 429	1.0	%
Pyrene	CARB 429	0	ng/g
Terphenyl d14(Surr.)	CARB 429	1.0	%
Soil-Polycyclic Aromatic Hydrocarbons			
1-Methylnaphthalene	SW846 3510/8270	0.030	ug/g
2-Fluorobiphenyl	SW486 8270	1	%
2-Fluorobiphenyl	SW486 8270	1	
2-Fluorobiphenyl	SW846 3510/8270	1	%
2-Methylnaphthalene	SW846 3510/8270	0.030	ug/g
Acenaphthene	SW846 3510/8270	0.050	ug/g
Acenaphthylene	SW846 3510/8270	0.050	ug/g
Anthracene	SW846 3510/8270	0.050	ug/g
Benzo(a)anthracene	SW846 3510/8270	0.050	ug/g
Benzo(a)pyrene	SW486 8270	0.020	mg/kg
Benzo(a)pyrene	SW846 3510/8270	0.050	ug/g
Benzo(b)fluoranthene	SW846 3510/8270	0.050	ug/g
Benzo(g,h,i)perylene	SW846 3510/8270	0.050	ug/g
Benzo(k)fluoranthene	SW846 3510/8270	0.050	ug/g
Chrysene	SW846 3510/8270	0.050	ug/g

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
d12-Chrysene	SW486 8270	1	
Dibenzo(ah)anthracene	SW846 3510/8270	0.050	ug/g
Fluoranthene	SW846 3510/8270	0.050	ug/g
Fluorene	SW846 3510/8270	0.050	ug/g
Indeno(1,2,3-cd)pyrene	SW846 3510/8270	0.050	ug/g
Naphthalene	SW486 8270	0.050	mg/kg
Naphthalene	SW846 3510/8270	0.013	ug/g
p-Terphenyl d14	SW486 8270	1	%
p-Terphenyl d14	SW486 8270	1	
p-Terphenyl d14	SW846 3510/8270	1	%
Phenanthrene	SW846 3510/8270	0.046	ug/g
Pyrene	SW846 3510/8270	0.050	ug/g
Water-Trihalomethanes			
Total THMs	CALCULATION	0.0040	mg/L
Total THMs	CALCULATION	1.0	ug/L
Water-Haloacetic Acids			
2-Bromobutanoic Acid	EPA 552.3	1	%
Bromochloroacetic Acid	EPA 552.3	5.0	ug/L
Bromodichloroacetic Acid	EPA 552.3	1.0	ug/L
Chlorodibromoacetic Acid	EPA 552.3	1.0	ug/L
Dalapon	EPA 552.3	1.0	ug/L
Dibromoacetic Acid	EPA 552.3	1.0	ug/L
Dichloroacetic Acid	EPA 552.3	1.0	ug/L
Total Haloacetic Acids 5	CALCULATION	2.2	ug/L
Bromoacetic Acid	EPA 552.3	1.0	ug/L
Chloroacetic acid	EPA 552.3	1.0	ug/L
Tribromoacetic Acid	EPA 552.3	5.0	ug/L
Trichloroacetic Acid	EPA 552.3	1.0	ug/L
Soil-Glycols			
Diethylene Glycol	EPA 3550C, EPA 8015D	5.0	mg/kg
Ethylene Glycol	EPA 3550C, EPA 8015D	10	mg/kg
Propylene Glycol	EPA 3550C, EPA 8015D	10	mg/kg
Triethylene Glycol	EPA 3550C, EPA 8015D	10	mg/kg
Water-Semi-Volatile Organics			
1,2,3-Trichlorobenzene	SW846 8270	0.40	ug/L
1,2,4-Trichlorobenzene	SW846 8270	0.40	ug/L
1,2-Dichlorobenzene	SW846 8270	0.40	ug/L
1,3-Dichlorobenzene	SW846 8270	0.40	ug/L

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
1,4-Dichlorobenzene	SW846 8270	0.40	ug/L
1-Chloronaphthalene	SW846 8270	0.40	ug/L
1-Methylnaphthalene	SW846 8270	0.40	ug/L
2,3,4,5-Tetrachlorophenol	SW846 8270	0.50	ug/L
2,3,4,6-Tetrachlorophenol	SW846 8270	0.50	ug/L
2,3,4-Trichlorophenol	SW846 8270	0.50	ug/L
2,3,5,6-Tetrachlorophenol	SW846 8270	0.50	ug/L
2,3,5-Trichlorophenol	SW846 8270	0.50	ug/L
2,4,5-Trichlorophenol	SW846 8270	0.50	ug/L
2,4,6-Tribromophenol	SW846 8270	1	ug/L
2,4,6-Trichlorophenol	SW846 8270	0.50	ug/L
2,4-Dichlorophenol	SW846 8270	0.30	ug/L
2,4-Dimethylphenol	SW846 8270	0.50	ug/L
2,4-Dinitrophenol	SW846 8270	1.0	ug/L
2,4-Dinitrotoluene	SW846 8270	0.40	ug/L
2,6-Dichlorophenol	SW846 8270	0.50	ug/L
2,6-Dinitrotoluene	SW846 8270	0.40	ug/L
2-Chloronaphthalene	SW846 8270	0.40	ug/L
2-Chlorophenol	SW846 8270	0.30	ug/L
2-Fluorobiphenyl	SW846 8270	1	ug/L
4,6-Dinitro-2-methylphenol	SW846 8270	2.0	ug/L
2-Methylnaphthalene	SW846 8270	0.40	ug/L
2-Methylphenol	SW846 8270	0.50	ug/L
2-Nitrophenol	SW846 8270	0.50	ug/L
3,3'-Dichlorobenzidine	SW846 8270	0.40	ug/L
4-Bromophenyl phenyl ether	SW846 8270	0.40	ug/L
4-Chloro-3-methylphenol	SW846 8270	0.50	ug/L
4-Chloroaniline	SW846 8270	0.40	ug/L
4-Chlorophenyl phenyl ether	SW846 8270	0.40	ug/L
4-Nitrophenol	SW846 8270	0.50	ug/L
5-Nitroacenaphthene	SW846 8270	0.40	ug/L
Acenaphthene	SW846 8270	0.20	ug/L
Acenaphthylene	SW846 8270	0.20	ug/L
Anthracene	SW846 8270	0.20	ug/L
Benzo(a)anthracene	SW846 8270	0.20	ug/L
Benzo(a)pyrene	SW846 8270	0.050	ug/L
Benzo(b)fluoranthene	SW846 8270	0.20	ug/L
Benzo(ghi)perylene	SW846 8270	0.20	ug/L
Benzo(k)fluoranthene	SW846 8270	0.20	ug/L

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
Biphenyl	SW846 8270	0.40	ug/L
Bis(2-chloroethoxy)methane	SW846 8270	0.40	ug/L
Bis(2-chloroethyl)ether	SW846 8270	0.40	ug/L
Bis(2-chloroisopropyl)ether	SW846 8270	0.40	ug/L
Bis(2-ethylhexyl)phthalate	SW846 8270	1.0	ug/L
Butylbenzyl phthalate	SW846 8270	0.40	ug/L
Camphene	SW846 8270	0.40	ug/L
Chrysene	SW846 8270	0.20	ug/L
Cresols (total)	CALCULATION	0.75	ug/L
Di-n-butylphthalate	SW846 8270	1.0	ug/L
Di-n-octylphthalate	SW846 8270	0.40	ug/L
Dibenzo(a,h)anthracene	SW846 8270	0.20	ug/L
Dibenzofuran	SW846 8270	0.20	ug/L
Diethylphthalate	SW846 8270	0.20	ug/L
Dimethylphthalate	SW846 8270	0.20	ug/L
Diphenyl ether	SW846 8270	0.40	ug/L
Diphenylamine	SW846 8270	0.40	ug/L
Fluoranthene	SW846 8270	0.20	ug/L
Fluorene	SW846 8270	0.20	ug/L
Hexachlorobenzene	SW846 8270	0.040	ug/L
Hexachlorobutadiene	SW846 8270	0.20	ug/L
Hexachlorocyclopentadiene	SW846 8270	0.40	ug/L
Hexachloroethane	SW846 8270	0.40	ug/L
Indeno(1,2,3-cd)pyrene	SW846 8270	0.20	ug/L
Indole	SW846 8270	0.40	ug/L
Isophorone	SW846 8270	0.40	ug/L
3&4-Methylphenol	SW846 8270	0.50	ug/L
N-Nitroso-di-n-propylamine	SW846 8270	0.40	ug/L
N-Nitrosodimethylamine	MOE E3388	0	ng/L
N-Nitrosodimethylamine-d6	MOE E3388	1	%
Naphthalene	SW846 8270	0.20	ug/L
Nitrobenzene	SW846 8270	0.40	ug/L
Nitrobenzene d5	SW846 8270	1	ug/L
p-Terphenyl d14	SW846 8270	1	ug/L
Pentachlorophenol	SW846 8270	0.50	ug/L
Perylene	SW846 8270	0.20	ug/L
Phenanthrene	SW846 8270	0.20	ug/L
Phenol	SW846 8270	0.50	ug/L
Pyrene	SW846 8270	0.20	ug/L

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
Soil-Semi-Volatile Organics			
1,2,4-Trichlorobenzene	SW846 8270 (511)	0.05	mg/kg
1-Methylnaphthalene	SW846 8270 (511)	0.03	mg/kg
2,4+2,6-Dinitrotoluene	SW846 8270	0.50	ug/g
2,4,5-Trichlorophenol	SW846 8270 (511)	0.1	mg/kg
2,4,6-Tribromophenol	SW846 8270 (511)	1	%
2,4,6-Trichlorophenol	SW846 8270 (511)	0.1	mg/kg
2,4-Dichlorophenol	SW846 8270 (511)	0.1	mg/kg
2,4-Dimethylphenol	SW846 8270 (511)	0.1	mg/kg
2,4-Dinitrophenol	SW846 8270 (511)	1	mg/kg
2,4-Dinitrotoluene	SW846 8270 (511)	0.1	mg/kg
2,6-Dinitrotoluene	SW846 8270 (511)	0.1	mg/kg
2-Chlorophenol	SW846 8270 (511)	0.1	mg/kg
2-Fluorobiphenyl	SW846 8270 (511)	1	%
2-Methylnaphthalene	SW846 8270 (511)	0.03	mg/kg
3,3'-Dichlorobenzidine	SW846 8270 (511)	0.1	mg/kg
4-Chloroaniline	SW846 8270 (511)	0.1	mg/kg
Acenaphthene	SW846 8270 (511)	0.05	mg/kg
Acenaphthylene	SW846 8270 (511)	0.05	mg/kg
Anthracene	SW846 8270 (511)	0.05	mg/kg
Benzo(a)anthracene	SW846 8270 (511)	0.05	mg/kg
Benzo(a)pyrene	SW846 8270 (511)	0.05	mg/kg
Benzo(b)fluoranthene	SW846 8270 (511)	0.05	mg/kg
Benzo(ghi)perylene	SW846 8270 (511)	0.05	mg/kg
Benzo(k)fluoranthene	SW846 8270 (511)	0.05	mg/kg
Biphenyl	SW846 8270 (511)	0.05	mg/kg
Bis(2-chloroethyl)ether	SW846 8270 (511)	0.1	mg/kg
Bis(2-chloroisopropyl)ether	SW846 8270 (511)	0.1	mg/kg
Bis(2-ethylhexyl)phthalate	SW846 8270 (511)	0.1	mg/kg
Chrysene	SW846 8270 (511)	0.05	mg/kg
Dibenzo(a,h)anthracene	SW846 8270 (511)	0.05	mg/kg
Diethylphthalate	SW846 8270 (511)	0.1	mg/kg
Dimethylphthalate	SW846 8270 (511)	0.1	mg/kg
Fluoranthene	SW846 8270 (511)	0.05	mg/kg
Fluorene	SW846 8270 (511)	0.05	mg/kg
Indeno(1,2,3-cd)pyrene	SW846 8270 (511)	0.05	mg/kg
Naphthalene	SW846 8270 (511)	0.05	mg/kg
Nitrobenzene d5	SW846 8270 (511)	1	%
p-Terphenyl d14	SW846 8270 (511)	1	%

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
Pentachlorophenol	SW846 8270 (511)	0.1	mg/kg
Phenanthrene	SW846 8270 (511)	0.05	mg/kg
Phenol	SW846 8270 (511)	0.1	mg/kg
Phenol d5	SW846 8270 (511)	1	%
Pyrene	SW846 8270 (511)	0.05	mg/kg
Sulfolane	ASTM D7599	0.050	ug/g
Soil-Phenolics			
2,4,6-Tribromophenol	SW846 8270	1	
Pentachlorophenol	SW846 8270	0.10	ug/g
Soil-Polychlorinated Biphenyls			
2-Fluorobiphenyl	EPA 8082	1	
Aroclor 1242	EPA 8082	0.010	mg/kg
Aroclor 1248	EPA 8082	0.010	mg/kg
Aroclor 1254	EPA 8082	0.010	mg/kg
Aroclor 1260	EPA 8082	0.010	mg/kg
d14-Terphenyl	EPA 8082	1	
Total PCBs	EPA 8082	0.020	mg/kg
Soil-Organochlorine Pesticides			
op-DDD	SW846 8270	0.020	mg/kg
o,p-DDE	SW846 8270	0.020	mg/kg
op-DDT	SW846 8270	0.020	mg/kg
pp-DDD	SW846 8270	0.020	mg/kg
pp-DDE	SW846 8270	0.020	mg/kg
pp-DDT	SW846 8270	0.020	mg/kg
d14-Terphenyl	SW846 8270	1	
Water-Herbicides			
2,4,5-T	MOE E3552	0.00010	mg/L
2,4,5-TP	MOE E3552	0.00010	mg/L
2,4-D	MOE E3552	0.00010	mg/L
2,4-D	MOE E3552	0.20	ug/L
2,4-Dichlorophenylacetic Acid	MOE E3552	1	
Bromoxynil	MOE E3552	0.00010	mg/L
Bromoxynil	MOE E3552	0.20	ug/L
Dicamba	MOE E3552	0.00010	mg/L
Dicamba	MOE E3552	0.20	ug/L
Dinoseb	MOE E3552	0.00010	mg/L
Glyphosate	MOE E3500	5.0	ug/L
MCPA	MOE E3552	0.00010	mg/L

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
MCPA	MOE E3552	0.20	ug/L
Mecoprop	MOE E3552	0.00010	mg/L
Picloram	MOE E3552	0.00010	mg/L
Picloram	MOE E3552	0.20	ug/L
Water-Pesticides			
2,3,4,6-Tetrachlorophenol	SW846 8270	0.50	ug/L
2,4,6-Tribromophenol	SW846 8270	1	ug/L
2,4,6-Trichlorophenol	SW846 8270	0.50	ug/L
2,4-Dichlorophenol	SW846 8270	0.30	ug/L
2-Fluorobiphenyl	SW846 8270	1	ug/L
Alachlor	SW846 8270	0.10	ug/L
Atrazine	SW846 8270	0.10	ug/L
Atrazine Desethyl	SW846 8270	0.10	ug/L
Atrazine & Metabolites	SW846 8270	0.20	ug/L
Azinphos-methyl	SW846 8270	0.10	ug/L
Carbaryl	SW846 8270	0.20	ug/L
Carbofuran	SW846 8270	0.20	ug/L
Chlorpyrifos	SW846 8270	0.10	ug/L
Diazinon	SW846 8270	0.10	ug/L
Diclofop-methyl	SW846 8270	0.20	ug/L
Dimethoate	SW846 8270	0.10	ug/L
Diquat	E3503	1.0	ug/L
Diuron	E3501	1.0	ug/L
Malathion	SW846 8270	0.10	ug/L
Metolachlor	SW846 8270	0.10	ug/L
Metribuzin	SW846 8270	0.10	ug/L
Paraquat	E3503	1.0	ug/L
Pentachlorophenol	SW846 8270	0.50	ug/L
Phorate	SW846 8270	0.10	ug/L
Prometryne	SW846 8270	0.10	ug/L
Simazine	SW846 8270	0.10	ug/L
Terbufos	SW846 8270	0.20	ug/L
Triallate	SW846 8270	0.10	ug/L
Trifluralin	SW846 8270	0.10	ug/L
Water-Dioxins and Furans			
OCDD	USEPA 1613B	0	pg/L
OCDF	USEPA 1613B	0	pg/L
1,2,3,4,6,7,8-HpCDD	USEPA 1613B	0	pg/L

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
1,2,3,4,6,7,8-HpCDF	USEPA 1613B	0	pg/L
1,2,3,4,7,8,9-HpCDF	USEPA 1613B	0	pg/L
1,2,3,4,7,8-HxCDD	USEPA 1613B	0	pg/L
1,2,3,4,7,8-HxCDF	USEPA 1613B	0	pg/L
1,2,3,6,7,8-HxCDD	USEPA 1613B	0	pg/L
1,2,3,6,7,8-HxCDF	USEPA 1613B	0	pg/L
1,2,3,7,8,9-HxCDD	USEPA 1613B	0	pg/L
1,2,3,7,8,9-HxCDF	USEPA 1613B	0	pg/L
1,2,3,7,8-PeCDD	USEPA 1613B	0	pg/L
1,2,3,7,8-PeCDF	USEPA 1613B	0	pg/L
13C12-1,2,3,4,6,7,8-HpCDD	USEPA 1613B	1.00	%
13C12-1,2,3,4,6,7,8-HpCDF	USEPA 1613B	1.00	%
13C12-1,2,3,4,7,8-HxCDD	USEPA 1613B	1.00	%
13C12-1,2,3,4,7,8-HxCDF	USEPA 1613B	1.00	%
13C12-1,2,3,4,7,8,9-HpCDF	USEPA 1613B	1.00	%
13C12-1,2,3,6,7,8-HxCDD	USEPA 1613B	1.00	%
13C12-1,2,3,6,7,8-HxCDF	USEPA 1613B	1.00	%
13C12-1,2,3,7,8-PeCDD	USEPA 1613B	1.00	%
13C12-1,2,3,7,8-PeCDF	USEPA 1613B	1.00	%
13C12-1,2,3,7,8,9-HxCDF	USEPA 1613B	1.00	%
13C12-2,3,4,6,7,8-HxCDF	USEPA 1613B	1.00	%
13C12-2,3,4,7,8-PeCDF	USEPA 1613B	1.00	%
13C12-2,3,7,8-TCDD	USEPA 1613B	1.00	%
13C12-2,3,7,8-TCDF	USEPA 1613B	1.00	%
13C12-OCDD	USEPA 1613B	1.00	%
2,3,4,6,7,8-HxCDF	USEPA 1613B	0	pg/L
2,3,4,7,8-PeCDF	USEPA 1613B	0	pg/L
2,3,7,8-TCDD	USEPA 1613B	0	pg/L
2,3,7,8-TCDF	USEPA 1613B	0	pg/L
37Cl4-2,3,7,8-TCDD (Cleanup)	USEPA 1613B	1.0	%
Lower Bound PCDD/F TEQ (NATO)	USEPA 1613B		pg/L
Lower Bound PCDD/F TEQ (WHO 1998)	USEPA 1613B		pg/L
Lower Bound PCDD/F TEQ (WHO 2005)	USEPA 1613B		pg/L
Mid Point PCDD/F TEQ (NATO)	USEPA 1613B		pg/L
Mid Point PCDD/F TEQ (WHO 1998)	USEPA 1613B		pg/L
Mid Point PCDD/F TEQ (WHO 2005)	USEPA 1613B		pg/L
Total-TCDD	USEPA 1613B	0	pg/L
Total-HpCDD	USEPA 1613B	0	pg/L
Total-HpCDF	USEPA 1613B	0	pg/L

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
Total-HxCDD	USEPA 1613B	0	pg/L
Total-HxCDF	USEPA 1613B	0	pg/L
Total HpCDD # Homologues	USEPA 1613B		
Total HpCDF # Homologues	USEPA 1613B		
Total HxCDD # Homologues	USEPA 1613B		
Total HxCDF # Homologues	USEPA 1613B		
Total PeCDD # Homologues	USEPA 1613B		
Total PeCDF # Homologues	USEPA 1613B		
Total-PeCDD	USEPA 1613B	0	pg/L
Total-PeCDF	USEPA 1613B	0	pg/L
Total TCDD # Homologues	USEPA 1613B		
Total TCDF # Homologues	USEPA 1613B		
Total-TCDF	USEPA 1613B	0	pg/L
Upper Bound PCDD/F TEQ (NATO)	USEPA 1613B		pg/L
Upper Bound PCDD/F TEQ (WHO 1998)	USEPA 1613B		pg/L
Upper Bound PCDD/F TEQ (WHO 2005)	USEPA 1613B		pg/L
Waste-Dioxins and Furans			
OCDD	USEPA 1613B	10	pg/L
OCDF	USEPA 1613B	10	pg/L
1,2,3,4,6,7,8-HpCDD	USEPA 1613B	5.0	pg/L
1,2,3,4,6,7,8-HpCDF	USEPA 1613B	5.0	pg/L
1,2,3,4,7,8,9-HpCDF	USEPA 1613B	5.0	pg/L
1,2,3,4,7,8-HxCDD	USEPA 1613B	5.0	pg/L
1,2,3,4,7,8-HxCDF	USEPA 1613B	5.0	pg/L
1,2,3,6,7,8-HxCDD	USEPA 1613B	5.0	pg/L
1,2,3,6,7,8-HxCDF	USEPA 1613B	5.0	pg/L
1,2,3,7,8,9-HxCDD	USEPA 1613B	5.0	pg/L
1,2,3,7,8,9-HxCDF	USEPA 1613B	5.0	pg/L
1,2,3,7,8-PeCDD	USEPA 1613B	5.0	pg/L
1,2,3,7,8-PeCDF	USEPA 1613B	5.0	pg/L
13C12-1,2,3,4,6,7,8-HpCDD	USEPA 1613B	1	%
13C12-1,2,3,4,6,7,8-HpCDF	USEPA 1613B	1	%
13C12-1,2,3,4,7,8-HxCDD	USEPA 1613B	1	%
13C12-1,2,3,4,7,8-HxCDF	USEPA 1613B	1	%
13C12-1,2,3,4,7,8,9-HpCDF	USEPA 1613B	1	%
13C12-1,2,3,6,7,8-HxCDD	USEPA 1613B	1	%
13C12-1,2,3,6,7,8-HxCDF	USEPA 1613B	1	%
13C12-1,2,3,7,8-PeCDD	USEPA 1613B	1	%
13C12-1,2,3,7,8-PeCDF	USEPA 1613B	1	%

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
13C12-1,2,3,7,8,9-HxCDF	USEPA 1613B	1	%
13C12-2,3,4,6,7,8-HxCDF	USEPA 1613B	1	%
13C12-2,3,4,7,8-PeCDF	USEPA 1613B	1	%
13C12-2,3,7,8-TCDD	USEPA 1613B	1	%
13C12-2,3,7,8-TCDF	USEPA 1613B	1	%
13C12-OCDD	USEPA 1613B	1	%
2,3,4,6,7,8-HxCDF	USEPA 1613B	5.0	pg/L
2,3,4,7,8-PeCDF	USEPA 1613B	5.0	pg/L
2,3,7,8-TCDD	USEPA 1613B	2.0	pg/L
2,3,7,8-TCDF	USEPA 1613B	2.0	pg/L
37Cl4-2,3,7,8-TCDD (Cleanup)	USEPA 1613B	1	%
Lower Bound PCDD/F TEQ (NATO)	USEPA 1613B		pg/L
Lower Bound PCDD/F TEQ (WHO 1998)	USEPA 1613B		pg/L
Lower Bound PCDD/F TEQ (WHO 2005)	USEPA 1613B		pg/L
Mid Point PCDD/F TEQ (NATO)	USEPA 1613B		pg/L
Mid Point PCDD/F TEQ (WHO 1998)	USEPA 1613B		pg/L
Mid Point PCDD/F TEQ (WHO 2005)	USEPA 1613B		pg/L
Total-TCDD	USEPA 1613B	2.0	pg/L
Total-HpCDD	USEPA 1613B	5.0	pg/L
Total-HpCDF	USEPA 1613B	5.0	pg/L
Total-HxCDD	USEPA 1613B	5.0	pg/L
Total-HxCDF	USEPA 1613B	5.0	pg/L
Total HpCDD # Homologues	USEPA 1613B		
Total HpCDF # Homologues	USEPA 1613B		
Total HxCDD # Homologues	USEPA 1613B		
Total HxCDF # Homologues	USEPA 1613B		
Total PeCDD # Homologues	USEPA 1613B		
Total PeCDF # Homologues	USEPA 1613B		
Total-PeCDD	USEPA 1613B	5.0	pg/L
Total-PeCDF	USEPA 1613B	5.0	pg/L
Total TCDD # Homologues	USEPA 1613B		
Total TCDF # Homologues	USEPA 1613B		
Total-TCDF	USEPA 1613B	2.0	pg/L
Upper Bound PCDD/F TEQ (NATO)	USEPA 1613B		pg/L
Upper Bound PCDD/F TEQ (WHO 1998)	USEPA 1613B		pg/L
Upper Bound PCDD/F TEQ (WHO 2005)	USEPA 1613B		pg/L
Soil-Dioxins and Furans			
% Moisture	USEPA 1613B	0.010	%
OCDD	USEPA 1613B	1.0	pg/g

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
OCDF	USEPA 1613B	1.0	pg/g
1,2,3,4,6,7,8-HpCDD	USEPA 1613B	0.40	pg/g
1,2,3,4,6,7,8-HpCDF	USEPA 1613B	0.40	pg/g
1,2,3,4,7,8,9-HpCDF	USEPA 1613B	0.40	pg/g
1,2,3,4,7,8-HxCDD	USEPA 1613B	0.40	pg/g
1,2,3,4,7,8-HxCDF	USEPA 1613B	0.40	pg/g
1,2,3,6,7,8-HxCDD	USEPA 1613B	0.40	pg/g
1,2,3,6,7,8-HxCDF	USEPA 1613B	0.40	pg/g
1,2,3,7,8,9-HxCDD	USEPA 1613B	0.40	pg/g
1,2,3,7,8,9-HxCDF	USEPA 1613B	0.40	pg/g
1,2,3,7,8-PeCDD	USEPA 1613B	0.40	pg/g
1,2,3,7,8-PeCDF	USEPA 1613B	0.40	pg/g
13C12-1,2,3,4,6,7,8-HpCDD	USEPA 1613B	1.00	%
13C12-1,2,3,4,6,7,8-HpCDF	USEPA 1613B	1.00	%
13C12-1,2,3,4,7,8-HxCDD	USEPA 1613B	1.00	%
13C12-1,2,3,4,7,8-HxCDF	USEPA 1613B	1.00	%
13C12-1,2,3,4,7,8,9-HpCDF	USEPA 1613B	1.00	%
13C12-1,2,3,6,7,8-HxCDD	USEPA 1613B	1.00	%
13C12-1,2,3,6,7,8-HxCDF	USEPA 1613B	1.00	%
13C12-1,2,3,7,8-PeCDD	USEPA 1613B	1.00	%
13C12-1,2,3,7,8-PeCDF	USEPA 1613B	1.00	%
13C12-1,2,3,7,8,9-HxCDF	USEPA 1613B	1.00	%
13C12-2,3,4,6,7,8-HxCDF	USEPA 1613B	1.00	%
13C12-2,3,4,7,8-PeCDF	USEPA 1613B	1.00	%
13C12-2,3,7,8-TCDD	USEPA 1613B	1.00	%
13C12-2,3,7,8-TCDF	USEPA 1613B	1.00	%
13C12-OCDD	USEPA 1613B	1.00	%
2,3,4,6,7,8-HxCDF	USEPA 1613B	0.40	pg/g
2,3,4,7,8-PeCDF	USEPA 1613B	0.40	pg/g
2,3,7,8-TCDD	USEPA 1613B	0.40	pg/g
2,3,7,8-TCDF	USEPA 1613B	0.40	pg/g
37Cl4-2,3,7,8-TCDD (Cleanup)	USEPA 1613B	1.0	%
Lower Bound PCDD/F TEQ (NATO)	USEPA 1613B		pg/g
Lower Bound PCDD/F TEQ (WHO 1998)	USEPA 1613B		pg/g
Lower Bound PCDD/F TEQ (WHO 2005)	USEPA 1613B		pg/g
Mid Point PCDD/F TEQ (NATO)	USEPA 1613B		pg/g
Mid Point PCDD/F TEQ (WHO 1998)	USEPA 1613B		pg/g
Mid Point PCDD/F TEQ (WHO 2005)	USEPA 1613B		pg/g
Percent Solids	USEPA 1613B	0.010	%

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
Total-TCDD	USEPA 1613B	0.40	pg/g
Total-HpCDD	USEPA 1613B	0.40	pg/g
Total-HpCDF	USEPA 1613B	0.40	pg/g
Total-HxCDD	USEPA 1613B	0.40	pg/g
Total-HxCDF	USEPA 1613B	0.40	pg/g
Total HpCDD # Homologues	USEPA 1613B		
Total HpCDF # Homologues	USEPA 1613B		
Total HxCDD # Homologues	USEPA 1613B		
Total HxCDF # Homologues	USEPA 1613B		
Total PeCDD # Homologues	USEPA 1613B		
Total PeCDF # Homologues	USEPA 1613B		
Total-PeCDD	USEPA 1613B	0.40	pg/g
Total-PeCDF	USEPA 1613B	0.40	pg/g
Total TCDD # Homologues	USEPA 1613B		
Total TCDF # Homologues	USEPA 1613B		
Total-TCDF	USEPA 1613B	0.40	pg/g
Upper Bound PCDD/F TEQ (NATO)	USEPA 1613B		pg/g
Upper Bound PCDD/F TEQ (WHO 1998)	USEPA 1613B		pg/g
Upper Bound PCDD/F TEQ (WHO 2005)	USEPA 1613B		pg/g
Water-Plant Pigments			
Chlorophyll a	EPA 445.0 ACET	0.10	ug/L
Phaeophytin a	EPA 445.0 ACET	0.10	ug/L
Water-Organic Parameters			
Microcystin	ENVIROLOGIX QUANTIPLATE KIT CAT. EP022	0.20	ug/L
Nitrilotriacetic Acid (NTA)	EPA 430.1	0.20	mg/L
Soil-Organic Parameters			
Bisphenol A	J. of Chrom. A849 (1999) 467-482	0.050	ug/g
Nonylphenol	J. of Chrom. A849 (1999) 467-482	0.25	ug/g
Nonylphenol Diethoxylates	J. of Chrom. A849 (1999) 467-482	0.063	ug/g
Nonylphenol Monoethoxylates	J. of Chrom. A849 (1999) 467-482	0.50	ug/g
Octylphenol	J. of Chrom. A849 (1999) 467-482	0.25	ug/g
Octylphenol Diethoxylates	J. of Chrom. A849 (1999) 467-482	0.025	ug/g
Octylphenol Monoethoxylates	J. of Chrom. A849 (1999) 467-482	0.50	ug/g
Total Nonylphenol Ethoxylates	J. of Chrom. A849 (1999) 467-482	0.50	ug/g
Total Octylphenol Ethoxylates	J. of Chrom. A849 (1999) 467-482	0.50	ug/g
Water-Radiological Parameters			
Ra-226	EPA 903.1	0.010	Bq/L

Quoted Parameters with Detection Limits

Parameter	Method Reference	Report D.L.	Units
Misc.-Miscellaneous			
Special Request	SEE SUBLET LAB RESULTS		
Special Request	SPECIAL REQUEST		

Methodology

Product	Matrix	Product Description	Analytical Method Reference
625-511-WT	Soil	ABN-O.Reg 153/04 (July 2011)	SW846 8270 (511)

Soil and sediment samples are dried by mixing with a desiccant prior to extraction. The extracts are dried, concentrated and exchanged into a solvent and analyzed by GC/MS. Depending on the analytical GC/MS column used benzo(j)fluoranthene may chromatographically co-elute with benzo(b)fluoranthene or benzo(k)fluoranthene.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

625-WT	Water	EPA 8270 Extractables	SW846 8270

Aqueous samples are extracted and extracts are analyzed on GC/MSD. Depending on the analytical GC/MS column used benzo(j) fluoranthene may chromatographically co-elute with benzo(b)fluoranthene or benzo(k)fluoranthene.

N-nitrosodiphenylamine is reported as diphenylamine. N-nitrosodiphenylamine decomposes in the gas chromatographic inlet and cannot be separated from diphenylamine. (EPA 8270D)

ACIDS-ONT-DW-WT	Water	O.Reg 170/03 Acids	SW846 8270

Pesticides are extracted from an aqueous sample using separate aliquots of solvent, extracts are concentrated down to a certain volume and analyzed on the GC/MSD.

ACY-TITR-TB	Water	Acidity	APHA 2310 B modified

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

AG-DRY-MICR-CCMS-VA	Tissue	Silver in Tissue by CRC ICPMS (DRY)	EPA 200.3/6020B

This method is conducted following British Columbia Lab Manual method "Metals in Animal Tissue and Vegetation (Biota) - Prescriptive". Tissue samples are homogenized and sub-sampled prior to hotblock digestion with nitric and hydrochloric acids, in combination with addition of hydrogen peroxide. Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modified from EPA Method 6020B).

Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.

AIR VOLUME-ED	Misc.	Air volume (L)	HYGIENE METHOD

NOTE: When air concentrations of analytes are reported, they are based on air sampling information (air volume, sampling time, sampling flow rate) supplied by the client.

ALK-AUTO-WT	Water	Automated Speciated Alkalinity	EPA 310.2

This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.

Methodology

Product	Matrix	Product Description	Analytical Method Reference
ALK-SPEC-PCT-WT	Water	Automated Speciated Alkalinity	APHA 2320B

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

ALK-WT	Water	Alkalinity, Total (as CaCO3)	EPA 310.2

This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.

ALKANOL-LCMS-WT	Soil	Alkanolamines in soil	ASTM D7599

Analytes are extracted from soil into HPLC grade water. Each compound is separated by HPLC and analyzed by Electro Spray Ionization MS/MS detection using Triple Quadrupole MS/MS detector. Internal standards are used for quantitation.

Results are expressed as dry weight.

ANIONS-WT	Soil	Anion Scan (IC)	EPA 300.1

5 grams of soil is mixed with 50 mL of distilled water for a minimum of 30 minutes. The extract is filtered and analyzed by ion chromatography.

B-HWS-R511-WT	Soil	Boron-HWE-O.Reg 153/04 (July 2011)	HW EXTR, EPA 6010B

A dried solid sample is extracted with calcium chloride, the sample undergoes a heating process. After cooling the sample is filtered and analyzed by ICP/OES.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

BAP-WT	Soil	Benzo(a)pyrene	SW486 8270

The procedure uses a mechanical shaking technique to extract a representative sub-sample with a mixture of methanol and toluene. The extract is analyzed by GC/MSD.

BIM-NO2-IC-L-WT	Water	Low Level Nitrite in Water by IC	EPA 300.1 (mod)

This analysis is carried out procedures adapted from EPA 300.1 "Anions". Nitrite is determined by Ion Chromatography with conductivity and/or UV detection on a water sample.

BNA-TCLP-WT	Waste	BNAs for O. Reg 347	SW846 8270

Samples are leached according to TCLP protocol and then the aqueous leachate is extracted and the resulting extracts are analyzed on GC/MSD

BOD-WT	Water	BOD	APHA 5210 B

This analysis is carried out using procedures adapted from APHA Method 5210B - "Biochemical Oxygen Demand (BOD)". All forms of biochemical oxygen demand (BOD) are determined by diluting and incubating a sample for a specified time period, and measuring the oxygen depletion using a dissolved oxygen meter. Dissolved BOD (SOLUBLE) is determined by filtering the sample through a glass fibre filter prior to dilution. Carbonaceous BOD (CBOD) is determined by adding a nitrification inhibitor to the diluted sample prior to incubation.

BR-IC-N-WT	Water	Bromide in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Methodology

Product	Matrix	Product Description	Analytical Method Reference
BROMATE-ONT-DW-WT	Water	Bromate in Water by LC/MS-MS	EPA 6850

An aliquot of sample is spiked with 18O-BrO3 internal standard and analyzed by LC/MS/MS.

This test procedure does not incorporate EDA preservation for bromate. Unpreserved bromate in water is stable for at least the 28 day recommended hold time, but samples that contain free chlorine or ozone could form additional bromate after the time of sampling (EPA 300.0 and 300.1).

BTX-511-HS-WT	Water	BTEX by Headspace	SW846 8260 (511)

BTX is determined by analyzing by headspace-GC/MS.

BTX-HS-WT	Soil	BTEX by Headspace	SW846 8260 (HEADSPACE)

BTX is s determined by extracting a soil or sediment sample as received with methanol and then analyzed by headspace-GC/MS.

BTX-HS-WT	Water	BTEX by Headspace	SW846 8260 (HEADSPACE)

BTX is determined by analyzing by headspace-GC/MS.

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.

C-TOC-CALC-SK	Soil	Total Organic Carbon Calculation	CSSS (2008) 21.2

Total Organic Carbon (TOC) is calculated by the difference between total carbon (TC) and total inorganic carbon. (TIC)

C-TOT-LECO-SK	Soil	Total Carbon by combustion method	CSSS (2008) 21.2

The sample is ignited in a combustion analyzer where carbon in the reduced CO2 gas is determined using a thermal conductivity detector.

CHL/A-ACET-FLUORO-WP	Water	Chlorophyll a by fluorometry	EPA 445.0 ACET

This analysis is done using procedures modified from EPA method 445.0. Chlorophyll a is determined by a 90 % acetone extraction followed with analysis by fluorometry using the non-acidification procedure. This method is not subject to interferences from chlorophyll b.

CHLORATE-IC-WT	Water	Chlorate by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CHLORITE-IC-WT	Water	Chlorite by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CL-IC-N-WT	Water	Chloride by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

Methodology

Product	Matrix	Product Description	Analytical Method Reference
CL-PASTE-COL-ED	Soil	Chloride in Soil (Paste) by Colorimetry	CSSS 15.2.1; APHA 4500-Cl E

A soil extract produced by the saturated paste extraction procedure is analyzed for Chloride by Colourimetry.

CL-R511-WT	Soil	Chloride-O.Reg 153/04 (July 2011)	EPA 300.0

5 grams of dried soil is mixed with 10 grams of distilled water for a minimum of 30 minutes. The extract is filtered and analyzed by ion chromatography.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

CL2-FREE-WT	Water	Free Chlorine	SM 4500-CL G, EPA 330.5

Chlorine (residual), as free or total, is analyzed using the DPD colourimetric method. The recommended hold time for these tests is 15 minutes; field testing is recommended for best results. Chlorine can be rapidly consumed by organic matter, if present, and dissipates rapidly into headspace.

CL2-TOTAL-WT	Water	Total Residual Chlorine	APHA 4500-CL G

Chlorine (residual), as free or total, is analyzed using the DPD colourimetric method. The recommended hold time for these tests is 15 minutes; field testing is recommended for best results. Chlorine can be rapidly consumed by organic matter, if present, and dissipates rapidly into headspace.

CN-FREE-CFA-WT	Water	Free Cyanide in water by CFA	ASTM 7237

This analysis is carried out using procedures adapted from ASTM Method 7237 "Free Cyanide with Flow Injection Analysis (FIA) Utilizing Gas Diffusion Separation and Amperometric Detection". Free cyanide is determined by in-line gas diffusion at pH 6 with final determination by colourimetric analysis.

CN-TOT-WT	Water	Cyanide, Total	ISO 14403-2

Total cyanide is determined by the combination of UV digestion and distillation. Cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

When using this method, high levels of thiocyanate in samples can cause false positives at ~1-2% of the thiocyanate concentration. For samples with detectable cyanide analyzed by this method, ALS recommends analysis for thiocyanate to check for this potential interference

CN-WAD-R511-WT	Soil	Cyanide (WAD)-O.Reg 153/04 (July 2011)	MOE 3015/APHA 4500CN I-WAD

The sample is extracted with a strong base for 16 hours, and then filtered. The filtrate is then distilled where the cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

COD-BF	Water	Chemical Oxygen Demand	APHA 5220 D

The dichromate ion oxidizes COD material when the sample is digested and after digestion the sample is then analyzed on a spectrophotometer.

COD-T-WT	Water	Chemical Oxygen Demand	APHA 5220 D

This analysis is carried out using procedures adapted from APHA Method 5220 "Chemical Oxygen Demand (COD)". Chemical oxygen demand is determined using the closed reflux colourimetric method.

Methodology

Product	Matrix	Product Description	Analytical Method Reference
COLOUR-APPARENT-WT	Water	Colour	APHA 2120

Apparent Colour is measured spectrophotometrically by comparison to platinum-cobalt standards using the single wavelength method after sample decanting. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment. Concurrent measurement of sample pH is recommended.

COLOUR-TRUE-WT	Water	Colour, True	APHA 2120C

True Colour is measured spectrophotometrically by comparison to platinum-cobalt standards using the single wavelength method after filtration of sample through a 0.45 um filter. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment. Concurrent measurement of sample pH is recommended.

CR-CR6-IC-WT	Soil	Hexavalent Chromium in Soil	SW846 3060A/7199

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 7199, published by the United States Environmental Protection Agency (EPA). The procedure involves analysis for chromium (VI) by ion chromatography using diphenylcarbazide in a sulphuric acid solution.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

CR-CR6-IC-WT	Water	Chromium +6	EPA 7199

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 7199, published by the United States Environmental Protection Agency (EPA). The procedure involves analysis for chromium (VI) by ion chromatography using diphenylcarbazide in a sulphuric acid solution. Chromium (III) is calculated as the difference between the total chromium and the chromium (VI) results.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

CRESOL-SUM-CALC-WT	Water	Total Cresols	CALCULATION

Total cresols represents the sum of o-cresol and m&p-cresol.

DDT&MET-WT	Soil	DDT and Metabolites	SW846 8270
DIQUAT-ONT-DW-WT	Water	Diquat in Water by LC/MS-MS	E3503

An aliquot of the sample is taken and internal standard is added. The sample is analyzed by LC/MS/MS.

DIURON-ONT-DW-WT	Water	Diuron in Drinking Water	E3501

An aliquot of water sample is diluted 1:1 using acetonitrile and analyzed using LC/MS/MS

DOC-WT	Water	Dissolved Organic Carbon	APHA 5310B

Sample is filtered through a 0.45um filter, then injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic carbon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.

DUSTFALLS-INS.DM2-WT	Dustfall	Dustfalls Insoluble (mg/dm2.day)	BCMOE DUSTFALLS

Dustfall analysis is carried out in accordance with procedures published by the B.C. Ministry of Environment Laboratory.

DX-1613B-HRMS-BU	Soil	Dioxins and Furans HR 1613B	USEPA 1613B

Samples are extracted by Soxhlet. The extracts are prepared using column chromatography, reduced in volume and analyzed by isotope-dilution GC/HRMS

Methodology

Product	Matrix	Product Description	Analytical Method Reference
DX-1613B-HRMS-BU	Waste	Dioxins and Furans by method 1613B	USEPA 1613B
Samples filtered if required. The solid portion is extracted by Soxhlet, the liquid portion is liquid/liquid extracted with dichloromethane. The extracts are prepared using column chromatography, reduced in volume and analyzed by isotope-dilution GC/HRMS.			
DX-R511-HRMS-BU	Water	Dioxins and Furans	USEPA 1613B
EC-BF	Water	Conductivity	APHA 2510 B
Water samples can be measured directly by immersing the conductivity cell into the sample.			
EC-MF-WT	Water	E. coli	SM 9222D
A 100 mL volume of sample is filtered through a membrane, the membrane is placed on mFC-BCIG agar and incubated at 44.5 ±0 .2 °C for 24 ± 2 h. Method ID: WT-TM-1200			
EC-PASTE-ED	Soil	Conductivity Sat. Paste	CSSS 15.2.1 & 15.3.1
A soil extract produced by the saturated paste extraction procedure is analyzed by conductivity meter.			
EC-SCREEN-VA	Water	Conductivity Screen (Internal Use Only)	APHA 2510
Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.			
EC-SCREEN-WT	Water	Conductivity Screen (Internal Use Only)	APHA 2510
Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.			
EC-SOLID-MF-WT	Soil	E. coli on sludge or solid	E3433
A biosolid sub-sample is transferred into buffered dilution water blank. The sample is manually shaken and an aliquot of the sample is then filtered through the membrane filter. The filter is then placed on mFC-BCIG agar and incubated at 44.5 ± 0.2 ºC for 24 ± 2 hours. Method ID: WT-TM-1200. Results are reported on a dry weight basis. Moisture is required.			
EC-WT	Soil	Conductivity (EC)	MOEE E3138
A representative subsample is tumbled with de-ionized (DI) water. The ratio of water to soil is 2:1 v/w. After tumbling the sample is then analyzed by a conductivity meter.			
Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).			
EC-WT	Water	Conductivity	APHA 2510 B
Water samples can be measured directly by immersing the conductivity cell into the sample.			
ETL-CHLORAMINES-WT	Water	Chloramines	APHA 4500-Cl B
ETL-N2N3-WT	Water	Calculate from NO2 + NO3	APHA 4110 B
ETL-NH3-UNION-WT	Water	Un-ionized ammonia	CALCULATION
F-DW-IC-WT	Water	Fluoride in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			

Methodology

Product	Matrix	Product Description	Analytical Method Reference
F-IC-N-WT	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

F1-F4-511-CALC-WT	Soil	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-S

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

Hydrocarbon results are expressed on a dry weight basis.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k) fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

Methodology

Product	Matrix	Product Description	Analytical Method Reference
F1-F4-511-CALC-WT	Water	F1-F4 Hydrocarbon Calculated Parameters	CCME CWS-PHC, Pub #1310, Dec 2001-L

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k) fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-F4-CALC-WT	Soil	CCME Total Hydrocarbons	CCME CWS-PHC, Pub #1310, Dec 2001-S

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

Hydrocarbon results are expressed on a dry weight basis.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k) fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

Methodology

Product	Matrix	Product Description	Analytical Method Reference
F1-F4-CALC-WT	Water	CCME Total Hydrocarbons	CCME CWS-PHC, Pub #1310, Dec 2001-L

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k) fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-HS-511-WT	Soil	F1-O.Reg 153/04 (July 2011)	E3398/CCME TIER 1-HS

Fraction F1 is determined by extracting a soil or sediment sample as received with methanol, then analyzing by headspace-GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F1-HS-511-WT	Water	F1-O.Reg 153/04 (July 2011)	E3398/CCME TIER 1-HS

Fraction F1 is determined by analyzing by headspace-GC/FID.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F1-HS-WT	Soil	F1 (O.Reg.153/04)	E3398/CCME TIER 1-HS

Fraction F1 is determined by extracting a soil or sediment sample as received with methanol, then analyzing by headspace-GC/FID.

F1-HS-WT	Water	F1 (O.Reg.153/04)	E3421/CCME (HS)

Fraction F1 is determined by analyzing by headspace-GC/FID.

Methodology

Product	Matrix	Product Description	Analytical Method Reference
F2-F4-511-WT	Soil	F2-F4-O.Reg 153/04 (July 2011)	CCME Tier 1

Petroleum Hydrocarbons (F2-F4 fractions) are extracted from soil with 1:1 hexane:acetone using a rotary extractor. Extracts are treated with silica gel to remove polar organic interferences. F2, F3, & F4 are analyzed by GC-FID. F4G-sg is analyzed gravimetrically.

Notes:
1. F2 (C10-C16): Sum of all hydrocarbons that elute between nC10 and nC16.
2. F3 (C16-C34): Sum of all hydrocarbons that elute between nC16 and nC34.
3. F4 (C34-C50): Sum of all hydrocarbons that elute between nC34 and nC50.
4. F4G: Gravimetric Heavy Hydrocarbons
5. F4G-sg: Gravimetric Heavy Hydrocarbons (F4G) after silica gel treatment.
6. Where both F4 (C34-C50) and F4G-sg are reported for a sample, the larger of the two values is used for comparison against the relevant CCME guideline for F4.
7. F4G-sg cannot be added to the C6 to C50 hydrocarbon results to obtain an estimate of total extractable hydrocarbons.
8. This method is validated for use.
9. Data from analysis of validation and quality control samples is available upon request.
10. Reported results are expressed as milligrams per dry kilogram, unless otherwise indicated.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-511-WT	Water	F2-F4-O.Reg 153/04 (July 2011)	EPA 3511/CCME Tier 1

Petroleum Hydrocarbons (F2-F4 fractions) are extracted from water using a hexane micro-extraction technique. Instrumental analysis is by GC-FID, as per the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Tier 1 Method, CCME, 2001.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

F2-F4-WT	Soil	F2-F4 (O.Reg.153/04)	CCME Tier 1

A sub-sample of the solid sample is extracted with a solvent mixture. Following extraction, the sample extract is treated in situ with Silica Gel analyzed by GC/FID.

The F2 fraction is determined by integrating the area in the chromatogram from the apex of nC10 to the apex nC16 and quantitating using external calibration using a standard mix containing nC10, nC16 and nC34. Similarly, the F3 fraction extends from the apex of nC16 to the apex nC34 and the F4 fraction covers the area from the apex nC34 to the apex nC50. If the chromatogram does not return to the baseline by the time nC50 elutes, a gravimetric determination of the F4 is performed.

F2-F4-WT	Water	F2-F4 (O.Reg.153/04)	MOE DECPH-E3421/CCME TIER 1

Petroleum Hydrocarbons (F2-F4 fractions) are extracted from water using a hexane micro-extraction technique. Instrumental analysis is by GC-FID, as per the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Tier 1 Method, CCME, 2001.

FC-MF-WT	Water	Fecal Coliforms	SM 9222D

A 100mL volume of sample is filtered through a membrane, the membrane is placed on mFC agar and incubated at 24±2h@44.5±0.2°C. Method ID: WT-TM-1200

FC-SOLID-MF-WT	Soil	Fecal Coliform on sludge or solid	SM 9222D

Methodology

Product	Matrix	Product Description	Analytical Method Reference
FLASH-PMCC-AUTO-CL	Waste	Pensky-Martens Closed Cup Flashpoint	ASTM D-93

A brass cup of specified dimensions, filled to the inner mark with test sample and fitted with a cover, is heated and the sample stirred at specified rates, using one of 3 defined procedures. An ignition source is directed into the cup at regular intervals until a flash is detected. The flash point is the lowest temperature corrected for barometric pressure, at which the vapour of the sample ignites.

GLYCOL-CL	Soil	Glycol Screen	EPA 3550C, EPA 8015D

This analysis is carried out using procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846, Method 8015D and 3550C, published by the United States Environmental Protection Agency (EPA). The procedure involves extraction of a subsample of the sediment/soil with de-ionized water, followed by ultrasonic bath. The water extract is then analyzed by GC-FID direct aqueous injection.

GLYPHOSATE-ONT-DW-WT	Water	Glyphosate in Drinking Water	MOE E3500

This analysis is carried out using procedures adapted from ON MOE E3500 "Glyphosate". Glyphosate is determined by direct injection by LC-MS/MS on a sample that bas been derivatized.

GRAIN SIZE-HYD-WT	Soil	Grain Size by Hydrometer	ASTM D422-63

Particle size curve is generated from dry sieving (particles > 2 mm), wet sieving (particles 2 mm-75 um and hydrometer readings (particles < 75 um)

HAA+DAL-ECD-WT	Water	Haloacetic Acids - Extended EPA List	EPA 552.3

An aliquot of sample is acidified and shaken with methyl tert-butyl ether (MTBE). After extraction, the haloacetic acids partitioned into MTBE are esterified with acidic methanol and analyzed using a gas chromatograph equipped with an electron capture detector (GC-ECD).

HAA5-SUM-CALC-WT	Water		CALCULATION

Total Haloacetic Acids 5 (HAA5) represents the sum of monobromoacetic acid, monochloroacetic acid, dibromoacetic acid, dichloroacetic acid and trichloroacetic acid. For the purpose of calculation, results less than the detection limit (DL) are treated as zero.

HARDNESS-CALC-WT	Water	Hardness	APHA 2340 B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-200.2-CVAA-WT	Soil	Mercury in Soil by CVAAS	EPA 200.2/1631E (mod)

Soil samples are digested with nitric and hydrochloric acids, followed by analysis by CVAAS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

HG-D-CVAA-WT	Water	Dissolved Mercury in Water by CVAAS	EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

Methodology

Product	Matrix	Product Description	Analytical Method Reference
HG-DRY-MICR-CVAA-VA	Tissue	Mercury in Tissue by CVAAS (DRY)	EPA 200.3, EPA 245.7

This method is adapted from US EPA Method 200.3 "Sample Procedures for Spectrochemical Determination of Total Recoverable Elements in Biological Tissues" (1996). Tissue samples are homogenized and sub-sampled prior to hotblock digestion with nitric and hydrochloric acids, in combination with repeated additions of hydrogen peroxide. Analysis is by atomic absorption spectrophotometry, adapted from US EPA Method 245.7.

HG-DUST(DM2)-CVAA-WT	Dustfall	Total Mercury in Dustfalls by CVAA	EPA SW846 7470A

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). Instrumental analysis is by cold vapour atomic absorption spectrophotometry.

HG-T-CVAA-WT	Water	Total Mercury in Water by CVAAS	EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

HG-T-ONT-DW-WT	Water	Mercury (Hg)	EPA 1631E (mod)
HG-TCLP-WT	Waste	Mercury (CVAA) for O.Reg 347	EPA 1631E

This analysis is carried out in accordance with the extraction procedure outlined in "Test Methods for Evaluating Solid Waste - Physical/Chemical Methods Volume 1C" SW-846 EPA Method 1311, published by the United States Environmental Protection Agency (EPA). In summary, the sample is extracted at a 20:1 liquid to solids ratio for 16 to 20 hours using either extraction fluid #1 (glacial acetic acid, water and sodium hydroxide) or extraction fluid #2 (glacial acetic acid), depending on the pH of the original sample. The extract is then filtered through a 0.6 to 0.8 micron glass fibre filter and analysed using atomic absorption spectrophotometry (EPA 1631E).

HG-WET-CVAA-WP	Tissue	Mercury in Tissue	EPA 200.3/1631E (mod)

Tissue samples undergo hotblock digestion with nitric and hydrochloric acids, in combination with repeated additons of hydrogen peroxide, followed by cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analysis by CVAAS.

HPC-MF-WT	Water	Heterotrophic Plate Count	SM 9215D

A 1mL volume of sample is filtered through a membrane, the membrane is placed on mHPC agar and incubated for 48±2h@35±0.5° C. Method ID: WT-TM-1200

IC-CACO3-CALC-SK	Soil	Inorganic Carbon as CaCO3 Equivalent	Calculation
LEACH-TCLP-WT	Waste	Leachate Procedure for Reg 347	EPA 1311

Inorganic and Semi-Volatile Organic contaminants are leached from waste samples in strict accordance with US EPA Method 1311, "Toxicity Characteristic Leaching Procedure" (TCLP). Test results are reported in leachate concentration units (normally mg/L).

LEACH-ZHE-WT	Waste	Zero Headspace Leaching Procedure	EPA 1311

Volatile Organic contaminants are leached from waste samples in strict accordance with US EPA Method 1311, "Toxicity Characteristic Leaching Procedure" (TCLP), using the Zero Headspace Extraction (ZHE) process. Test results are reported in leachate concentration units (normally mg/L).

Methodology

Product	Matrix	Product Description	Analytical Method Reference
MET-200.2-CCMS-WT	Soil	Metals in Soil by CRC ICPMS	EPA 200.2/6020A (mod)

Soil/sediment is dried, disaggregated, and sieved (2 mm). For tests intended to support Ontario regulations, the <2mm fraction is ground to pass through a 0.355 mm sieve. Strong Acid Leachable Metals in the <2mm fraction are solubilized by heated digestion with nitric and hydrochloric acids. Instrumental analysis is by Collision / Reaction Cell ICPMS.

Limitations: This method is intended to liberate environmentally available metals. Silicate minerals are not solubilized. Some metals may be only partially recovered (matrix dependent), including Al, Ba, Be, Cr, S, Sr, Ti, Tl, V, W, and Zr. Elemental Sulfur may be poorly recovered by this method. Volatile forms of sulfur (e.g. sulfide, H2S) may be excluded if lost during sampling, storage, or digestion.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

MET-D-CCMS-WT	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

MET-D-NP-U-CCMS-WT	Water	Dissolved Metals in Water by CRC ICPMS	EPA SW-846 6020A

Ultra trace metals in water are analyzed by CRC ICPMS, based on US EPA Method 6020A (Jan 1998). This procedure is intended for pristine field-filtered acid-preserved water samples. The detection limits (LOR) for this test are based on lab instrumental analysis only, not including filtration. ALS-supplied field filtration equipment does not support these LOR. Therefore, because of the high probability of false positives due to filtration, it is strongly recommended that a filtration blank be analysed to aid in data interpretation. Special bottles, preservatives and sampling procedures apply.

MET-DRY-MICR-CCMS-VA	Tissue	Metals in Tissue by CRC ICPMS (DRY)	EPA 200.3/6020B

This method is conducted following British Columbia Lab Manual method "Metals in Animal Tissue and Vegetation (Biota) - Prescriptive". Tissue samples are homogenized and sub-sampled prior to hotblock digestion with nitric and hydrochloric acids, in combination with addition of hydrogen peroxide. Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modified from EPA Method 6020B).

Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.

MET-DUST(DM2)-MS-WT	Dustfall	Total Metals in Dustfalls by ICPMS	EPA 6020A

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). Instrumental analysis is by ICP-MS (EPA Method 6020A)

Methodology

Product	Matrix	Product Description	Analytical Method Reference
MET-ONT-DW-WT	Water	Drinking Water Metals	EPA 6020A
MET-PASTE-ICP-ED	Soil	Salinity metals by ICPOES (Sat. Paste)	CSSS CH15/EPA 6010B

A soil extract produced by the saturated paste extraction procedure is analyzed for Sodium, Calcium, and Magnesium by ICPOES as per "Soil Sampling and Methods of Analysis" by M. Carter.

MET-T-CCMS-VA	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

MET-T-CCMS-WT	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

MET-T-NP-U-CCMS-WT	Water	Total Metals by CRC ICPMS (Undigested)	EPA SW-846 6020A

Ultra trace metals in water are analyzed by CRC ICPMS, based on US EPA Method 6020A (Jan 1998). The detection limits provided can only be met for undigested samples. This procedure is intended for colorless, non-turbid, acid-preserved water samples (i.e. pristine water samples), having turbidity < 1 NTU and no odor. Where turbidity exceeds 1 NTU, and/or the sample is colored and has an odor, results may be biased low compared to true Total Metals concentrations. ALS recommends that turbidity analysis be requested on samples submitted for this test to aid with interpretation of results. Special bottles, preservatives and sampling procedures apply.

MET-TCLP-EXTRA-WT	Waste	O. Reg 347 Extra Metals on TCLP Leachate	EPA 200.8
MET-TCLP-WT	Waste	O.Reg 347 TCLP Leachable Metals	EPA 6020B

This analysis is carried out in accordance with the extraction procedure outlined in "Test Methods for Evaluating Solid Waste - Physical/Chemical Methods Volume 1C" SW-846 EPA Method 1311, published by the United States Environmental Protection Agency (EPA). In summary, the sample is extracted at a 20:1 liquid to solids ratio for 16 to 20 hours using either extraction fluid #1 (glacial acetic acid, water and sodium hydroxide) or extraction fluid #2 (glacial acetic acid), depending on the pH of the original sample. The extract is then filtered through a 0.6 to 0.8 micron glass fibre filter. Instrumental analysis of the digested extract is by collision cell inductively coupled plasma - mass spectrometry (modifed from EPA Method 6020B).

MET-WET-CCMS-WP	Tissue	Metals in Tissue by CRC ICPMS (WET)	EPA 200.3/6020B (mod)

This method is conducted following British Columbia Lab Manual method "Metals in Animal Tissue and Vegetation (Biota) - Prescriptive". Tissue samples are homogenized and sub-sampled prior to hotblock digestion with nitric and hydrochloric acids, in combination with addition of hydrogen peroxide. Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modified from EPA Method 6020A).

Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.

Methodology

Product	Matrix	Product Description	Analytical Method Reference
METHYLNAPS-CALC-WT	Soil	ABN-Calculated Parameters	SW846 8270
MICROCYSTIN-WP	Water	Microcystin	ENVIROLOGIX QUANTIPLATE KIT CAT. EP022

Total Microcystins (intraceller and extraceller) in aqueous matrices is determined by the Enzyme-Linked ImmunoSorbent Assay (ELISA) method.

MISC-ONT-DW-WT	Water	O.Reg 170/03 Miscellaneous Pesticides	SW846 8270

Pesticides are extracted from an aqueous sample using separate aliquots of solvent, extracts are concentrated down to a certain volume and analyzed on the GC/MSD.

MOISTURE-BU	Soil	% Moisture	CCME PHC in Soil - Tier 1 (mod)

This method is used to determine the percent moisture in a sample. Samples are homogenized, moisture is removed by heating at 105°C until constant mass is achieved. The residues are measured gravimetrically and the difference in weight between the wet sample and the dried sample is used to determine the moisture content. This percent moisture can be used, in conjunction with analytical results, to report data on a dry weight basis.

MOISTURE-MICR-VA	Tissue	Moisture in Tissue	Puget Sound WQ Authority, Apr 1997

This analysis is carried out gravimetrically by drying the sample at <60 deg. C.

MOISTURE-WT	Soil	% Moisture	CCME PHC in Soil - Tier 1 (mod)
N-TOTKJ-COL-SK	Soil	Total Kjeldahl Nitrogen	CSSS (2008) 22.2.3

The soil is digested with sulfuric acid in the presence of CuSO4 and K2SO4 catalysts. Ammonia in the soil extract is determined colrimetrically at 660 nm.

NDMA-ONTDW-HRMS-BU	Water	NDMA to meet Ont Reg 170/03	MOE E3388

NDMA by modified Ont. MOE method E3388 GC/HRMS

NH3-F-WT	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NH3-WT	Soil	Ammonia as N	EPA 350.1

Sample is distilled into a solution of boric acid and measured colorimetrically.

NO2-DW-IC-WT	Water	Nitrite in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO2-IC-WT	Water	Nitrite in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO2-L-IC-N-WP	Water	Nitrite in Water by IC (Low Level)	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO2-WT	Soil	Nitrite in Soil	EPA 300.0

5 grams of soil is mixed with 50 mL of distilled water for a minimum of 30 minutes. The extract is filtered and analyzed by ion chromatography.

Methodology

Product	Matrix	Product Description	Analytical Method Reference
NO3-AVAIL-SK	Soil	Available Nitrate-N	Alberta Ag / APHA 4500 NO3F

Available Nitrate and Nitrite are extracted from the soil using a dilute calcium chloride solution. Nitrate is quantitatively reduced to nitrite by passing of the sample through a copperized cadmium column. The nitrite (reduced nitrate plus original nitrite) is then determined by diazotizing with sulfanilamide followed by coupling with N-(1-naphthyl) ethylenediamine dihydrochloride. The resulting water soluble dye has a magenta color which is measured at colorimetrically at 520nm.

NO3-DW-IC-WT	Water	Nitrate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-IC-N-WT	Water	Nitrate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-IC-WT	Water	Nitrate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

NO3-WT	Soil	Nitrate in Soil (NO3-N)	EPA 300.0

5 grams of soil is mixed with 50 mL of distilled water for a minimum of 30 minutes. The extract is filtered and analyzed by ion chromatography.

NP,NPE-LCMS-WT	Soil	Nonyl Phenols and Ethoxylates	J. of Chrom. A849 (1999) 467-482

Sample is derivatized and injected directly. Each compound is separated by reversed phase HPLC and analyzed by Electro Spray Ionization MS/MS detection using Triple Quadrupole MS/MS detector. Internal standards are used for quantitation.

NTA-ONT-DW-WT	Water	NTA in Drinking Water	EPA 430.1

NTA refers to the tri-sodium salt of nitrilotriacetic acid, N(CH2COONa)3. Zinc forms a blue-coloured complex with 2 carboxy-2-hydroxy-5-sulfoformazylbenzene (Zincon) in a solution buffered to pH 9.2. When NTA is added to the sample, the Zinc-Zincon complex is broken which reduces the absorbance in proportion to the amount of NTA present.

OGG-SPEC-CALC-WT	Water	Speciated Oil and Grease A/V Calc	CALCULATION

Sample is extracted with hexane, sample speciation into mineral and animal/vegetable fractions is achieved via silica gel separation and is then determined gravimetrically.

OGG-SPEC-WT	Water	Speciated Oil and Grease-Gravimetric	APHA 5520 B

The procedure involves an extraction of the entire water sample with hexane. Sample speciation into mineral and animal/vegetable fractions is achieved via silica gel separation and is then determined gravimetrically.

OGG-TOT-WT	Soil	Oil and Grease, Total	APHA 5520 B

Sample is extracted with an acetone:hexane mixture and then evaporated and the resulting residue is weighed to determine the total oil and grease.

OGG-TOT-WT	Water	Oil and Grease, Total	APHA 5520 B

The procedure involves an extraction of the entire water sample with hexane. This extract is then evaporated to dryness, and the residue weighed to determine Oil and Grease.

OM-LOI-SK	Soil	Organic Matter by LOI at 375 deg C.	CSSS (1978) p. 160

The dry-ash method involves the removal of organic matter by combustion at 375 degrees C for a minimum of 16 hours. Samples are dried prior to combustion.

Methodology

Product	Matrix	Product Description	Analytical Method Reference
P-T-COL-WT	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is deteremined colourimetrically after persulphate digestion of the sample.

PAH-511-WT	Soil	PAH-O.Reg 153/04 (July 2011)	SW846 3510/8270

A representative sub-sample of soil is fortified with deuterium-labelled surrogates and a mechanical shaking techniqueis used to extract the sample with a mixture of methanol and toluene. The extracts are concentrated and analyzed by GC/MS. Results for benzo(b) fluoranthene may include contributions from benzo(j)fluoranthene, if also present in the sample.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

PAH-C429-LRMS-BU	Tissue	PAH by GC/LRMS	CARB 429

Samples are Soxhlet extracted with dichloromethane. Extracts are prepared by column chromatography, reduced in volume and analyzed by isotope-dilution SIM-GC/LRMS

PAHERB-LCMS-PPM-WT	Water	Phenoxyacid Herbicides by LC-MS/MS	MOE E3552

Water samples are subjected to 0.2 µM RC filtration and analyzed by direct injection without sample preparation using liquid chromatography tandem mass spectrometry (LC-MS/MS).

PAHERB-ONT-DW-WT	Water	O.Reg 170/03 PA Herbicides	MOE E3552

Water samples are analyzed by direct injection without sample preparation using liquid chromatography tandem mass spectrometry (LC-MS/MS).

PARAQUAT-ONT-DW-WT	Water	Paraquat in Water by LC/MS-MS	E3503

An aliquot of the sample is taken and internal standard is added. The sample is analyzed by LC/MS/MS.

PARTICULATE-0.10-SLT	Filter	Respirable Dust N0600	NIOSH 0600 Mod., MW MCE Filter
PCB-TCLP-WT	Waste	PCBs for O. Reg 347	SW846 8270
PCB-WT	Soil	Polychlorinated Biphenyls	EPA 8082

A representative sub-sample of a soil sample is mixed with methanol and extracted with toluene using a shaker technique. An aliquot of the separated toluene is analyzed by GC/MSD.

PCP-WT	Soil	Pentachlorophenol	SW846 8270

Soil samples are extracted and the extracts are analyzed by GC/MSD

PH-1:2 CACL2-ED	Soil	pH (1:2 CaCl2)	CSSS 16.3 - 1:2 Extraction w/0.01M CaCl2

Soil and 0.01M CaCl2 solution (by volume) are mixed in a defined ratio. The slurry is allowed to stand, shaken, and then allowed to stand again prior to taking measurements. After equilibration, the pH of the liquid portion of the extract is measured by a pH meter.

PH-1:2-ED	Soil	pH 1:2 H2O Extract	CSSS 16.2 - PH OF 1:2 WATER EXTRACT

Soil and de-ionized water (by volume) are mixed in a defined ratio. The slurry is allowed to stand, shaken, and then allowed to stand again prior to taking measurements. After equilibration, the pH of the liquid portion of the extract is measured by a pH meter. Field Measurement is recommended where accurate pH measurements are required, due to the 15 minute recommended hold time.

Methodology

Product	Matrix	Product Description	Analytical Method Reference
PH-BF	Water	pH	APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

PH-WT	Soil	pH	MOEE E3137A

A minimum 10g portion of the sample is extracted with 20mL of 0.01M calcium chloride solution by shaking for at least 30 minutes. The aqueous layer is separated from the soil and then analyzed using a pH meter and electrode.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

PH-WT	Water	pH	APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011). Holdtime for samples under this regulation is 28 days

PHENOLS-4AAP-WT	Soil	Phenol (4AAP)	EPA 9066

A manual method is used to distill the sample. The distillate is then buffered to pH 9.4 and reacts with 4AAP and alkaline ferricyanide to form a red complex which is measured colorimetrically.

PHENOLS-4AAP-WT	Water	Phenol (4AAP)	EPA 9066

An automated method is used to distill the sample. The distillate is then buffered to pH 9.4 which reacts with 4AAP and potassium ferricyanide to form a red complex which is measured colorimetrically.

PHEOA-ACET-FLUORO-WP	Water	Pheophytin a by fluorometry	EPA 445.0 ACET

This analysis is done using procedures modified from EPA method 445.0. Pheopigments present in the sample are determined collectively as Pheophytin a by a 90% (v/v) acetone extraction followed with analysis by fluorometry using the acidification procedure.

PO4-DO-COL-WT	Soil	Orthophosphate in Soil (PO4-P)	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a soil sample that has been extracted and filtered through a 0.45 micron membrane filter.

PO4-DO-COL-WT	Water	Diss. Orthophosphate in Water by Colour	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter.

PO4/K-AVAIL-SK	Soil	Plant Available Phosphorus and Potassium	Comm. Soil Sci. Plant Anal, 25 (5&6)

Plant available phosphorus and potassium are extracted from the soil usng Modified Kelowna solution. Phosphorous in the soil extract is determined colorimetrically at 880 nm, while potassiumis determined by flame emission at 770 nm.

PREP-DRY/GRIND-ED	Soil	Dry and Grind	
PREP-DRY/GRIND-SK	Soil	Dry and Grind	
PREP-MET-DIGEST-WT	Water	Sample Prep (Digestion for Metals)	
PREP-MET-FILT-WT	Water	Sample Prep (Filtration for Metals)	

Methodology

Product	Matrix	Product Description	Analytical Method Reference
PREP-MICR-DIGEST-VA	Tissue	Tissue/Vegetation MIcro Preparation	
PSA-1-ED	Soil	Particle Size	CSSS 55.3-Hydrometer

Soil samples are oven dried, ground to pass a 2 mm sieve , and soaked in Calgon solution for a minimum of 16 hours. Soil suspensions are measured for particle size by distribution using a hydrometer after specified settling times.

PSA-1-SK	Soil	Particle Size Analysis:Mini-Pipet Method	SSIR-51 Method 3.2.1

Dry, < 2 mm soil is treated with sodium hexametaphosphate to ensure complete dispersion of primary soil particles. After treatment, sub-samples of the homogenized soil suspension are taken at specific times and sampling depths as determined by Stoke's Law. The dry weight of soil found in each sub-sample is used determine the silt and clay content. The sand fraction is determined by difference.

The soil texture is determined according to the CSSC soil texture triangle.

PYR-TCLP-WT	Waste	Pyridine for O. Reg 347	SW846 8260D

Samples are leached according to TCLP protocol and then analyzed on GC/MSD

RA226-MMER-FC	Water	Ra226 by Alpha Scint, MDC=0.01 Bq/L	EPA 903.1
S2-T>H2S-CALC-WT	Water	Total Sulphide Calculated as H2S	Calculation

This calculation converts Total Sulphide as (S2-) and reports it as Total Sulphide as (H2S). Total Sulphide as (S2-) is determined using procedures adapted from APHA 4500-S2 "Sulphide".

SAL-MG/KG-CALC-ED	Soil	Detail Salinity in mg/kg	Calculation

Conversion of Saturation Extract soluble ions from units of mg/L to mg/kg:
mg/kg = mg/L * (% Saturation / 100%)

SALINITY-INTCHECK-ED	Soil		CSSS 18.4-Calculation

An internal calculation is reviewed to examine the balance of cations to anions, to ensure data correctness.

SAMPLE-DISPOSAL-WT	Misc.	Sample Handling and Disposal Fee	
SAR-PASTE-CALC-ED	Soil	Sodium Adsorption Ratio (Sat. Paste)	CSSS 15.4.4-Calculation

A soil extract produced by the saturated paste extraction procedure is analyzed for Sodium, Calcium, and Magnesium by ICPOES. Sodium Adsorption Ratio (SAR) is calculated as per "Soil Sampling and Methods of Analysis" by M. Carter.

SAR-R511-WT	Soil	SAR-O.Reg 153/04 (July 2011)	SW846 6010C

A dried, disaggregated solid sample is extracted with deionized water, the aqueous extract is separated from the solid, acidified and then analyzed using a ICP/OES. The concentrations of Na, Ca and Mg are reported as per CALA requirements for calculated parameters. These individual parameters are not for comparison to any guideline.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

SAT-PCNT-ED	Soil	% Saturation	CSSS 15.2-CALCULATION

As received samples are pasted to saturation. A sub-sample is weighed, oven dried and re-weighed to determine % saturation.

Methodology

Product	Matrix	Product Description	Analytical Method Reference
SHIPPING-WT	Misc.	Shipping Charge	
SIO2-T-CALC-WT	Water	Total Silicon (reported as Silica)	Calculation
SO4-AVAIL-SK	Soil	Available Sulfate-S	REC METH SOIL ANAL - AB. AG(1988)

Plant available sulfate in the soil is extracted using a weak calcium chloride solution. Sulfate in the extract is determined by ICP-OES. This extraction may also produce organic sulfur in the extracts when organic soils are analyzed.

SO4-IC-N-WT	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SO4-PASTE-ICP-ED	Soil	Sulfur (as SO4) by ICPOES (Sat. Paste)	CSSS CH15/EPA 6010B

A soil extract produced by the saturated paste extraction procedure is analyzed for Sulfur by ICPOES, then converted mathematically to report as SO4.

SOLIDS-TDS-BF	Water	Total Dissolved Solids	APHA 2540C

A well-mixed sample is filtered though glass fibres filter. A known volume of the filtrate is evaporated and dried at 180 +/- 2C for 1hr.

SOLIDS-TDS-WT	Water	Total Dissolved Solids	APHA 2540C

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

SOLIDS-TSS-BF	Water	Suspended solids	APHA 2540 D-Gravimetric

A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104 +/- 1C for a minimum of four hours or until a constant weight is achieved.

SOLIDS-TSS-WT	Water	Suspended solids	APHA 2540 D-Gravimetric

A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104±1°C for a minimum of four hours or until a constant weight is achieved.

SPECIAL REQ-61-WP	Misc.	Special Request Inorganics Winnipeg	SPECIAL REQUEST
SPECIAL REQUEST-AV	Misc.	Special Request Activation Laboratories	SEE SUBLET LAB RESULTS
SPECIAL REQUEST-SLT	Misc.	Special Request Datachem Salt Lake	SEE SUBLET LAB RESULTS
SULFOLANE-LCMS-WT	Soil	Sulfolane in soil by LC/MS-MS	ASTM D7599

A soil sample is spiked with internal standard, extracted with HPLC Water. and analyzed by direct injection using HPLC Triple Quadrupole MS/MS.

SULPHIDE-WT	Water	Sulphide (as S)	APHA 4500S2D

This analysis is carried out using procedures adapted from APHA Method 4500-S2-D "Methylene Blue Method". Sulphide is determined colourmetrically.

Methodology

Product	Matrix	Product Description	Analytical Method Reference
TC,EC-QT51-WT	Water	Total Coliform and E. Coli	APHA 9223B

This analysis is carried out using procedures adapted from APHA Method 9223 "Enzyme Substrate Coliform Test". E. coli and Total Coliform are determined simultaneously. The sample is mixed with a mixture of hydrolyzable substrates and then sealed in a multi-well packet. The packet is incubated for 18 or 24 hours and then the number of wells exhibiting a positive response are counted. The final result is obtained by comparing the positive responses to a probability table.

TC-MF-WT	Water	Total Coliforms	SM 9222B

A 100mL volume of sample is filtered through a membrane, the membrane is placed on mENDO LES agar and incubated at 35±0.5° C for 24±2h. Method ID: WT-TM-1200

THM-SUM-CALC-WT	Water	Total Trihalomethanes (THMs)	CALCULATION

Total Trihalomethanes (THMs) represents the sum of bromodichloromethane, bromoform, chlorodibromomethane and chloroform. For the purpose of calculation, results less than the detection limit (DL) are treated as zero.

THM-SUM-PPB-CALC-WT	Water	Total Trihalomethanes (THMs)	CALCULATION

Total Trihalomethanes (THMs) represents the sum of bromodichloromethane, bromoform, chlorodibromomethane and chloroform. For the purpose of calculation, results less than the detection limit (DL) are treated as zero.

THM-TCLP-WT	Waste	Trihalomethanes for O. Reg 347	SW846 8260

A sample of waste is leached in a zero headspace extractor at 30±2 rpm for 18±2.0 hours with the appropriate leaching solution. After tumbling the leachate is analyzed directly by purge and trap technology, followed by GC/MS using internal standard quantitation.

TI-DRY-MICR-CCMS-VA	Tissue	Titanium in Tissue by CRC ICPMS (DRY)	EPA 200.3/6020B

This method is conducted following British Columbia Lab Manual method "Metals in Animal Tissue and Vegetation (Biota) - Prescriptive". Tissue samples are homogenized and sub-sampled prior to hotblock digestion with nitric and hydrochloric acids, in combination with addition of hydrogen peroxide. Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modified from EPA Method 6020B).

Method Limitation: This method employs a strong acid/peroxide digestion, and is intended to provide a conservative estimate of bio-available metals. Near complete recoveries are achieved for most toxicologically important metals, but elements associated with recalcitrant minerals may be only partially recovered.

TKN-WT	Water	Total Kjeldahl Nitrogen	APHA 4500-Norg D

This analysis is carried out using procedures adapted from APHA Method 4500-Norg "Nitrogen (Organic)". Total Kjeldahl Nitrogen is determined by sample digestion at 380 Celsius with analysis using an automated colorimetric method.

TOC-WT	Soil	TOC & FOC in Solids	CARTER 21.3.2

Soil is treated with excess acidic dichromate, which reacts with the organic carbon, oxidizing it to CO2. The residual dichromate is titrated with ferrous ammonium sulphate and TOC calculated by difference.

TOC-WT	Water	Total Organic Carbon	APHA 5310B

Sample is injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic cabon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.

TURB-MET-WT	Water	Turbidity on preserved metals sample	APHA 2130 B

Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.

Methodology

Product	Matrix	Product Description	Analytical Method Reference
TURBIDITY-BF	Water	Turbidity	APHA 2130 B

Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.

TURBIDITY-WT	Water	Turbidity	APHA 2130 B

Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.

VOC-511-HS-WT	Soil	VOC-O.Reg 153/04 (July 2011)	SW846 8260 (511)

Soil and sediment samples are extracted in methanol and analyzed by headspace-GC/MS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011), unless a subset of the Analytical Test Group (ATG) has been requested (the Protocol states that all analytes in an ATG must be reported).

VOC-ONT-DW-WT	Water	Volatile Organics (O.Reg 170/03)	SW846 8260

Liquid samples are analyzed by headspace GC/MSD.

VOC-ROU-HS-WT	Water	Volatile Organic Compounds	SW846 8260

Aqueous samples are analyzed by headspace-GC/MS.

VOC-TCLP-WT	Waste	VOC for O. Reg 347	SW846 8260

A sample of waste is leached in a zero headspace extractor at 30±2 rpm for 18±2.0 hours with the appropriate leaching solution. After tumbling the leachate is analyzed directly by headspace technology, followed by GC/MS using internal standard quantitation.

XYLENES-SUM-CALC-WT	Soil	Sum of Xylene Isomer Concentrations	CALCULATION

Total xylenes represents the sum of o-xylene and m&p-xylene.

XYLENES-SUM-CALC-WT	Water	Sum of Xylene Isomer Concentrations	CALCULATION

Total xylenes represents the sum of o-xylene and m&p-xylene.

APPENDIX E

Analytical Laboratory QA/QC Procedures

ALS Quality Management System Summary

ALS is a global diversified testing services organization with a presence on every continent, offering a broad range of services to leading global companies.

The following report summarizes standard practices routinely employed by the ALS Environmental Division in Canada. Our practices exceed accreditation requirements and have been built to meet the needs of our customers and to give them confidence in the reliability of our test data.

Additional information is available on request from the Quality Department. Customers are invited to audit or tour ALS facilities at their convenience.

Services to Customers

ALS cooperates closely with its customers to ensure their testing needs are understood, and allows them reasonable access to relevant work areas of the laboratories to audit the management system or to witness test work undertaken on their behalf.

All client issues are logged into our tracking system to ensure each issue is addressed completely and appropriately. Local and national oversight and initiatives ensure that identified improvements are incorporated in the Canadian laboratories so that customers receive the same level of service regardless of which location performs the testing.

Documentation and Document Control

Test methods and support procedures are documented in detail to ensure consistency of application, repeatability of test results and traceability of analyses.

Test method requirements include but are not limited to sample handling, sample storage, minimizing interference, sample preparation, reagent and standard specifications, equipment, supplies, calibration requirements, instrumental measurement procedures, quality control requirements, data quality objectives and corrective actions, calculations, reporting requirements, reference information, hazards and their preventive measures.

Administrative support procedures are also documented where needed to ensure quality system procedures and customer services are provided in a controlled, approved manner consistent with ALS policies and client needs.

All procedures are authorized prior to use by the signing authority, ensuring adequate technical and quality oversight.

Distribution of documents is controlled to ensure only the most recent version is available for use. Authorized documents are reviewed periodically by the signing authority to ensure they continue to meet ALS requirements and customer needs.

Test methods and support procedures are available for client viewing on-site.

Internal Audits

Internal audits are scheduled and performed by qualified Quality and Technical staff for all routine analytical procedures and Quality System elements. Such audits ensure that procedures are implemented as intended, that test methods are scientifically defensible and technically sound, and that policies, procedures and records continue to meet the Quality System objectives.

Quality staff may periodically initiate unscheduled audits in response to proficiency testing program results, client feedback, requests from managers or any other circumstance that warrants investigation.

Quality Control (QC)

ALS has established QC procedures for monitoring the validity of tests performed by its laboratories. Individual test methods specify quality control requirements, frequency of use, and Data Quality Objectives (DQOs).

The type of quality control elements used for process monitoring is dependent on the test performed, but typically includes (as appropriate): Calibration Verification Standards, Continuing Calibration Verifications, Instrument Blanks, Method Blanks, Laboratory Control Samples, Reference Materials, Matrix Spikes, Surrogate Spikes, and Internal Standards.

DQOs are established for each QC sample, based on a combination of reference method objectives, customer requirements and historical test method performance. Where applicable, prescriptive elements of reference methods take precedence over internal DQOs.

Test results for selected QC samples are available on test reports. Please contact your Account Manager for more information.

Control Charts

Control charts are used to provide a graphical representation of QC results and test method performance over time. Control charts graphically display DQOs as well as the statistically derived mean and ± 2 and 3 standard deviations ("sigma") around the mean, calculated from recent historical QC results. ALS applies advanced trend monitoring algorithms to identify outliers and non-random data distributions (trends) that may indicate undesirable changes in test method performance. The trend monitoring process has been automated within our LIMS. Upon data entry, each QC result is checked against programmed limits and trends. If a trend is identified, a notification is e-mailed to the analyst and their supervisor, so that it can be investigated and corrected.

Continuous Improvement

ALS is committed to continuously improving its processes and services. The Quality System feeds into a continuous cycle of review, implementation, and monitoring so that improvements are actively sought and adopted where needed.

Data Validation

ALS analytical data proceeds through several reviews prior to the release of final reports. The ALS data validation process includes test result validation, inter-parameter validation and report validation. Test result validation involves an independent peer review of raw and calculated test results. Inter-parameter validation occurs when all department specific parameters for a sample are completed, and involves an overall review of test results within each sample for consistency among any related test parameters. Report validation occurs when all the requested test results for a work order are completed, and involves a review of the final report before it is sent to the customer.

ALS maintains laboratory records in a traceable manner for five years.

Method Validation

Customers rely on ALS to select test methods that are appropriate to meet their needs. Wherever possible, ALS references the latest versions of published standard methods developed by organizations such as American Public Health Association, United States Environmental Protection Agency, NIOSH, Environment Canada, and other international, regional or regulatory organizations, or equipment manufacturers.

Method validations are conducted to confirm that our test methods are fit for their intended use. The validations are as extensive as necessary to meet the needs of the given application. The extent depends on the source of the method. Test methods are revalidated periodically to ensure continued suitability and fitness for purpose.

Method Detection Limits and Limits of Reporting

ALS Limits of Reporting (LORs) are established using rigorous experimental and statistical procedures that begin with the determination of the Method Detection Limit (MDL) at 99% confidence. The MDL takes into account several factors, like long term Method Blanks, low level Sample Duplicates, and low level Spiked Samples. When detected at or above the MDL, ALS test results are considered to be qualitatively accurate, and a parameter can be reported with 99% confidence as being present in the sample.

$$MDL = (s_0 \times t_{n-1}) + |MBlk|$$

Where:
- s_0 = the standard deviation derived from the analysis of blank or low level samples, whichever gives a higher standard deviation,
- t_{n-1} = the Student's t-distribution with n-1 degrees of freedom for the one-sided 99% confidence interval.
- |MBlk|= the absolute value of the mean method blank.

ALS takes a conservative approach to detection limits. Our goal is to minimize false positives, because we recognize that any false positive results can be damaging for our clients. Where possible, we establish LORs at levels well-above the statistical MDL, and ideally at the LOQ_5. This improves the accuracy and precision of results near the detection limit, and reduces the chance of false positives due to sample-specific issues. At or above the LOQ_5, test results are considered to be quantitatively accurate. A reported parameter at the LOQ_5 is considered to be within 40% of the true value 95% of the time.

$$LOQ_5 = 5s_0 + |MBlk|$$

Where:
- s_0 = the standard deviation used in the MDL calculation,
- |MBlk| = the absolute value of the mean method blank.

The D. L. column on ALS analytical reports contains the LOR. The LOR may be the MDL as calculated above, or a higher value. ALS does not report LORs that are less than the calculated MDL.

Measurement Uncertainty (MU)

ALS procedures for calculating measurement uncertainty are based on accepted practices of identifying components contributing to uncertainty, compiling data that represents or includes these components, evaluating the data using appropriate statistical calculations, and reporting in a manner that prevents misunderstanding of the result. The Type A method of calculating measurement uncertainty is followed, however additional factors are considered to ensure the best and most complete information is derived from our evaluation of test method performance.

The ALS model describes the dependency of uncertainty on three factors. The first is a constant contribution to uncertainty attributable to s_0, the standard deviation of the method for concentrations that approach zero. The second is a constant relative uncertainty associated with higher parameter concentrations. The third is a constant contribution to uncertainty attributable to the mean long-term method blank value where it is significant. The following is the ALS equation for measurement uncertainty, using an expansion factor of k=2:

Expanded 95% Uncertainty as a Function of Concentration

$$U(c) = 2 * [\sqrt{ \{ s_0^2 + (\Theta c)^2 \} }] + |MBlk_{LT}|$$

Where:
- **U(c)** = The expanded uncertainty at concentration c. The range c ± U(c) represents approximately the 95% confidence interval (two standard deviations).
- **c** = Measured concentration of parameter in the sample.
- s_0 = A constant contribution to standard uncertainty represented by the standard deviation at zero concentration, which is related to the method detection limit.
- **Θ** = Combined relative standard uncertainty, excluding MDL and Method Blank contributions. Theta has no units.
- $|MBlk_{LT}|$ = Absolute value of the mean long-term Method Blank value, where significant (i.e. if > 1/5 s_0). [Note that the Method Blank term is not expanded because it represents a constant bias, not a variance.]

Uncertainty values obtained from this procedure must be regarded as estimates. Primarily, this is because all environmental samples are different, especially with regard to matrix effects and heterogeneity. It is our intent with this procedure to arrive at an estimate of a 95% confidence level uncertainty value that can be assumed to apply to 95% (or more) of the samples that a laboratory receives for a given test. It follows that for samples where undetected matrix effects or interferences occur, or for samples that are atypically heterogeneous, uncertainty estimates may be low.

Another aspect of reporting MU is the reporting of test method bias. Bias occurs in a small number of test methods that cannot recover 100% of a parameter from a sample. In these cases ALS reports bias along with the MU to aid with the interpretation of the test result.

Participation in Interlaboratory Proficiency Testing (PT) Programs

ALS locations participate in an extensive variety of proficiency testing programs. Where available, formal programs operated by outside agencies are used. When not available, ALS utilizes less formal proficiency testing studies. Root cause analysis is initiated and corrective action plans are developed when PT program results indicate a decline in test method performance.

Staff Training

Formal training procedures are in place to ensure all staff are trained in ALS polices and analytical procedures prior to performing analyses. A staff orientation program communicates ALS polices to newly hired staff. Task specific training is performed, and analyst proficiency is demonstrated and documented before staff are authorized to work independently. On-going analyst proficiency is monitored using proficiency testing programs. Records are maintained in training logs issued to staff upon hiring.

As well, ALS Canada promotes continuing education and learning by offering advanced courses covering technical and quality functions.

Employee Agreements

ALS protects its customers' confidential information and proprietary rights. We require all employees to review and sign a Code of Conduct policy that communicates the ALS confidentiality policy. It is ALS practice to never disclose information about a client's analysis to a third party without prior consent of the client, or unless compelled to by law. If we are obligated by law to disclose such information, we will inform the client prior to doing so.

Our employees avoid involvement in activities that would diminish confidence in their competence, impartiality, judgment, or integrity by complying with the ALS Code of Conduct and Data Integrity Policy.

Sample Tracking

Procedures are in place to track samples from receipt at the lab through to final reporting. A data management system (LIMS – Laboratory Information Management System) is used to generate a work order number for each sample submission, and a unique identification number is generated for each sample within the work order. The system is then used to assign specific analyses for the samples, to identify methods to be used, and to assign due dates for the results. The system is used to manage analytical workloads and track the status of all samples in-house. LIMS is a secure system that can only be accessed using login passwords. Controlling the level of access according to staff needs provides additional security.

When requested by the client, legal sample protocols are implemented to ensure chain of custody defensibility in a court of law. Contact the lab for legal sampling and transportation instructions if this service is needed.

Equipment Calibration

Measuring and testing equipment used by ALS laboratories that can have a significant effect on the accuracy or validity of test results is calibrated using established procedures. The procedures ensure traceability through an unbroken chain of calibrations or comparisons to national measurement standards. Where traceability of measurements to SI units is not possible and/or not relevant, traceability is provided by the use of certified reference materials and/or consensus standards.

Management Reviews (MR)

Management conducts a review at least annually to ensure the management system is effective, and continues to be suitable for its operations, and to identify necessary changes or improvements. Senior management is included in the review process for all locations.

ALS Quality Control Protocols

08 May, 2012

Quality control samples are introduced into batches of samples at critical points of sample handling, preparation and analysis to demonstrate the processes are performing as expected. In general, quality control samples are considered either Instrument QC or Method QC.

Instrument QC:

Instrument QC samples demonstrate control for the instrumental portion of a method. Instrument QC requirements must be successfully met before the analysis of Method QC or samples may proceed.

- Verification of initial calibration - criteria varies with each test.
- 2nd source Calibration Verification Standard (CVS) – at minimum, with each initial calibration.
- Continuing Calibration Verification (CCV) – frequency varies by test.
- Instrument Blanks – usage and frequency varies by test.

Method QC:

Method QC samples encompass the entire method and are initiated at the earliest point of the method where appropriate. Refer to the QC Definitions below. One set of Method QC is included for each batch of up to 20 client samples. Each set includes:

- 1 Method Blank.
- 1 Sample Duplicate. *
- 1 Lab Control Sample.
- 1 Reference Material or Matrix Spike. **
- Surrogate Compounds.

* Duplicate analyses are not performed where sub-sampling is not possible – e.g. most tests for organics in water.
** Spikes and Reference Materials are unavailable for Microbiology tests.

Method QC must be successfully analyzed before sample results are approved. Method QC results are normally reported to ALS clients with data reports.

Data Quality Objectives (DQOs):

DQOs are established for each QC sample, based on a combination of reference method objectives, customer requirements and historical test method performance. Where applicable, prescriptive elements of reference methods take precedence over internal DQOs. Current DQOs are available upon request.

Detailed descriptions of how DQOs are evaluated for different types of Quality Control samples are described on the following pages.

Types of Quality Control – Definitions and Evaluation Protocols

Method Blank (MB) - A blank sample prepared to represent the sample matrix as closely as possible and analyzed exactly like the calibration standards, samples, and quality control (QC) samples. Results of Method Blanks provide an estimate of the within batch variability of the blank response and an indication of bias introduced by the analytical procedure.

Except in special cases (as outlined in ALS DQO summary documents) the ALS DQO for Method Blanks is for all results to lie below the Limit of Reporting (LOR).

Laboratory Sample Duplicate (DUP) - A second portion of sample taken from the same container as the sub-sample used for the primary analysis, that is analyzed independently through all steps of the laboratory's sampling and analytical procedures. Duplicate samples are used to assess variance of the total method including sampling and analysis.

Duplicate precision is normally measured as Relative Percent Difference (RPD), where RPD = |(Result2 - Result1) / Mean| * 100. Duplicate samples should normally agree to within the ALS Precision DQO for the test and parameter (expressed as RPD), or within ± 2 x the LOR (for low level results). Refer to the ALS DQOs for Precision for specific limits for any given test.

ALS does not establish DQOs for Field Sample Duplicates. However, it is generally understood and accepted that the variability of Field Sample Duplicates is significantly more than what is observed with Laboratory Sample Duplicates.[1]

Laboratory Control Sample (LCS) - A known matrix spiked with compound(s) representative of the target analytes. An LCS is used to verify the accuracy of the laboratory's performance of the test.

LCS accuracy is calculated as the measured amount divided by the target concentration, and is normally expressed as percent recovery. LCS recoveries should normally lie within the ALS Accuracy DQOs for the test and parameter. For a low level LCS, the result should lie within ± 1 x the LOR of the target concentration. Refer to the ALS Accuracy DQOs for specific limits for any given test.

Reference Material (RM) – A material or substance, one or more of whose property values are sufficiently homogeneous and well established to be used for the calibration of an apparatus, the assessment of a measurement method, or for assigning values to materials. An RM is similar to an LCS, but encompasses a representative sample matrix. Similar to an LCS, an RM is used to verify the accuracy of the laboratory's performance of the test, but including the challenges of a complex sample matrix.

RM accuracy is calculated, expressed, and evaluated similarly to LCS accuracy. Refer to ALS Accuracy DQOs for specific limits for any given test.

Matrix Spike (MS) - A sample prepared by adding a known amount of a target analyte to a specified amount of a sample for which an independent estimate of the target analyte concentration is available. Spiked samples are used, for example, to determine the effect of the sample matrix on a method's recovery efficiency.

Matrix Spike results are calculated and expressed as percent recovery, by dividing the measured result (minus any analyte contribution from the unspiked sample) by the target analyte concentration. Matrix Spike results should normally lie within the ALS Accuracy DQOs for Matrix

[1] Depending on the type of Field Sample Duplicates being evaluated (e.g. Co-located versus Split Sample Duplicates), ALS recommends DQOs for Field Sample Duplicates that are between 1.5 – 2.0 times higher than our Laboratory Sample Duplicate DQOs. Co-located Sample Duplicates generally require higher DQOs than Split Sample Duplicates.

Spikes. Matrix Spike results cannot be calculated or reported in cases where the background concentration of the test parameter in the sample is too high relative to the spike level.

Surrogate Compounds (SURR) – Surrogate Compounds are added to every sample where applicable (organics tests only). They are substances with properties that mimic the analyte of interest, and which are unlikely to be found in environmental samples. They are added at known concentration to samples to establish that the analytical method has been properly performed.

Surrogate results are calculated and expressed as percent recovery, by dividing the measured result against the expected target concentration. Refer to ALS Accuracy DQOs for specific limits for any given test.

Automated Relational Checks

In addition to all our standard Quality Control checks, ALS also employs dozens of "Relational Checks", which are programmed into our Laboratory Information Systems (LIMS) to automatically highlight any situations where the expected relationships between different test parameters are violated, which can often point to errors. Such errors may originate with field sampling, or from laboratory processes, but should always be identified and pro-actively investigated.

Total versus Dissolved Metals ("D > T" Check) – One of the most important and common relational checks we do is a check for situations where Dissolved Metal concentrations significantly exceed Total Metal concentrations. By definition, this situation should not occur. However, there are a few reasons why this can occur:

i) Circumstances where Dissolved Metals slightly exceed Total Metals are expected in a small percentage of samples, simply due to normal random variability. In fact, when all metals in a test sample exist in the dissolved form, we expect that Dissolved Metals measurements will numerically exceed Total Metals measurements exactly half the time (by a small margin), simply due to random chance.

ii) Samples to be analyzed for Dissolved Metals must be filtered, which is normally done in the field. Filtration processes are a common source of low level metals contaminants. Contamination of a sample during filtration is the most common source of significant D > T issues.

iii) Field samples for Dissolved and Total Metals are normally collected independently, so variability of the sampling process is another common cause of D > T issues.

If none of the above causes can explain a situation where Dissolved Metals exceed Total Metals, then another type of error may be indicated, either with the collection of the sample in the field, or with sample containers or preservatives, or with the laboratory testing process.

ALS automatically highlights and investigates all circumstances where a Dissolved Metal result exceeds the Total Metal result by 20% RPD or more, but only if the absolute difference between the two results is greater than the sum of the Limits of Reporting (Detection Limits) of the two results.

The mechanism of this relational check is derived from the ALS Duplicate DQOs for Metals in Water.

All D > T relational checks that violate the rule above are flagged internally, and are investigated by ALS before sample results will be released to our clients. In most cases, results will be re-analyzed to confirm or correct the anomalous relationship. If results are confirmed by re-analysis, the following data qualifier is applied:

DTC: Dissolved concentration exceeds total. Results were confirmed by re-analysis.

Other Important Relational Checks Conducted by ALS

ALS employs dozens of other relational checks to highlight anomalous relationships between test parameters. Some of more common checks include the following:

- *Total Ammonia should not exceed Total Kjeldahl Nitrogen*
- *Weak Acid Dissociable Cyanide should not exceed Total Cyanide*
- *E. coli should not exceed Fecal Coliforms*
- *Nitrate + Nitrite should not exceed Total Nitrogen*
- *Hexavalent Chromium should not exceed Total Chromium*
- *True Colour should not exceed Apparent Colour*
- *Mineral Oil and Grease should not exceed Total Oil and Grease*
- *Reactive Phosphorus should not exceed Total Phosphorus*

Quality Control Report Guide

Matrix is the substance type of the QC sample.

Common matrices are water, soil, and tissue.

The **Reference** column contains:

a) Lab sample number (L#) or work group number (WG#) of samples that were used for duplicates or matrix spikes - this information is for internal tracking purposes.

b) Test results for actual samples that were duplicated for QC purposes.

Result from analyzing the QC sample.

% Recovery is calculated for QC samples with known target values (e.g. Spikes or CRMs).

Actual (absolute) test results are reported for the second aliquot of a duplicate pair and method blanks.

A **Qualifier** is used to communicate important information about the QC sample test results.

Sample parameter qualifiers used in the report are defined near the end of the Quality Control Report.

Also refer to the *Sample Parameter Qualifier Definitions* on the next page.

Units of the QC sample test results.

Test results are reported in % recovery for samples with known target values.

Actual (absolute) concentration units are used for reporting duplicate sample and Method Blank test results.

The calculated **Relative % Difference** between duplicate pairs.

RPD is calculated as follows:
|{(Sample Result - Duplicate Result) / [Mean]}| x 100

Duplicate pairs with test results that are < 5 x LOR are reported in sample concentration units (absolute units) and are accompanied by a J qualifier.

The Control **Limit** for the QC sample (ALS Data Quality Objective (DQO)).

QC samples must fall within Control Limits or appropriate action is taken, such as reanalysis where possible, or the data is qualified.

QC samples with known target values have a range for % recovery (eg) 85-115%.

Duplicates have a ± RPD range (e.g. ± 20 RPD). The RPD is reported as an absolute value (e.g. 20 RPD).

Method Blank control limit is the parameter Detection Limit (DL), also known as the Limit of Reporting (LOR).

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SO4-IC-WP	**Water**							
Batch R2179887								
WG1269694-3 DUP		L997018-4						
Sulfate		60.1	62.0		mg/L	3.1	20	21-APR-11
WG1269674-2 LCS								
Sulfate			100		%		85-115	21-APR-11
WG1269674-1 MB								
Sulfate			<0.50		mg/L		0.5	21-APR-11
WG1269674-4 MS		L997018-4						
Sulfate			N/A	MS-B	%		-	21-APR-11
WG1269674-5 CVS								
Sulfate			103		%		85-115	21-APR-11
WG1269674-6 CRM								
Sulfate			95		%		80-120	21-APR-11

Test Code: Sulfate (SO4), analyzed by Ion Chromatography (IC), in ALS Winnipeg (WP).

DUP: Laboratory Sample Duplicate - a second portion of sample taken from the same container as the sub-sample used for the primary analysis. Assesses variance of the total method including lab sub-sampling and analysis.

The results for this duplicate pair are 60.1 and 62.0 mg/L. The RPD is 3.1 and the control limits are ± 20 RPD.

LCS: Laboratory Control Sample – a known matrix spiked with target analytes. Verifies the accuracy of the performance of the test.

The recovery for this LCS is 100%, with control limits of 85 to 115% recovery.

MB: Method Blank – a blank matrix taken through the entire test method. Monitors variability of the blank response and bias of the test method.

The result for this MB is less than 0.50 mg/L. The control limit for the MB is equal to the LOR.

MS: Matrix Spike – a known amount of target analytes are added to a client sample. Measures the effect of the sample matrix on a method's recovery efficiency.

In this example, the recovery of the MS could not be calculated. The qualifier explains why – refer to the *Sample Parameter Qualifier Definitions*.

CVS: Calibration Verification Standard - a second source reference standard containing known concentrations of target analytes. Confirms the accuracy and stability of the calibration standards.

This CVS has a recovery of 103% and control limits of 85 to 115% recovery.

CRM/IRM: Certified or Internal Reference Material – a homogeneous sample whose analyte values have been well characterized.

This CRM has a 95% recovery and control limits of 80 to 120% recovery.

Quality Control Report Guide

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

Legend: explains acronyms that may be used in the QC Report.

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Qualifiers: QC sample qualifiers are listed and explained here.

The three examples are common qualifiers. They explain unusual or special circumstances that pertain to the QC sample results.

Quality Control Report Guide

Parameters and sample numbers that had Hold Time exceedances are listed in this table.

Hold Times are tracked from sampling date and time to the date and time when the sample was processed in the lab.

The recommended Hold Times.

See the Notes* section for sources of recommendations.

Hold time exceedance Qualifiers are explained in the *Legend and Qualifiers Definitions* section below.

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Transmittance, UV (254 nm)	1	19-APR-11 14:00	25-APR-11 08:16	48	38	hours	EHTL
pH	1	19-APR-11 14:00	10-MAY-11 09:32	0.25	499	hours	EHTR-FM

Legend & Qualifier Definitions:

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR: Exceeded ALS recommended hold time prior to sample receipt.
EHTL: Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT: Exceeded ALS recommended hold time prior to analysis.
Rec. HT: ALS recommended hold time (see units).

Explanations for the Qualifiers listed above.

See also the additional Notes below.

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L997206 were received on 21-APR-11 07:30.

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 predetermined 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.

APPENDIX E

NON-COMPLIANCE AND SPILLS REPORTS

August 04, 2019

Enforcement Officer
Environment and Climate Change Canada
933 Mivvik Street
Iqaluit, NU X0A 0H0

Re: Report MS-08 June Monthly TSS Exceedance - Mary River Project

On June 7, 2019, discharge commenced from the Waste Rock Facility (WRF) pond. The WRF pond is a high-density polyethylene (HDPE) lined earthen walled basin with an approximate capacity of 9,200 m3 and a surface area of 11,000 square metres (m^2). A transfer pump (located at Latitude 71° 20' 41.7" Longitude 79° 14' 21.2") pumps water from the sedimentation pond through approximately 330 metres (m) of 8" layflat hose to the water treatment plant (WTP). The WTP consists of physical-chemical treatment for pH adjustment, chemical precipitation and removal of solids by physical barrier. The water treatment processes include coagulation, pH adjustment and precipitation, flocculation and filtration. The WTP effluent is discharged via a Gorman-Rupp 6" pump and sections of layflat hose. The FDP for MS-08 is a sampling port after the discharge pump. Coordinates for the MS-08 FDP and MS-08 Discharge Line Outflow are provided below. Following the FDP, effluent passes through approximately 475 m of layflat hose and is discharged to the tundra of the approved receiving environment, the Mary River watershed.

Final Discharge Point MS-08:	Latitude: 71° 20' 41.6"	Longitude: 79° 13' 44.5"
MS-08 Discharge Line Outflow:	Latitude: 71° 20' 42.2"	Longitude: 79° 13' 01.2"

Deleterious substances water quality monitoring was conducted on June 7th, 17th, 24th and 30th. Effluent characterization, acute toxicity and sublethal toxicity monitoring was conducted June 11th. Results from the acute toxicity test on June 11th was non-lethal. On June 7th and 11th, elevated total suspended solids (TSS) results from the water quality monitoring, although below 30 ppm contributed to an elevated June monthly total TSS average of 15.52 mg/L .

Appendix A outlines water quality results from monitoring conducted June 7th to July 8th. Appendix B includes the certificates of analyses (COAs) for these sampling events.

As per MDMER Reporting section 31:

a) Total Suspended Solids (TSS) mean monthly concentration average exceedance of 15.52 mg/L at the WRF pond FDP (MS-08).
b) Discharge volume for the month of June was 31 088 m^3. This was measured by using a Krohne Enviromag 6" Magnetic Flow Meter.
c) A summary is provided in Appendix A of the sampling events during the month of June which includes date, time and respective TSS concentrations.
d) N/A. All effluent was discharge through the MS-08 FDP.
e) Appendix A outlines quantity of total suspended solids deposited through FDP MS-08 for the respective sampling dates.
f) Mary River Tributary F (MRTF) and Mary River would be the receiving bodies of water. The WTP effluent is discharged through approximately 475 m of layflat hose overland (no defined channel) and flows eastnortheast over boulder-cobble till material for approximately 475 m before entering a headwater depression that contains intermittent natural flow. The gradient of the depression continues eastward, eventually forming a clearly defined channel approximately 1,170 m down gradient of the end of the lay-flat hose line. This defined channel drains southeast approximately 740 m before discharging into MRTF. From this confluence, MRTF flows south approximately 3.3 km) before discharging into the Mary River.
g) Acute toxicity samples were collected on June 11th and July 8th, 2019, and both test results were non-lethal. Certificates of Analyses are attached in Appendix B.

Baffinland

h) See summary above for circumstances of deposit. The WRF WTP was commissioned and began treatment of the WRF pond water for solids removal. Internal monitoring was increased and improved to better document and inform the decision process for discharge.

i) Since the plant's commissioning and full-time operation, we've increased the frequency and rigor of testing and sampling of the intake and discharge effluent. Operators perform YSI testing on a regular basis throughout to day to supplement the more comprehensive discharge sampling regime. A flow chart of the decision process has been developed and is used by operators at multiple steps in the treatment process to determine if water can be discharged.
Additional experience and bench testing performed throughout operations has allowed for further optimization of dosing regiments to reduce variances in TSS and pH. The installation of a bag filter as a final filtration stage following the geotube pond also allows us to ensure consistently low TSS for all effluent to be discharged.

Weekly deleterious substances sampling occurred throughout June and July with monthly effluent characterization and acute toxicity monitoring. Effluent characterization and acute toxicity monitoring conducted on July 8th had a non-lethal acute toxicity test result with a TSS value of 12.0 mg/L. The July TSS average from the four deleterious substance sampling events and the monthly effluent characterisation event was 9.5 mg/L.

Samples were collected from the MS-08 reference and exposure areas on June 17th and July 22nd, with TSS values at the MS-08-DS exposure site of 6 mg/L and 3.6 mg/L, respectively.

Effluent from the WTP continues to be treated for removal of solids via geotubes and bag filters and the TSS values are monitored regularly.

Should you require further information or clarification on the above noted spill, please feel free to contact Connor Devereaux or William Bowden at (647) 253- 0596 x6016.

Prepared by:

Connor Devereaux
Environmental Superintendent

Reviewed by:

Shawn Stevens
Manager Health, Safety, Environment and Security

Attach: Water Quality Results, Certificates of Analyses

cc. Grant Goddard, Megan Lord-Hoyle, Sylvain Proulx, Tim Sewell, Shawn Stevens, William Bowden, Francois Gaudreau, Christopher Murray, Lou Kamermans (Baffinland), Curtis Didham (ECCC).

Appendix A

Water Quality Results Summary

	ALS Laboratory Sample ID			MS-08	MS-08	MS-08	MS-08	MS-08
	ALS ID			L2287961-1	L2289712-1	L2293039-1	L2297608-1	L2301638-1
	Sample Date & Time			6/7/2019 10:30:00 PM	6/11/2019 8:25:00 AM	6/17/2019 9:25:00 AM	6/24/2019 11:35:00 AM	6/30/2019 9:00:00 AM
	QA/QC Sample Type			N/A	N/A	N/A	N/A	N/A
	Units	LOR	MDMER Grab Sample Limits					
Conductivity	umhos/cm	3	-	5380	888	712	930	1060
Hardness (as CaCO3)	mg/L	10	-	502	-	375	-	-
pH	pH units	0.1	6.0-9.5	6.43	6.63	6.7	7.2	7.81
Total Suspended Solids	mg/L	2	30	20.00	28.00	10.8	15.6	3.2
Total Dissolved Solids	mg/L	20	-	742	684	561	772	985
Turbidity	NTU	0.1	-	18.7	34.5	20.3	19.8	2.3
Acidity (as CaCO3)	mg/L	2	-	632	-	4.8	-	-
Alkalinity, Total (as CaCO3)	mg/L	10	-	<10	-	<10	-	-
Ammonia, Total (as N)	mg/L	0.1	-	0.405	0.379	0.425	0.537	0.86
Chloride (Cl)	mg/L	0.5	-	1.98	-	1.38	-	-
Fluoride (F)	mg/L	0.02	-	0.042	-	0.034	-	-
Nitrate (as N)	mg/L	0.02	-	186	-	1.76	-	-
Total Kjeldahl Nitrogen	mg/L	0.15	-	0.63	-	0.67	-	-
Phosphorus, Total	mg/L	0.03	-	0.0095	-	0.0096	-	-
Sulfate (SO4)	mg/L	0.3	-	498	-	375	-	-
Cyanide, Total	mg/L	0.002	2	<0.0020	<0.0020	<0.20	0.0039	<0.020
Dissolved Organic Carbon	mg/L	0.5	-	1.75	-	0.99	-	-
Total Organic Carbon	mg/L	0.5	-	1.58	-	1.64	-	-
Aluminum (Al)-Total	mg/L	0.05	-	0.605	1.07	0.531	0.712	<0.050
Antimony (Sb)-Total	mg/L	0.001	-	<0.0010	<0.0010	<0.00010	<0.0010	<0.0010
Arsenic (As)-Total	mg/L	0.001	1	<0.0010	<0.0010	0.00011	<0.0010	<0.0010
Barium (Ba)-Total	mg/L	0.001	-	0.0096	0.0164	0.0136	0.0139	0.011
Beryllium (Be)-Total	mg/L	0.001	-	<0.0010	<0.0010	<0.00010	<0.0010	<0.0010
Bismuth (Bi)-Total	mg/L	0.0005	-	<0.00050	<0.00050	<0.000050	<0.00050	<0.00050
Boron (B)-Total	mg/L	0.1	-	<0.10	<0.10	0.015	<0.10	<0.10
Cadmium (Cd)-Total	mg/L	0.00005	-	0.000085	0.000078	0.0000588	0.000063	<0.000050
Calcium (Ca)-Total	mg/L	0.5	-	17.8	20.3	21.6	34.9	51.6
Cesium (Cs)-Total	mg/L	0.0001	-	<0.00010	<0.00010	0.000048	<0.00010	<0.00010
Chromium (Cr)-Total	mg/L	0.005	-	<0.0050	<0.0050	0.0013	<0.0050	<0.0050
Cobalt (Co)-Total	mg/L	0.001	-	0.0742	0.0629	0.0405	0.0375	0.037
Copper (Cu)-Total	mg/L	0.01	0.6	<0.010	<0.010	0.0024	<0.010	<0.010
Iron (Fe)-Total	mg/L	0.1	-	6.58	4.93	2.65	1.76	0.6
Lead (Pb)-Total	mg/L	0.0005	0.4	<0.00050	0.00068	0.000453	0.00051	<0.00050
Lithium (Li)-Total	mg/L	0.01	-	0.011	0.013	0.0084	<0.010	0.016
Magnesium (Mg)-Total	mg/L	0.05	-	107	101	81	109	146
Manganese (Mn)-Total	mg/L	0.005	-	3.93	3.65	2.79	2.8	3.35
Mercury (Hg)-Total	mg/L	0.00001	-	<0.000010	-	<0.000010	-	-
Molybdenum (Mo)-Total	mg/L	0.0005	-	<0.00050	<0.00050	0.000536	0.00075	0.00076
Nickel (Ni)-Total	mg/L	0.005	1	0.0775	0.0672	0.0419	0.0399	0.0389
Phosphorus (P)-Total	mg/L	0.5	-	<0.50	<0.50	<0.050	<0.50	<0.50
Potassium (K)-Total	mg/L	0.5	-	1.72	2.05	2.16	2.73	2.83
Rubidium (Rb)-Total	mg/L	0.002	-	0.0027	0.0047	0.00307	0.0038	0.003
Selenium (Se)-Total	mg/L	0.0005	-	0.00112	0.00105	0.00113	0.00152	0.00194
Silicon (Si)-Total	mg/L	1	-	1.3	2.8	1.69	1.9	<1.0
Silver (Ag)-Total	mg/L	0.0005	-	<0.00050	<0.00050	<0.000050	<0.00050	<0.00050
Sodium (Na)-Total	mg/L	0.5	-	0.83	0.92	0.971	1.32	1.62
Strontium (Sr)-Total	mg/L	0.01	-	0.025	0.027	0.0421	0.083	0.151
Sulfur (S)-Total	mg/L	5	-	162	164	131	172	237
Tellurium (Te)-Total	mg/L	0.002	-	<0.0020	<0.0020	<0.00020	<0.0020	<0.0020
Thallium (Tl)-Total	mg/L	0.0001	-	<0.00010	<0.00010	0.000026	<0.00010	<0.00010
Thorium (Th)-Total	mg/L	0.001	-	<0.0010	<0.0010	0.00045	<0.0010	<0.0010
Tin (Sn)-Total	mg/L	0.001	-	<0.0010	<0.0010	<0.00010	<0.0010	<0.0010
Titanium (Ti)-Total	mg/L	0.003	-	0.0240	0.0449	0.0243	0.0305	<0.0030
Tungsten (W)-Total	mg/L	0.001	-	<0.0010	<0.0010	<0.00010	<0.0010	<0.0010
Uranium (U)-Total	mg/L	0.0001	-	0.00052	0.00035	0.000407	0.00066	0.00023
Vanadium (V)-Total	mg/L	0.005	-	<0.0050	<0.0050	0.0009	<0.0050	<0.0050
Zinc (Zn)-Total	mg/L	0.03	1	<0.030	<0.030	0.007	<0.030	<0.030
Zirconium (Zr)-Total	mg/L	0.003	-	<0.0020	<0.0020	0.00065	<0.0020	<0.0020
Aluminum (Al)-Dissolved	mg/L	0.05	-	0.0086	-	<0.0050	-	-
Antimony (Sb)-Dissolved	mg/L	0.001	-	<0.00010	-	<0.00010	-	-
Arsenic (As)-Dissolved	mg/L	0.001	-	<0.00010	-	<0.00010	-	-
Barium (Ba)-Dissolved	mg/L	0.001	-	0.00694	-	0.0116	-	-
Beryllium (Be)-Dissolved	mg/L	0.001	-	<0.00010	-	<0.00010	-	-
Bismuth (Bi)-Dissolved	mg/L	0.0005	-	<0.000050	-	<0.000050	-	-
Boron (B)-Dissolved	mg/L	0.1	-	0.011	-	0.014	-	-
Cadmium (Cd)-Dissolved	mg/L	0.00005	-	0.0000918	-	0.0000617	-	-
Calcium (Ca)-Dissolved	mg/L	0.5	-	19.2	-	22.3	-	-
Cesium (Cs)-Dissolved	mg/L	0.0001	-	<0.000010	-	<0.000010	-	-
Chromium (Cr)-Dissolved	mg/L	0.005	-	<0.00050	-	<0.00050	-	-
Cobalt (Co)-Dissolved	mg/L	0.001	-	0.0724	-	0.0381	-	-
Copper (Cu)-Dissolved	mg/L	0.002	-	0.00074	-	0.00107	-	-
Iron (Fe)-Dissolved	mg/L	0.1	-	4.70	-	1.1	-	-
Lead (Pb)-Dissolved	mg/L	0.0005	-	<0.000050	-	<0.000050	-	-
Lithium (Li)-Dissolved	mg/L	0.01	-	0.0074	-	0.0077	-	-
Magnesium (Mg)-Dissolved	mg/L	0.05	-	110	-	77.5	-	-
Manganese (Mn)-Dissolved	mg/L	0.005	-	3.91	-	2.56	-	-
Mercury (Hg)-Dissolved	mg/L	0.00001	-	<0.000010	-	<0.000010	-	-
Molybdenum (Mo)-Dissolved	mg/L	0.0005	-	0.000194	-	0.0003	-	-
Nickel (Ni)-Dissolved	mg/L	0.005	-	0.0748	-	0.0391	-	-
Phosphorus (P)-Dissolved	mg/L	0.5	-	<0.050	-	<0.050	-	-
Potassium (K)-Dissolved	mg/L	0.5	-	1.70	-	1.86	-	-
Rubidium (Rb)-Dissolved	mg/L	0.002	-	0.00170	-	0.00194	-	-
Selenium (Se)-Dissolved	mg/L	0.0005	-	0.00147	-	0.00125	-	-
Silicon (Si)-Dissolved	mg/L	0.5	-	0.466	-	0.65	-	-
Silver (Ag)-Dissolved	mg/L	0.0005	-	<0.000050	-	<0.000050	-	-
Sodium (Na)-Dissolved	mg/L	0.5	-	0.875	-	0.921	-	-
Strontium (Sr)-Dissolved	mg/L	0.01	-	0.0259	-	0.0397	-	-
Sulfur (S)-Dissolved	mg/L	5	-	173	-	130	-	-
Tellurium (Te)-Dissolved	mg/L	0.002	-	<0.00020	-	<0.00020	-	-
Thallium (Tl)-Dissolved	mg/L	0.0001	-	0.000019	-	0.000019	-	-
Thorium (Th)-Dissolved	mg/L	0.001	-	<0.00010	-	<0.00010	-	-
Tin (Sn)-Dissolved	mg/L	0.001	-	<0.00010	-	<0.00010	-	-
Titanium (Ti)-Dissolved	mg/L	0.003	-	<0.00030	-	<0.00030	-	-
Tungsten (W)-Dissolved	mg/L	0.001	-	<0.00010	-	<0.00010	-	-
Uranium (U)-Dissolved	mg/L	0.0001	-	0.000156	-	0.000135	-	-
Vanadium (V)-Dissolved	mg/L	0.005	-	<0.00050	-	<0.00050	-	-
Zinc (Zn)-Dissolved	mg/L	0.01	-	0.0124	-	0.0054	-	-
Zirconium (Zr)-Dissolved	mg/L	0.003	-	<0.00020	-	<0.00020	-	-
Ra-226	Bq/L	0.0044	1.11	<0.0093	0.012	0.0097	0.0086	<0.0071
Acute Toxicity			Non-lethal	-	-	Non-lethal	-	-

Notes:

[1]Metal and Diamond Mining Effluent Regulations - Schedule 4

Appendix B

Certificates of Analyses

Baffinland Iron Mine's Corporation (Oakville)
ATTN: William Bowden/Connor Devereaux
2275 Upper Middle Rd. E.
Suite #300
Oakville ON L6H 0C3

Date Received: 12-JUN-19
Report Date: 05-JUL-19 15:58 (MT)
Version: FINAL REV. 2

Client Phone: 647-253-0596

Certificate of Analysis

Lab Work Order #: L2287961

Project P.O. #: 4500057496
Job Reference: MS-08 WT TOX
C of C Numbers:
Legal Site Desc:

Comments:

5-JUL-2019 Job ID MS-08 WT TOX

Rick Hawthorne
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2287961-1 MS-08 Sampled By: KB/BE on 07-JUN-19 @ 22:30 Matrix: WATER							
Physical Tests							
Conductivity	5380		3.0	umhos/cm		12-JUN-19	R4668310
Hardness (as CaCO3)	502		0.50	mg/L		12-JUN-19	
pH	6.43		0.10	pH units		07-JUN-19	R4661705
Total Suspended Solids	20.0		2.0	mg/L		07-JUN-19	R4662055
Total Dissolved Solids	742		20	mg/L		08-JUN-19	R4662058
Turbidity	18.7		0.10	NTU		07-JUN-19	R4661704
Anions and Nutrients							
Acidity (as CaCO3)	632		2.0	mg/L		14-JUN-19	R4670047
Alkalinity, Total (as CaCO3)	<10	NR:PH4	10	mg/L		20-JUN-19	R4678306
Ammonia, Total (as N)	0.405		0.010	mg/L		13-JUN-19	R4668555
Chloride (Cl)	1.98		0.50	mg/L		19-JUN-19	R4674012
Fluoride (F)	0.042		0.020	mg/L		19-JUN-19	R4674012
Nitrate (as N)	186		0.020	mg/L		19-JUN-19	R4674012
Total Kjeldahl Nitrogen	0.63	TKNI	0.15	mg/L	12-JUN-19	13-JUN-19	R4668542
Phosphorus, Total	0.0095		0.0030	mg/L	12-JUN-19	13-JUN-19	R4668512
Sulfate (SO4)	498		0.30	mg/L		19-JUN-19	R4674012
Cyanides							
Cyanide, Total	<0.0020		0.0020	mg/L		12-JUN-19	R4665587
Organic / Inorganic Carbon							
Dissolved Carbon Filtration Location	LAB	PEHR				12-JUN-19	R4660319
Dissolved Organic Carbon	1.75		0.50	mg/L	12-JUN-19	13-JUN-19	R4668327
Total Organic Carbon	1.58		0.50	mg/L		13-JUN-19	R4668329
Total Metals							
Aluminum (Al)-Total	0.605	DLHC	0.050	mg/L	12-JUN-19	12-JUN-19	R4666488
Antimony (Sb)-Total	<0.0010	DLHC	0.0010	mg/L	12-JUN-19	12-JUN-19	R4666488
Arsenic (As)-Total	<0.0010	DLHC	0.0010	mg/L	12-JUN-19	12-JUN-19	R4666488
Barium (Ba)-Total	0.0096	DLHC	0.0010	mg/L	12-JUN-19	12-JUN-19	R4666488
Beryllium (Be)-Total	<0.0010	DLHC	0.0010	mg/L	12-JUN-19	12-JUN-19	R4666488
Bismuth (Bi)-Total	<0.00050	DLHC	0.00050	mg/L	12-JUN-19	12-JUN-19	R4666488
Boron (B)-Total	<0.10	DLHC	0.10	mg/L	12-JUN-19	12-JUN-19	R4666488
Cadmium (Cd)-Total	0.000085	DLHC	0.000050	mg/L	12-JUN-19	12-JUN-19	R4666488
Calcium (Ca)-Total	17.8	DLHC	0.50	mg/L	12-JUN-19	12-JUN-19	R4666488
Cesium (Cs)-Total	<0.00010	DLHC	0.00010	mg/L	12-JUN-19	12-JUN-19	R4666488
Chromium (Cr)-Total	<0.0050	DLHC	0.0050	mg/L	12-JUN-19	12-JUN-19	R4666488
Cobalt (Co)-Total	0.0742	DLHC	0.0010	mg/L	12-JUN-19	12-JUN-19	R4666488
Copper (Cu)-Total	<0.010	DLHC	0.010	mg/L	12-JUN-19	12-JUN-19	R4666488
Iron (Fe)-Total	6.58	DLHC	0.10	mg/L	12-JUN-19	12-JUN-19	R4666488
Lead (Pb)-Total	<0.00050	DLHC	0.00050	mg/L	12-JUN-19	12-JUN-19	R4666488
Lithium (Li)-Total	0.011	DLHC	0.010	mg/L	12-JUN-19	12-JUN-19	R4666488
Magnesium (Mg)-Total	107	DLHC	0.050	mg/L	12-JUN-19	12-JUN-19	R4666488
Manganese (Mn)-Total	3.93	DLHC	0.0050	mg/L	12-JUN-19	12-JUN-19	R4666488
Mercury (Hg)-Total	<0.000010		0.000010	mg/L		12-JUN-19	R4664566

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2287961-1 MS-08 Sampled By: KB/BE on 07-JUN-19 @ 22:30 Matrix: WATER							
Total Metals							
Molybdenum (Mo)-Total	<0.00050	DLHC	0.00050	mg/L	12-JUN-19	12-JUN-19	R4666488
Nickel (Ni)-Total	0.0775	DLHC	0.0050	mg/L	12-JUN-19	12-JUN-19	R4666488
Phosphorus (P)-Total	<0.50	DLHC	0.50	mg/L	12-JUN-19	12-JUN-19	R4666488
Potassium (K)-Total	1.72	DLHC	0.50	mg/L	12-JUN-19	12-JUN-19	R4666488
Rubidium (Rb)-Total	0.0027	DLHC	0.0020	mg/L	12-JUN-19	12-JUN-19	R4666488
Selenium (Se)-Total	0.00112	DLHC	0.00050	mg/L	12-JUN-19	12-JUN-19	R4666488
Silicon (Si)-Total	1.3	DLHC	1.0	mg/L	12-JUN-19	12-JUN-19	R4666488
Silver (Ag)-Total	<0.00050	DLHC	0.00050	mg/L	12-JUN-19	12-JUN-19	R4666488
Sodium (Na)-Total	0.83	DLHC	0.50	mg/L	12-JUN-19	12-JUN-19	R4666488
Strontium (Sr)-Total	0.025	DLHC	0.010	mg/L	12-JUN-19	12-JUN-19	R4666488
Sulfur (S)-Total	162	DLHC	5.0	mg/L	12-JUN-19	12-JUN-19	R4666488
Tellurium (Te)-Total	<0.0020	DLHC	0.0020	mg/L	12-JUN-19	12-JUN-19	R4666488
Thallium (Tl)-Total	<0.00010	DLHC	0.00010	mg/L	12-JUN-19	12-JUN-19	R4666488
Thorium (Th)-Total	<0.0010	DLHC	0.0010	mg/L	12-JUN-19	12-JUN-19	R4666488
Tin (Sn)-Total	<0.0010	DLHC	0.0010	mg/L	12-JUN-19	12-JUN-19	R4666488
Titanium (Ti)-Total	0.0240	DLHC	0.0030	mg/L	12-JUN-19	12-JUN-19	R4666488
Tungsten (W)-Total	<0.0010	DLHC	0.0010	mg/L	12-JUN-19	12-JUN-19	R4666488
Uranium (U)-Total	0.00052	DLHC	0.00010	mg/L	12-JUN-19	12-JUN-19	R4666488
Vanadium (V)-Total	<0.0050	DLHC	0.0050	mg/L	12-JUN-19	12-JUN-19	R4666488
Zinc (Zn)-Total	<0.030	DLHC	0.030	mg/L	12-JUN-19	12-JUN-19	R4666488
Zirconium (Zr)-Total	<0.0020	DLHC	0.0020	mg/L	12-JUN-19	12-JUN-19	R4666488
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					12-JUN-19	R4664219
Dissolved Metals Filtration Location	FIELD					12-JUN-19	R4664206
Aluminum (Al)-Dissolved	0.0086		0.0050	mg/L	12-JUN-19	12-JUN-19	R4664388
Antimony (Sb)-Dissolved	<0.00010		0.00010	mg/L	12-JUN-19	12-JUN-19	R4664388
Arsenic (As)-Dissolved	<0.00010		0.00010	mg/L	12-JUN-19	12-JUN-19	R4664388
Barium (Ba)-Dissolved	0.00694		0.00010	mg/L	12-JUN-19	12-JUN-19	R4664388
Beryllium (Be)-Dissolved	<0.00010		0.00010	mg/L	12-JUN-19	12-JUN-19	R4664388
Bismuth (Bi)-Dissolved	<0.000050		0.000050	mg/L	12-JUN-19	12-JUN-19	R4664388
Boron (B)-Dissolved	0.011		0.010	mg/L	12-JUN-19	12-JUN-19	R4664388
Cadmium (Cd)-Dissolved	0.0000918		0.0000050	mg/L	12-JUN-19	12-JUN-19	R4664388
Calcium (Ca)-Dissolved	19.2		0.050	mg/L	12-JUN-19	12-JUN-19	R4664388
Cesium (Cs)-Dissolved	<0.000010		0.000010	mg/L	12-JUN-19	12-JUN-19	R4664388
Chromium (Cr)-Dissolved	<0.00050		0.00050	mg/L	12-JUN-19	12-JUN-19	R4664388
Cobalt (Co)-Dissolved	0.0724		0.00010	mg/L	12-JUN-19	12-JUN-19	R4664388
Copper (Cu)-Dissolved	0.00074		0.00020	mg/L	12-JUN-19	12-JUN-19	R4664388
Iron (Fe)-Dissolved	4.70		0.010	mg/L	12-JUN-19	12-JUN-19	R4664388
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L	12-JUN-19	12-JUN-19	R4664388
Lithium (Li)-Dissolved	0.0074		0.0010	mg/L	12-JUN-19	12-JUN-19	R4664388
Magnesium (Mg)-Dissolved	110	DLHC	0.050	mg/L	12-JUN-19	12-JUN-19	R4664388

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2287961-1 MS-08 Sampled By: KB/BE on 07-JUN-19 @ 22:30 Matrix: WATER							
Dissolved Metals							
Manganese (Mn)-Dissolved	3.91	DLHC	0.0050	mg/L	12-JUN-19	12-JUN-19	R4664388
Mercury (Hg)-Dissolved	<0.000010		0.000010	mg/L	12-JUN-19	12-JUN-19	R4664592
Molybdenum (Mo)-Dissolved	0.000194		0.000050	mg/L	12-JUN-19	12-JUN-19	R4664388
Nickel (Ni)-Dissolved	0.0748		0.00050	mg/L	12-JUN-19	12-JUN-19	R4664388
Phosphorus (P)-Dissolved	<0.050		0.050	mg/L	12-JUN-19	12-JUN-19	R4664388
Potassium (K)-Dissolved	1.70		0.050	mg/L	12-JUN-19	12-JUN-19	R4664388
Rubidium (Rb)-Dissolved	0.00170		0.00020	mg/L	12-JUN-19	12-JUN-19	R4664388
Selenium (Se)-Dissolved	0.00147		0.000050	mg/L	12-JUN-19	12-JUN-19	R4664388
Silicon (Si)-Dissolved	0.466		0.050	mg/L	12-JUN-19	12-JUN-19	R4664388
Silver (Ag)-Dissolved	<0.000050		0.000050	mg/L	12-JUN-19	12-JUN-19	R4664388
Sodium (Na)-Dissolved	0.875		0.050	mg/L	12-JUN-19	12-JUN-19	R4664388
Strontium (Sr)-Dissolved	0.0259		0.0010	mg/L	12-JUN-19	12-JUN-19	R4664388
Sulfur (S)-Dissolved	173		0.50	mg/L	12-JUN-19	12-JUN-19	R4664388
Tellurium (Te)-Dissolved	<0.00020		0.00020	mg/L	12-JUN-19	12-JUN-19	R4664388
Thallium (Tl)-Dissolved	0.000019		0.000010	mg/L	12-JUN-19	12-JUN-19	R4664388
Thorium (Th)-Dissolved	<0.00010		0.00010	mg/L	12-JUN-19	12-JUN-19	R4664388
Tin (Sn)-Dissolved	<0.00010		0.00010	mg/L	12-JUN-19	12-JUN-19	R4664388
Titanium (Ti)-Dissolved	<0.00030		0.00030	mg/L	12-JUN-19	12-JUN-19	R4664388
Tungsten (W)-Dissolved	<0.00010		0.00010	mg/L	12-JUN-19	12-JUN-19	R4664388
Uranium (U)-Dissolved	0.000156		0.000010	mg/L	12-JUN-19	12-JUN-19	R4664388
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L	12-JUN-19	12-JUN-19	R4664388
Zinc (Zn)-Dissolved	0.0124		0.0010	mg/L	12-JUN-19	12-JUN-19	R4664388
Zirconium (Zr)-Dissolved	<0.00020		0.00020	mg/L	12-JUN-19	12-JUN-19	R4664388
Radiological Parameters							
Ra-226	<0.0093		0.0093	Bq/L	18-JUN-19	26-JUN-19	R4653808
Report Remarks : Sample received/analyzed by JS June 8, 2019							

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

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2287961-1
Matrix Spike	Cobalt (Co)-Dissolved	MS-B	L2287961-1
Matrix Spike	Iron (Fe)-Dissolved	MS-B	L2287961-1
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2287961-1
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L2287961-1
Matrix Spike	Nickel (Ni)-Dissolved	MS-B	L2287961-1
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2287961-1
Matrix Spike	Sulfur (S)-Dissolved	MS-B	L2287961-1
Matrix Spike	Aluminum (Al)-Total	MS-B	L2287961-1
Matrix Spike	Calcium (Ca)-Total	MS-B	L2287961-1
Matrix Spike	Cobalt (Co)-Total	MS-B	L2287961-1
Matrix Spike	Iron (Fe)-Total	MS-B	L2287961-1
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2287961-1
Matrix Spike	Manganese (Mn)-Total	MS-B	L2287961-1
Matrix Spike	Nickel (Ni)-Total	MS-B	L2287961-1
Matrix Spike	Silicon (Si)-Total	MS-B	L2287961-1
Matrix Spike	Strontium (Sr)-Total	MS-B	L2287961-1
Matrix Spike	Sulfur (S)-Total	MS-B	L2287961-1
Matrix Spike	Titanium (Ti)-Total	MS-B	L2287961-1
Matrix Spike	Uranium (U)-Total	MS-B	L2287961-1
Matrix Spike	Ammonia, Total (as N)	MS-B	L2287961-1
Matrix Spike	Total Kjeldahl Nitrogen	MS-B	L2287961-1

Sample Parameter Qualifier key listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
NR:PH4	No Result: No Alkalinity, pH Of Sample <4.5
PEHR	Parameter Exceeded Recommended Holding Time On Receipt: Proceed With Analysis As Requested.
TKNI	TKN result may be biased low due to Nitrate interference. Nitrate-N is > 10x TKN.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACY-TITR-TB	Water	Acidity	APHA 2310 B modified

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

ALK-WT	Water	Alkalinity, Total (as CaCO3)	EPA 310.2

This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.

CL-IC-N-WT	Water	Chloride by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

CN-TOT-WT	Water	Cyanide, Total	ISO 14403-2

Total cyanide is determined by the combination of UV digestion and distillation. Cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

When using this method, high levels of thiocyanate in samples can cause false positives at ~1-2% of the thiocyanate concentration. For samples with detectable cyanide analyzed by this method, ALS recommends analysis for thiocyanate to check for this potential interference

DOC-WT	Water	Dissolved Organic Carbon	APHA 5310B

Sample is filtered through a 0.45um filter, then injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic carbon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.

EC-SCREEN-WT	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

Reference Information

EC-WT	Water	Conductivity	APHA 2510 B

Water samples can be measured directly by immersing the conductivity cell into the sample.

F-IC-N-WT	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-WT	Water	Hardness	APHA 2340 B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-WT	Water	Dissolved Mercury in Water by CVAAS	EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

HG-T-CVAA-WT	Water	Total Mercury in Water by CVAAS	EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

MET-D-CCMS-WT	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

MET-T-CCMS-WT	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

NH3-F-WT	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO3-IC-WT	Water	Nitrate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-COL-WT	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is deteremined colourimetrically after persulphate digestion of the sample.

PH-BF	Water	pH	APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

RA226-MMER-FC	Water	Ra226 by Alpha Scint, MDC=0.01 Bq/L	EPA 903.1
SO4-IC-N-WT	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-BF	Water	Total Dissolved Solids	APHA 2540C

A well-mixed sample is filtered though glass fibres filter. A known volume of the filtrate is evaporated and dried at 180 +/- 2C for 1hr.

SOLIDS-TSS-BF	Water	Suspended solids	APHA 2540 D-Gravimetric

A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104 +/- 1C for a minimum of four hours or until a constant weight is achieved.

TKN-WT	Water	Total Kjeldahl Nitrogen	APHA 4500-Norg D

This analysis is carried out using procedures adapted from APHA Method 4500-Norg "Nitrogen (Organic)". Total Kjeldahl Nitrogen is determined by sample digestion at 380 Celsius with analysis using an automated colorimetric method.

TOC-WT	Water	Total Organic Carbon	APHA 5310B

Reference Information

Sample is injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic cabon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.

TURBIDITY-BF Water Turbidity APHA 2130 B

Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.

** 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
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA
FC	ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
TB	ALS ENVIRONMENTAL - THUNDER BAY, ONTARIO, CANADA
BF	ALS ENVIRONMENTAL - BAFFIN ISLAND, NUNAVUT, 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 weight of sample
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

Workorder: L2287961 Report Date: 05-JUL-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACY-TITR-TB	**Water**							
Batch R4670047								
WG3077078-2 LCS								
Acidity (as CaCO3)			98.6		%		85-115	14-JUN-19
WG3077078-1 MB								
Acidity (as CaCO3)			<2.0		mg/L		2	14-JUN-19
CL-IC-N-WT	**Water**							
Batch R4674012								
WG3081366-4 DUP		**WG3081366-3**						
Chloride (Cl)		52.0	51.9		mg/L	0.2	20	19-JUN-19
WG3081366-2 LCS								
Chloride (Cl)			101.5		%		90-110	19-JUN-19
WG3081366-1 MB								
Chloride (Cl)			<0.50		mg/L		0.5	19-JUN-19
WG3081366-5 MS		**WG3081366-3**						
Chloride (Cl)			102.5		%		75-125	19-JUN-19
CN-TOT-WT	**Water**							
Batch R4665587								
WG3074895-7 DUP		**L2287875-5**						
Cyanide, Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	12-JUN-19
WG3074895-6 LCS								
Cyanide, Total			89.7		%		80-120	12-JUN-19
WG3074895-5 MB								
Cyanide, Total			<0.0020		mg/L		0.002	12-JUN-19
WG3074895-8 MS		**L2287875-5**						
Cyanide, Total			121.8		%		70-130	12-JUN-19
DOC-WT	**Water**							
Batch R4668327								
WG3069770-3 DUP		**L2287922-1**						
Dissolved Organic Carbon		3.17	3.59		mg/L	13	25	13-JUN-19
WG3069770-2 LCS								
Dissolved Organic Carbon			101.8		%		70-130	13-JUN-19
WG3069770-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	13-JUN-19
WG3069770-4 MS		**L2287922-1**						
Dissolved Organic Carbon			99.2		%		70-130	13-JUN-19
F-IC-N-WT	**Water**							

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F-IC-N-WT	**Water**							
Batch R4674012								
WG3081366-4 DUP		**WG3081366-3**						
Fluoride (F)		0.280	0.282		mg/L	0.7	20	19-JUN-19
WG3081366-2 LCS								
Fluoride (F)			101.8		%		90-110	19-JUN-19
WG3081366-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	19-JUN-19
WG3081366-5 MS		**WG3081366-3**						
Fluoride (F)			103.7		%		75-125	19-JUN-19
HG-D-CVAA-WT	**Water**							
Batch R4664592								
WG3074749-4 DUP		**WG3074749-3**						
Mercury (Hg)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	12-JUN-19
WG3074749-2 LCS								
Mercury (Hg)-Dissolved			96.9		%		80-120	12-JUN-19
WG3074749-1 MB								
Mercury (Hg)-Dissolved			<0.000010		mg/L		0.00001	12-JUN-19
WG3074749-6 MS		**WG3074749-5**						
Mercury (Hg)-Dissolved			89.7		%		70-130	12-JUN-19
HG-T-CVAA-WT	**Water**							
Batch R4664566								
WG3074747-3 DUP		**L2288792-1**						
Mercury (Hg)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	12-JUN-19
WG3074747-2 LCS								
Mercury (Hg)-Total			96.4		%		80-120	12-JUN-19
WG3074747-1 MB								
Mercury (Hg)-Total			<0.000010		mg/L		0.00001	12-JUN-19
WG3074747-4 MS		**L2288792-2**						
Mercury (Hg)-Total			90.1		%		70-130	12-JUN-19
MET-D-CCMS-WT	**Water**							
Batch R4664388								
WG3074716-4 DUP		**WG3074716-3**						
Aluminum (Al)-Dissolved		0.0086	0.0089		mg/L	3.1	20	12-JUN-19
Antimony (Sb)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	12-JUN-19
Arsenic (As)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	12-JUN-19
Barium (Ba)-Dissolved		0.00694	0.00684		mg/L	1.4	20	12-JUN-19
Beryllium (Be)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	12-JUN-19
Bismuth (Bi)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	12-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4664388								
WG3074716-4 DUP		**WG3074716-3**						
Boron (B)-Dissolved		0.011	0.011		mg/L	3.8	20	12-JUN-19
Cadmium (Cd)-Dissolved		0.0000918	0.0000920		mg/L	0.2	20	12-JUN-19
Calcium (Ca)-Dissolved		19.2	18.5		mg/L	3.3	20	12-JUN-19
Cesium (Cs)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	12-JUN-19
Chromium (Cr)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	12-JUN-19
Cobalt (Co)-Dissolved		0.0724	0.0722		mg/L	0.2	20	12-JUN-19
Copper (Cu)-Dissolved		0.00074	0.00069		mg/L	6.2	20	12-JUN-19
Iron (Fe)-Dissolved		4.70	4.66		mg/L	1.0	20	12-JUN-19
Lead (Pb)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	12-JUN-19
Lithium (Li)-Dissolved		0.0074	0.0067		mg/L	9.6	20	12-JUN-19
Magnesium (Mg)-Dissolved		110	107		mg/L	3.0	20	12-JUN-19
Manganese (Mn)-Dissolved		3.91	4.05		mg/L	3.6	20	12-JUN-19
Molybdenum (Mo)-Dissolved		0.000194	0.000200		mg/L	2.9	20	12-JUN-19
Nickel (Ni)-Dissolved		0.0748	0.0744		mg/L	0.5	20	12-JUN-19
Phosphorus (P)-Dissolved		<0.050	<0.050	RPD-NA	mg/L	N/A	20	12-JUN-19
Potassium (K)-Dissolved		1.70	1.64		mg/L	3.8	20	12-JUN-19
Rubidium (Rb)-Dissolved		0.00170	0.00177		mg/L	4.0	20	12-JUN-19
Selenium (Se)-Dissolved		0.00147	0.00136		mg/L	7.8	20	12-JUN-19
Silicon (Si)-Dissolved		0.466	0.461		mg/L	0.9	20	12-JUN-19
Silver (Ag)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	12-JUN-19
Sodium (Na)-Dissolved		0.875	0.849		mg/L	3.1	20	12-JUN-19
Strontium (Sr)-Dissolved		0.0259	0.0265		mg/L	2.5	20	12-JUN-19
Sulfur (S)-Dissolved		173	166		mg/L	4.1	20	12-JUN-19
Tellurium (Te)-Dissolved		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	12-JUN-19
Thallium (Tl)-Dissolved		0.000019	0.000020		mg/L	5.6	20	12-JUN-19
Thorium (Th)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	12-JUN-19
Tin (Sn)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	12-JUN-19
Titanium (Ti)-Dissolved		<0.00030	<0.00030	RPD-NA	mg/L	N/A	20	12-JUN-19
Tungsten (W)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	12-JUN-19
Uranium (U)-Dissolved		0.000156	0.000165		mg/L	5.2	20	12-JUN-19
Vanadium (V)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	12-JUN-19
Zinc (Zn)-Dissolved		0.0124	0.0119		mg/L	4.7	20	12-JUN-19
Zirconium (Zr)-Dissolved		<0.00020	<0.00020		mg/L			12-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4664388								
WG3074716-4 DUP		**WG3074716-3**						
Zirconium (Zr)-Dissolved		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	12-JUN-19
WG3074716-2 LCS								
Aluminum (Al)-Dissolved			98.0		%		80-120	12-JUN-19
Antimony (Sb)-Dissolved			99.4		%		80-120	12-JUN-19
Arsenic (As)-Dissolved			98.5		%		80-120	12-JUN-19
Barium (Ba)-Dissolved			96.0		%		80-120	12-JUN-19
Beryllium (Be)-Dissolved			100.5		%		80-120	12-JUN-19
Bismuth (Bi)-Dissolved			98.9		%		80-120	12-JUN-19
Boron (B)-Dissolved			95.7		%		80-120	12-JUN-19
Cadmium (Cd)-Dissolved			100.8		%		80-120	12-JUN-19
Calcium (Ca)-Dissolved			101.1		%		80-120	12-JUN-19
Cesium (Cs)-Dissolved			98.8		%		80-120	12-JUN-19
Chromium (Cr)-Dissolved			97.0		%		80-120	12-JUN-19
Cobalt (Co)-Dissolved			98.7		%		80-120	12-JUN-19
Copper (Cu)-Dissolved			96.9		%		80-120	12-JUN-19
Iron (Fe)-Dissolved			95.0		%		80-120	12-JUN-19
Lead (Pb)-Dissolved			99.2		%		80-120	12-JUN-19
Lithium (Li)-Dissolved			99.8		%		80-120	12-JUN-19
Magnesium (Mg)-Dissolved			98.3		%		80-120	12-JUN-19
Manganese (Mn)-Dissolved			96.0		%		80-120	12-JUN-19
Molybdenum (Mo)-Dissolved			97.4		%		80-120	12-JUN-19
Nickel (Ni)-Dissolved			97.6		%		80-120	12-JUN-19
Phosphorus (P)-Dissolved			105.1		%		80-120	12-JUN-19
Potassium (K)-Dissolved			98.7		%		80-120	12-JUN-19
Rubidium (Rb)-Dissolved			97.4		%		80-120	12-JUN-19
Selenium (Se)-Dissolved			98.4		%		80-120	12-JUN-19
Silicon (Si)-Dissolved			98.1		%		60-140	12-JUN-19
Silver (Ag)-Dissolved			96.5		%		80-120	12-JUN-19
Sodium (Na)-Dissolved			100.9		%		80-120	12-JUN-19
Strontium (Sr)-Dissolved			96.2		%		80-120	12-JUN-19
Sulfur (S)-Dissolved			99.2		%		80-120	12-JUN-19
Tellurium (Te)-Dissolved			93.2		%		80-120	12-JUN-19
Thallium (Tl)-Dissolved			97.6		%		80-120	12-JUN-19
Thorium (Th)-Dissolved			95.9		%		80-120	12-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4664388								
WG3074716-2 LCS								
Tin (Sn)-Dissolved			96.5		%		80-120	12-JUN-19
Titanium (Ti)-Dissolved			98.2		%		80-120	12-JUN-19
Tungsten (W)-Dissolved			96.9		%		80-120	12-JUN-19
Uranium (U)-Dissolved			97.2		%		80-120	12-JUN-19
Vanadium (V)-Dissolved			99.4		%		80-120	12-JUN-19
Zinc (Zn)-Dissolved			96.5		%		80-120	12-JUN-19
Zirconium (Zr)-Dissolved			96.3		%		80-120	12-JUN-19
WG3074716-1 MB								
Aluminum (Al)-Dissolved			<0.0050		mg/L		0.005	12-JUN-19
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	12-JUN-19
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	12-JUN-19
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	12-JUN-19
Beryllium (Be)-Dissolved			<0.00010		mg/L		0.0001	12-JUN-19
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	12-JUN-19
Boron (B)-Dissolved			<0.010		mg/L		0.01	12-JUN-19
Cadmium (Cd)-Dissolved			<0.000005(		mg/L		0.000005	12-JUN-19
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	12-JUN-19
Cesium (Cs)-Dissolved			<0.000010		mg/L		0.00001	12-JUN-19
Chromium (Cr)-Dissolved			<0.00050		mg/L		0.0005	12-JUN-19
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	12-JUN-19
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	12-JUN-19
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	12-JUN-19
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	12-JUN-19
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	12-JUN-19
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	12-JUN-19
Manganese (Mn)-Dissolved			<0.00050		mg/L		0.0005	12-JUN-19
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	12-JUN-19
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	12-JUN-19
Phosphorus (P)-Dissolved			<0.050		mg/L		0.05	12-JUN-19
Potassium (K)-Dissolved			<0.050		mg/L		0.05	12-JUN-19
Rubidium (Rb)-Dissolved			<0.00020		mg/L		0.0002	12-JUN-19
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	12-JUN-19
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	12-JUN-19
Silver (Ag)-Dissolved			<0.000050		mg/L		0.00005	12-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4664388								
WG3074716-1 MB								
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	12-JUN-19
Strontium (Sr)-Dissolved			<0.0010		mg/L		0.001	12-JUN-19
Sulfur (S)-Dissolved			<0.50		mg/L		0.5	12-JUN-19
Tellurium (Te)-Dissolved			<0.00020		mg/L		0.0002	12-JUN-19
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	12-JUN-19
Thorium (Th)-Dissolved			<0.00010		mg/L		0.0001	12-JUN-19
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	12-JUN-19
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	12-JUN-19
Tungsten (W)-Dissolved			<0.00010		mg/L		0.0001	12-JUN-19
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	12-JUN-19
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	12-JUN-19
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	12-JUN-19
Zirconium (Zr)-Dissolved			<0.00020		mg/L		0.0002	12-JUN-19
WG3074716-5 MS		**WG3074716-3**						
Aluminum (Al)-Dissolved			89.0		%		70-130	12-JUN-19
Antimony (Sb)-Dissolved			95.5		%		70-130	12-JUN-19
Arsenic (As)-Dissolved			104.4		%		70-130	12-JUN-19
Barium (Ba)-Dissolved			91.2		%		70-130	12-JUN-19
Beryllium (Be)-Dissolved			94.7		%		70-130	12-JUN-19
Bismuth (Bi)-Dissolved			88.9		%		70-130	12-JUN-19
Boron (B)-Dissolved			83.8		%		70-130	12-JUN-19
Cadmium (Cd)-Dissolved			103.7		%		70-130	12-JUN-19
Calcium (Ca)-Dissolved			N/A	MS-B	%		-	12-JUN-19
Cesium (Cs)-Dissolved			102.8		%		70-130	12-JUN-19
Chromium (Cr)-Dissolved			95.9		%		70-130	12-JUN-19
Cobalt (Co)-Dissolved			N/A	MS-B	%		-	12-JUN-19
Copper (Cu)-Dissolved			95.5		%		70-130	12-JUN-19
Iron (Fe)-Dissolved			N/A	MS-B	%		-	12-JUN-19
Lead (Pb)-Dissolved			97.3		%		70-130	12-JUN-19
Lithium (Li)-Dissolved			86.4		%		70-130	12-JUN-19
Magnesium (Mg)-Dissolved			N/A	MS-B	%		-	12-JUN-19
Manganese (Mn)-Dissolved			N/A	MS-B	%		-	12-JUN-19
Molybdenum (Mo)-Dissolved			98.4		%		70-130	12-JUN-19
Nickel (Ni)-Dissolved			N/A	MS-B	%		-	12-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4664388								
WG3074716-5 MS		**WG3074716-3**						
Phosphorus (P)-Dissolved			107.9		%		70-130	12-JUN-19
Potassium (K)-Dissolved			87.7		%		70-130	12-JUN-19
Rubidium (Rb)-Dissolved			102.0		%		70-130	12-JUN-19
Selenium (Se)-Dissolved			120.9		%		70-130	12-JUN-19
Silicon (Si)-Dissolved			90.1		%		70-130	12-JUN-19
Silver (Ag)-Dissolved			84.7		%		70-130	12-JUN-19
Sodium (Na)-Dissolved			97.0		%		70-130	12-JUN-19
Strontium (Sr)-Dissolved			N/A	MS-B	%		-	12-JUN-19
Sulfur (S)-Dissolved			N/A	MS-B	%		-	12-JUN-19
Tellurium (Te)-Dissolved			102.4		%		70-130	12-JUN-19
Thallium (Tl)-Dissolved			99.1		%		70-130	12-JUN-19
Thorium (Th)-Dissolved			97.3		%		70-130	12-JUN-19
Tin (Sn)-Dissolved			96.9		%		70-130	12-JUN-19
Titanium (Ti)-Dissolved			96.6		%		70-130	12-JUN-19
Tungsten (W)-Dissolved			96.8		%		70-130	12-JUN-19
Uranium (U)-Dissolved			96.5		%		70-130	12-JUN-19
Vanadium (V)-Dissolved			99.3		%		70-130	12-JUN-19
Zinc (Zn)-Dissolved			94.2		%		70-130	12-JUN-19
Zirconium (Zr)-Dissolved			95.6		%		70-130	12-JUN-19
MET-T-CCMS-WT	**Water**							
Batch R4666488								
WG3074728-4 DUP		**WG3074728-3**						
Aluminum (Al)-Total		0.605	0.700		mg/L	15	20	12-JUN-19
Antimony (Sb)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	12-JUN-19
Arsenic (As)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	12-JUN-19
Barium (Ba)-Total		0.0096	0.0100		mg/L	4.7	20	12-JUN-19
Beryllium (Be)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	12-JUN-19
Bismuth (Bi)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	12-JUN-19
Boron (B)-Total		<0.10	<0.10	RPD-NA	mg/L	N/A	20	12-JUN-19
Cadmium (Cd)-Total		0.000085	0.000101		mg/L	17	20	12-JUN-19
Calcium (Ca)-Total		17.8	17.9		mg/L	0.6	20	12-JUN-19
Chromium (Cr)-Total		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	12-JUN-19
Cesium (Cs)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	12-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4666488								
WG3074728-4 DUP		**WG3074728-3**						
Cobalt (Co)-Total		0.0742	0.0743		mg/L	0.2	20	12-JUN-19
Copper (Cu)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	12-JUN-19
Iron (Fe)-Total		6.58	6.79		mg/L	3.2	20	12-JUN-19
Lead (Pb)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	12-JUN-19
Lithium (Li)-Total		0.011	0.011		mg/L	4.5	20	12-JUN-19
Magnesium (Mg)-Total		107	108		mg/L	0.4	20	12-JUN-19
Manganese (Mn)-Total		3.93	3.95		mg/L	0.6	20	12-JUN-19
Molybdenum (Mo)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	12-JUN-19
Nickel (Ni)-Total		0.0775	0.0784		mg/L	1.1	20	12-JUN-19
Phosphorus (P)-Total		<0.50	<0.50	RPD-NA	mg/L	N/A	20	12-JUN-19
Potassium (K)-Total		1.72	1.80		mg/L	4.5	20	12-JUN-19
Rubidium (Rb)-Total		0.0027	0.0031		mg/L	12	20	12-JUN-19
Selenium (Se)-Total		0.00112	0.00119		mg/L	5.5	20	12-JUN-19
Silicon (Si)-Total		1.3	1.5		mg/L	13	20	12-JUN-19
Silver (Ag)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	12-JUN-19
Sodium (Na)-Total		0.83	0.84		mg/L	0.6	20	12-JUN-19
Strontium (Sr)-Total		0.025	0.025		mg/L	0.9	20	12-JUN-19
Sulfur (S)-Total		162	164		mg/L	0.9	25	12-JUN-19
Thallium (Tl)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	12-JUN-19
Tellurium (Te)-Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	12-JUN-19
Thorium (Th)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	25	12-JUN-19
Tin (Sn)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	12-JUN-19
Titanium (Ti)-Total		0.0240	0.0290		mg/L	19	20	12-JUN-19
Tungsten (W)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	12-JUN-19
Uranium (U)-Total		0.00052	0.00051		mg/L	2.3	20	12-JUN-19
Vanadium (V)-Total		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	12-JUN-19
Zinc (Zn)-Total		<0.030	<0.030	RPD-NA	mg/L	N/A	20	12-JUN-19
Zirconium (Zr)-Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	12-JUN-19
WG3074728-2 LCS								
Aluminum (Al)-Total			96.1		%		80-120	12-JUN-19
Antimony (Sb)-Total			97.5		%		80-120	12-JUN-19
Arsenic (As)-Total			94.9		%		80-120	12-JUN-19
Barium (Ba)-Total			96.0		%		80-120	12-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4666488								
WG3074728-2 LCS								
Beryllium (Be)-Total			93.8		%		80-120	12-JUN-19
Bismuth (Bi)-Total			93.6		%		80-120	12-JUN-19
Boron (B)-Total			87.0		%		80-120	12-JUN-19
Cadmium (Cd)-Total			94.8		%		80-120	12-JUN-19
Calcium (Ca)-Total			92.2		%		80-120	12-JUN-19
Chromium (Cr)-Total			96.2		%		80-120	12-JUN-19
Cesium (Cs)-Total			94.3		%		80-120	12-JUN-19
Cobalt (Co)-Total			94.5		%		80-120	12-JUN-19
Copper (Cu)-Total			94.3		%		80-120	12-JUN-19
Iron (Fe)-Total			97.2		%		80-120	12-JUN-19
Lead (Pb)-Total			94.2		%		80-120	12-JUN-19
Lithium (Li)-Total			93.8		%		80-120	12-JUN-19
Magnesium (Mg)-Total			96.7		%		80-120	12-JUN-19
Manganese (Mn)-Total			95.3		%		80-120	12-JUN-19
Molybdenum (Mo)-Total			97.0		%		80-120	12-JUN-19
Nickel (Ni)-Total			94.5		%		80-120	12-JUN-19
Phosphorus (P)-Total			104.4		%		70-130	12-JUN-19
Potassium (K)-Total			95.5		%		80-120	12-JUN-19
Rubidium (Rb)-Total			95.6		%		80-120	12-JUN-19
Selenium (Se)-Total			92.3		%		80-120	12-JUN-19
Silicon (Si)-Total			96.8		%		60-140	12-JUN-19
Silver (Ag)-Total			95.6		%		80-120	12-JUN-19
Sodium (Na)-Total			95.1		%		80-120	12-JUN-19
Strontium (Sr)-Total			93.7		%		80-120	12-JUN-19
Sulfur (S)-Total			97.1		%		80-120	12-JUN-19
Thallium (Tl)-Total			93.1		%		80-120	12-JUN-19
Tellurium (Te)-Total			90.3		%		80-120	12-JUN-19
Thorium (Th)-Total			92.8		%		70-130	12-JUN-19
Tin (Sn)-Total			94.2		%		80-120	12-JUN-19
Titanium (Ti)-Total			93.8		%		80-120	12-JUN-19
Tungsten (W)-Total			94.6		%		80-120	12-JUN-19
Uranium (U)-Total			92.8		%		80-120	12-JUN-19
Vanadium (V)-Total			95.8		%		80-120	12-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4666488								
WG3074728-2 LCS								
Zinc (Zn)-Total			94.6		%		80-120	12-JUN-19
Zirconium (Zr)-Total			93.5		%		80-120	12-JUN-19
WG3074728-1 MB								
Aluminum (Al)-Total			<0.0050		mg/L		0.005	12-JUN-19
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	12-JUN-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	12-JUN-19
Barium (Ba)-Total			<0.00010		mg/L		0.0001	12-JUN-19
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	12-JUN-19
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	12-JUN-19
Boron (B)-Total			<0.010		mg/L		0.01	12-JUN-19
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	12-JUN-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	12-JUN-19
Chromium (Cr)-Total			<0.00050		mg/L		0.0005	12-JUN-19
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	12-JUN-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	12-JUN-19
Copper (Cu)-Total			<0.0010		mg/L		0.001	12-JUN-19
Iron (Fe)-Total			<0.010		mg/L		0.01	12-JUN-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	12-JUN-19
Lithium (Li)-Total			<0.0010		mg/L		0.001	12-JUN-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	12-JUN-19
Manganese (Mn)-Total			<0.00050		mg/L		0.0005	12-JUN-19
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	12-JUN-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	12-JUN-19
Phosphorus (P)-Total			<0.050		mg/L		0.05	12-JUN-19
Potassium (K)-Total			<0.050		mg/L		0.05	12-JUN-19
Rubidium (Rb)-Total			<0.00020		mg/L		0.0002	12-JUN-19
Selenium (Se)-Total			<0.000050		mg/L		0.00005	12-JUN-19
Silicon (Si)-Total			<0.10		mg/L		0.1	12-JUN-19
Silver (Ag)-Total			<0.000050		mg/L		0.00005	12-JUN-19
Sodium (Na)-Total			<0.050		mg/L		0.05	12-JUN-19
Strontium (Sr)-Total			<0.0010		mg/L		0.001	12-JUN-19
Sulfur (S)-Total			<0.50		mg/L		0.5	12-JUN-19
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	12-JUN-19
Tellurium (Te)-Total			<0.00020		mg/L		0.0002	12-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4666488								
WG3074728-1 MB								
Thorium (Th)-Total			<0.00010		mg/L		0.0001	12-JUN-19
Tin (Sn)-Total			<0.00010		mg/L		0.0001	12-JUN-19
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	12-JUN-19
Tungsten (W)-Total			<0.00010		mg/L		0.0001	12-JUN-19
Uranium (U)-Total			<0.000010		mg/L		0.00001	12-JUN-19
Vanadium (V)-Total			<0.00050		mg/L		0.0005	12-JUN-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	12-JUN-19
Zirconium (Zr)-Total			<0.00020		mg/L		0.0002	12-JUN-19
WG3074728-5 MS		**WG3074728-3**						
Aluminum (Al)-Total			N/A	MS-B	%		-	12-JUN-19
Antimony (Sb)-Total			95.2		%		70-130	12-JUN-19
Arsenic (As)-Total			94.7		%		70-130	12-JUN-19
Barium (Ba)-Total			97.3		%		70-130	12-JUN-19
Beryllium (Be)-Total			94.6		%		70-130	12-JUN-19
Bismuth (Bi)-Total			96.5		%		70-130	12-JUN-19
Boron (B)-Total			92.1		%		70-130	12-JUN-19
Cadmium (Cd)-Total			91.2		%		70-130	12-JUN-19
Calcium (Ca)-Total			N/A	MS-B	%		-	12-JUN-19
Chromium (Cr)-Total			94.9		%		70-130	12-JUN-19
Cesium (Cs)-Total			95.2		%		70-130	12-JUN-19
Cobalt (Co)-Total			N/A	MS-B	%		-	12-JUN-19
Copper (Cu)-Total			90.9		%		70-130	12-JUN-19
Iron (Fe)-Total			N/A	MS-B	%		-	12-JUN-19
Lead (Pb)-Total			96.3		%		70-130	12-JUN-19
Lithium (Li)-Total			94.7		%		70-130	12-JUN-19
Magnesium (Mg)-Total			N/A	MS-B	%		-	12-JUN-19
Manganese (Mn)-Total			N/A	MS-B	%		-	12-JUN-19
Molybdenum (Mo)-Total			94.9		%		70-130	12-JUN-19
Nickel (Ni)-Total			N/A	MS-B	%		-	12-JUN-19
Phosphorus (P)-Total			102.2		%		70-130	12-JUN-19
Potassium (K)-Total			91.7		%		70-130	12-JUN-19
Rubidium (Rb)-Total			105.3		%		70-130	12-JUN-19
Selenium (Se)-Total			90.7		%		70-130	12-JUN-19
Silicon (Si)-Total			N/A	MS-B	%		-	12-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4666488								
WG3074728-5 MS		**WG3074728-3**						
Silver (Ag)-Total			92.2		%		70-130	12-JUN-19
Sodium (Na)-Total			87.1		%		70-130	12-JUN-19
Strontium (Sr)-Total			N/A	MS-B	%		-	12-JUN-19
Sulfur (S)-Total			N/A	MS-B	%		-	12-JUN-19
Thallium (Tl)-Total			95.6		%		70-130	12-JUN-19
Tellurium (Te)-Total			99.9		%		70-130	12-JUN-19
Thorium (Th)-Total			91.2		%		70-130	12-JUN-19
Tin (Sn)-Total			93.4		%		70-130	12-JUN-19
Titanium (Ti)-Total			N/A	MS-B	%		-	12-JUN-19
Tungsten (W)-Total			91.8		%		70-130	12-JUN-19
Uranium (U)-Total			N/A	MS-B	%		-	12-JUN-19
Vanadium (V)-Total			92.9		%		70-130	12-JUN-19
Zinc (Zn)-Total			86.1		%		70-130	12-JUN-19
Zirconium (Zr)-Total			92.2		%		70-130	12-JUN-19
NH3-F-WT	**Water**							
Batch R4668555								
WG3076326-15 DUP		**L2290682-1**						
Ammonia, Total (as N)		0.302	0.300		mg/L	0.5	20	13-JUN-19
WG3076326-14 LCS								
Ammonia, Total (as N)			108.0		%		85-115	13-JUN-19
WG3076326-13 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	13-JUN-19
WG3076326-16 MS		**L2290682-1**						
Ammonia, Total (as N)			N/A	MS-B	%		-	13-JUN-19
NO3-IC-WT	**Water**							
Batch R4674012								
WG3081366-4 DUP		**WG3081366-3**						
Nitrate (as N)		0.097	0.097		mg/L	0.2	20	19-JUN-19
WG3081366-2 LCS								
Nitrate (as N)			100.9		%		90-110	19-JUN-19
WG3081366-1 MB								
Nitrate (as N)			<0.020		mg/L		0.02	19-JUN-19
WG3081366-5 MS		**WG3081366-3**						
Nitrate (as N)			100.1		%		75-125	19-JUN-19
P-T-COL-WT	**Water**							

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
P-T-COL-WT	**Water**							
Batch R4668512								
WG3075309-3 DUP		**L2286754-4**						
Phosphorus, Total		0.0459	0.0441		mg/L	4.2	20	13-JUN-19
WG3075309-2 LCS								
Phosphorus, Total			98.1		%		80-120	13-JUN-19
WG3075309-1 MB								
Phosphorus, Total			<0.0030		mg/L		0.003	13-JUN-19
WG3075309-4 MS		**L2286754-4**						
Phosphorus, Total			92.3		%		70-130	13-JUN-19
WG3075309-5 MS		**L2283144-2**						
Phosphorus, Total			91.6		%		70-130	13-JUN-19
PH-BF	**Water**							
Batch R4661705								
WG3071428-2 DUP		**L2287920-1**						
pH		7.98	8.02	J	pH units	0.04	0.2	07-JUN-19
WG3071428-1 LCS								
pH			7.02		pH units		6.9-7.1	07-JUN-19
SO4-IC-N-WT	**Water**							
Batch R4674012								
WG3081366-4 DUP		**WG3081366-3**						
Sulfate (SO4)		10.4	10.4		mg/L	0.1	20	19-JUN-19
WG3081366-2 LCS								
Sulfate (SO4)			102.1		%		90-110	19-JUN-19
WG3081366-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	19-JUN-19
WG3081366-5 MS		**WG3081366-3**						
Sulfate (SO4)			104.6		%		75-125	19-JUN-19
SOLIDS-TDS-BF	**Water**							
Batch R4662058								
WG3071431-3 DUP		**L2287930-1**						
Total Dissolved Solids		125	121		mg/L	2.9	20	07-JUN-19
WG3071431-2 LCS								
Total Dissolved Solids			97.9		%		85-115	07-JUN-19
WG3071431-1 MB								
Total Dissolved Solids			<20		mg/L		20	07-JUN-19
SOLIDS-TSS-BF	**Water**							

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SOLIDS-TSS-BF	**Water**							
Batch R4662055								
WG3071430-3 DUP		**L2287930-1**						
Total Suspended Solids		<2.0	<2.0	RPD-NA	mg/L	N/A	25	07-JUN-19
WG3071430-2 LCS								
Total Suspended Solids			97.8		%		85-115	07-JUN-19
WG3071430-1 MB								
Total Suspended Solids			<2.0		mg/L		2	07-JUN-19
TKN-WT	**Water**							
Batch R4668542								
WG3075205-3 DUP		**L2283580-1**						
Total Kjeldahl Nitrogen		12.5	12.4		mg/L	1.2	20	13-JUN-19
WG3075205-2 LCS								
Total Kjeldahl Nitrogen			105.0		%		75-125	13-JUN-19
WG3075205-1 MB								
Total Kjeldahl Nitrogen			<0.15		mg/L		0.15	13-JUN-19
WG3075205-4 MS		**L2283580-1**						
Total Kjeldahl Nitrogen			N/A	MS-B	%		-	13-JUN-19
TOC-WT	**Water**							
Batch R4668329								
WG3075858-3 DUP		**L2287922-1**						
Total Organic Carbon		3.46	3.60		mg/L	4.1	20	13-JUN-19
WG3075858-2 LCS								
Total Organic Carbon			101.3		%		80-120	13-JUN-19
WG3075858-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	13-JUN-19
WG3075858-4 MS		**L2287922-1**						
Total Organic Carbon			97.3		%		70-130	13-JUN-19
TURBIDITY-BF	**Water**							
Batch R4661704								
WG3071429-3 DUP		**L2287920-1**						
Turbidity		3.75	3.80		NTU	1.3	15	07-JUN-19
WG3071429-2 LCS								
Turbidity			111.0		%		85-115	07-JUN-19
WG3071429-1 MB								
Turbidity			<0.10		NTU		0.1	07-JUN-19

Quality Control Report

Workorder: L2287961 Report Date: 05-JUL-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

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

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Quality Control Report

Workorder: L2287961 Report Date: 05-JUL-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Leachable Anions & Nutrients							
Nitrate in Water by IC							
	1	07-JUN-19 22:30	19-JUN-19 13:32	7	12	days	EHT
Organic / Inorganic Carbon							
Dissolved Organic Carbon							
	1	07-JUN-19 22:30	12-JUN-19 20:00	3	5	days	EHTR

Legend & Qualifier Definitions:

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR: Exceeded ALS recommended hold time prior to sample receipt.
EHTL: Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT: Exceeded ALS recommended hold time prior to analysis.
Rec. HT: ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2287961 were received on 12-JUN-19 09:30.

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.

Thursday, June 27, 2019

Rick Hawthorne
ALS Environmental
60 Northland Rd, Unit 1
Waterloo Canada, ON N2V 2B8

Re: ALS Workorder: 1906284
Project Name:
Project Number: L2287961

Dear Mr. Hawthorne:

One water sample was received from ALS Environmental, on 6/13/2019. The sample was scheduled for the following analysis:

Radium-226

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,

ALS Environmental
Katie M. OBrien
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
AIHA	214884
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280

1906284

Radium-226:

The sample was prepared and analyzed according to the current revision of SOP 783.

All acceptance criteria were met.

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1906284
Client Name: ALS Environmental
Client Project Name:
Client Project Number: L2287961
Client PO Number: L2287961

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
L2287961-1	1906284-1		WATER	07-Jun-19	

ALS Environmental

L2287961

WATERLOO

1906284
~~1906283~~
MJ 6.14.19

Subcontract Request Form

Subcontract To:

ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
225 COMMERCE DRIVE
FORT COLLINS,CO 80524

NOTES: Please reference on final report and invoice: PO# *L2287961*
ALS requires QC data to be provided with your final results.

1x1L HDPE

Please see enclosed 1 **sample(s) in** 1 **Container(s)**

SAMPLE NUMBER	ANALYTICAL REQUIRED	DATE SAMPLED / DUE DATE	Priority Flag
L2287961-1 MS-08		6/7/2019	E
	Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	6/13/2019	

Subcontract Info Contact: Mary-Lynn Pike (519) 886-6910
Analysis and reporting info contact: Rick Hawthorne
60 NORTHLAND ROAD, UNIT 1
WATERLOO,ON N2V 2B8
Phone: (519) 886-6910 Email: Rick.Hawthorne@alsglobal.com

Please email confirmation of receipt to: **Rick.Hawthorne@alsglobal.com**

Shipped By: _____ Date Shipped: _____

Received By: AJ Date Received: 6.13.19 1550

Verified By: _____ Date Verified: _____

Temperature: _____

Sample Integrity Issues: _____

ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: ALS Water 100 Workorder No: 1906284

Project Manager: KO Initials: NJ Date: 6.14.19

1.	Are airbills / shipping documents present and/or removable?	DROP OFF	YES	NO
2.	Are custody seals on **shipping** containers intact?	NONE	YES	NO *
3.	Are custody seals on **sample** containers intact?	NONE	YES	NO *
4.	Is there a COC (chain-of-custody) present?		YES	NO *
5.	Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)		YES	NO *
6.	Are short-hold samples present?		YES	NO
7.	Are all samples within holding times for the requested analyses?		YES	NO *
8.	Were all sample containers received intact? (not broken or leaking)		YES	NO *
9.	Is there sufficient sample for the requested analyses?		YES	NO *
10.	Are all samples in the proper containers for the requested analyses?		YES	NO *
11.	Are all aqueous samples preserved correctly, if required? (excluding volatiles)	N/A	YES	NO *
12.	Are all aqueous non-preserved samples pH 4-9?	N/A	YES	NO *
13.	Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm (1/4 inch) diameter? (i.e. size of green pea)	N/A	YES	NO
14.	Were the samples shipped on ice?		YES	NO
15.	Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: #1 #3 #4	RAD ONLY	YES	NO

Cooler #:	1
Temperature (°C):	16.7
No. of custody seals on cooler:	0
DOT Survey/ Acceptance Information — External µR/hr reading:	8
DOT Survey/ Acceptance Information — Background µR/hr reading:	10

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? **YES / NO / NA** (If no, see Form 008.)

*** Please provide details here for NO responses to gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.**

Sample had an initial pH of 4
-1.0 ml HNO3 added, final pH is ≤ 2 LOT # 197345

All client bottle ID's vs ALS lab ID's double-checked by: NJ

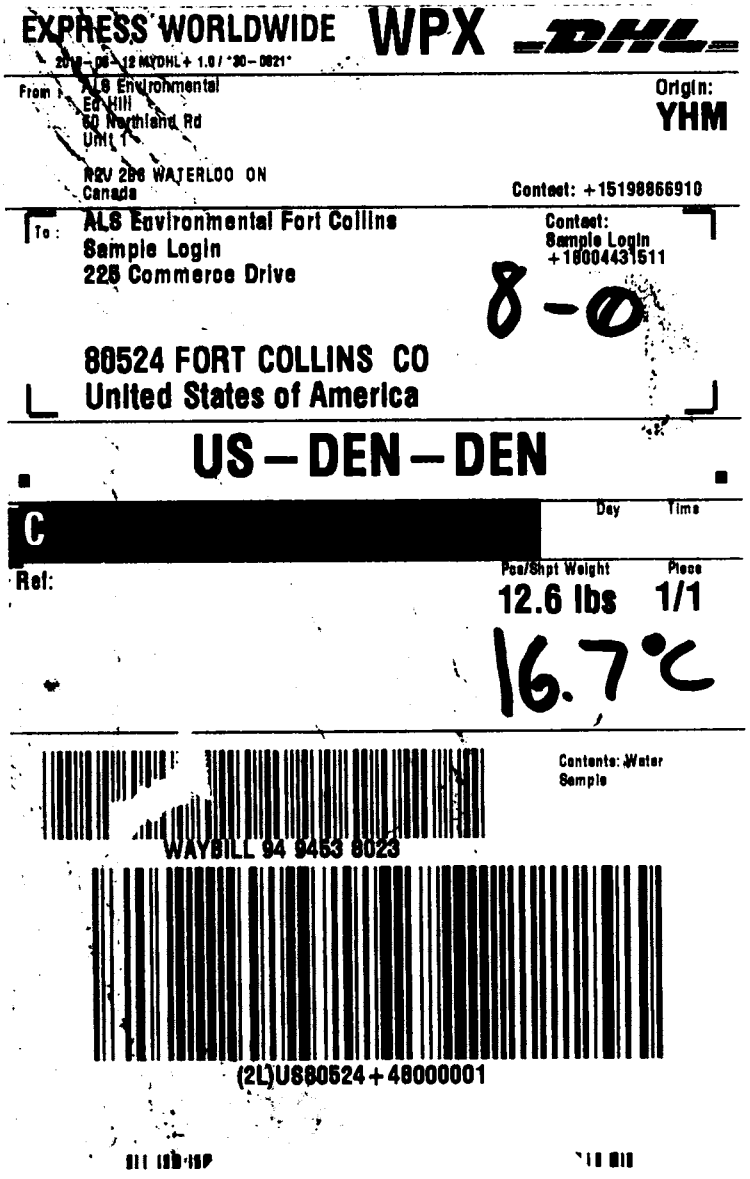
If applicable, was the client contacted? **YES / NO / NA** Contact: _____ Date/Time: _____

Project Manager Signature / Date: 6/14/19

Form 201r27.xls
(02/11/2019)

*IR Gun #1, VWR SN 170560549
*IR Gun #3, VWR SN 170647571
*IR Gun #4, Oakton, SN 2372220101-0002

1906284



EXPRESS WORLDWIDE WPX DHL

2018-08-12 MYDHL+ 1.0/*30-0021*

From: ALS Environmental
Ed Hill
50 Northland Rd
Unit 1
N2V 2B8 WATERLOO ON
Canada

Origin:
YHM

Contact: +15198866910

To: ALS Environmental Fort Collins
Sample Login
225 Commerce Drive

Contact:
Sample Login
+18004431511

8-0

80524 FORT COLLINS CO
United States of America

US-DEN-DEN

C [redacted] Day Time

Ref:

Pce/Shpt Weight: 12.6 lbs
Piece: 1/1

16.7°C

Contents: Water Sample

WAYBILL 94 9453 8023

(2L)US80524+48000001

Client:	ALS Environmental	**Date:**	*27-Jun-19*
Project:	L2287961	**Work Order:**	1906284
Sample ID:	L2287961-1	**Lab ID:**	1906284-1
Legal Location:		**Matrix:**	WATER
Collection Date:	6/7/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1			**SOP 783**		Prep Date: **6/18/2019**	PrepBy: **JXH**
Ra-226	0.0037 (+/- 0.0056)	U	0.0093	BQ/l	NA	6/26/2019 12:27
Carr: BARIUM	*96*		*40-110*	*%REC*	DL = NA	6/26/2019 12:27

Client:	ALS Environmental	**Date:**	*27-Jun-19*
Project:	L2287961	**Work Order:**	1906284
Sample ID:	L2287961-1	**Lab ID:**	1906284-1
Legal Location:		**Matrix:**	WATER
Collection Date:	6/7/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed

Explanation of Qualifiers

Radiochemistry:

- "Report Limit" is the MDC

U or ND - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

Y2 - Chemical Yield outside default limits.

W - DER is greater than Warning Limit of 1.42

* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.
# - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.
G - Sample density differs by more than 15% of LCS density.
D - DER is greater than Control Limit

M - Requested MDC not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS, Matrix Spike Recovery within control limits.

N - Matrix Spike Recovery outside control limits

NC - Not Calculated for duplicate results less than 5 times MDC

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

Inorganics:

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).

U or ND - Indicates that the compound was analyzed for but not detected.

E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.

M - Duplicate injection precision was not met.

N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.

Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.

* - Duplicate analysis (relative percent difference) not within control limits.

S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

Organics:

U or ND - Indicates that the compound was analyzed for but not detected.

B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.

E - Analyte concentration exceeds the upper level of the calibration range.

J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).

A - A tentatively identified compound is a suspected aldol-condensation product.

X - The analyte was diluted below an accurate quantitation level.

* - The spike recovery is equal to or outside the control criteria used.

+ - The relative percent difference (RPD) equals or exceeds the control criteria.

G - A pattern resembling gasoline was detected in this sample.

D - A pattern resembling diesel was detected in this sample.

M - A pattern resembling motor oil was detected in this sample.

C - A pattern resembling crude oil was detected in this sample.

4 - A pattern resembling JP-4 was detected in this sample.

5 - A pattern resembling JP-5 was detected in this sample.

H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.

L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.

Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
- gasoline
- JP-8
- diesel
- mineral spirits
- motor oil
- Stoddard solvent
- bunker C

QC BATCH REPORT

Batch ID: **RE190618-1-1** Instrument ID **Alpha Scin** Method: **Radium-226 by Radon Emanation**

LCS Sample ID: **RE190618-1** Units: **BQ/l** Analysis Date: **6/26/2019 13:01**

Client ID: Run ID: **RE190618-1A** Prep Date: **6/18/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.47 (+/- 0.372)	0.0105	1.771		83.1	67-120					P,M3
Carr: BARIUM	16100		16960		95.1	40-110					

LCSD Sample ID: **RE190618-1** Units: **BQ/l** Analysis Date: **6/26/2019 13:01**

Client ID: Run ID: **RE190618-1A** Prep Date: **6/18/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.85 (+/- 0.462)	0.015	1.771		104	67-120		1.47	0.6	2.1	P,M3
Carr: BARIUM	16400		16960		96.7	40-110		16100			

MB Sample ID: **RE190618-1** Units: **BQ/l** Analysis Date: **6/26/2019 13:01**

Client ID: Run ID: **RE190618-1A** Prep Date: **6/18/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	0.00048 (+/- 0.0044)	0.0084									U
Carr: BARIUM	16200		16960		95.8	40-110					

The following samples were analyzed in this batch: 1906284-1

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

L2287961-COFC

COC Number: 15 -

Report To	Contact and company name below will appear on the final report
Company:	Baffinland Iron Mines Corp.
Contact:	Wiliam Bowden and Connor Devereaux
Phone:	647-253-0596 EXT 6016
	Company address below will appear on the final report
Street:	2275 Upper Middle Rd. E., Suite #300
City/Province:	Oakville, ON
Postal Code:	L6H 0C3
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)

Quality Control (QC) Report with Report ☑ YES ☐ NO

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: bimcore@alsglobal.com

Email 2: bimww@alsglobal.com

Email 3:

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: ap@baffinland.com

Email 2: commercial@baffinland.com

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☐ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4] ☐ | 3 day [P3] ☐ | 2 day [P2] ☐

EMERGENCY: 1 Business day [E1] ☐ | Same Day, Weekend or Statutory holiday [E0] ☑

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information

ALS Account # / Quote #:	23642 /Q42455
Job #:	MS-08
PO / AFE:	4500057496
LSD:	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only): L2287961 08

ALS Contact: **Sampler:** KB/BE

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	BIM-MMER-WT	Group 3	Number of Containers
1	MS-08	7-Jun-19	22:30	Water	E0	R	11

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human drinking water use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Kendra Button	Date: 7-Jun-19	Time: 23:30	Received by:	Date:	Time:	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Baffinland Iron Mine's Corporation (Oakville)
ATTN: William Bowden/Connor Devereaux
2275 Upper Middle Rd. E.
Suite #300
Oakville ON L6H 0C3

Date Received: 12-JUN-19
Report Date: 28-JUN-19 08:04 (MT)
Version: FINAL

Client Phone: 647-253-0596

Certificate of Analysis

Lab Work Order #: L2289712

Project P.O. #: 4500057496
Job Reference: MS-08 DEL
C of C Numbers:
Legal Site Desc:

Rick Hawthorne
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2289712-1 MS-08 Sampled By: CP/AZ/RH on 11-JUN-19 @ 08:25 Matrix: WATER							
Physical Tests							
Conductivity	888		3.0	umhos/cm		12-JUN-19	R4668310
pH	6.63		0.10	pH units		11-JUN-19	R4663765
Total Suspended Solids	28.0		2.0	mg/L		12-JUN-19	R4664286
Total Dissolved Solids	684		20	mg/L		12-JUN-19	R4666587
Turbidity	34.5		0.10	NTU		11-JUN-19	R4663766
Anions and Nutrients							
Ammonia, Total (as N)	0.379		0.010	mg/L		13-JUN-19	R4668555
Cyanides							
Cyanide, Total	<0.0020		0.0020	mg/L		12-JUN-19	R4665587
Total Metals							
Aluminum (Al)-Total	1.07	DLHC	0.050	mg/L	12-JUN-19	12-JUN-19	R4666488
Antimony (Sb)-Total	<0.0010	DLHC	0.0010	mg/L	12-JUN-19	12-JUN-19	R4666488
Arsenic (As)-Total	<0.0010	DLHC	0.0010	mg/L	12-JUN-19	12-JUN-19	R4666488
Barium (Ba)-Total	0.0164	DLHC	0.0010	mg/L	12-JUN-19	12-JUN-19	R4666488
Beryllium (Be)-Total	<0.0010	DLHC	0.0010	mg/L	12-JUN-19	12-JUN-19	R4666488
Bismuth (Bi)-Total	<0.00050	DLHC	0.00050	mg/L	12-JUN-19	12-JUN-19	R4666488
Boron (B)-Total	<0.10	DLHC	0.10	mg/L	12-JUN-19	12-JUN-19	R4666488
Cadmium (Cd)-Total	0.000078	DLHC	0.000050	mg/L	12-JUN-19	12-JUN-19	R4666488
Calcium (Ca)-Total	20.3	DLHC	0.50	mg/L	12-JUN-19	12-JUN-19	R4666488
Cesium (Cs)-Total	<0.00010	DLHC	0.00010	mg/L	12-JUN-19	12-JUN-19	R4666488
Chromium (Cr)-Total	<0.0050	DLHC	0.0050	mg/L	12-JUN-19	12-JUN-19	R4666488
Cobalt (Co)-Total	0.0629	DLHC	0.0010	mg/L	12-JUN-19	12-JUN-19	R4666488
Copper (Cu)-Total	<0.010	DLHC	0.010	mg/L	12-JUN-19	12-JUN-19	R4666488
Iron (Fe)-Total	4.93	DLHC	0.10	mg/L	12-JUN-19	12-JUN-19	R4666488
Lead (Pb)-Total	0.00068	DLHC	0.00050	mg/L	12-JUN-19	12-JUN-19	R4666488
Lithium (Li)-Total	0.013	DLHC	0.010	mg/L	12-JUN-19	12-JUN-19	R4666488
Magnesium (Mg)-Total	101	DLHC	0.050	mg/L	12-JUN-19	12-JUN-19	R4666488
Manganese (Mn)-Total	3.65	DLHC	0.0050	mg/L	12-JUN-19	12-JUN-19	R4666488
Molybdenum (Mo)-Total	<0.00050	DLHC	0.00050	mg/L	12-JUN-19	12-JUN-19	R4666488
Nickel (Ni)-Total	0.0672	DLHC	0.0050	mg/L	12-JUN-19	12-JUN-19	R4666488
Phosphorus (P)-Total	<0.50	DLHC	0.50	mg/L	12-JUN-19	12-JUN-19	R4666488
Potassium (K)-Total	2.05	DLHC	0.50	mg/L	12-JUN-19	12-JUN-19	R4666488
Rubidium (Rb)-Total	0.0047	DLHC	0.0020	mg/L	12-JUN-19	12-JUN-19	R4666488
Selenium (Se)-Total	0.00105	DLHC	0.00050	mg/L	12-JUN-19	12-JUN-19	R4666488
Silicon (Si)-Total	2.8	DLHC	1.0	mg/L	12-JUN-19	12-JUN-19	R4666488
Silver (Ag)-Total	<0.00050	DLHC	0.00050	mg/L	12-JUN-19	12-JUN-19	R4666488
Sodium (Na)-Total	0.92	DLHC	0.50	mg/L	12-JUN-19	12-JUN-19	R4666488
Strontium (Sr)-Total	0.027	DLHC	0.010	mg/L	12-JUN-19	12-JUN-19	R4666488
Sulfur (S)-Total	164	DLHC	5.0	mg/L	12-JUN-19	12-JUN-19	R4666488
Tellurium (Te)-Total	<0.0020	DLHC	0.0020	mg/L	12-JUN-19	12-JUN-19	R4666488
Thallium (Tl)-Total	<0.00010	DLHC	0.00010	mg/L	12-JUN-19	12-JUN-19	R4666488
Thorium (Th)-Total	<0.0010	DLHC	0.0010	mg/L	12-JUN-19	12-JUN-19	R4666488

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2289712-1 MS-08 Sampled By: CP/AZ/RH on 11-JUN-19 @ 08:25 Matrix: WATER							
Total Metals							
Tin (Sn)-Total	<0.0010	DLHC	0.0010	mg/L	12-JUN-19	12-JUN-19	R4666488
Titanium (Ti)-Total	0.0449	DLHC	0.0030	mg/L	12-JUN-19	12-JUN-19	R4666488
Tungsten (W)-Total	<0.0010	DLHC	0.0010	mg/L	12-JUN-19	12-JUN-19	R4666488
Uranium (U)-Total	0.00035	DLHC	0.00010	mg/L	12-JUN-19	12-JUN-19	R4666488
Vanadium (V)-Total	<0.0050	DLHC	0.0050	mg/L	12-JUN-19	12-JUN-19	R4666488
Zinc (Zn)-Total	<0.030	DLHC	0.030	mg/L	12-JUN-19	12-JUN-19	R4666488
Zirconium (Zr)-Total	<0.0020	DLHC	0.0020	mg/L	12-JUN-19	12-JUN-19	R4666488
Radiological Parameters							
Ra-226	0.012		0.0099	Bq/L	18-JUN-19	26-JUN-19	R4653808

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

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Barium (Ba)-Total	MS-B	L2289712-1
Matrix Spike	Boron (B)-Total	MS-B	L2289712-1
Matrix Spike	Calcium (Ca)-Total	MS-B	L2289712-1
Matrix Spike	Iron (Fe)-Total	MS-B	L2289712-1
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2289712-1
Matrix Spike	Manganese (Mn)-Total	MS-B	L2289712-1
Matrix Spike	Potassium (K)-Total	MS-B	L2289712-1
Matrix Spike	Silicon (Si)-Total	MS-B	L2289712-1
Matrix Spike	Sodium (Na)-Total	MS-B	L2289712-1
Matrix Spike	Strontium (Sr)-Total	MS-B	L2289712-1
Matrix Spike	Sulfur (S)-Total	MS-B	L2289712-1
Matrix Spike	Uranium (U)-Total	MS-B	L2289712-1
Matrix Spike	Zinc (Zn)-Total	MS-B	L2289712-1
Matrix Spike	Ammonia, Total (as N)	MS-B	L2289712-1

Sample Parameter Qualifier key listed:

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
CN-TOT-WT	Water	Cyanide, Total	ISO 14403-2

Total cyanide is determined by the combination of UV digestion and distillation. Cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

When using this method, high levels of thiocyanate in samples can cause false positives at ~1-2% of the thiocyanate concentration. For samples with detectable cyanide analyzed by this method, ALS recommends analysis for thiocyanate to check for this potential interference

EC-SCREEN-WT	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

EC-WT	Water	Conductivity	APHA 2510 B

Water samples can be measured directly by immersing the conductivity cell into the sample.

MET-T-CCMS-WT	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

NH3-F-WT	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

PH-BF	Water	pH	APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

RA226-MMER-FC	Water	Ra226 by Alpha Scint, MDC=0.01 Bq/L	EPA 903.1

SOLIDS-TDS-BF	Water	Total Dissolved Solids	APHA 2540C

A well-mixed sample is filtered though glass fibres filter. A known volume of the filtrate is evaporated and dried at 180 +/- 2C for 1hr.

SOLIDS-TSS-BF	Water	Suspended solids	APHA 2540 D-Gravimetric

A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104 +/- 1C for a minimum of four hours or until a constant weight is achieved.

TURBIDITY-BF	Water	Turbidity	APHA 2130 B

Reference Information

Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.

** 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
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA
FC	ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
BF	ALS ENVIRONMENTAL - BAFFIN ISLAND, NUNAVUT, 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 weight of sample
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

Workorder: L2289712 Report Date: 28-JUN-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CN-TOT-WT	**Water**							
Batch R4665587								
WG3074895-19 DUP		**L2288432-1**						
Cyanide, Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	12-JUN-19
WG3074895-18 LCS								
Cyanide, Total			90.0		%		80-120	12-JUN-19
WG3074895-17 MB								
Cyanide, Total			<0.0020		mg/L		0.002	12-JUN-19
WG3074895-20 MS		**L2288432-1**						
Cyanide, Total			87.7		%		70-130	12-JUN-19
EC-WT	**Water**							
Batch R4668310								
WG3075298-4 DUP		**WG3075298-3**						
Conductivity		145	144		umhos/cm	0.4	10	12-JUN-19
WG3075298-2 LCS								
Conductivity			99.1		%		90-110	12-JUN-19
WG3075298-1 MB								
Conductivity			<3.0		umhos/cm		3	12-JUN-19
MET-T-CCMS-WT	**Water**							
Batch R4666488								
WG3075458-4 DUP		**WG3075458-3**						
Aluminum (Al)-Total		0.0240	0.0266		mg/L	10	20	12-JUN-19
Antimony (Sb)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	12-JUN-19
Arsenic (As)-Total		0.00025	0.00027		mg/L	4.0	20	12-JUN-19
Barium (Ba)-Total		0.101	0.104		mg/L	2.6	20	12-JUN-19
Beryllium (Be)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	12-JUN-19
Bismuth (Bi)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	12-JUN-19
Boron (B)-Total		0.172	0.166		mg/L	3.2	20	12-JUN-19
Cadmium (Cd)-Total		0.000233	0.000251		mg/L	7.4	20	12-JUN-19
Calcium (Ca)-Total		137	134		mg/L	2.4	20	12-JUN-19
Chromium (Cr)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	12-JUN-19
Cesium (Cs)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	12-JUN-19
Cobalt (Co)-Total		0.00052	0.00053		mg/L	1.7	20	12-JUN-19
Copper (Cu)-Total		0.0014	0.0014		mg/L	2.2	20	12-JUN-19
Iron (Fe)-Total		0.965	0.964		mg/L	0.1	20	12-JUN-19
Lead (Pb)-Total		0.000404	0.000411		mg/L	1.8	20	12-JUN-19
Lithium (Li)-Total		0.0057	0.0054		mg/L	5.7	20	12-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4666488								
WG3075458-4 DUP		**WG3075458-3**						
Magnesium (Mg)-Total		31.6	32.1		mg/L	1.7	20	12-JUN-19
Manganese (Mn)-Total		0.445	0.442		mg/L	0.8	20	12-JUN-19
Molybdenum (Mo)-Total		0.00139	0.00141		mg/L	1.2	20	12-JUN-19
Nickel (Ni)-Total		0.00407	0.00406		mg/L	0.2	20	12-JUN-19
Phosphorus (P)-Total		<0.050	<0.050	RPD-NA	mg/L	N/A	20	12-JUN-19
Potassium (K)-Total		4.33	4.37		mg/L	0.9	20	12-JUN-19
Rubidium (Rb)-Total		0.00151	0.00141		mg/L	6.3	20	12-JUN-19
Selenium (Se)-Total		0.000547	0.000560		mg/L	2.3	20	12-JUN-19
Silicon (Si)-Total		3.99	4.03		mg/L	0.9	20	12-JUN-19
Silver (Ag)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	12-JUN-19
Sodium (Na)-Total		257	263		mg/L	2.5	20	12-JUN-19
Strontium (Sr)-Total		0.720	0.721		mg/L	0.2	20	12-JUN-19
Sulfur (S)-Total		36.4	36.7		mg/L	1.0	25	12-JUN-19
Thallium (Tl)-Total		0.000039	0.000038		mg/L	2.6	20	12-JUN-19
Tellurium (Te)-Total		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	12-JUN-19
Thorium (Th)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	25	12-JUN-19
Tin (Sn)-Total		0.00041	0.00043		mg/L	5.3	20	12-JUN-19
Titanium (Ti)-Total		0.00058	0.00063		mg/L	9.5	20	12-JUN-19
Tungsten (W)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	12-JUN-19
Uranium (U)-Total		0.000531	0.000524		mg/L	1.5	20	12-JUN-19
Vanadium (V)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	12-JUN-19
Zinc (Zn)-Total		0.0914	0.0913		mg/L	0.1	20	12-JUN-19
Zirconium (Zr)-Total		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	12-JUN-19
WG3075458-2 LCS								
Aluminum (Al)-Total			93.8		%		80-120	12-JUN-19
Antimony (Sb)-Total			98.0		%		80-120	12-JUN-19
Arsenic (As)-Total			93.3		%		80-120	12-JUN-19
Barium (Ba)-Total			99.9		%		80-120	12-JUN-19
Beryllium (Be)-Total			95.8		%		80-120	12-JUN-19
Bismuth (Bi)-Total			95.3		%		80-120	12-JUN-19
Boron (B)-Total			91.4		%		80-120	12-JUN-19
Cadmium (Cd)-Total			92.2		%		80-120	12-JUN-19
Calcium (Ca)-Total			95.7		%		80-120	12-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4666488								
WG3075458-2 LCS								
Chromium (Cr)-Total			90.5		%		80-120	12-JUN-19
Cesium (Cs)-Total			96.4		%		80-120	12-JUN-19
Cobalt (Co)-Total			90.0		%		80-120	12-JUN-19
Copper (Cu)-Total			87.0		%		80-120	12-JUN-19
Iron (Fe)-Total			92.4		%		80-120	12-JUN-19
Lead (Pb)-Total			95.8		%		80-120	12-JUN-19
Lithium (Li)-Total			102.0		%		80-120	12-JUN-19
Magnesium (Mg)-Total			91.1		%		80-120	12-JUN-19
Manganese (Mn)-Total			94.1		%		80-120	12-JUN-19
Molybdenum (Mo)-Total			93.8		%		80-120	12-JUN-19
Nickel (Ni)-Total			88.4		%		80-120	12-JUN-19
Phosphorus (P)-Total			96.9		%		70-130	12-JUN-19
Potassium (K)-Total			94.5		%		80-120	12-JUN-19
Rubidium (Rb)-Total			96.3		%		80-120	12-JUN-19
Selenium (Se)-Total			88.3		%		80-120	12-JUN-19
Silicon (Si)-Total			98.4		%		60-140	12-JUN-19
Silver (Ag)-Total			93.4		%		80-120	12-JUN-19
Sodium (Na)-Total			88.4		%		80-120	12-JUN-19
Strontium (Sr)-Total			93.6		%		80-120	12-JUN-19
Sulfur (S)-Total			97.5		%		80-120	12-JUN-19
Thallium (Tl)-Total			94.8		%		80-120	12-JUN-19
Tellurium (Te)-Total			88.3		%		80-120	12-JUN-19
Thorium (Th)-Total			96.5		%		70-130	12-JUN-19
Tin (Sn)-Total			95.2		%		80-120	12-JUN-19
Titanium (Ti)-Total			89.2		%		80-120	12-JUN-19
Tungsten (W)-Total			95.0		%		80-120	12-JUN-19
Uranium (U)-Total			98.8		%		80-120	12-JUN-19
Vanadium (V)-Total			93.0		%		80-120	12-JUN-19
Zinc (Zn)-Total			89.1		%		80-120	12-JUN-19
Zirconium (Zr)-Total			92.9		%		80-120	12-JUN-19
WG3075458-1 MB								
Aluminum (Al)-Total			<0.0050		mg/L		0.005	12-JUN-19
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	12-JUN-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	12-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4666488								
WG3075458-1 MB								
Barium (Ba)-Total			<0.00010		mg/L		0.0001	12-JUN-19
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	12-JUN-19
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	12-JUN-19
Boron (B)-Total			<0.010		mg/L		0.01	12-JUN-19
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	12-JUN-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	12-JUN-19
Chromium (Cr)-Total			<0.00050		mg/L		0.0005	12-JUN-19
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	12-JUN-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	12-JUN-19
Copper (Cu)-Total			<0.0010		mg/L		0.001	12-JUN-19
Iron (Fe)-Total			<0.010		mg/L		0.01	12-JUN-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	12-JUN-19
Lithium (Li)-Total			<0.0010		mg/L		0.001	12-JUN-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	12-JUN-19
Manganese (Mn)-Total			<0.00050		mg/L		0.0005	12-JUN-19
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	12-JUN-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	12-JUN-19
Phosphorus (P)-Total			<0.050		mg/L		0.05	12-JUN-19
Potassium (K)-Total			<0.050		mg/L		0.05	12-JUN-19
Rubidium (Rb)-Total			<0.00020		mg/L		0.0002	12-JUN-19
Selenium (Se)-Total			<0.000050		mg/L		0.00005	12-JUN-19
Silicon (Si)-Total			<0.10		mg/L		0.1	12-JUN-19
Silver (Ag)-Total			<0.000050		mg/L		0.00005	12-JUN-19
Sodium (Na)-Total			<0.050		mg/L		0.05	12-JUN-19
Strontium (Sr)-Total			<0.0010		mg/L		0.001	12-JUN-19
Sulfur (S)-Total			<0.50		mg/L		0.5	12-JUN-19
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	12-JUN-19
Tellurium (Te)-Total			<0.00020		mg/L		0.0002	12-JUN-19
Thorium (Th)-Total			<0.00010		mg/L		0.0001	12-JUN-19
Tin (Sn)-Total			<0.00010		mg/L		0.0001	12-JUN-19
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	12-JUN-19
Tungsten (W)-Total			<0.00010		mg/L		0.0001	12-JUN-19
Uranium (U)-Total			<0.000010		mg/L		0.00001	12-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4666488								
WG3075458-1 MB								
Vanadium (V)-Total			<0.00050		mg/L		0.0005	12-JUN-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	12-JUN-19
Zirconium (Zr)-Total			<0.00020		mg/L		0.0002	12-JUN-19
WG3075458-5 MS		**WG3075458-6**						
Aluminum (Al)-Total			102.5		%		70-130	12-JUN-19
Antimony (Sb)-Total			100.2		%		70-130	12-JUN-19
Arsenic (As)-Total			97.5		%		70-130	12-JUN-19
Barium (Ba)-Total			N/A	MS-B	%		-	12-JUN-19
Beryllium (Be)-Total			97.7		%		70-130	12-JUN-19
Bismuth (Bi)-Total			85.6		%		70-130	12-JUN-19
Boron (B)-Total			N/A	MS-B	%		-	12-JUN-19
Cadmium (Cd)-Total			88.6		%		70-130	12-JUN-19
Calcium (Ca)-Total			N/A	MS-B	%		-	12-JUN-19
Chromium (Cr)-Total			95.6		%		70-130	12-JUN-19
Cesium (Cs)-Total			101.2		%		70-130	12-JUN-19
Cobalt (Co)-Total			91.7		%		70-130	12-JUN-19
Copper (Cu)-Total			83.7		%		70-130	12-JUN-19
Iron (Fe)-Total			N/A	MS-B	%		-	12-JUN-19
Lead (Pb)-Total			89.7		%		70-130	12-JUN-19
Lithium (Li)-Total			105.7		%		70-130	12-JUN-19
Magnesium (Mg)-Total			N/A	MS-B	%		-	12-JUN-19
Manganese (Mn)-Total			N/A	MS-B	%		-	12-JUN-19
Molybdenum (Mo)-Total			100.8		%		70-130	12-JUN-19
Nickel (Ni)-Total			87.0		%		70-130	12-JUN-19
Phosphorus (P)-Total			102.4		%		70-130	12-JUN-19
Potassium (K)-Total			N/A	MS-B	%		-	12-JUN-19
Rubidium (Rb)-Total			100.6		%		70-130	12-JUN-19
Selenium (Se)-Total			92.5		%		70-130	12-JUN-19
Silicon (Si)-Total			N/A	MS-B	%		-	12-JUN-19
Silver (Ag)-Total			88.4		%		70-130	12-JUN-19
Sodium (Na)-Total			N/A	MS-B	%		-	12-JUN-19
Strontium (Sr)-Total			N/A	MS-B	%		-	12-JUN-19
Sulfur (S)-Total			N/A	MS-B	%		-	12-JUN-19
Thallium (Tl)-Total			89.8		%		70-130	12-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4666488								
WG3075458-5 MS		**WG3075458-6**						
Tellurium (Te)-Total			85.5		%		70-130	12-JUN-19
Thorium (Th)-Total			97.5		%		70-130	12-JUN-19
Tin (Sn)-Total			97.3		%		70-130	12-JUN-19
Titanium (Ti)-Total			97.6		%		70-130	12-JUN-19
Tungsten (W)-Total			96.1		%		70-130	12-JUN-19
Uranium (U)-Total			N/A	MS-B	%		-	12-JUN-19
Vanadium (V)-Total			100.3		%		70-130	12-JUN-19
Zinc (Zn)-Total			N/A	MS-B	%		-	12-JUN-19
Zirconium (Zr)-Total			97.3		%		70-130	12-JUN-19
NH3-F-WT	**Water**							
Batch R4668555								
WG3076326-15 DUP		**L2290682-1**						
Ammonia, Total (as N)		0.302	0.300		mg/L	0.5	20	13-JUN-19
WG3076326-14 LCS								
Ammonia, Total (as N)			108.0		%		85-115	13-JUN-19
WG3076326-13 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	13-JUN-19
WG3076326-16 MS		**L2290682-1**						
Ammonia, Total (as N)			N/A	MS-B	%		-	13-JUN-19
PH-BF	**Water**							
Batch R4663765								
WG3074050-2 DUP		**L2288672-3**						
pH		7.99	7.99	J	pH units	0.00	0.2	11-JUN-19
WG3074050-1 LCS								
pH			7.01		pH units		6.9-7.1	11-JUN-19
SOLIDS-TDS-BF	**Water**							
Batch R4666587								
WG3074386-3 DUP		**L2288672-1**						
Total Dissolved Solids		417	397		mg/L	4.9	20	12-JUN-19
WG3074386-2 LCS								
Total Dissolved Solids			103.3		%		85-115	12-JUN-19
WG3074386-1 MB								
Total Dissolved Solids			<20		mg/L		20	12-JUN-19
SOLIDS-TSS-BF	**Water**							

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SOLIDS-TSS-BF	**Water**							
Batch R4664286								
WG3074385-3 DUP		**L2289615-1**						
Total Suspended Solids		2.8	2.8		mg/L	0.0	25	12-JUN-19
WG3074385-2 LCS								
Total Suspended Solids			100.4		%		85-115	12-JUN-19
WG3074385-1 MB								
Total Suspended Solids			<2.0		mg/L		2	12-JUN-19
TURBIDITY-BF	**Water**							
Batch R4663766								
WG3074052-3 DUP		**L2288672-3**						
Turbidity		4.84	4.85		NTU	0.2	15	11-JUN-19
WG3074052-2 LCS								
Turbidity			100.0		%		85-115	11-JUN-19
WG3074052-1 MB								
Turbidity			<0.10		NTU		0.1	11-JUN-19

Quality Control Report

Workorder: L2289712 Report Date: 28-JUN-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

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

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

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.

Thursday, June 27, 2019

Rick Hawthorne
ALS Environmental
60 Northland Rd, Unit 1
Waterloo Canada, ON N2V 2B8

Re: ALS Workorder: 1906283
Project Name:
Project Number: L2289712

Dear Mr. Hawthorne:

One water sample was received from ALS Environmental, on 6/13/2019. The sample was scheduled for the following analysis:

Radium-226

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,

ALS Environmental
Katie M. OBrien
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
AIHA	214884
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280

1906283

Radium-226:

The sample was prepared and analyzed according to the current revision of SOP 783.

All acceptance criteria were met.

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1906283
Client Name: ALS Environmental
Client Project Name:
Client Project Number: L2289712
Client PO Number: L2289712

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
L2289712-1	1906283-1		WATER	11-Jun-19	

ALS Environmental

L2289712

WATERLOO

1906283

Subcontract Request Form

Subcontract To:

ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
225 COMMERCE DRIVE
FORT COLLINS,CO 80524

NOTES: Please reference on final report and invoice: PO# *L2289712*
ALS requires QC data to be provided with your final results.

1 x 1L HNO3

Please see enclosed 1 sample(s) in 1 Container(s)

SAMPLE NUMBER	ANALYTICAL REQUIRED	DATE SAMPLED / DUE DATE	Priority Flag
L2289712-1 MS-08		6/11/2019	**E**
	Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	7/2/2019	

Subcontract Info Contact: Mary-Lynn Pike (519) 886-6910
Analysis and reporting info contact: Rick Hawthorne
60 NORTHLAND ROAD, UNIT 1
WATERLOO,ON N2V 2B8
Phone: (519) 886-6910 Email: Rick.Hawthorne@alsglobal.com

Please email confirmation of receipt to: **Rick.Hawthorne@alsglobal.com**

Shipped By: _____ Date Shipped: _____

Received By: VTJ Date Received: 6.13.19 1550

Verified By: _____ Date Verified: _____

Temperature: _____

Sample Integrity Issues: _____

ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: ALS Water100 Workorder No: 1906283

Project Manager: KO Initials: KO Date: 6.13.19

1. Are airbills / shipping documents present and/or removable?	DROP OFF	YES	NO
2. Are custody seals on **shipping** containers intact?	NONE	YES	NO *
3. Are custody seals on **sample** containers intact?	NONE	YES	NO *
4. Is there a COC (chain-of-custody) present?		YES	NO *
5. Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)		YES	NO *
6. Are short-hold samples present?		YES	NO
7. Are all samples within holding times for the requested analyses?		YES	NO *
8. Were all sample containers received intact? (not broken or leaking)		YES	NO *
9. Is there sufficient sample for the requested analyses?		YES	NO *
10. Are all samples in the proper containers for the requested analyses?		YES	NO *
11. Are all aqueous samples preserved correctly, if required? (excluding volatiles)	N/A	YES	NO *
12. Are all aqueous non-preserved samples pH 4-9?	N/A	YES	NO *
13. Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm (1/4 inch) diameter? (i.e. size of green pea)	N/A	YES	NO
14. Were the samples shipped on ice?		YES	NO
15. Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: #1 #3 #4	RAD ONLY	YES	NO

Cooler #:	1							
Temperature (°C):	16.7							
No. of custody seals on cooler:	0							
DOT Survey/ Acceptance Information — External µR/hr reading:	8							
Background µR/hr reading:	9							

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? **YES / NO / NA** (If no, see Form 008.)

*** Please provide details here for NO responses to gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.**

The client bottle labels list Radium 223 as the test, but the COC and ALS labels list Radium 226. All other sample information is correct.

Per Rich, analyze for Ra226

All client bottle ID's vs ALS lab ID's double-checked by: KO

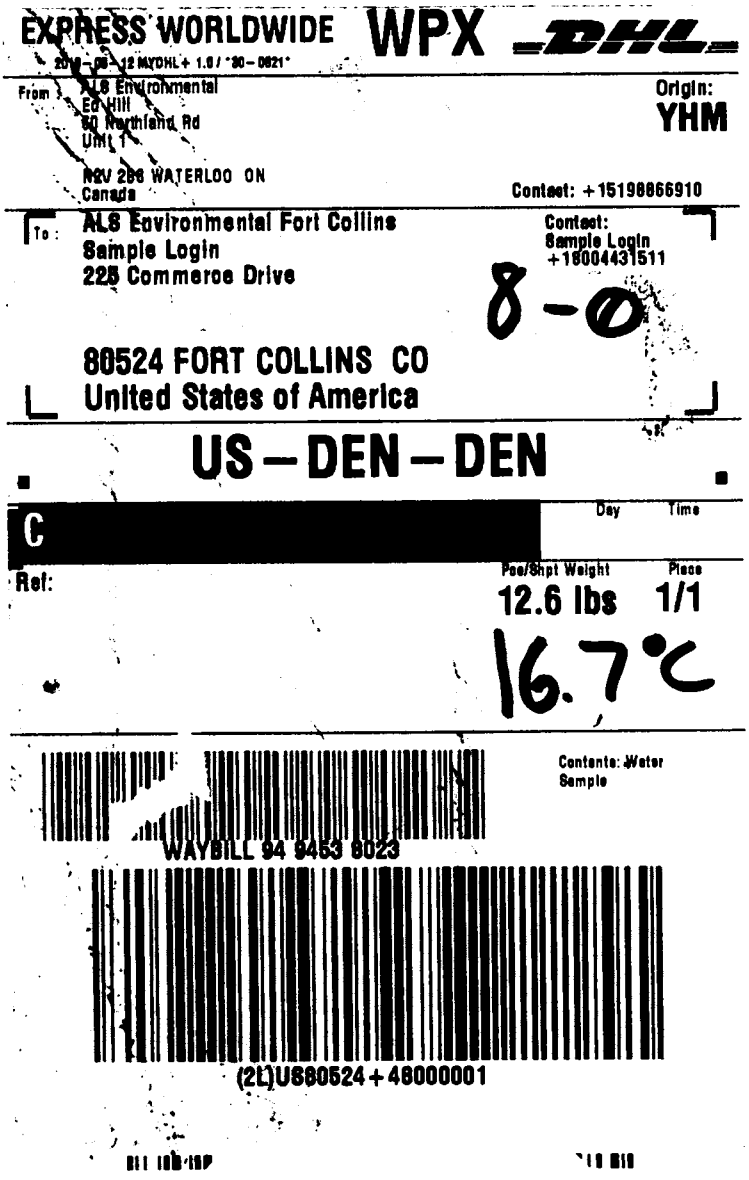
If applicable, was the client contacted? YES / NO / NA Contact: Rich Hawthorne Date/Time: 6/14/19 8:40

Project Manager Signature / Date: 6/14/19

Form 201r27.xls
(02/11/2019)

*IR Gun #1, VWR SN 170560549
*IR Gun #3, VWR SN 170647571
*IR Gun #4, Oakton, SN 2372220101-0002

1906283


EXPRESS WORLDWIDE
WPX
DHL
From
ALS Environmental
Ed Hill
50 Northland Rd
Unit 1
N2V 2B8 WATERLOO ON
Canada
Origin:
YHM
Contact: +15198866910
To
ALS Environmental Fort Collins
Sample Login
225 Commerce Drive
Contact:
Sample Login
+16004431511
8-0
80524 FORT COLLINS CO
United States of America
US – DEN – DEN
C
Day
Time
Ref:
Pce/Shpt Weight
12.6 lbs
Piece
1/1
16.7°C
Contents: Water Sample
WAYBILL 94 9453 8023
(2L)US80524+48000001

Client:	ALS Environmental	**Date:**	*27-Jun-19*
Project:	L2289712	**Work Order:**	1906283
Sample ID:	L2289712-1	**Lab ID:**	1906283-1
Legal Location:		**Matrix:**	WATER
Collection Date:	6/11/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **6/18/2019**		PrepBy: **JXH**
Ra-226	**0.012 (+/- 0.0078)**		**0.0099**	**BQ/l**	NA	6/26/2019 12:27
Carr: BARIUM	*96.5*		*40-110*	*%REC*	DL = NA	6/26/2019 12:27

Client:	ALS Environmental	**Date:**	*27-Jun-19*
Project:	L2289712	**Work Order:**	1906283
Sample ID:	L2289712-1	**Lab ID:**	1906283-1
Legal Location:		**Matrix:**	WATER
Collection Date:	6/11/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed

Explanation of Qualifiers

Radiochemistry:

- "Report Limit" is the MDC

U or ND - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

Y2 - Chemical Yield outside default limits.

W - DER is greater than Warning Limit of 1.42

* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.
# - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.
G - Sample density differs by more than 15% of LCS density.
D - DER is greater than Control Limit

M - Requested MDC not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS, Matrix Spike Recovery within control limits.

N - Matrix Spike Recovery outside control limits

NC - Not Calculated for duplicate results less than 5 times MDC

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

Inorganics:

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).

U or ND - Indicates that the compound was analyzed for but not detected.

E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.

M - Duplicate injection precision was not met.

N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.

Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.

* - Duplicate analysis (relative percent difference) not within control limits.

S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

Organics:

U or ND - Indicates that the compound was analyzed for but not detected.

B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.

E - Analyte concentration exceeds the upper level of the calibration range.

J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).

A - A tentatively identified compound is a suspected aldol-condensation product.

X - The analyte was diluted below an accurate quantitation level.

* - The spike recovery is equal to or outside the control criteria used.

+ - The relative percent difference (RPD) equals or exceeds the control criteria.

G - A pattern resembling gasoline was detected in this sample.

D - A pattern resembling diesel was detected in this sample.

M - A pattern resembling motor oil was detected in this sample.

C - A pattern resembling crude oil was detected in this sample.

4 - A pattern resembling JP-4 was detected in this sample.

5 - A pattern resembling JP-5 was detected in this sample.

H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.

L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.

Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
- gasoline
- JP-8
- diesel
- mineral spirits
- motor oil
- Stoddard solvent
- bunker C

QC BATCH REPORT

Batch ID: **RE190618-1-1** Instrument ID **Alpha Scin** Method: **Radium-226 by Radon Emanation**

LCS Sample ID: **RE190618-1** Units: **BQ/l** Analysis Date: **6/26/2019 13:01**

Client ID: Run ID: **RE190618-1A** Prep Date: **6/18/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.47 (+/- 0.372)	0.0105	1.771		83.1	67-120					P,M3
Carr: BARIUM	16100		16960		95.1	40-110					

LCSD Sample ID: **RE190618-1** Units: **BQ/l** Analysis Date: **6/26/2019 13:01**

Client ID: Run ID: **RE190618-1A** Prep Date: **6/18/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.85 (+/- 0.462)	0.015	1.771		104	67-120		1.47	0.6	2.1	P,M3
Carr: BARIUM	16400		16960		96.7	40-110		16100			

MB Sample ID: **RE190618-1** Units: **BQ/l** Analysis Date: **6/26/2019 13:01**

Client ID: Run ID: **RE190618-1A** Prep Date: **6/18/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	0.00048 (+/- 0.0044)	0.0084									U
Carr: BARIUM	16200		16960		95.8	40-110					

The following samples were analyzed in this batch: 1906283-1

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

L2289712-COFC

COC Number: 15 -

Report To	Contact and company name below will appear on the final report
Company:	Baffinland Iron Mines Corp.
Contact:	Wiliam Bowden and Connor Devereaux
Phone:	647-253-0596 EXT 6016
	Company address below will appear on the final report
Street:	2275 Upper Middle Rd. E., Suite #300
City/Province:	Oakville, ON
Postal Code:	L6H 0C3
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)

Quality Control (QC) Report with Report ☑ YES ☐ NO

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax bimcore@alsglobal.com

Email 2 bimww@alsglobal.com

Email 3

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax ap@baffinland.com

Email 2 commercial@baffinland.com

Project Information

ALS Account # / Quote #:	23642 /Q42455
Job #:	MS-08 DEL
PO / AFE:	4500057496
LSD:	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only): L2289712

ALS Contact:

Sampler: CP/AZ/RH

n all E&P TATs with your AM - surcharges will apply

Regular [R] ☐ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4] ☐ | 3 day [P3] ☐ | 2 day [P2] ☐

EMERGENCY: 1 Business day [E1] ☐ | Same Day, Weekend or Statutory holiday [E0] ☑

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	BIM-MMER-DEL	Number of Containers
	MS-08	11-Jun-19	8:25	Water	E0	6

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human drinking water use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ | SIF Observations Yes ☐ No ☐

Ice Packs ☐ | Ice Cubes ☒ | Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			3.2		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Kendra Button	Date: 11-Jun-19	Time: 11:25	Received by:	Date:	Time:	Received by:	Date: 12-6-19	Time: 9:30

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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 specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Baffinland Iron Mine's Corporation
(Oakville)
ATTN: William Bowden/Connor Devereaux
2275 Upper Middle Rd. E.
Suite #300
Oakville ON L6H 0C3

Date Received: 17-JUN-19
Report Date: 19-JUL-19 13:49 (MT)
Version: FINAL

Client Phone: 647-253-0596

Certificate of Analysis

Lab Work Order #: L2293039

Project P.O. #: 4500057496
Job Reference: MS-08 TOX AND EFF CHARACTERIZATION
C of C Numbers:
Legal Site Desc:

Rick Hawthorne
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2293039-1 MS-08 Sampled By: CP/LM/KB on 17-JUN-19 @ 09:25 Matrix: Water							
Physical Tests							
Conductivity	712		3.0	umhos/cm		18-JUN-19	R4673872
Hardness (as CaCO3)	375		0.50	mg/L		19-JUN-19	
pH	6.70		0.10	pH units		17-JUN-19	R4672022
Total Suspended Solids	10.8		2.0	mg/L		17-JUN-19	R4672091
Total Dissolved Solids	561		20	mg/L		18-JUN-19	R4673058
Turbidity	20.3		0.10	NTU		19-JUN-19	R4673290
Anions and Nutrients							
Acidity (as CaCO3)	4.8		2.0	mg/L		22-JUN-19	R4682053
Alkalinity, Total (as CaCO3)	<10		10	mg/L		18-JUN-19	R4673872
Ammonia, Total (as N)	0.425		0.010	mg/L		18-JUN-19	R4672917
Chloride (Cl)	1.38		0.50	mg/L		19-JUN-19	R4674012
Fluoride (F)	0.034		0.020	mg/L		19-JUN-19	R4674012
Nitrate (as N)	1.76		0.020	mg/L		19-JUN-19	R4674012
Total Kjeldahl Nitrogen	0.67		0.15	mg/L	18-JUN-19	19-JUN-19	R4674366
Phosphorus, Total	0.0096		0.0030	mg/L	18-JUN-19	19-JUN-19	R4673670
Sulfate (SO4)	375		0.30	mg/L		19-JUN-19	R4674012
Cyanides							
Cyanide, Total	<0.20	DLM	0.20	mg/L		19-JUN-19	R4675171
Organic / Inorganic Carbon							
Dissolved Carbon Filtration Location	LAB					18-JUN-19	R4673010
Dissolved Organic Carbon	0.99		0.50	mg/L	18-JUN-19	19-JUN-19	R4674209
Total Organic Carbon	1.64		0.50	mg/L		18-JUN-19	R4673217
Total Metals							
Aluminum (Al)-Total	0.531		0.0050	mg/L	19-JUN-19	19-JUN-19	R4673448
Antimony (Sb)-Total	<0.00010		0.00010	mg/L	19-JUN-19	19-JUN-19	R4673448
Arsenic (As)-Total	0.00011		0.00010	mg/L	19-JUN-19	19-JUN-19	R4673448
Barium (Ba)-Total	0.0136		0.00010	mg/L	19-JUN-19	19-JUN-19	R4673448
Beryllium (Be)-Total	<0.00010		0.00010	mg/L	19-JUN-19	19-JUN-19	R4673448
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L	19-JUN-19	19-JUN-19	R4673448
Boron (B)-Total	0.015		0.010	mg/L	19-JUN-19	19-JUN-19	R4673448
Cadmium (Cd)-Total	0.0000588		0.0000050	mg/L	19-JUN-19	19-JUN-19	R4673448
Calcium (Ca)-Total	21.6		0.050	mg/L	19-JUN-19	19-JUN-19	R4673448
Cesium (Cs)-Total	0.000048		0.000010	mg/L	19-JUN-19	19-JUN-19	R4673448
Chromium (Cr)-Total	0.00130		0.00050	mg/L	19-JUN-19	19-JUN-19	R4673448
Cobalt (Co)-Total	0.0405		0.00010	mg/L	19-JUN-19	19-JUN-19	R4673448
Copper (Cu)-Total	0.0024		0.0010	mg/L	19-JUN-19	19-JUN-19	R4673448
Iron (Fe)-Total	2.65		0.010	mg/L	19-JUN-19	19-JUN-19	R4673448
Lead (Pb)-Total	0.000453		0.000050	mg/L	19-JUN-19	19-JUN-19	R4673448
Lithium (Li)-Total	0.0084		0.0010	mg/L	19-JUN-19	19-JUN-19	R4673448
Magnesium (Mg)-Total	81.0		0.0050	mg/L	19-JUN-19	19-JUN-19	R4673448
Manganese (Mn)-Total	2.79	DLHC	0.0050	mg/L	19-JUN-19	19-JUN-19	R4673448
Mercury (Hg)-Total	<0.000010		0.000010	mg/L		19-JUN-19	R4674168

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2293039-1 MS-08 Sampled By: CP/LM/KB on 17-JUN-19 @ 09:25 Matrix: Water							
Total Metals							
Molybdenum (Mo)-Total	0.000536		0.000050	mg/L	19-JUN-19	19-JUN-19	R4673448
Nickel (Ni)-Total	0.0419		0.00050	mg/L	19-JUN-19	19-JUN-19	R4673448
Phosphorus (P)-Total	<0.050		0.050	mg/L	19-JUN-19	19-JUN-19	R4673448
Potassium (K)-Total	2.16		0.050	mg/L	19-JUN-19	19-JUN-19	R4673448
Rubidium (Rb)-Total	0.00307		0.00020	mg/L	19-JUN-19	19-JUN-19	R4673448
Selenium (Se)-Total	0.00113		0.000050	mg/L	19-JUN-19	19-JUN-19	R4673448
Silicon (Si)-Total	1.69		0.10	mg/L	19-JUN-19	19-JUN-19	R4673448
Silver (Ag)-Total	<0.000050		0.000050	mg/L	19-JUN-19	19-JUN-19	R4673448
Sodium (Na)-Total	0.971		0.050	mg/L	19-JUN-19	19-JUN-19	R4673448
Strontium (Sr)-Total	0.0421		0.0010	mg/L	19-JUN-19	19-JUN-19	R4673448
Sulfur (S)-Total	131		0.50	mg/L	19-JUN-19	19-JUN-19	R4673448
Tellurium (Te)-Total	<0.00020		0.00020	mg/L	19-JUN-19	19-JUN-19	R4673448
Thallium (Tl)-Total	0.000026		0.000010	mg/L	19-JUN-19	19-JUN-19	R4673448
Thorium (Th)-Total	0.00045		0.00010	mg/L	19-JUN-19	19-JUN-19	R4673448
Tin (Sn)-Total	<0.00010		0.00010	mg/L	19-JUN-19	19-JUN-19	R4673448
Titanium (Ti)-Total	0.0243		0.00030	mg/L	19-JUN-19	19-JUN-19	R4673448
Tungsten (W)-Total	<0.00010		0.00010	mg/L	19-JUN-19	19-JUN-19	R4673448
Uranium (U)-Total	0.000407		0.000010	mg/L	19-JUN-19	19-JUN-19	R4673448
Vanadium (V)-Total	0.00090		0.00050	mg/L	19-JUN-19	19-JUN-19	R4673448
Zinc (Zn)-Total	0.0070		0.0030	mg/L	19-JUN-19	19-JUN-19	R4673448
Zirconium (Zr)-Total	0.00065		0.00020	mg/L	19-JUN-19	19-JUN-19	R4673448
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					19-JUN-19	R4673153
Dissolved Metals Filtration Location	FIELD					18-JUN-19	R4672640
Aluminum (Al)-Dissolved	<0.0050		0.0050	mg/L	18-JUN-19	18-JUN-19	R4672659
Antimony (Sb)-Dissolved	<0.00010		0.00010	mg/L	18-JUN-19	18-JUN-19	R4672659
Arsenic (As)-Dissolved	<0.00010		0.00010	mg/L	18-JUN-19	18-JUN-19	R4672659
Barium (Ba)-Dissolved	0.0116		0.00010	mg/L	18-JUN-19	18-JUN-19	R4672659
Beryllium (Be)-Dissolved	<0.00010		0.00010	mg/L	18-JUN-19	18-JUN-19	R4672659
Bismuth (Bi)-Dissolved	<0.000050		0.000050	mg/L	18-JUN-19	18-JUN-19	R4672659
Boron (B)-Dissolved	0.014		0.010	mg/L	18-JUN-19	18-JUN-19	R4672659
Cadmium (Cd)-Dissolved	0.0000617		0.0000050	mg/L	18-JUN-19	18-JUN-19	R4672659
Calcium (Ca)-Dissolved	22.3		0.050	mg/L	18-JUN-19	18-JUN-19	R4672659
Cesium (Cs)-Dissolved	<0.000010		0.000010	mg/L	18-JUN-19	18-JUN-19	R4672659
Chromium (Cr)-Dissolved	<0.00050		0.00050	mg/L	18-JUN-19	18-JUN-19	R4672659
Cobalt (Co)-Dissolved	0.0381		0.00010	mg/L	18-JUN-19	18-JUN-19	R4672659
Copper (Cu)-Dissolved	0.00107		0.00020	mg/L	18-JUN-19	18-JUN-19	R4672659
Iron (Fe)-Dissolved	1.10		0.010	mg/L	18-JUN-19	18-JUN-19	R4672659
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L	18-JUN-19	18-JUN-19	R4672659
Lithium (Li)-Dissolved	0.0077		0.0010	mg/L	18-JUN-19	18-JUN-19	R4672659
Magnesium (Mg)-Dissolved	77.5		0.0050	mg/L	18-JUN-19	18-JUN-19	R4672659

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2293039-1 MS-08 Sampled By: CP/LM/KB on 17-JUN-19 @ 09:25 Matrix: Water							
Dissolved Metals							
Manganese (Mn)-Dissolved	2.56	DLHC	0.0050	mg/L	18-JUN-19	18-JUN-19	R4672659
Mercury (Hg)-Dissolved	<0.000010		0.000010	mg/L	19-JUN-19	19-JUN-19	R4674229
Molybdenum (Mo)-Dissolved	0.000300		0.000050	mg/L	18-JUN-19	18-JUN-19	R4672659
Nickel (Ni)-Dissolved	0.0391		0.00050	mg/L	18-JUN-19	18-JUN-19	R4672659
Phosphorus (P)-Dissolved	<0.050		0.050	mg/L	18-JUN-19	18-JUN-19	R4672659
Potassium (K)-Dissolved	1.86		0.050	mg/L	18-JUN-19	18-JUN-19	R4672659
Rubidium (Rb)-Dissolved	0.00194		0.00020	mg/L	18-JUN-19	18-JUN-19	R4672659
Selenium (Se)-Dissolved	0.00125		0.000050	mg/L	18-JUN-19	18-JUN-19	R4672659
Silicon (Si)-Dissolved	0.650		0.050	mg/L	18-JUN-19	18-JUN-19	R4672659
Silver (Ag)-Dissolved	<0.000050		0.000050	mg/L	18-JUN-19	18-JUN-19	R4672659
Sodium (Na)-Dissolved	0.921		0.050	mg/L	18-JUN-19	18-JUN-19	R4672659
Strontium (Sr)-Dissolved	0.0397		0.0010	mg/L	18-JUN-19	18-JUN-19	R4672659
Sulfur (S)-Dissolved	130		0.50	mg/L	18-JUN-19	18-JUN-19	R4672659
Tellurium (Te)-Dissolved	<0.00020		0.00020	mg/L	18-JUN-19	18-JUN-19	R4672659
Thallium (Tl)-Dissolved	0.000019		0.000010	mg/L	18-JUN-19	18-JUN-19	R4672659
Thorium (Th)-Dissolved	<0.00010		0.00010	mg/L	18-JUN-19	18-JUN-19	R4672659
Tin (Sn)-Dissolved	<0.00010		0.00010	mg/L	18-JUN-19	18-JUN-19	R4672659
Titanium (Ti)-Dissolved	<0.00030		0.00030	mg/L	18-JUN-19	18-JUN-19	R4672659
Tungsten (W)-Dissolved	<0.00010		0.00010	mg/L	18-JUN-19	18-JUN-19	R4672659
Uranium (U)-Dissolved	0.000135		0.000010	mg/L	18-JUN-19	18-JUN-19	R4672659
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L	18-JUN-19	18-JUN-19	R4672659
Zinc (Zn)-Dissolved	0.0054		0.0010	mg/L	18-JUN-19	18-JUN-19	R4672659
Zirconium (Zr)-Dissolved	<0.00020		0.00020	mg/L	18-JUN-19	18-JUN-19	R4672659
Radiological Parameters							
Ra-226	0.0097		0.0047	Bq/L	24-JUN-19	02-JUL-19	R4692536
L2293039-2 MS-0801 Sampled By: CP/LM/KB on 17-JUN-19 @ 09:25 Matrix: Water							
Physical Tests							
Conductivity	714		3.0	umhos/cm		18-JUN-19	R4673872
Hardness (as CaCO3)	378		0.50	mg/L		19-JUN-19	
pH	6.71		0.10	pH units		17-JUN-19	R4672022
Total Suspended Solids	9.6		2.0	mg/L		17-JUN-19	R4672091
Total Dissolved Solids	457		20	mg/L		19-JUN-19	R4676267
Turbidity	19.9		0.10	NTU		19-JUN-19	R4673290
Anions and Nutrients							
Acidity (as CaCO3)	3.5		2.0	mg/L		22-JUN-19	R4682053
Alkalinity, Total (as CaCO3)	<10		10	mg/L		18-JUN-19	R4673872
Ammonia, Total (as N)	0.428		0.010	mg/L		18-JUN-19	R4672917
Chloride (Cl)	1.39		0.50	mg/L		19-JUN-19	R4674012
Fluoride (F)	0.033		0.020	mg/L		19-JUN-19	R4674012
Nitrate (as N)	1.77		0.020	mg/L		19-JUN-19	R4674012

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2293039-2 MS-0801 Sampled By: CP/LM/KB on 17-JUN-19 @ 09:25 Matrix: Water							
Anions and Nutrients							
Total Kjeldahl Nitrogen	0.63		0.15	mg/L	18-JUN-19	19-JUN-19	R4674366
Phosphorus, Total	0.0055		0.0030	mg/L	18-JUN-19	19-JUN-19	R4673670
Sulfate (SO4)	377		0.30	mg/L		19-JUN-19	R4674012
Cyanides							
Cyanide, Total	0.0026		0.0020	mg/L		18-JUN-19	R4674395
Organic / Inorganic Carbon							
Dissolved Carbon Filtration Location	LAB					18-JUN-19	R4673010
Dissolved Organic Carbon	0.92		0.50	mg/L	18-JUN-19	19-JUN-19	R4674209
Total Organic Carbon	1.33		0.50	mg/L		18-JUN-19	R4673217
Total Metals							
Aluminum (Al)-Total	0.479		0.0050	mg/L	19-JUN-19	19-JUN-19	R4673448
Antimony (Sb)-Total	<0.00010		0.00010	mg/L	19-JUN-19	19-JUN-19	R4673448
Arsenic (As)-Total	<0.00010		0.00010	mg/L	19-JUN-19	19-JUN-19	R4673448
Barium (Ba)-Total	0.0138		0.00010	mg/L	19-JUN-19	19-JUN-19	R4673448
Beryllium (Be)-Total	<0.00010		0.00010	mg/L	19-JUN-19	19-JUN-19	R4673448
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L	19-JUN-19	19-JUN-19	R4673448
Boron (B)-Total	0.014		0.010	mg/L	19-JUN-19	19-JUN-19	R4673448
Cadmium (Cd)-Total	0.0000605		0.0000050	mg/L	19-JUN-19	19-JUN-19	R4673448
Calcium (Ca)-Total	21.5		0.050	mg/L	19-JUN-19	19-JUN-19	R4673448
Cesium (Cs)-Total	0.000045		0.000010	mg/L	19-JUN-19	19-JUN-19	R4673448
Chromium (Cr)-Total	0.00114		0.00050	mg/L	19-JUN-19	19-JUN-19	R4673448
Cobalt (Co)-Total	0.0403		0.00010	mg/L	19-JUN-19	19-JUN-19	R4673448
Copper (Cu)-Total	0.0021		0.0010	mg/L	19-JUN-19	19-JUN-19	R4673448
Iron (Fe)-Total	2.31		0.010	mg/L	19-JUN-19	19-JUN-19	R4673448
Lead (Pb)-Total	0.000403		0.000050	mg/L	19-JUN-19	19-JUN-19	R4673448
Lithium (Li)-Total	0.0080		0.0010	mg/L	19-JUN-19	19-JUN-19	R4673448
Magnesium (Mg)-Total	81.0		0.0050	mg/L	19-JUN-19	19-JUN-19	R4673448
Manganese (Mn)-Total	2.61	DLHC	0.0050	mg/L	19-JUN-19	19-JUN-19	R4673448
Mercury (Hg)-Total	<0.000010		0.000010	mg/L		19-JUN-19	R4674168
Molybdenum (Mo)-Total	0.000533		0.000050	mg/L	19-JUN-19	19-JUN-19	R4673448
Nickel (Ni)-Total	0.0421		0.00050	mg/L	19-JUN-19	19-JUN-19	R4673448
Phosphorus (P)-Total	<0.050		0.050	mg/L	19-JUN-19	19-JUN-19	R4673448
Potassium (K)-Total	2.14		0.050	mg/L	19-JUN-19	19-JUN-19	R4673448
Rubidium (Rb)-Total	0.00299		0.00020	mg/L	19-JUN-19	19-JUN-19	R4673448
Selenium (Se)-Total	0.00114		0.000050	mg/L	19-JUN-19	19-JUN-19	R4673448
Silicon (Si)-Total	1.62		0.10	mg/L	19-JUN-19	19-JUN-19	R4673448
Silver (Ag)-Total	<0.000050		0.000050	mg/L	19-JUN-19	19-JUN-19	R4673448
Sodium (Na)-Total	0.962		0.050	mg/L	19-JUN-19	19-JUN-19	R4673448
Strontium (Sr)-Total	0.0420		0.0010	mg/L	19-JUN-19	19-JUN-19	R4673448
Sulfur (S)-Total	131		0.50	mg/L	19-JUN-19	19-JUN-19	R4673448
Tellurium (Te)-Total	<0.00020		0.00020	mg/L	19-JUN-19	19-JUN-19	R4673448
Thallium (Tl)-Total	0.000025		0.000010	mg/L	19-JUN-19	19-JUN-19	R4673448

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2293039-2 MS-0801 Sampled By: CP/LM/KB on 17-JUN-19 @ 09:25 Matrix: Water							
Total Metals							
Thorium (Th)-Total	0.00036		0.00010	mg/L	19-JUN-19	19-JUN-19	R4673448
Tin (Sn)-Total	<0.00010		0.00010	mg/L	19-JUN-19	19-JUN-19	R4673448
Titanium (Ti)-Total	0.0234		0.00030	mg/L	19-JUN-19	19-JUN-19	R4673448
Tungsten (W)-Total	<0.00010		0.00010	mg/L	19-JUN-19	19-JUN-19	R4673448
Uranium (U)-Total	0.000351		0.000010	mg/L	19-JUN-19	19-JUN-19	R4673448
Vanadium (V)-Total	0.00084		0.00050	mg/L	19-JUN-19	19-JUN-19	R4673448
Zinc (Zn)-Total	0.0062		0.0030	mg/L	19-JUN-19	19-JUN-19	R4673448
Zirconium (Zr)-Total	0.00065		0.00020	mg/L	19-JUN-19	19-JUN-19	R4673448
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					19-JUN-19	R4673153
Dissolved Metals Filtration Location	FIELD					18-JUN-19	R4672640
Aluminum (Al)-Dissolved	<0.0050		0.0050	mg/L	18-JUN-19	18-JUN-19	R4672659
Antimony (Sb)-Dissolved	<0.00010		0.00010	mg/L	18-JUN-19	18-JUN-19	R4672659
Arsenic (As)-Dissolved	<0.00010		0.00010	mg/L	18-JUN-19	18-JUN-19	R4672659
Barium (Ba)-Dissolved	0.0118		0.00010	mg/L	18-JUN-19	18-JUN-19	R4672659
Beryllium (Be)-Dissolved	<0.00010		0.00010	mg/L	18-JUN-19	18-JUN-19	R4672659
Bismuth (Bi)-Dissolved	<0.000050		0.000050	mg/L	18-JUN-19	18-JUN-19	R4672659
Boron (B)-Dissolved	0.014		0.010	mg/L	18-JUN-19	18-JUN-19	R4672659
Cadmium (Cd)-Dissolved	0.0000604		0.0000050	mg/L	18-JUN-19	18-JUN-19	R4672659
Calcium (Ca)-Dissolved	22.6		0.050	mg/L	18-JUN-19	18-JUN-19	R4672659
Cesium (Cs)-Dissolved	<0.000010		0.000010	mg/L	18-JUN-19	18-JUN-19	R4672659
Chromium (Cr)-Dissolved	<0.00050		0.00050	mg/L	18-JUN-19	18-JUN-19	R4672659
Cobalt (Co)-Dissolved	0.0378		0.00010	mg/L	18-JUN-19	18-JUN-19	R4672659
Copper (Cu)-Dissolved	0.00108		0.00020	mg/L	18-JUN-19	18-JUN-19	R4672659
Iron (Fe)-Dissolved	1.13		0.010	mg/L	18-JUN-19	18-JUN-19	R4672659
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L	18-JUN-19	18-JUN-19	R4672659
Lithium (Li)-Dissolved	0.0074		0.0010	mg/L	18-JUN-19	18-JUN-19	R4672659
Magnesium (Mg)-Dissolved	78.2		0.0050	mg/L	18-JUN-19	18-JUN-19	R4672659
Manganese (Mn)-Dissolved	2.57	DLHC	0.0050	mg/L	18-JUN-19	18-JUN-19	R4672659
Mercury (Hg)-Dissolved	<0.000010		0.000010	mg/L	19-JUN-19	19-JUN-19	R4674229
Molybdenum (Mo)-Dissolved	0.000342		0.000050	mg/L	18-JUN-19	18-JUN-19	R4672659
Nickel (Ni)-Dissolved	0.0390		0.00050	mg/L	18-JUN-19	18-JUN-19	R4672659
Phosphorus (P)-Dissolved	<0.050		0.050	mg/L	18-JUN-19	18-JUN-19	R4672659
Potassium (K)-Dissolved	1.87		0.050	mg/L	18-JUN-19	18-JUN-19	R4672659
Rubidium (Rb)-Dissolved	0.00188		0.00020	mg/L	18-JUN-19	18-JUN-19	R4672659
Selenium (Se)-Dissolved	0.00120		0.000050	mg/L	18-JUN-19	18-JUN-19	R4672659
Silicon (Si)-Dissolved	0.634		0.050	mg/L	18-JUN-19	18-JUN-19	R4672659
Silver (Ag)-Dissolved	<0.000050		0.000050	mg/L	18-JUN-19	18-JUN-19	R4672659
Sodium (Na)-Dissolved	0.914		0.050	mg/L	18-JUN-19	18-JUN-19	R4672659
Strontium (Sr)-Dissolved	0.0406		0.0010	mg/L	18-JUN-19	18-JUN-19	R4672659
Sulfur (S)-Dissolved	132		0.50	mg/L	18-JUN-19	18-JUN-19	R4672659

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2293039-2 MS-0801 Sampled By: CP/LM/KB on 17-JUN-19 @ 09:25 Matrix: Water							
Dissolved Metals							
Tellurium (Te)-Dissolved	<0.00020		0.00020	mg/L	18-JUN-19	18-JUN-19	R4672659
Thallium (Tl)-Dissolved	0.000018		0.000010	mg/L	18-JUN-19	18-JUN-19	R4672659
Thorium (Th)-Dissolved	<0.00010		0.00010	mg/L	18-JUN-19	18-JUN-19	R4672659
Tin (Sn)-Dissolved	<0.00010		0.00010	mg/L	18-JUN-19	18-JUN-19	R4672659
Titanium (Ti)-Dissolved	<0.00030		0.00030	mg/L	18-JUN-19	18-JUN-19	R4672659
Tungsten (W)-Dissolved	<0.00010		0.00010	mg/L	18-JUN-19	18-JUN-19	R4672659
Uranium (U)-Dissolved	0.000131		0.000010	mg/L	18-JUN-19	18-JUN-19	R4672659
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L	18-JUN-19	18-JUN-19	R4672659
Zinc (Zn)-Dissolved	0.0058		0.0010	mg/L	18-JUN-19	18-JUN-19	R4672659
Zirconium (Zr)-Dissolved	<0.00020		0.00020	mg/L	18-JUN-19	18-JUN-19	R4672659
Radiological Parameters							
Ra-226	0.011		0.0077	Bq/L	24-JUN-19	02-JUL-19	R4692536

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

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2293039-1, -2
Matrix Spike	Cobalt (Co)-Dissolved	MS-B	L2293039-1, -2
Matrix Spike	Iron (Fe)-Dissolved	MS-B	L2293039-1, -2
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2293039-1, -2
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L2293039-1, -2
Matrix Spike	Nickel (Ni)-Dissolved	MS-B	L2293039-1, -2
Matrix Spike	Silicon (Si)-Dissolved	MS-B	L2293039-1, -2
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2293039-1, -2
Matrix Spike	Sulfur (S)-Dissolved	MS-B	L2293039-1, -2
Matrix Spike	Calcium (Ca)-Total	MS-B	L2293039-1, -2
Matrix Spike	Chromium (Cr)-Total	MS-B	L2293039-1, -2
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2293039-1, -2
Matrix Spike	Potassium (K)-Total	MS-B	L2293039-1, -2
Matrix Spike	Silicon (Si)-Total	MS-B	L2293039-1, -2
Matrix Spike	Sodium (Na)-Total	MS-B	L2293039-1, -2
Matrix Spike	Strontium (Sr)-Total	MS-B	L2293039-1, -2
Matrix Spike	Sulfur (S)-Total	MS-B	L2293039-1, -2
Matrix Spike	Uranium (U)-Total	MS-B	L2293039-1, -2

Sample Parameter Qualifier key listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACY-TITR-TB	Water	Acidity	APHA 2310 B modified

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

ALK-WT	Water	Alkalinity, Total (as CaCO3)	EPA 310.2

This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.

CL-IC-N-WT	Water	Chloride by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

CN-TOT-WT	Water	Cyanide, Total	ISO 14403-2

Total cyanide is determined by the combination of UV digestion and distillation. Cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

When using this method, high levels of thiocyanate in samples can cause false positives at ~1-2% of the thiocyanate concentration. For samples with detectable cyanide analyzed by this method, ALS recommends analysis for thiocyanate to check for this potential interference

DOC-WT	Water	Dissolved Organic Carbon	APHA 5310B

Sample is filtered through a 0.45um filter, then injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic carbon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.

EC-SCREEN-WT	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

EC-WT	Water	Conductivity	APHA 2510 B

Water samples can be measured directly by immersing the conductivity cell into the sample.

F-IC-N-WT	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-WT	Water	Hardness	APHA 2340 B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents.

Reference Information

Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-WT	Water	Dissolved Mercury in Water by CVAAS	EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

HG-T-CVAA-WT	Water	Total Mercury in Water by CVAAS	EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

MET-D-CCMS-WT	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

MET-T-CCMS-WT	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

NH3-F-WT	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO3-IC-WT	Water	Nitrate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-COL-WT	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is deteremined colourimetrically after persulphate digestion of the sample.

PH-BF	Water	pH	APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

RA226-MMER-FC	Water	Ra226 by Alpha Scint, MDC=0.01 Bq/L	EPA 903.1
SO4-IC-N-WT	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-BF	Water	Total Dissolved Solids	APHA 2540C

A well-mixed sample is filtered though glass fibres filter. A known volume of the filtrate is evaporated and dried at 180 +/- 2C for 1hr.

SOLIDS-TSS-BF	Water	Suspended solids	APHA 2540 D-Gravimetric

A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104 +/- 1C for a minimum of four hours or until a constant weight is achieved.

TKN-WT	Water	Total Kjeldahl Nitrogen	APHA 4500-Norg D

This analysis is carried out using procedures adapted from APHA Method 4500-Norg "Nitrogen (Organic)". Total Kjeldahl Nitrogen is determined by sample digestion at 380 Celsius with analysis using an automated colorimetric method.

TOC-WT	Water	Total Organic Carbon	APHA 5310B

Sample is injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic cabon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.

TURBIDITY-WT	Water	Turbidity	APHA 2130 B

Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.

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

Reference Information

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
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA
FC	ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
TB	ALS ENVIRONMENTAL - THUNDER BAY, ONTARIO, CANADA
BF	ALS ENVIRONMENTAL - BAFFIN ISLAND, NUNAVUT, 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 weight of sample
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

Workorder: L2293039 Report Date: 19-JUL-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACY-TITR-TB	**Water**							
Batch R4682053								
WG3085278-3 DUP		**L2293202-1**						
Acidity (as CaCO3)		10.2	9.4		mg/L	8.1	20	22-JUN-19
WG3085278-2 LCS								
Acidity (as CaCO3)			91.6		%		85-115	22-JUN-19
WG3085278-1 MB								
Acidity (as CaCO3)			<2.0		mg/L		2	22-JUN-19
ALK-WT	**Water**							
Batch R4673872								
WG3080204-28 DUP		**WG3080204-27**						
Alkalinity, Total (as CaCO3)		<10	<10	RPD-NA	mg/L	N/A	20	18-JUN-19
WG3080204-26 LCS								
Alkalinity, Total (as CaCO3)			101.5		%		85-115	18-JUN-19
WG3080204-25 MB								
Alkalinity, Total (as CaCO3)			<10		mg/L		10	18-JUN-19
CL-IC-N-WT	**Water**							
Batch R4674012								
WG3081366-4 DUP		**WG3081366-3**						
Chloride (Cl)		52.0	51.9		mg/L	0.2	20	19-JUN-19
WG3081366-2 LCS								
Chloride (Cl)			101.5		%		90-110	19-JUN-19
WG3081366-1 MB								
Chloride (Cl)			<0.50		mg/L		0.5	19-JUN-19
WG3081366-5 MS		**WG3081366-3**						
Chloride (Cl)			102.5		%		75-125	19-JUN-19
CN-TOT-WT	**Water**							
Batch R4674395								
WG3080331-5 DUP		**L2292912-1**						
Cyanide, Total		0.0036	0.0030	J	mg/L	0.0007	0.004	18-JUN-19
WG3080331-2 LCS								
Cyanide, Total			86.8		%		80-120	18-JUN-19
WG3080331-1 MB								
Cyanide, Total			<0.0020		mg/L		0.002	18-JUN-19
WG3080331-6 MS		**L2292912-1**						
Cyanide, Total			86.0		%		70-130	18-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CN-TOT-WT	**Water**							
Batch R4675171								
WG3082008-7 DUP		**L2293402-2**						
Cyanide, Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	19-JUN-19
WG3082008-6 LCS								
Cyanide, Total			85.5		%		80-120	19-JUN-19
WG3082008-5 MB								
Cyanide, Total			<0.0020		mg/L		0.002	19-JUN-19
WG3082008-8 MS		**L2293402-2**						
Cyanide, Total			80.8		%		70-130	19-JUN-19
DOC-WT	**Water**							
Batch R4674209								
WG3081035-3 DUP		**L2281505-1**						
Dissolved Organic Carbon		3.27	3.38		mg/L	3.6	25	19-JUN-19
WG3081035-2 LCS								
Dissolved Organic Carbon			98.1		%		70-130	19-JUN-19
WG3081035-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	19-JUN-19
WG3081035-4 MS		**L2281505-1**						
Dissolved Organic Carbon			95.2		%		70-130	19-JUN-19
EC-WT	**Water**							
Batch R4673872								
WG3080204-28 DUP		**WG3080204-27**						
Conductivity		30.3	29.3		umhos/cm	3.4	10	18-JUN-19
WG3080204-26 LCS								
Conductivity			98.1		%		90-110	18-JUN-19
WG3080204-25 MB								
Conductivity			<3.0		umhos/cm		3	18-JUN-19
F-IC-N-WT	**Water**							
Batch R4674012								
WG3081366-4 DUP		**WG3081366-3**						
Fluoride (F)		0.280	0.282		mg/L	0.7	20	19-JUN-19
WG3081366-2 LCS								
Fluoride (F)			101.8		%		90-110	19-JUN-19
WG3081366-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	19-JUN-19
WG3081366-5 MS		**WG3081366-3**						
Fluoride (F)			103.7		%		75-125	19-JUN-19
HG-D-CVAA-WT	**Water**							

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-D-CVAA-WT	**Water**							
Batch R4674229								
WG3081282-4 DUP		**WG3081282-3**						
Mercury (Hg)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	19-JUN-19
WG3081282-2 LCS								
Mercury (Hg)-Dissolved			97.3		%		80-120	19-JUN-19
WG3081282-1 MB								
Mercury (Hg)-Dissolved			<0.000010		mg/L		0.00001	19-JUN-19
WG3081282-6 MS		**WG3081282-5**						
Mercury (Hg)-Dissolved			99.8		%		70-130	19-JUN-19
HG-T-CVAA-WT	**Water**							
Batch R4674168								
WG3081277-3 DUP		**L2293039-2**						
Mercury (Hg)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	19-JUN-19
WG3081277-2 LCS								
Mercury (Hg)-Total			98.0		%		80-120	19-JUN-19
WG3081277-1 MB								
Mercury (Hg)-Total			<0.000010		mg/L		0.00001	19-JUN-19
WG3081277-4 MS		**L2293039-1**						
Mercury (Hg)-Total			95.0		%		70-130	19-JUN-19
MET-D-CCMS-WT	**Water**							
Batch R4672659								
WG3080585-4 DUP		**WG3080585-3**						
Aluminum (Al)-Dissolved		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	18-JUN-19
Antimony (Sb)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	18-JUN-19
Arsenic (As)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	18-JUN-19
Barium (Ba)-Dissolved		0.0116	0.0116		mg/L	0.4	20	18-JUN-19
Beryllium (Be)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	18-JUN-19
Bismuth (Bi)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	18-JUN-19
Boron (B)-Dissolved		0.014	0.014		mg/L	0.9	20	18-JUN-19
Cadmium (Cd)-Dissolved		0.0000617	0.0000676		mg/L	9.1	20	18-JUN-19
Calcium (Ca)-Dissolved		22.3	21.9		mg/L	1.7	20	18-JUN-19
Cesium (Cs)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	18-JUN-19
Chromium (Cr)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	18-JUN-19
Cobalt (Co)-Dissolved		0.0381	0.0381		mg/L	0.1	20	18-JUN-19
Copper (Cu)-Dissolved		0.00107	0.00109		mg/L	1.7	20	18-JUN-19
Iron (Fe)-Dissolved		1.10	1.13		mg/L	2.8	20	18-JUN-19
Lead (Pb)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	18-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4672659								
WG3080585-4 DUP		**WG3080585-3**						
Lithium (Li)-Dissolved		0.0077	0.0076		mg/L	1.5	20	18-JUN-19
Magnesium (Mg)-Dissolved		77.5	78.6		mg/L	1.4	20	18-JUN-19
Manganese (Mn)-Dissolved		2.56	2.62		mg/L	2.1	20	18-JUN-19
Molybdenum (Mo)-Dissolved		0.000300	0.000357		mg/L	17	20	18-JUN-19
Nickel (Ni)-Dissolved		0.0391	0.0394		mg/L	0.6	20	18-JUN-19
Phosphorus (P)-Dissolved		<0.050	<0.050	RPD-NA	mg/L	N/A	20	18-JUN-19
Potassium (K)-Dissolved		1.86	1.86		mg/L	0.3	20	18-JUN-19
Rubidium (Rb)-Dissolved		0.00194	0.00186		mg/L	3.9	20	18-JUN-19
Selenium (Se)-Dissolved		0.00125	0.00130		mg/L	3.8	20	18-JUN-19
Silicon (Si)-Dissolved		0.650	0.638		mg/L	1.8	20	18-JUN-19
Silver (Ag)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	18-JUN-19
Sodium (Na)-Dissolved		0.921	0.914		mg/L	0.7	20	18-JUN-19
Strontium (Sr)-Dissolved		0.0397	0.0417		mg/L	4.9	20	18-JUN-19
Sulfur (S)-Dissolved		130	129		mg/L	0.1	20	18-JUN-19
Tellurium (Te)-Dissolved		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	18-JUN-19
Thallium (Tl)-Dissolved		0.000019	0.000018		mg/L	4.3	20	18-JUN-19
Thorium (Th)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	18-JUN-19
Tin (Sn)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	18-JUN-19
Titanium (Ti)-Dissolved		<0.00030	<0.00030	RPD-NA	mg/L	N/A	20	18-JUN-19
Tungsten (W)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	18-JUN-19
Uranium (U)-Dissolved		0.000135	0.000139		mg/L	2.7	20	18-JUN-19
Vanadium (V)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	18-JUN-19
Zinc (Zn)-Dissolved		0.0054	0.0053		mg/L	2.3	20	18-JUN-19
Zirconium (Zr)-Dissolved		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	18-JUN-19
WG3080585-2 LCS								
Aluminum (Al)-Dissolved			102.2		%		80-120	18-JUN-19
Antimony (Sb)-Dissolved			99.1		%		80-120	18-JUN-19
Arsenic (As)-Dissolved			101.6		%		80-120	18-JUN-19
Barium (Ba)-Dissolved			100.6		%		80-120	18-JUN-19
Beryllium (Be)-Dissolved			96.0		%		80-120	18-JUN-19
Bismuth (Bi)-Dissolved			94.2		%		80-120	18-JUN-19
Boron (B)-Dissolved			93.3		%		80-120	18-JUN-19
Cadmium (Cd)-Dissolved			96.1		%		80-120	18-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4672659								
WG3080585-2 LCS								
Calcium (Ca)-Dissolved			98.5		%		80-120	18-JUN-19
Cesium (Cs)-Dissolved			102.6		%		80-120	18-JUN-19
Chromium (Cr)-Dissolved			99.6		%		80-120	18-JUN-19
Cobalt (Co)-Dissolved			98.1		%		80-120	18-JUN-19
Copper (Cu)-Dissolved			97.8		%		80-120	18-JUN-19
Iron (Fe)-Dissolved			97.4		%		80-120	18-JUN-19
Lead (Pb)-Dissolved			98.3		%		80-120	18-JUN-19
Lithium (Li)-Dissolved			88.2		%		80-120	18-JUN-19
Magnesium (Mg)-Dissolved			101.1		%		80-120	18-JUN-19
Manganese (Mn)-Dissolved			101.3		%		80-120	18-JUN-19
Molybdenum (Mo)-Dissolved			100.1		%		80-120	18-JUN-19
Nickel (Ni)-Dissolved			98.4		%		80-120	18-JUN-19
Phosphorus (P)-Dissolved			109.1		%		80-120	18-JUN-19
Potassium (K)-Dissolved			102.0		%		80-120	18-JUN-19
Rubidium (Rb)-Dissolved			104.1		%		80-120	18-JUN-19
Selenium (Se)-Dissolved			98.9		%		80-120	18-JUN-19
Silicon (Si)-Dissolved			100.2		%		60-140	18-JUN-19
Silver (Ag)-Dissolved			96.9		%		80-120	18-JUN-19
Sodium (Na)-Dissolved			100.9		%		80-120	18-JUN-19
Strontium (Sr)-Dissolved			101.7		%		80-120	18-JUN-19
Sulfur (S)-Dissolved			100.3		%		80-120	18-JUN-19
Tellurium (Te)-Dissolved			98.6		%		80-120	18-JUN-19
Thallium (Tl)-Dissolved			96.0		%		80-120	18-JUN-19
Thorium (Th)-Dissolved			93.8		%		80-120	18-JUN-19
Tin (Sn)-Dissolved			100.3		%		80-120	18-JUN-19
Titanium (Ti)-Dissolved			100.9		%		80-120	18-JUN-19
Tungsten (W)-Dissolved			98.5		%		80-120	18-JUN-19
Uranium (U)-Dissolved			97.9		%		80-120	18-JUN-19
Vanadium (V)-Dissolved			100.9		%		80-120	18-JUN-19
Zinc (Zn)-Dissolved			100.9		%		80-120	18-JUN-19
Zirconium (Zr)-Dissolved			99.0		%		80-120	18-JUN-19
WG3080585-1 MB								
Aluminum (Al)-Dissolved			<0.0050		mg/L		0.005	18-JUN-19
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	18-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4672659								
WG3080585-1 MB								
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	18-JUN-19
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	18-JUN-19
Beryllium (Be)-Dissolved			<0.00010		mg/L		0.0001	18-JUN-19
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	18-JUN-19
Boron (B)-Dissolved			<0.010		mg/L		0.01	18-JUN-19
Cadmium (Cd)-Dissolved			<0.000005C		mg/L		0.000005	18-JUN-19
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	18-JUN-19
Cesium (Cs)-Dissolved			<0.000010		mg/L		0.00001	18-JUN-19
Chromium (Cr)-Dissolved			<0.00050		mg/L		0.0005	18-JUN-19
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	18-JUN-19
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	18-JUN-19
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	18-JUN-19
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	18-JUN-19
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	18-JUN-19
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	18-JUN-19
Manganese (Mn)-Dissolved			<0.00050		mg/L		0.0005	18-JUN-19
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	18-JUN-19
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	18-JUN-19
Phosphorus (P)-Dissolved			<0.050		mg/L		0.05	18-JUN-19
Potassium (K)-Dissolved			<0.050		mg/L		0.05	18-JUN-19
Rubidium (Rb)-Dissolved			<0.00020		mg/L		0.0002	18-JUN-19
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	18-JUN-19
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	18-JUN-19
Silver (Ag)-Dissolved			<0.000050		mg/L		0.00005	18-JUN-19
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	18-JUN-19
Strontium (Sr)-Dissolved			<0.0010		mg/L		0.001	18-JUN-19
Sulfur (S)-Dissolved			<0.50		mg/L		0.5	18-JUN-19
Tellurium (Te)-Dissolved			<0.00020		mg/L		0.0002	18-JUN-19
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	18-JUN-19
Thorium (Th)-Dissolved			<0.00010		mg/L		0.0001	18-JUN-19
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	18-JUN-19
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	18-JUN-19
Tungsten (W)-Dissolved			<0.00010		mg/L		0.0001	18-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4672659								
WG3080585-1 MB								
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	18-JUN-19
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	18-JUN-19
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	18-JUN-19
Zirconium (Zr)-Dissolved			<0.00020		mg/L		0.0002	18-JUN-19
WG3080585-5 MS		**WG3080585-3**						
Aluminum (Al)-Dissolved			98.7		%		70-130	18-JUN-19
Antimony (Sb)-Dissolved			94.2		%		70-130	18-JUN-19
Arsenic (As)-Dissolved			108.6		%		70-130	18-JUN-19
Barium (Ba)-Dissolved			94.6		%		70-130	18-JUN-19
Beryllium (Be)-Dissolved			101.9		%		70-130	18-JUN-19
Bismuth (Bi)-Dissolved			88.0		%		70-130	18-JUN-19
Boron (B)-Dissolved			92.9		%		70-130	18-JUN-19
Cadmium (Cd)-Dissolved			100.9		%		70-130	18-JUN-19
Calcium (Ca)-Dissolved			N/A	MS-B	%		-	18-JUN-19
Cesium (Cs)-Dissolved			97.2		%		70-130	18-JUN-19
Chromium (Cr)-Dissolved			98.5		%		70-130	18-JUN-19
Cobalt (Co)-Dissolved			N/A	MS-B	%		-	18-JUN-19
Copper (Cu)-Dissolved			96.1		%		70-130	18-JUN-19
Iron (Fe)-Dissolved			N/A	MS-B	%		-	18-JUN-19
Lead (Pb)-Dissolved			95.8		%		70-130	18-JUN-19
Lithium (Li)-Dissolved			91.9		%		70-130	18-JUN-19
Magnesium (Mg)-Dissolved			N/A	MS-B	%		-	18-JUN-19
Manganese (Mn)-Dissolved			N/A	MS-B	%		-	18-JUN-19
Molybdenum (Mo)-Dissolved			97.1		%		70-130	18-JUN-19
Nickel (Ni)-Dissolved			N/A	MS-B	%		-	18-JUN-19
Phosphorus (P)-Dissolved			115.9		%		70-130	18-JUN-19
Potassium (K)-Dissolved			102.5		%		70-130	18-JUN-19
Rubidium (Rb)-Dissolved			100.6		%		70-130	18-JUN-19
Selenium (Se)-Dissolved			120.1		%		70-130	18-JUN-19
Silicon (Si)-Dissolved			N/A	MS-B	%		-	18-JUN-19
Silver (Ag)-Dissolved			78.2		%		70-130	18-JUN-19
Sodium (Na)-Dissolved			96.9		%		70-130	18-JUN-19
Strontium (Sr)-Dissolved			N/A	MS-B	%		-	18-JUN-19
Sulfur (S)-Dissolved			N/A	MS-B	%		-	18-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4672659								
WG3080585-5 MS		**WG3080585-3**						
Tellurium (Te)-Dissolved			97.4		%		70-130	18-JUN-19
Thallium (Tl)-Dissolved			96.9		%		70-130	18-JUN-19
Thorium (Th)-Dissolved			93.1		%		70-130	18-JUN-19
Tin (Sn)-Dissolved			96.1		%		70-130	18-JUN-19
Titanium (Ti)-Dissolved			99.9		%		70-130	18-JUN-19
Tungsten (W)-Dissolved			96.0		%		70-130	18-JUN-19
Uranium (U)-Dissolved			92.2		%		70-130	18-JUN-19
Vanadium (V)-Dissolved			103.2		%		70-130	18-JUN-19
Zinc (Zn)-Dissolved			103.7		%		70-130	18-JUN-19
Zirconium (Zr)-Dissolved			94.6		%		70-130	18-JUN-19
MET-T-CCMS-WT	**Water**							
Batch R4673448								
WG3081157-4 DUP		**WG3081157-3**						
Aluminum (Al)-Total		<0.050	<0.050	RPD-NA	mg/L	N/A	20	19-JUN-19
Antimony (Sb)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	19-JUN-19
Arsenic (As)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	19-JUN-19
Barium (Ba)-Total		0.0124	0.0127		mg/L	2.0	20	19-JUN-19
Beryllium (Be)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	19-JUN-19
Bismuth (Bi)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	19-JUN-19
Boron (B)-Total		<0.10	<0.10	RPD-NA	mg/L	N/A	20	19-JUN-19
Cadmium (Cd)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	19-JUN-19
Calcium (Ca)-Total		90.2	90.3		mg/L	0.1	20	19-JUN-19
Chromium (Cr)-Total		1.69	1.70		mg/L	0.2	20	19-JUN-19
Cesium (Cs)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	19-JUN-19
Cobalt (Co)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	19-JUN-19
Copper (Cu)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	19-JUN-19
Iron (Fe)-Total		<0.10	<0.10	RPD-NA	mg/L	N/A	20	19-JUN-19
Lead (Pb)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	19-JUN-19
Lithium (Li)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	19-JUN-19
Magnesium (Mg)-Total		17.8	17.9		mg/L	0.8	20	19-JUN-19
Manganese (Mn)-Total		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	19-JUN-19
Molybdenum (Mo)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	19-JUN-19
Nickel (Ni)-Total		0.0106	0.0104		mg/L	2.0	20	19-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4673448								
WG3081157-4 DUP		**WG3081157-3**						
Phosphorus (P)-Total		<0.50	<0.50	RPD-NA	mg/L	N/A	20	19-JUN-19
Potassium (K)-Total		3.65	3.62		mg/L	0.6	20	19-JUN-19
Rubidium (Rb)-Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	19-JUN-19
Selenium (Se)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	19-JUN-19
Silicon (Si)-Total		2.9	3.0		mg/L	2.7	20	19-JUN-19
Silver (Ag)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	19-JUN-19
Sodium (Na)-Total		107	109		mg/L	1.3	20	19-JUN-19
Strontium (Sr)-Total		0.153	0.155		mg/L	1.0	20	19-JUN-19
Sulfur (S)-Total		9.5	10.2		mg/L	6.8	25	19-JUN-19
Thallium (Tl)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	19-JUN-19
Tellurium (Te)-Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	19-JUN-19
Thorium (Th)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	25	19-JUN-19
Tin (Sn)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	19-JUN-19
Titanium (Ti)-Total		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	19-JUN-19
Tungsten (W)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	19-JUN-19
Uranium (U)-Total		0.00068	0.00071		mg/L	3.8	20	19-JUN-19
Vanadium (V)-Total		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	19-JUN-19
Zinc (Zn)-Total		<0.030	<0.030	RPD-NA	mg/L	N/A	20	19-JUN-19
Zirconium (Zr)-Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	19-JUN-19
WG3081157-2 LCS								
Aluminum (Al)-Total			100.6		%		80-120	19-JUN-19
Antimony (Sb)-Total			104.1		%		80-120	19-JUN-19
Arsenic (As)-Total			99.8		%		80-120	19-JUN-19
Barium (Ba)-Total			102.6		%		80-120	19-JUN-19
Beryllium (Be)-Total			95.5		%		80-120	19-JUN-19
Bismuth (Bi)-Total			101.3		%		80-120	19-JUN-19
Boron (B)-Total			86.2		%		80-120	19-JUN-19
Cadmium (Cd)-Total			96.3		%		80-120	19-JUN-19
Calcium (Ca)-Total			98.1		%		80-120	19-JUN-19
Chromium (Cr)-Total			100.5		%		80-120	19-JUN-19
Cesium (Cs)-Total			101.9		%		80-120	19-JUN-19
Cobalt (Co)-Total			99.9		%		80-120	19-JUN-19
Copper (Cu)-Total			97.8		%		80-120	19-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4673448								
WG3081157-2 LCS								
Iron (Fe)-Total			102.0		%		80-120	19-JUN-19
Lead (Pb)-Total			102.3		%		80-120	19-JUN-19
Lithium (Li)-Total			93.5		%		80-120	19-JUN-19
Magnesium (Mg)-Total			100.7		%		80-120	19-JUN-19
Manganese (Mn)-Total			100.9		%		80-120	19-JUN-19
Molybdenum (Mo)-Total			101.2		%		80-120	19-JUN-19
Nickel (Ni)-Total			99.1		%		80-120	19-JUN-19
Phosphorus (P)-Total			105.3		%		70-130	19-JUN-19
Potassium (K)-Total			102.6		%		80-120	19-JUN-19
Rubidium (Rb)-Total			100.2		%		80-120	19-JUN-19
Selenium (Se)-Total			96.6		%		80-120	19-JUN-19
Silicon (Si)-Total			105.1		%		60-140	19-JUN-19
Silver (Ag)-Total			100.4		%		80-120	19-JUN-19
Sodium (Na)-Total			102.4		%		80-120	19-JUN-19
Strontium (Sr)-Total			102.4		%		80-120	19-JUN-19
Sulfur (S)-Total			97.3		%		80-120	19-JUN-19
Thallium (Tl)-Total			100.7		%		80-120	19-JUN-19
Tellurium (Te)-Total			92.4		%		80-120	19-JUN-19
Thorium (Th)-Total			99.9		%		70-130	19-JUN-19
Tin (Sn)-Total			99.0		%		80-120	19-JUN-19
Titanium (Ti)-Total			97.9		%		80-120	19-JUN-19
Tungsten (W)-Total			101.2		%		80-120	19-JUN-19
Uranium (U)-Total			102.9		%		80-120	19-JUN-19
Vanadium (V)-Total			101.0		%		80-120	19-JUN-19
Zinc (Zn)-Total			100.6		%		80-120	19-JUN-19
Zirconium (Zr)-Total			99.7		%		80-120	19-JUN-19
WG3081157-1 MB								
Aluminum (Al)-Total			<0.0050		mg/L		0.005	19-JUN-19
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	19-JUN-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	19-JUN-19
Barium (Ba)-Total			<0.00010		mg/L		0.0001	19-JUN-19
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	19-JUN-19
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	19-JUN-19
Boron (B)-Total			<0.010		mg/L		0.01	19-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4673448								
WG3081157-1 MB								
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	19-JUN-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	19-JUN-19
Chromium (Cr)-Total			<0.00050		mg/L		0.0005	19-JUN-19
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	19-JUN-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	19-JUN-19
Copper (Cu)-Total			<0.0010		mg/L		0.001	19-JUN-19
Iron (Fe)-Total			<0.010		mg/L		0.01	19-JUN-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	19-JUN-19
Lithium (Li)-Total			<0.0010		mg/L		0.001	19-JUN-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	19-JUN-19
Manganese (Mn)-Total			<0.00050		mg/L		0.0005	19-JUN-19
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	19-JUN-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	19-JUN-19
Phosphorus (P)-Total			<0.050		mg/L		0.05	19-JUN-19
Potassium (K)-Total			<0.050		mg/L		0.05	19-JUN-19
Rubidium (Rb)-Total			<0.00020		mg/L		0.0002	19-JUN-19
Selenium (Se)-Total			<0.000050		mg/L		0.00005	19-JUN-19
Silicon (Si)-Total			<0.10		mg/L		0.1	19-JUN-19
Silver (Ag)-Total			<0.000050		mg/L		0.00005	19-JUN-19
Sodium (Na)-Total			<0.050		mg/L		0.05	19-JUN-19
Strontium (Sr)-Total			<0.0010		mg/L		0.001	19-JUN-19
Sulfur (S)-Total			<0.50		mg/L		0.5	19-JUN-19
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	19-JUN-19
Tellurium (Te)-Total			<0.00020		mg/L		0.0002	19-JUN-19
Thorium (Th)-Total			<0.00010		mg/L		0.0001	19-JUN-19
Tin (Sn)-Total			<0.00010		mg/L		0.0001	19-JUN-19
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	19-JUN-19
Tungsten (W)-Total			<0.00010		mg/L		0.0001	19-JUN-19
Uranium (U)-Total			<0.000010		mg/L		0.00001	19-JUN-19
Vanadium (V)-Total			<0.00050		mg/L		0.0005	19-JUN-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	19-JUN-19
Zirconium (Zr)-Total			<0.00020		mg/L		0.0002	19-JUN-19
WG3081157-5 MS		**WG3081157-3**						
Aluminum (Al)-Total			100.1		%		70-130	19-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4673448								
WG3081157-5 MS		**WG3081157-3**						
Antimony (Sb)-Total			100.7		%		70-130	19-JUN-19
Arsenic (As)-Total			99.9		%		70-130	19-JUN-19
Barium (Ba)-Total			92.3		%		70-130	19-JUN-19
Beryllium (Be)-Total			100.0		%		70-130	19-JUN-19
Bismuth (Bi)-Total			97.9		%		70-130	19-JUN-19
Boron (B)-Total			83.1		%		70-130	19-JUN-19
Cadmium (Cd)-Total			96.0		%		70-130	19-JUN-19
Calcium (Ca)-Total			N/A	MS-B	%		-	19-JUN-19
Chromium (Cr)-Total			N/A	MS-B	%		-	19-JUN-19
Cesium (Cs)-Total			99.8		%		70-130	19-JUN-19
Cobalt (Co)-Total			97.8		%		70-130	19-JUN-19
Copper (Cu)-Total			97.8		%		70-130	19-JUN-19
Iron (Fe)-Total			100.9		%		70-130	19-JUN-19
Lead (Pb)-Total			99.0		%		70-130	19-JUN-19
Magnesium (Mg)-Total			N/A	MS-B	%		-	19-JUN-19
Manganese (Mn)-Total			96.7		%		70-130	19-JUN-19
Molybdenum (Mo)-Total			99.1		%		70-130	19-JUN-19
Nickel (Ni)-Total			96.3		%		70-130	19-JUN-19
Phosphorus (P)-Total			104.9		%		70-130	19-JUN-19
Potassium (K)-Total			N/A	MS-B	%		-	19-JUN-19
Rubidium (Rb)-Total			103.0		%		70-130	19-JUN-19
Selenium (Se)-Total			98.4		%		70-130	19-JUN-19
Silicon (Si)-Total			N/A	MS-B	%		-	19-JUN-19
Silver (Ag)-Total			97.0		%		70-130	19-JUN-19
Sodium (Na)-Total			N/A	MS-B	%		-	19-JUN-19
Strontium (Sr)-Total			N/A	MS-B	%		-	19-JUN-19
Sulfur (S)-Total			N/A	MS-B	%		-	19-JUN-19
Thallium (Tl)-Total			99.3		%		70-130	19-JUN-19
Tellurium (Te)-Total			98.5		%		70-130	19-JUN-19
Thorium (Th)-Total			94.9		%		70-130	19-JUN-19
Tin (Sn)-Total			98.1		%		70-130	19-JUN-19
Titanium (Ti)-Total			98.7		%		70-130	19-JUN-19
Tungsten (W)-Total			99.7		%		70-130	19-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4673448								
WG3081157-5 MS		**WG3081157-3**						
Uranium (U)-Total			N/A	MS-B	%		-	19-JUN-19
Vanadium (V)-Total			99.96		%		70-130	19-JUN-19
Zinc (Zn)-Total			99.7		%		70-130	19-JUN-19
Zirconium (Zr)-Total			99.9		%		70-130	19-JUN-19
NH3-F-WT	**Water**							
Batch R4672917								
WG3080650-19 DUP		**L2290839-1**						
Ammonia, Total (as N)		<0.010	<0.010	RPD-NA	mg/L	N/A	20	18-JUN-19
WG3080650-18 LCS								
Ammonia, Total (as N)			99.2		%		85-115	18-JUN-19
WG3080650-17 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	18-JUN-19
WG3080650-20 MS		**L2290839-1**						
Ammonia, Total (as N)			86.2		%		75-125	18-JUN-19
NO3-IC-WT	**Water**							
Batch R4674012								
WG3081366-4 DUP		**WG3081366-3**						
Nitrate (as N)		0.097	0.097		mg/L	0.2	20	19-JUN-19
WG3081366-2 LCS								
Nitrate (as N)			100.9		%		90-110	19-JUN-19
WG3081366-1 MB								
Nitrate (as N)			<0.020		mg/L		0.02	19-JUN-19
WG3081366-5 MS		**WG3081366-3**						
Nitrate (as N)			100.1		%		75-125	19-JUN-19
P-T-COL-WT	**Water**							
Batch R4673670								
WG3081040-3 DUP		**L2293039-1**						
Phosphorus, Total		0.0096	0.0094		mg/L	2.2	20	19-JUN-19
WG3081040-2 LCS								
Phosphorus, Total			99.6		%		80-120	19-JUN-19
WG3081040-1 MB								
Phosphorus, Total			<0.0030		mg/L		0.003	19-JUN-19
WG3081040-4 MS		**L2293039-1**						
Phosphorus, Total			100.4		%		70-130	19-JUN-19
PH-BF	**Water**							

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PH-BF	**Water**							
Batch R4672022								
WG3079768-2 DUP		**L2293039-2**						
pH		6.71	6.74	J	pH units	0.03	0.2	17-JUN-19
WG3079768-1 LCS								
pH			7.02		pH units		6.9-7.1	17-JUN-19
SO4-IC-N-WT	**Water**							
Batch R4674012								
WG3081366-4 DUP		**WG3081366-3**						
Sulfate (SO4)		10.4	10.4		mg/L	0.1	20	19-JUN-19
WG3081366-2 LCS								
Sulfate (SO4)			102.1		%		90-110	19-JUN-19
WG3081366-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	19-JUN-19
WG3081366-5 MS		**WG3081366-3**						
Sulfate (SO4)			104.6		%		75-125	19-JUN-19
SOLIDS-TDS-BF	**Water**							
Batch R4673058								
WG3079944-3 DUP		**L2293082-4**						
Total Dissolved Solids		33000	33200		mg/L	0.5	20	18-JUN-19
WG3079944-2 LCS								
Total Dissolved Solids			104.5		%		85-115	18-JUN-19
WG3079944-1 MB								
Total Dissolved Solids			<20		mg/L		20	18-JUN-19
Batch R4676267								
WG3081127-3 DUP		**L2293039-2**						
Total Dissolved Solids		457	436		mg/L	4.7	20	19-JUN-19
WG3081127-2 LCS								
Total Dissolved Solids			96.6		%		85-115	19-JUN-19
WG3081127-1 MB								
Total Dissolved Solids			<20		mg/L		20	19-JUN-19
SOLIDS-TSS-BF	**Water**							
Batch R4672091								
WG3079839-3 DUP		**L2293039-2**						
Total Suspended Solids		9.6	9.6		mg/L	0.0	25	17-JUN-19
WG3079839-2 LCS								
Total Suspended Solids			99.8		%		85-115	17-JUN-19
WG3079839-1 MB								
Total Suspended Solids			<2.0		mg/L		2	17-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TKN-WT	**Water**							
Batch R4674366								
WG3080816-3 DUP		**L2293039-2**						
Total Kjeldahl Nitrogen		0.63	0.60		mg/L	4.6	20	19-JUN-19
WG3080816-2 LCS								
Total Kjeldahl Nitrogen			103.2		%		75-125	19-JUN-19
WG3080816-1 MB								
Total Kjeldahl Nitrogen			<0.15		mg/L		0.15	19-JUN-19
WG3080816-4 MS		**L2293039-2**						
Total Kjeldahl Nitrogen			104.6		%		70-130	19-JUN-19
TOC-WT	**Water**							
Batch R4673217								
WG3080377-3 DUP		**L2291275-7**						
Total Organic Carbon		0.59	0.54		mg/L	8.7	20	18-JUN-19
WG3080377-2 LCS								
Total Organic Carbon			97.5		%		80-120	18-JUN-19
WG3080377-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	18-JUN-19
WG3080377-4 MS		**L2291275-7**						
Total Organic Carbon			97.0		%		70-130	18-JUN-19
TURBIDITY-WT	**Water**							
Batch R4673290								
WG3080340-3 DUP		**L2293238-2**						
Turbidity		2.65	2.66		NTU	0.4	15	19-JUN-19
WG3080340-2 LCS								
Turbidity			104.0		%		85-115	19-JUN-19
WG3080340-1 MB								
Turbidity			<0.10		NTU		0.1	19-JUN-19

Quality Control Report

Workorder: L2293039 Report Date: 19-JUL-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

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

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

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.

AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

TOXICITY TEST REPORT

Daphnia magna
EPS 1/RM/14

Work Order : 239474
Sample Number : 59519

SAMPLE IDENTIFICATION

Company :	ALS Laboratory Group, Waterloo	Date Collected :	2019-06-17
Location :	Waterloo ON	Time Collected :	09:25
Job Number :	L2293039-1	Date Received :	2019-06-18
Substance :	MS-08	Time Received :	13:00
Sampling Method :	Grab	Temperature on Receipt :	8.0 °C
Sampled By :	KB/LM/CP	Date Tested :	2019-06-18
Sample Description :	Cloudy, yellow, odourless.		

Test Method : Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna*. Environment Canada EPS 1/RM/14 (Second Edition, December 2000, with February 2016 amendments).

48-HOUR TEST RESULTS

Substance	Effect	Value
Control	Mean Immobility	0.0 %
	Mean Mortality	0.0 %
100%	Mean Immobility	0.0 %
	Mean Mortality	0.0 %

The results reported relate only to the sample tested and as received.

TEST ORGANISM

Species :	*Daphnia magna*	Time to First Brood :	9.2 days
Organism Batch :	Dm19-11	Average Brood Size :	31.2 young
Culture Mortality :	0.0% (previous 7 days)		

TEST CONDITIONS

Sample Treatment :	None	Number of Replicates :	3
pH Adjustment :	None	Organisms / Replicate :	10
Pre-aeration Rate :	~30 mL/min/L	Organisms / Test Level :	30
Pre-aeration Time :	30 minutes	Organism Loading Rate :	15.0 mL/organism
Test Aeration :	None	Impaired Control Organisms :	0.0%
Hardness Adjustment :	None	Test Method Deviation(s) :	None

REFERENCE TOXICANT DATA

Toxicant :	Sodium Chloride	Historical Mean LC50 :	6.3 g/L
Date Tested :	2019-06-11	Warning Limits (± 2SD) :	5.6 - 7.0 g/L
LC50 :	6.7 g/L	Organism Batch :	Dm19-11
95% Confidence Limits :	6.4 - 7.0 g/L	Analyst(s) :	SV, MW, NM
Statistical Method :	Spearman-Kärber		

COMMENTS

All test validity criteria as specified in the test method were satisfied.

Date : 2019-06-24
yyyy-mm-dd

Approved By : _____
Project Manager

AQUATOX

TOXICITY TEST REPORT

Daphnia magna

EPS 1/RM/14

Work Order : 239474
Sample Number : 59519

TEST DATA

	pH	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	Temperature (°C)	O_2 Saturation (%)*	Hardness (as $CaCO_3$)
Initial Water Chemistry (100%) :	7.0	11.1	758	20.0	130	400 mg/L

0 HOURS

Date & Time 2019-06-18 14:40
Analyst(s) : KP

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O_2	Conductivity	Temperature	O_2 Saturation (%)*	Hardness
100	A	0	0	7.0	10.7	755	20.0	125	400
100	B	0	0	7.0	10.7	755	20.0	125	400
100	C	0	0	7.0	10.7	755	20.0	125	400
Control	A	0	0	8.6	8.6	787	20.0	100	200
Control	B	0	0	8.6	8.6	787	20.0	100	200
Control	C	0	0	8.6	8.6	787	20.0	100	200

Notes:

24 HOURS

Date & Time 2019-06-19 14:40
Analyst(s) : MJT

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O_2	Conductivity	Temperature
100	A	–	1	–	–	–	20.0
100	B	–	2	–	–	–	20.0
100	C	–	1	–	–	–	20.0
Control	A	–	0	–	–	–	20.0
Control	B	–	0	–	–	–	20.0
Control	C	–	0	–	–	–	20.0

Notes:

48 HOURS

Date & Time 2019-06-20 14:40
Analyst(s) : NM(SV)

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O_2	Conductivity	Temperature
100	A	0	0	7.4	8.1	756	20.0
100	B	0	0	7.4	8.1	758	20.0
100	C	0	0	7.4	8.2	786	20.0
Control	A	0	0	8.4	8.2	804	20.0
Control	B	0	0	8.4	8.1	804	20.0
Control	C	0	0	8.4	8.2	821	20.0

Notes: Test organisms in the 100% concentration appeared to be adhered to gas bubbles on the sides and bottom of the test chamber (NM).

Number immobile does not include number dead.

– = not measured/not required
* adjusted for temperature and barometric pressure

Test Data Reviewed By : FS
Date : 2019-06-24

AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

TOXICITY TEST REPORT

Rainbow Trout
EPS 1/RM/13

Work Order : 239474
Sample Number : 59519

SAMPLE IDENTIFICATION

Company :	ALS Laboratory Group, Waterloo	Date Collected :	2019-06-17
Location :	Waterloo ON	Time Collected :	09:25
Job Number :	L2293039-1	Date Received :	2019-06-18
Substance :	MS-08	Time Received :	13:00
Sampling Method :	Grab	Temperature on Receipt :	8.0 °C
Sampled By :	KB/LM/CP	Date Tested :	2019-06-18
Sample Description :	Cloudy, yellow, odourless.		

Test Method(s) : Reference Method for Determining Acute Lethality of Liquid Effluents to Rainbow Trout. Environment Canada, EPS 1/RM/13 (2nd Edition, December 2000, with May 2007 and February 2016 amendments).

96-HOUR TEST RESULTS

Substance	Effect	Value
Control	Mean Impairment	0.0 %
	Mean Mortality	0.0 %
100%	Mean Impairment	0.0 %
	Mean Mortality	0.0 %

The results reported relate only to the sample tested and as received.

TEST ORGANISM

Test Organism :	*Oncorhynchus mykiss*	Average Fork Length (± 2 SD) :	34.8 mm (±6.6)
Organism Batch :	T19-11	Range of Fork Lengths :	30 - 42 mm
Control Sample Size :	10	Average Wet Weight (± 2 SD) :	0.40 g (±0.20)
Cumulative stock tank mortality rate :	0% (previous 7 days)	Range of Wet Weights :	0.34 - 0.67 g
Control organisms showing stress :	0 (at test completion)	Organism Loading Rate :	0.2 g/L

TEST CONDITIONS

Sample Treatment :	None	Volume Tested (L) :	20
pH Adjustment :	None	Number of Replicates :	1
Test Aeration :	Yes	Organisms Per Replicate :	10
Pre-aeration/Aeration Rate :	6.5 ± 1 mL/min/L	Organisms Per Test Level :	10
Total Pre-Aeration Time :	120 minutes	Test Method Deviation(s) :	None

REFERENCE TOXICANT DATA

Toxicant :	Potassium Chloride	Date Tested :	2019-06-07
Organism Batch :	T19-11	Historical Mean LC50 :	3843 mg/L
LC50 :	3553 mg/L	Warning Limits (± 2SD) :	3265 - 4522 mg/L
95% Confidence Limits :	3111 - 3890 mg/L	Analyst(s) :	MW, TA, FS, KP
Statistical Method :	Linear Regression (MLE)		

COMMENTS

•All test validity criteria as specified in the test method were satisfied.

Date : 2019-06-24
yyyy-mm-dd

Approved By : *Project Manager*

Work Order : 239474
Sample Number : 59519

TEST DATA

	pH	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	Temperature (°C)	O_2 Saturation (%)*
Initial Water Chemistry (100%) :	7.8	10.8	763	14.0	–
After 30 min pre-aeration :	7.6	10.1	761	14.0	103

0 HOURS

Date & Time 2019-06-18 16:25
Analyst(s) : FS

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature	O_2 Saturation*
100%	0	0	7.7	9.9	760	14.0	101
Control	0	0	8.0	9.5	944	15.0	100

Notes:

24 HOURS

Date & Time 2019-06-19 16:25
Analyst(s) : TA

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	7.5	9.2	–	15.0
Control	0	0	–	–	–	15.0

Notes:

48 HOURS

Date & Time 2019-06-20 16:25
Analyst(s) : TA

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	7.3	9.2	–	15.0
Control	0	0	–	–	–	15.0

Notes:

72 HOURS

Date & Time 2019-06-21 16:25
Analyst(s) : TA

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	7.2	9.3	–	15.0
Control	0	0	–	–	–	15.0

Notes:

96 HOURS

Date & Time 2019-06-22 16:25
Analyst(s) : FS

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	7.5	9.3	765	15.0
Control	0	0	8.3	9.5	898	15.0

Notes:

"–" = not measured/not required
Number impaired does not include number dead.
* adjusted for temperature and barometric pressure

Test Data Reviewed By : FS
Date : 2019-06-24

CHAIN OF CUSTODY RECORD

AQUATOX

AquaTox Work Order No: 239474

Shipping Address: AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, Ontario Canada N0B 2J0

Voice: (519) 763-4412 **Fax:** (519) 763-4419

P.O. Number:	4500057496
Field Sampler Name (print):	KB/LM/CP
Signature:	KoButton
Affiliation:	Baffinland Iron Mine / ALS Environmental
Sample Storage (prior to shipping):	Cooler
Custody Relinquished by:	Kendra Button
Date/Time Shipped:	2019-06-17/20:00 RH

Client:	ALS Environmental c/o Baffinland Iron Mine Quote # (2019): 162705399-19
Phone:	(519) 886-6910
Fax:	(519) 886-9047
Contact:	Rick Hawthorne (ALS) / Martina Rendas (Aquatox)

Sample Identification					Analyses Requested									Sample Method and Volume		
Date Collected (yyyy-mm-dd)	Time Collected (e.g. 14:30, 24 hr clock)	Sample Name (L2293039-1)	AquaTox Sample Number	Temp. on arrival	Rainbow Trout Single Concentration	Rainbow Trout LC50	*Daphnia magna* Single Concentration	*Daphnia magna* LC50	Fathead Minnow Survival & Growth	*Ceriodaphnia dubia* Survival & Reproduction	*Lemna minor* Growth	*Pseudokirchneriella subcapitata* Growth	Other (please specify below)	Grab	Composite	# of Containers and Volume (eg. 2 x 1L, 3 x 10L, etc.)
2019-06-17	09:25	MS-08	59519	8.0	✓		✓		✓	✓	✓	✓	✓	✓		5 x 10LCarboy

For Lab Use Only	
Received By:	DV / MDH
Date:	2019-06-18
Time:	13:00
Storage Location:	
Storage Temp.(°C)	

Please list any special requests or instructions: "Other" Note: RISS upload required

Rush TAT w/ Daily updates. PH required.

Report Distribution: bimcore@alsglobal.com, rick.hawthorne@alsglobal.com

Sublethal submission #1 for BIM 2019 MDER

ALS Environmental

L2293039

WATERLOO

Subcontract Request Form

Subcontract To:

AQUATOX TESTING AND CONSULTING
11B NICHOLAS BEAVER ROAD
RR3
GUELPH,ON N1H 6H9

NOTES: Please reference on final report and invoice: PO# *L2293039*
ALS requires QC data to be provided with your final results.

Please see enclosed 1 **sample(s) in** 0 **Container(s)**

SAMPLE NUMBER	ANALYTICAL REQUIRED	DATE SAMPLED / DUE DATE	Priority Flag
L2293039-1 MS-08		6/ 17/ 2019	
	Special Request Aquatox (SPECIAL REQUEST2-AQT 14)	6/21/2019	
	Special Request Aquatox (SPECIAL REQUEST-AQT 14)	6/21/2019	

Subcontract Info Contact: Mary-Lynn Pike (519) 886-6910
Analysis and reporting info contact: Rick Hawthorne
60 NORTHLAND ROAD, UNIT 1
WATERLOO,ON N2V 2B8
Phone: (519) 886-6910 Email: Rick.Hawthorne@alsglobal.com

Please email confirmation of receipt to: **Rick.Hawthorne@alsglobal.com**

Shipped By: _____ Date Shipped: _____

Received By: _____ Date Received: _____

Verified By: _____ Date Verified: _____

Temperature: _____

Sample Integrity Issues: _____

CHAIN OF CUSTODY RECORD

AQUATOX

AquaTox Work Order No: 239474

Shipping Address: AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, Ontario Canada N0B 2J0

Voice: (519) 763-4412 **Fax:** (519) 763-4419

P.O. Number:	4500057496
Field Sampler Name (print):	KB/LM/CP
Signature:	KaButton
Affiliation:	Baffinland Iron Mine / ALS Environmental
Sample Storage (prior to shipping):	Cooler
Custody Relinquished by:	Kendra Button
Date/Time Shipped:	2019-06-17/20:00 RH

Client:	ALS Environmental c/o Baffinland Iron Mine Quote # (2019): 162705399-19
Phone:	(519) 886-6910
Fax:	(519) 886-9047
Contact:	Rick Hawthorne (ALS) / Martina Rendas (Aquatox)

Sample Identification					Analyses Requested									Sample Method and Volume		
Date Collected (yyyy-mm-dd)	Time Collected (e.g. 14:30, 24 hr clock)	Sample Name (L2293039-1)	AquaTox Sample Number	Temp. on arrival	Rainbow Trout Single Concentration	Rainbow Trout LC50	*Daphnia magna* Single Concentration	*Daphnia magna* LC50	Fathead Minnow Survival & Growth	*Ceriodaphnia dubia* Survival & Reproduction	*Lemna minor* Growth	*Pseudokirchneriella subcapitata* Growth	Other (please specify below)	Grab	Composite	# of Containers and Volume (eg. 2 x 1L, 3 x 10L, etc.)
2019-06-17	09:25	MS-08	59519	8.0	✓		✓		✓	✓	✓	✓	✓	✓		5 x 10LCarboy

For Lab Use Only

Received By:	DV / MDH
Date:	2019-06-18
Time:	13:00
Storage Location:	
Storage Temp.(°C)	

Please list any special requests or instructions: "Other" Note: RISS upload required

Rush TAT w/ Daily updates. PH required.

Report Distribution: bimcore@alsglobal.com, rick.hawthorne@alsglobal.com

Sublethal submission #1 for BIM 2019 MDER

ALS Environmental

L2293039

WATERLOO

Subcontract Request Form

Subcontract To:

AQUATOX TESTING AND CONSULTING
11B NICHOLAS BEAVER ROAD
RR3
GUELPH,ON N1H 6H9

NOTES: Please reference on final report and invoice: PO# *L2293039*
ALS requires QC data to be provided with your final results.

Please see enclosed 1 **sample(s) in** 0 **Container(s)**

SAMPLE NUMBER	ANALYTICAL REQUIRED	DATE SAMPLED / DUE DATE	Priority Flag
L2293039-1 MS-08		6/ 17/ 2019	
	Special Request Aquatox (SPECIAL REQUEST2-AQT 14)	6/21/2019	
	Special Request Aquatox (SPECIAL REQUEST-AQT 14)	6/21/2019	

Subcontract Info Contact: Mary-Lynn Pike (519) 886-6910
Analysis and reporting info contact: Rick Hawthorne
60 NORTHLAND ROAD, UNIT 1
WATERLOO,ON N2V 2B8
Phone: (519) 886-6910 Email: Rick.Hawthorne@alsglobal.com

Please email confirmation of receipt to: **Rick.Hawthorne@alsglobal.com**

Shipped By: _____ Date Shipped: _____

Received By: _____ Date Received: _____

Verified By: _____ Date Verified: _____

Temperature: _____

Sample Integrity Issues: _____

Wednesday, July 03, 2019

Rick Hawthorne
ALS Environmental
60 Northland Rd, Unit 1
Waterloo Canada, ON N2V 2B8

Re: ALS Workorder: 1906435
Project Name:
Project Number: L2293039

Dear Mr. Hawthorne:

Two water samples were received from ALS Environmental, on 6/19/2019. The samples were scheduled for the following analysis:

Radium-226

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,

ALS Environmental
Katie M. OBrien
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
AIHA	214884
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280

1906435

Radium-226:

The samples were prepared and analyzed according to the current revision of SOP 783.

All acceptance criteria were met.

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1906435
Client Name: ALS Environmental
Client Project Name:
Client Project Number: L2293039
Client PO Number: L2293039

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
L2293039-1	1906435-1		WATER	17-Jun-19	
L2293039-2	1906435-2		WATER	17-Jun-19	

ALS Environmental

1906435

Subcontract Request Form

Subcontract To:

ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
225 COMMERCE DRIVE
FORT COLLINS,CO 80524

NOTES: Please reference on final report and invoice: PO# L2293039
ALS requires QC data to be provided with your final results.

2x950mL HDPE (HNO_3).

Please see enclosed 2 sample(s) in 2 Container(s)

SAMPLE NUMBER	ANALYTICAL REQUIRED	DATE SAMPLED / DUE DATE	Priority Flag
1 **L2293039-1 MS-08**		6/ 17/ 2019	
	Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	7/10/2019	
2 **L2293039-2 MS-0801**		6/ 17/ 2019	
	Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	7/5/2019	

Subcontract Info Contact: Mary-Lynn Pike (519) 886-6910
Analysis and reporting info contact: Rick Hawthorne
60 NORTHLAND ROAD, UNIT 1
WATERLOO,ON N2V 2B8
Phone: (519) 886-6910 Email: Rick.Hawthorne@alsglobal.com

Please email confirmation of receipt to: Rick.Hawthorne@alsglobal.com

Shipped By: _____ Date Shipped: _____
Received By: KELI-JEAN SMITH Date Received: 6·19·19 1340
Verified By: _____ Date Verified: _____
Temperature: _____

Sample Integrity Issues: _____

ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: ALS WATERLOO PMO Workorder No: 1906435

Project Manager: _____ Initials: KZ Date: 6-19-19

1.	Are airbills / shipping documents present and/or removable?	DROP OFF	YES	NO
2.	Are custody seals on **shipping** containers intact?	NONE	YES	NO *
3.	Are custody seals on **sample** containers intact?	NONE	YES	NO *
4.	Is there a COC (chain-of-custody) present?		YES	NO *
5.	Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)		YES	NO *
6.	Are short-hold samples present?		YES	NO
7.	Are all samples within holding times for the requested analyses?		YES	NO *
8.	Were all sample containers received intact? (not broken or leaking)		YES	NO *
9.	Is there sufficient sample for the requested analyses?		YES	NO *
10.	Are all samples in the proper containers for the requested analyses?		YES	NO *
11.	Are all aqueous samples preserved correctly, if required? (excluding volatiles)	N/A	YES	NO *
12.	Are all aqueous non-preserved samples pH 4-9?	N/A	YES	NO *
13.	Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm (1/4 inch) diameter? (i.e. size of green pea)	N/A	YES	NO
14.	Were the samples shipped on ice?		YES	NO
15.	Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: #1 #3 #4	RAD ONLY	YES	NO

Cooler #:	1							
Temperature (°C):	12.9							
No. of custody seals on cooler:	0							
DOT Survey/ Acceptance Information — External µR/hr reading:	9							
Background µR/hr reading:	10							

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? **YES** / **NO** / **NA** (If no, see Form 008.)

*** Please provide details here for NO responses to gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.**

14;15) ice included but melted upon arrival.

5) no times on COC -vs- times on bottles
Sample 1 925
Sample 2 925

All client bottle ID's vs ALS lab ID's double-checked by: KZ

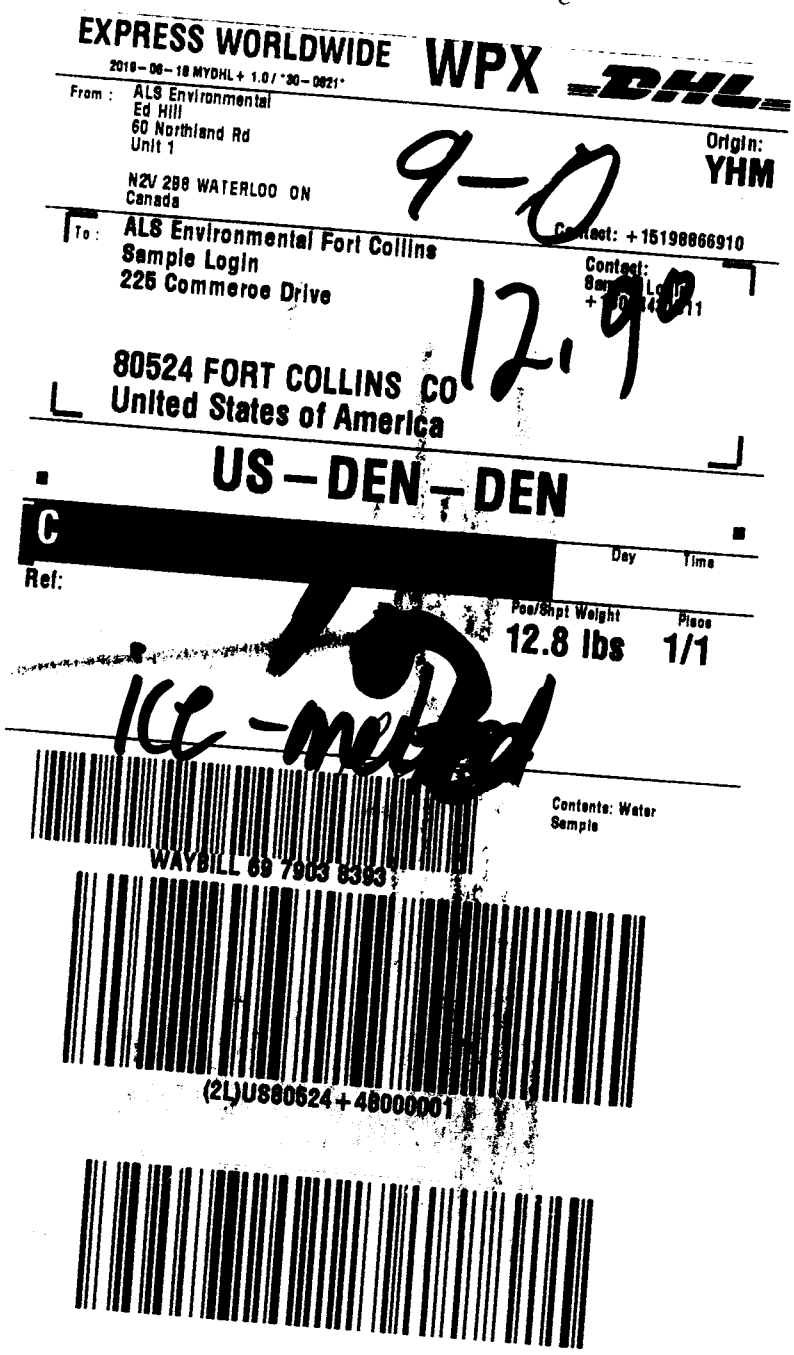
If applicable, was the client contacted? **YES** / **NO** / **NA** Contact: _____ Date/Time: _____

Project Manager Signature / Date: 6/19/19

Form 201r27.xls
(02/11/2019)

*IR Gun #1, VWR SN 170560549
*IR Gun #3, VWR SN 170647571
*IR Gun #4, Oakton, SN 2372220101-0002

1906435


EXPRESS WORLDWIDE
WPX
DHL
2018-06-18 MYDHL+ 1.0/*30-0821*
From : ALS Environmental
Ed Hill
60 Northland Rd
Unit 1
N2V 2B8 WATERLOO ON
Canada
Origin:
YHM
9-0
To : ALS Environmental Fort Collins
Sample Login
225 Commerce Drive
Contact: +15198866910
12.9
80524 FORT COLLINS CO
United States of America
US-DEN-DEN
C
Day
Time
Ref:
Pce/Shpt Weight
12.8 lbs
Place
1/1
ICE-packed
Contents: Water Sample
WAYBILL 69 7903 8393
(2L)US80624+48000001

Client:	ALS Environmental	**Date:**	*03-Jul-19*
Project:	L2293039	**Work Order:**	1906435
Sample ID:	L2293039-1	**Lab ID:**	1906435-1
Legal Location:		**Matrix:**	WATER
Collection Date:	6/17/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1			**SOP 783**		Prep Date: **6/24/2019**	PrepBy: **JXH**
Ra-226	**0.0097 (+/- 0.0052)**		**0.0047**	**BQ/l**	NA	7/2/2019 11:46
Carr: BARIUM	*96.4*		*40-110*	*%REC*	DL = NA	7/2/2019 11:46

Client:	ALS Environmental	**Date:**	*03-Jul-19*
Project:	L2293039	**Work Order:**	1906435
Sample ID:	L2293039-2	**Lab ID:**	1906435-2
Legal Location:		**Matrix:**	WATER
Collection Date:	6/17/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **6/24/2019**		PrepBy: **JXH**
Ra-226	**0.011 (+/- 0.0065)**		**0.0077**	**BQ/l**	NA	7/2/2019 11:46
Carr: BARIUM	*96.9*		*40-110*	*%REC*	DL = NA	7/2/2019 11:46

Client:	ALS Environmental	**Date:**	*03-Jul-19*
Project:	L2293039	**Work Order:**	1906435
Sample ID:	L2293039-2	**Lab ID:**	1906435-2
Legal Location:		**Matrix:**	WATER
Collection Date:	6/17/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed

Explanation of Qualifiers

Radiochemistry:

- "Report Limit" is the MDC

U or ND - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

Y2 - Chemical Yield outside default limits.

W - DER is greater than Warning Limit of 1.42

* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.
# - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.
G - Sample density differs by more than 15% of LCS density.
D - DER is greater than Control Limit

M - Requested MDC not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS, Matrix Spike Recovery within control limits.

N - Matrix Spike Recovery outside control limits

NC - Not Calculated for duplicate results less than 5 times MDC

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

Inorganics:

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).

U or ND - Indicates that the compound was analyzed for but not detected.

E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.

M - Duplicate injection precision was not met.

N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.

Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.

* - Duplicate analysis (relative percent difference) not within control limits.

S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

Organics:

U or ND - Indicates that the compound was analyzed for but not detected.

B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.

E - Analyte concentration exceeds the upper level of the calibration range.

J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).

A - A tentatively identified compound is a suspected aldol-condensation product.

X - The analyte was diluted below an accurate quantitation level.

* - The spike recovery is equal to or outside the control criteria used.

+ - The relative percent difference (RPD) equals or exceeds the control criteria.

G - A pattern resembling gasoline was detected in this sample.

D - A pattern resembling diesel was detected in this sample.

M - A pattern resembling motor oil was detected in this sample.

C - A pattern resembling crude oil was detected in this sample.

4 - A pattern resembling JP-4 was detected in this sample.

5 - A pattern resembling JP-5 was detected in this sample.

H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.

L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.

Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
- gasoline
- JP-8
- diesel
- mineral spirits
- motor oil
- Stoddard solvent
- bunker C

QC BATCH REPORT

Batch ID: **RE190624-1-1** Instrument ID **Alpha Scin** Method: **Radium-226 by Radon Emanation**

LCS Sample ID: **RE190624-1** Units: **BQ/l** Analysis Date: **7/2/2019 12:23**

Client ID: Run ID: **RE190624-1A** Prep Date: **6/24/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.90 (+/- 0.473)	0.0233	1.771		107	67-120					P,M3
Carr: BARIUM	15300		16100		95.1	40-110					

LCSD Sample ID: **RE190624-1** Units: **BQ/l** Analysis Date: **7/2/2019 12:23**

Client ID: Run ID: **RE190624-1A** Prep Date: **6/24/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.65 (+/- 0.412)	0.0193	1.771		92.9	67-120		1.9	0.4	2.1	P,M3
Carr: BARIUM	15200		16110		94.2	40-110		15300			

MB Sample ID: **RE190624-1** Units: **BQ/l** Analysis Date: **7/2/2019 12:23**

Client ID: Run ID: **RE190624-1A** Prep Date: **6/24/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	0.00090 (+/- 0.0042)	0.0079									U
Carr: BARIUM	15500		16100		96.4	40-110					

The following samples were analyzed in this batch: 1906435-1 1906435-2

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2293039-COFC

COC Number: 15 -

Report To	Contact and company name below will appear on the final report
Company:	Baffinland Iron Mines Corp.
Contact:	Wiliam Bowden and Connor Devereaux
Phone:	647-253-0596 EXT 6016
	Company address below will appear on the final report
Street:	2275 Upper Middle Rd. E., Suite #300
City/Province:	Oakville, ON
Postal Code:	L6H 0C3
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report ☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax bimcore@alsglobal.com
Email 2 bimww@alsglobal.com
Email 3

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax ap@baffinland.com
Email 2 commercial@baffinland.com

Oil and Gas Required Fields (client use)

AFE/Cost Center: | PO#
Major/Minor Code: | Routing Code:
Requisitioner:
Location:

Project Information

ALS Account # / Quote #: 23642 /Q42455
Job #: MS-08 Tox and Eff Characterization
PO / AFE: 4500057496
LSD:

ALS Lab Work Order # (lab use only): L2293039
ALS Contact: Sampler: CP/LM/KB

all E&P TATs with your AM - surcharges will apply

Regular [R] ☐ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
4 day [P4]	☐	1 Business day [E1]	☑
3 day [P3]	☐	Same Day, Weekend or Statutory holiday [E0]	☐
2 day [P2]	☐		

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	BIM MMER-WT	Group 3	Sublethal	Number of Containers
1	MS-08	17-Jun-19	9:25	Water	E1	R	R	16
2	MS-0801	17-Jun-19	9:25	Water	E1			11

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System?
☐ YES ☑ NO
Are samples for human drinking water use?
☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐
Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
	4C				

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Kendra Button	Date: 17-Jun-19	Time: 13:00	Received by: AJ/CV	Date: June 17, 2019	Time: 2pm	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

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 specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Baffinland Iron Mine's Corporation (Oakville)
ATTN: William Bowden/Connor Devereaux
2275 Upper Middle Rd. E.
Suite #300
Oakville ON L6H 0C3

Date Received: 24-JUN-19
Report Date: 19-JUL-19 13:56 (MT)
Version: FINAL

Client Phone: 647-253-0596

Certificate of Analysis

Lab Work Order #: L2297608

Project P.O. #: 4500057496
Job Reference: MS-08 DEL
C of C Numbers:
Legal Site Desc:

Rick Hawthorne
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2297608-1 MS-08 Sampled By: LM/SJS/BW on 24-JUN-19 @ 11:35 Matrix: Water							
Physical Tests							
Conductivity	930		3.0	umhos/cm		26-JUN-19	R4688344
pH	7.20		0.10	pH units		24-JUN-19	R4683161
Total Suspended Solids	15.6		2.0	mg/L		25-JUN-19	R4683222
Total Dissolved Solids	772		20	mg/L		25-JUN-19	R4686554
Turbidity	19.8		0.10	NTU		24-JUN-19	R4683185
Anions and Nutrients							
Ammonia, Total (as N)	0.537		0.010	mg/L		26-JUN-19	R4687969
Cyanides							
Cyanide, Total	0.0039		0.0020	mg/L		26-JUN-19	R4688262
Total Metals							
Aluminum (Al)-Total	0.712	DLHC	0.050	mg/L	26-JUN-19	26-JUN-19	R4688244
Antimony (Sb)-Total	<0.0010	DLHC	0.0010	mg/L	26-JUN-19	26-JUN-19	R4688244
Arsenic (As)-Total	<0.0010	DLHC	0.0010	mg/L	26-JUN-19	26-JUN-19	R4688244
Barium (Ba)-Total	0.0139	DLHC	0.0010	mg/L	26-JUN-19	26-JUN-19	R4688244
Beryllium (Be)-Total	<0.0010	DLHC	0.0010	mg/L	26-JUN-19	26-JUN-19	R4688244
Bismuth (Bi)-Total	<0.00050	DLHC	0.00050	mg/L	26-JUN-19	26-JUN-19	R4688244
Boron (B)-Total	<0.10	DLHC	0.10	mg/L	26-JUN-19	26-JUN-19	R4688244
Cadmium (Cd)-Total	0.000063	DLHC	0.000050	mg/L	26-JUN-19	26-JUN-19	R4688244
Calcium (Ca)-Total	34.9	DLHC	0.50	mg/L	26-JUN-19	26-JUN-19	R4688244
Cesium (Cs)-Total	<0.00010	DLHC	0.00010	mg/L	26-JUN-19	26-JUN-19	R4688244
Chromium (Cr)-Total	<0.0050	DLHC	0.0050	mg/L	26-JUN-19	26-JUN-19	R4688244
Cobalt (Co)-Total	0.0375	DLHC	0.0010	mg/L	26-JUN-19	26-JUN-19	R4688244
Copper (Cu)-Total	<0.010	DLHC	0.010	mg/L	26-JUN-19	26-JUN-19	R4688244
Iron (Fe)-Total	1.76	DLHC	0.10	mg/L	26-JUN-19	26-JUN-19	R4688244
Lead (Pb)-Total	0.00051	DLHC	0.00050	mg/L	26-JUN-19	26-JUN-19	R4688244
Lithium (Li)-Total	<0.010	DLHC	0.010	mg/L	26-JUN-19	26-JUN-19	R4688244
Magnesium (Mg)-Total	109	DLHC	0.050	mg/L	26-JUN-19	26-JUN-19	R4688244
Manganese (Mn)-Total	2.80	DLHC	0.0050	mg/L	26-JUN-19	26-JUN-19	R4688244
Molybdenum (Mo)-Total	0.00075	DLHC	0.00050	mg/L	26-JUN-19	26-JUN-19	R4688244
Nickel (Ni)-Total	0.0399	DLHC	0.0050	mg/L	26-JUN-19	26-JUN-19	R4688244
Phosphorus (P)-Total	<0.50	DLHC	0.50	mg/L	26-JUN-19	26-JUN-19	R4688244
Potassium (K)-Total	2.73	DLHC	0.50	mg/L	26-JUN-19	26-JUN-19	R4688244
Rubidium (Rb)-Total	0.0038	DLHC	0.0020	mg/L	26-JUN-19	26-JUN-19	R4688244
Selenium (Se)-Total	0.00152	DLHC	0.00050	mg/L	26-JUN-19	26-JUN-19	R4688244
Silicon (Si)-Total	1.9	DLHC	1.0	mg/L	26-JUN-19	26-JUN-19	R4688244
Silver (Ag)-Total	<0.00050	DLHC	0.00050	mg/L	26-JUN-19	26-JUN-19	R4688244
Sodium (Na)-Total	1.32	DLHC	0.50	mg/L	26-JUN-19	26-JUN-19	R4688244
Strontium (Sr)-Total	0.083	DLHC	0.010	mg/L	26-JUN-19	26-JUN-19	R4688244
Sulfur (S)-Total	172	DLHC	5.0	mg/L	26-JUN-19	26-JUN-19	R4688244
Tellurium (Te)-Total	<0.0020	DLHC	0.0020	mg/L	26-JUN-19	26-JUN-19	R4688244
Thallium (Tl)-Total	<0.00010	DLHC	0.00010	mg/L	26-JUN-19	26-JUN-19	R4688244
Thorium (Th)-Total	<0.0010	DLHC	0.0010	mg/L	26-JUN-19	26-JUN-19	R4688244

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2297608-1 MS-08 Sampled By: LM/SJS/BW on 24-JUN-19 @ 11:35 Matrix: Water							
Total Metals							
Tin (Sn)-Total	<0.0010	DLHC	0.0010	mg/L	26-JUN-19	26-JUN-19	R4688244
Titanium (Ti)-Total	0.0305	DLHC	0.0030	mg/L	26-JUN-19	26-JUN-19	R4688244
Tungsten (W)-Total	<0.0010	DLHC	0.0010	mg/L	26-JUN-19	26-JUN-19	R4688244
Uranium (U)-Total	0.00066	DLHC	0.00010	mg/L	26-JUN-19	26-JUN-19	R4688244
Vanadium (V)-Total	<0.0050	DLHC	0.0050	mg/L	26-JUN-19	26-JUN-19	R4688244
Zinc (Zn)-Total	<0.030	DLHC	0.030	mg/L	26-JUN-19	26-JUN-19	R4688244
Zirconium (Zr)-Total	<0.0020	DLHC	0.0020	mg/L	26-JUN-19	26-JUN-19	R4688244
Radiological Parameters							
Ra-226	0.0086		0.0075	Bq/L	09-JUL-19	17-JUL-19	R4692536
L2297608-2 MS-0801 Sampled By: LM/SJS/BW on 24-JUN-19 @ 11:35 Matrix: Water							
Physical Tests							
Conductivity	940		3.0	umhos/cm		26-JUN-19	R4688344
pH	7.23		0.10	pH units		24-JUN-19	R4683161
Total Suspended Solids	15.6		2.0	mg/L		25-JUN-19	R4683222
Total Dissolved Solids	758		20	mg/L		25-JUN-19	R4686554
Turbidity	16.4		0.10	NTU		24-JUN-19	R4683185
Anions and Nutrients							
Ammonia, Total (as N)	0.541		0.010	mg/L		26-JUN-19	R4687969
Cyanides							
Cyanide, Total	0.0036		0.0020	mg/L		26-JUN-19	R4688262
Total Metals							
Aluminum (Al)-Total	0.597	DLHC	0.050	mg/L	26-JUN-19	26-JUN-19	R4688244
Antimony (Sb)-Total	<0.0010	DLHC	0.0010	mg/L	26-JUN-19	26-JUN-19	R4688244
Arsenic (As)-Total	<0.0010	DLHC	0.0010	mg/L	26-JUN-19	26-JUN-19	R4688244
Barium (Ba)-Total	0.0150	DLHC	0.0010	mg/L	26-JUN-19	26-JUN-19	R4688244
Beryllium (Be)-Total	<0.0010	DLHC	0.0010	mg/L	26-JUN-19	26-JUN-19	R4688244
Bismuth (Bi)-Total	<0.00050	DLHC	0.00050	mg/L	26-JUN-19	26-JUN-19	R4688244
Boron (B)-Total	<0.10	DLHC	0.10	mg/L	26-JUN-19	26-JUN-19	R4688244
Cadmium (Cd)-Total	0.000062	DLHC	0.000050	mg/L	26-JUN-19	26-JUN-19	R4688244
Calcium (Ca)-Total	35.2	DLHC	0.50	mg/L	26-JUN-19	26-JUN-19	R4688244
Cesium (Cs)-Total	<0.00010	DLHC	0.00010	mg/L	26-JUN-19	26-JUN-19	R4688244
Chromium (Cr)-Total	<0.0050	DLHC	0.0050	mg/L	26-JUN-19	26-JUN-19	R4688244
Cobalt (Co)-Total	0.0378	DLHC	0.0010	mg/L	26-JUN-19	26-JUN-19	R4688244
Copper (Cu)-Total	<0.010	DLHC	0.010	mg/L	26-JUN-19	26-JUN-19	R4688244
Iron (Fe)-Total	1.62	DLHC	0.10	mg/L	26-JUN-19	26-JUN-19	R4688244
Lead (Pb)-Total	0.00056	DLHC	0.00050	mg/L	26-JUN-19	26-JUN-19	R4688244
Lithium (Li)-Total	<0.010	DLHC	0.010	mg/L	26-JUN-19	26-JUN-19	R4688244
Magnesium (Mg)-Total	110	DLHC	0.050	mg/L	26-JUN-19	26-JUN-19	R4688244
Manganese (Mn)-Total	2.80	DLHC	0.0050	mg/L	26-JUN-19	26-JUN-19	R4688244
Molybdenum (Mo)-Total	0.00091	DLHC	0.00050	mg/L	26-JUN-19	26-JUN-19	R4688244

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2297608-2 MS-0801 Sampled By: LM/SJS/BW on 24-JUN-19 @ 11:35 Matrix: Water							
Total Metals							
Nickel (Ni)-Total	0.0407	DLHC	0.0050	mg/L	26-JUN-19	26-JUN-19	R4688244
Phosphorus (P)-Total	<0.50	DLHC	0.50	mg/L	26-JUN-19	26-JUN-19	R4688244
Potassium (K)-Total	2.59	DLHC	0.50	mg/L	26-JUN-19	26-JUN-19	R4688244
Rubidium (Rb)-Total	0.0036	DLHC	0.0020	mg/L	26-JUN-19	26-JUN-19	R4688244
Selenium (Se)-Total	0.00149	DLHC	0.00050	mg/L	26-JUN-19	26-JUN-19	R4688244
Silicon (Si)-Total	1.6	DLHC	1.0	mg/L	26-JUN-19	26-JUN-19	R4688244
Silver (Ag)-Total	<0.00050	DLHC	0.00050	mg/L	26-JUN-19	26-JUN-19	R4688244
Sodium (Na)-Total	1.35	DLHC	0.50	mg/L	26-JUN-19	26-JUN-19	R4688244
Strontium (Sr)-Total	0.083	DLHC	0.010	mg/L	26-JUN-19	26-JUN-19	R4688244
Sulfur (S)-Total	169	DLHC	5.0	mg/L	26-JUN-19	26-JUN-19	R4688244
Tellurium (Te)-Total	<0.0020	DLHC	0.0020	mg/L	26-JUN-19	26-JUN-19	R4688244
Thallium (Tl)-Total	<0.00010	DLHC	0.00010	mg/L	26-JUN-19	26-JUN-19	R4688244
Thorium (Th)-Total	<0.0010	DLHC	0.0010	mg/L	26-JUN-19	26-JUN-19	R4688244
Tin (Sn)-Total	<0.0010	DLHC	0.0010	mg/L	26-JUN-19	26-JUN-19	R4688244
Titanium (Ti)-Total	0.0259	DLHC	0.0030	mg/L	26-JUN-19	26-JUN-19	R4688244
Tungsten (W)-Total	<0.0010	DLHC	0.0010	mg/L	26-JUN-19	26-JUN-19	R4688244
Uranium (U)-Total	0.00065	DLHC	0.00010	mg/L	26-JUN-19	26-JUN-19	R4688244
Vanadium (V)-Total	<0.0050	DLHC	0.0050	mg/L	26-JUN-19	26-JUN-19	R4688244
Zinc (Zn)-Total	<0.030	DLHC	0.030	mg/L	26-JUN-19	26-JUN-19	R4688244
Zirconium (Zr)-Total	<0.0020	DLHC	0.0020	mg/L	26-JUN-19	26-JUN-19	R4688244
Radiological Parameters							
Ra-226	<0.0071		0.0071	Bq/L	09-JUL-19	17-JUL-19	R4692536

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

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Aluminum (Al)-Total	MS-B	L2297608-1, -2
Matrix Spike	Barium (Ba)-Total	MS-B	L2297608-1, -2
Matrix Spike	Calcium (Ca)-Total	MS-B	L2297608-1, -2
Matrix Spike	Cobalt (Co)-Total	MS-B	L2297608-1, -2
Matrix Spike	Iron (Fe)-Total	MS-B	L2297608-1, -2
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2297608-1, -2
Matrix Spike	Manganese (Mn)-Total	MS-B	L2297608-1, -2
Matrix Spike	Nickel (Ni)-Total	MS-B	L2297608-1, -2
Matrix Spike	Potassium (K)-Total	MS-B	L2297608-1, -2
Matrix Spike	Silicon (Si)-Total	MS-B	L2297608-1, -2
Matrix Spike	Strontium (Sr)-Total	MS-B	L2297608-1, -2
Matrix Spike	Sulfur (S)-Total	MS-B	L2297608-1, -2
Matrix Spike	Titanium (Ti)-Total	MS-B	L2297608-1, -2
Matrix Spike	Uranium (U)-Total	MS-B	L2297608-1, -2

Sample Parameter Qualifier key listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
CN-TOT-WT	Water	Cyanide, Total	ISO 14403-2

Total cyanide is determined by the combination of UV digestion and distillation. Cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

When using this method, high levels of thiocyanate in samples can cause false positives at ~1-2% of the thiocyanate concentration. For samples with detectable cyanide analyzed by this method, ALS recommends analysis for thiocyanate to check for this potential interference

EC-SCREEN-WT	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

EC-WT	Water	Conductivity	APHA 2510 B

Water samples can be measured directly by immersing the conductivity cell into the sample.

MET-T-CCMS-WT	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

NH3-F-WT	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

PH-BF	Water	pH	APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

RA226-MMER-FC	Water	Ra226 by Alpha Scint, MDC=0.01 Bq/L	EPA 903.1

SOLIDS-TDS-BF	Water	Total Dissolved Solids	APHA 2540C

A well-mixed sample is filtered though glass fibres filter. A known volume of the filtrate is evaporated and dried at 180 +/- 2C for 1hr.

SOLIDS-TSS-BF	Water	Suspended solids	APHA 2540 D-Gravimetric

A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104 +/- 1C for a minimum of four hours or until a constant weight is achieved.

TURBIDITY-BF	Water	Turbidity	APHA 2130 B

Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.

Reference Information

** 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
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA
FC	ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
BF	ALS ENVIRONMENTAL - BAFFIN ISLAND, NUNAVUT, 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 weight of sample
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: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CN-TOT-WT	**Water**							
Batch R4688262								
WG3088679-3 DUP		**L2297608-2**						
Cyanide, Total		0.0036	0.0036		mg/L	1.7	20	26-JUN-19
WG3088679-2 LCS								
Cyanide, Total			90.9		%		80-120	26-JUN-19
WG3088679-1 MB								
Cyanide, Total			<0.0020		mg/L		0.002	26-JUN-19
WG3088679-4 MS		**L2297608-2**						
Cyanide, Total			76.8		%		70-130	26-JUN-19
EC-WT	**Water**							
Batch R4688344								
WG3088759-4 DUP		**WG3088759-3**						
Conductivity		1170	1160		umhos/cm	0.7	10	26-JUN-19
WG3088759-2 LCS								
Conductivity			98.4		%		90-110	26-JUN-19
WG3088759-1 MB								
Conductivity			<3.0		umhos/cm		3	26-JUN-19
MET-T-CCMS-WT	**Water**							
Batch R4688244								
WG3088722-4 DUP		**WG3088722-3**						
Aluminum (Al)-Total		0.597	0.641		mg/L	7.2	20	26-JUN-19
Antimony (Sb)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	26-JUN-19
Arsenic (As)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	26-JUN-19
Barium (Ba)-Total		0.0150	0.0148		mg/L	1.8	20	26-JUN-19
Beryllium (Be)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	26-JUN-19
Bismuth (Bi)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	26-JUN-19
Boron (B)-Total		<0.10	<0.10	RPD-NA	mg/L	N/A	20	26-JUN-19
Cadmium (Cd)-Total		0.000062	0.000060		mg/L	2.1	20	26-JUN-19
Calcium (Ca)-Total		35.2	35.6		mg/L	1.2	20	26-JUN-19
Chromium (Cr)-Total		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	26-JUN-19
Cesium (Cs)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	26-JUN-19
Cobalt (Co)-Total		0.0378	0.0374		mg/L	1.1	20	26-JUN-19
Copper (Cu)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	26-JUN-19
Iron (Fe)-Total		1.62	1.69		mg/L	4.1	20	26-JUN-19
Lead (Pb)-Total		0.00056	<0.00050	RPD-NA	mg/L	N/A	20	26-JUN-19
Lithium (Li)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	26-JUN-19

Quality Control Report

Workorder: L2297608 Report Date: 19-JUL-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4688244								
WG3088722-4 DUP		**WG3088722-3**						
Magnesium (Mg)-Total		110	109		mg/L	1.1	20	26-JUN-19
Manganese (Mn)-Total		2.80	2.78		mg/L	0.9	20	26-JUN-19
Molybdenum (Mo)-Total		0.00091	0.00087		mg/L	3.5	20	26-JUN-19
Nickel (Ni)-Total		0.0407	0.0405		mg/L	0.4	20	26-JUN-19
Phosphorus (P)-Total		<0.50	<0.50	RPD-NA	mg/L	N/A	20	26-JUN-19
Potassium (K)-Total		2.59	2.53		mg/L	2.1	20	26-JUN-19
Rubidium (Rb)-Total		0.0036	0.0039		mg/L	6.2	20	26-JUN-19
Selenium (Se)-Total		0.00149	0.00144		mg/L	4.0	20	26-JUN-19
Silicon (Si)-Total		1.6	1.7		mg/L	4.3	20	26-JUN-19
Silver (Ag)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	26-JUN-19
Sodium (Na)-Total		1.35	1.29		mg/L	4.9	20	26-JUN-19
Strontium (Sr)-Total		0.083	0.083		mg/L	0.6	20	26-JUN-19
Sulfur (S)-Total		169	168		mg/L	0.7	25	26-JUN-19
Thallium (Tl)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	26-JUN-19
Tellurium (Te)-Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	26-JUN-19
Thorium (Th)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	25	26-JUN-19
Tin (Sn)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	26-JUN-19
Titanium (Ti)-Total		0.0259	0.0259		mg/L	0.3	20	26-JUN-19
Tungsten (W)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	26-JUN-19
Uranium (U)-Total		0.00065	0.00066		mg/L	1.8	20	26-JUN-19
Vanadium (V)-Total		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	26-JUN-19
Zinc (Zn)-Total		<0.030	<0.030	RPD-NA	mg/L	N/A	20	26-JUN-19
Zirconium (Zr)-Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	26-JUN-19
WG3088722-2 LCS								
Aluminum (Al)-Total			102.8		%		80-120	26-JUN-19
Antimony (Sb)-Total			102.4		%		80-120	26-JUN-19
Arsenic (As)-Total			101.3		%		80-120	26-JUN-19
Barium (Ba)-Total			100.7		%		80-120	26-JUN-19
Beryllium (Be)-Total			96.2		%		80-120	26-JUN-19
Bismuth (Bi)-Total			100.2		%		80-120	26-JUN-19
Boron (B)-Total			91.7		%		80-120	26-JUN-19
Cadmium (Cd)-Total			102.3		%		80-120	26-JUN-19
Calcium (Ca)-Total			99.2		%		80-120	26-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4688244								
WG3088722-2 LCS								
Chromium (Cr)-Total			101.8		%		80-120	26-JUN-19
Cesium (Cs)-Total			101.5		%		80-120	26-JUN-19
Cobalt (Co)-Total			100.5		%		80-120	26-JUN-19
Copper (Cu)-Total			100.1		%		80-120	26-JUN-19
Iron (Fe)-Total			104.9		%		80-120	26-JUN-19
Lead (Pb)-Total			101.6		%		80-120	26-JUN-19
Lithium (Li)-Total			95.5		%		80-120	26-JUN-19
Magnesium (Mg)-Total			102.1		%		80-120	26-JUN-19
Manganese (Mn)-Total			100.3		%		80-120	26-JUN-19
Molybdenum (Mo)-Total			101.2		%		80-120	26-JUN-19
Nickel (Ni)-Total			100.9		%		80-120	26-JUN-19
Phosphorus (P)-Total			105.1		%		70-130	26-JUN-19
Potassium (K)-Total			103.0		%		80-120	26-JUN-19
Rubidium (Rb)-Total			103.0		%		80-120	26-JUN-19
Selenium (Se)-Total			100.2		%		80-120	26-JUN-19
Silicon (Si)-Total			104.2		%		60-140	26-JUN-19
Silver (Ag)-Total			103.4		%		80-120	26-JUN-19
Sodium (Na)-Total			103.2		%		80-120	26-JUN-19
Strontium (Sr)-Total			101.4		%		80-120	26-JUN-19
Sulfur (S)-Total			96.1		%		80-120	26-JUN-19
Thallium (Tl)-Total			101.4		%		80-120	26-JUN-19
Tellurium (Te)-Total			96.8		%		80-120	26-JUN-19
Thorium (Th)-Total			102.3		%		70-130	26-JUN-19
Tin (Sn)-Total			101.5		%		80-120	26-JUN-19
Titanium (Ti)-Total			100.1		%		80-120	26-JUN-19
Tungsten (W)-Total			103.6		%		80-120	26-JUN-19
Uranium (U)-Total			102.6		%		80-120	26-JUN-19
Vanadium (V)-Total			101.9		%		80-120	26-JUN-19
Zinc (Zn)-Total			101.2		%		80-120	26-JUN-19
Zirconium (Zr)-Total			101.7		%		80-120	26-JUN-19
WG3088722-1 MB								
Aluminum (Al)-Total			<0.0050		mg/L		0.005	26-JUN-19
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	26-JUN-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	26-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4688244								
WG3088722-1 MB								
Barium (Ba)-Total			<0.00010		mg/L		0.0001	26-JUN-19
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	26-JUN-19
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	26-JUN-19
Boron (B)-Total			<0.010		mg/L		0.01	26-JUN-19
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	26-JUN-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	26-JUN-19
Chromium (Cr)-Total			<0.00050		mg/L		0.0005	26-JUN-19
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	26-JUN-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	26-JUN-19
Copper (Cu)-Total			<0.0010		mg/L		0.001	26-JUN-19
Iron (Fe)-Total			<0.010		mg/L		0.01	26-JUN-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	26-JUN-19
Lithium (Li)-Total			<0.0010		mg/L		0.001	26-JUN-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	26-JUN-19
Manganese (Mn)-Total			<0.00050		mg/L		0.0005	26-JUN-19
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	26-JUN-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	26-JUN-19
Phosphorus (P)-Total			<0.050		mg/L		0.05	26-JUN-19
Potassium (K)-Total			<0.050		mg/L		0.05	26-JUN-19
Rubidium (Rb)-Total			<0.00020		mg/L		0.0002	26-JUN-19
Selenium (Se)-Total			<0.000050		mg/L		0.00005	26-JUN-19
Silicon (Si)-Total			<0.10		mg/L		0.1	26-JUN-19
Silver (Ag)-Total			<0.000050		mg/L		0.00005	26-JUN-19
Sodium (Na)-Total			<0.050		mg/L		0.05	26-JUN-19
Strontium (Sr)-Total			<0.0010		mg/L		0.001	26-JUN-19
Sulfur (S)-Total			<0.50		mg/L		0.5	26-JUN-19
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	26-JUN-19
Tellurium (Te)-Total			<0.00020		mg/L		0.0002	26-JUN-19
Thorium (Th)-Total			<0.00010		mg/L		0.0001	26-JUN-19
Tin (Sn)-Total			<0.00010		mg/L		0.0001	26-JUN-19
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	26-JUN-19
Tungsten (W)-Total			<0.00010		mg/L		0.0001	26-JUN-19
Uranium (U)-Total			<0.000010		mg/L		0.00001	26-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4688244								
WG3088722-1 MB								
Vanadium (V)-Total			<0.00050		mg/L		0.0005	26-JUN-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	26-JUN-19
Zirconium (Zr)-Total			<0.00020		mg/L		0.0002	26-JUN-19
WG3088722-5 MS		**WG3088722-3**						
Aluminum (Al)-Total			N/A	MS-B	%		-	26-JUN-19
Antimony (Sb)-Total			103.3		%		70-130	26-JUN-19
Arsenic (As)-Total			103.2		%		70-130	26-JUN-19
Barium (Ba)-Total			N/A	MS-B	%		-	26-JUN-19
Beryllium (Be)-Total			95.6		%		70-130	26-JUN-19
Bismuth (Bi)-Total			103.5		%		70-130	26-JUN-19
Boron (B)-Total			93.5		%		70-130	26-JUN-19
Cadmium (Cd)-Total			102.9		%		70-130	26-JUN-19
Calcium (Ca)-Total			N/A	MS-B	%		-	26-JUN-19
Chromium (Cr)-Total			104.9		%		70-130	26-JUN-19
Cesium (Cs)-Total			100.5		%		70-130	26-JUN-19
Cobalt (Co)-Total			N/A	MS-B	%		-	26-JUN-19
Copper (Cu)-Total			98.5		%		70-130	26-JUN-19
Iron (Fe)-Total			N/A	MS-B	%		-	26-JUN-19
Lead (Pb)-Total			102.0		%		70-130	26-JUN-19
Magnesium (Mg)-Total			N/A	MS-B	%		-	26-JUN-19
Manganese (Mn)-Total			N/A	MS-B	%		-	26-JUN-19
Molybdenum (Mo)-Total			102.7		%		70-130	26-JUN-19
Nickel (Ni)-Total			N/A	MS-B	%		-	26-JUN-19
Phosphorus (P)-Total			112.1		%		70-130	26-JUN-19
Potassium (K)-Total			N/A	MS-B	%		-	26-JUN-19
Rubidium (Rb)-Total			100.4		%		70-130	26-JUN-19
Selenium (Se)-Total			102.7		%		70-130	26-JUN-19
Silicon (Si)-Total			N/A	MS-B	%		-	26-JUN-19
Silver (Ag)-Total			105.6		%		70-130	26-JUN-19
Sodium (Na)-Total			97.3		%		70-130	26-JUN-19
Strontium (Sr)-Total			N/A	MS-B	%		-	26-JUN-19
Sulfur (S)-Total			N/A	MS-B	%		-	26-JUN-19
Thallium (Tl)-Total			103.4		%		70-130	26-JUN-19
Tellurium (Te)-Total			94.0		%		70-130	26-JUN-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4688244								
WG3088722-5 MS		**WG3088722-3**						
Thorium (Th)-Total			101.8		%		70-130	26-JUN-19
Tin (Sn)-Total			102.2		%		70-130	26-JUN-19
Titanium (Ti)-Total			N/A	MS-B	%		-	26-JUN-19
Tungsten (W)-Total			100.8		%		70-130	26-JUN-19
Uranium (U)-Total			N/A	MS-B	%		-	26-JUN-19
Vanadium (V)-Total			102.8		%		70-130	26-JUN-19
Zirconium (Zr)-Total			100.7		%		70-130	26-JUN-19
NH3-F-WT	**Water**							
Batch R4687969								
WG3088732-19 DUP		**L2294644-1**						
Ammonia, Total (as N)		0.018	0.018		mg/L	0.5	20	26-JUN-19
WG3088732-18 LCS								
Ammonia, Total (as N)			103.9		%		85-115	26-JUN-19
WG3088732-17 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	26-JUN-19
WG3088732-20 MS		**L2294644-1**						
Ammonia, Total (as N)			84.5		%		75-125	26-JUN-19
PH-BF	**Water**							
Batch R4683161								
WG3086898-2 DUP		**L2297625-3**						
pH		6.93	6.92	J	pH units	0.01	0.2	24-JUN-19
WG3086898-1 LCS								
pH			7.04		pH units		6.9-7.1	24-JUN-19
SOLIDS-TDS-BF	**Water**							
Batch R4686554								
WG3086985-3 DUP		**L2297005-24**						
Total Dissolved Solids		80	89		mg/L	11	20	25-JUN-19
WG3086985-2 LCS								
Total Dissolved Solids			105.4		%		85-115	25-JUN-19
WG3086985-1 MB								
Total Dissolved Solids			<20		mg/L		20	25-JUN-19
SOLIDS-TSS-BF	**Water**							

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SOLIDS-TSS-BF	**Water**							
Batch R4683222								
WG3086962-3 DUP		**L2297625-3**						
Total Suspended Solids		41.8	42.6		mg/L	1.9	25	25-JUN-19
WG3086962-2 LCS								
Total Suspended Solids			100.2		%		85-115	25-JUN-19
WG3086962-1 MB								
Total Suspended Solids			<2.0		mg/L		2	25-JUN-19
TURBIDITY-BF	**Water**							
Batch R4683185								
WG3086913-3 DUP		**L2297633-1**						
Turbidity		11.3	12.1		NTU	6.8	15	24-JUN-19
WG3086913-2 LCS								
Turbidity			102.0		%		85-115	24-JUN-19
WG3086913-1 MB								
Turbidity			<0.10		NTU		0.1	24-JUN-19

Quality Control Report

Workorder: L2297608 Report Date: 19-JUL-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

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

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

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.

Wednesday, July 17, 2019

Rick Hawthorne
ALS Environmental
60 Northland Rd, Unit 1
Waterloo Canada, ON N2V 2B8

Re: ALS Workorder: 1906685
Project Name:
Project Number: L2297608

Dear Mr. Hawthorne:

Two water samples were received from ALS Environmental, on 6/27/2019. The samples were scheduled for the following analysis:

Radium-226

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,

ALS Environmental
Katie M. OBrien
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
AIHA	214884
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280

1906685

Radium-226:
The samples were prepared and analyzed according to the current revision of SOP 783.

All acceptance criteria were met.

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1906685
Client Name: ALS Environmental
Client Project Name:
Client Project Number: L2297608
Client PO Number: L2297608

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
L2297608-1	1906685-1		WATER	24-Jun-19	
L2297608-2	1906685-2		WATER	24-Jun-19	

ALS Environmental

L2297608

WATERLOO

Subcontract Request Form 1906685

Subcontract To:

ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
225 COMMERCE DRIVE
FORT COLLINS,CO 80524

NOTES: Please reference on final report and invoice: PO# *L2297608*
ALS requires QC data to be provided with your final results.

Please see enclosed 2 sample(s) in 2 Container(s)

SAMPLE NUMBER	ANALYTICAL REQUIRED	DATE SAMPLED / DUE DATE	Priority Flag
L2297608-1 MS-08		6/ 24/ 2019	E
	Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	7/15/2019	
L2297608-2 MS-0801		6/ 24/ 2019	E
	Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	7/15/2019	

1
2

Subcontract Info Contact: Mary-Lynn Pike (519) 886-6910
Analysis and reporting info contact: Rick Hawthorne
60 NORTHLAND ROAD, UNIT 1
WATERLOO,ON N2V 2B8
Phone: (519) 886-6910 Email: Rick.Hawthorne@alsglobal.com

Please email confirmation of receipt to: Rick.Hawthorne@alsglobal.com

Shipped By: _____ Date Shipped: _____
Received By: Emily Ayers Date Received: 06-27-19 1305
Verified By: _____ Date Verified: _____
Temperature: _____
Sample Integrity Issues: _____

ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: ALS. Waterloo Workorder No: 1906685

Project Manager: KMO Initials: Em Date: 06.27.19

1.	Are airbills / shipping documents present and/or removable?	DROP OFF	(YES)	NO
2.	Are custody seals on **shipping** containers intact?	NONE	(YES)	NO *
3.	Are custody seals on **sample** containers intact?	(NONE)	YES	NO *
4.	Is there a COC (chain-of-custody) present?		(YES)	NO *
5.	Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)		(YES)	NO *
6.	Are short-hold samples present?		YES	(NO)
7.	Are all samples within holding times for the requested analyses?		(YES)	NO *
8.	Were all sample containers received intact? (not broken or leaking)		(YES)	NO *
9.	Is there sufficient sample for the requested analyses?		(YES)	NO *
10.	Are all samples in the proper containers for the requested analyses?		(YES)	NO *
11.	Are all aqueous samples preserved correctly, if required? (excluding volatiles)	N/A	(YES)	NO *
12.	Are all aqueous non-preserved samples pH 4-9?	(N/A)	YES	NO *
13.	Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm (1/4 inch) diameter? (i.e. size of green pea)	(N/A)	YES	NO
14.	Were the samples shipped on ice?		(YES)	NO
15.	Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: #1 (#3) #4	(RAD ONLY)	YES	NO

Cooler #:	1
Temperature (°C):	12.6
No. of custody seals on cooler:	1
DOT Survey/ Acceptance Information — External µR/hr reading:	8
Background µR/hr reading:	8

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? **YES / NO / NA** (If no, see Form 008.)

*** Please provide details here for NO responses to gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.**

All client bottle ID's vs ALS lab ID's double-checked by: Em

If applicable, was the client contacted? **YES / NO / NA** Contact: _____ Date/Time: _____

Project Manager Signature / Date: _____ 6/28/19

Form 201r27.xls
(02/11/2019)

*IR Gun #1, VWR SN 170560549
*IR Gun #3, VWR SN 170647571
*IR Gun #4, Oakton, SN 2372220101-0002

1906685

EXPRESS WORLDWIDE **WPX** DHL

2019-08-26 MYDHL+ 1.0 / *30-0621*

From : ALS Environmental
Ed Hill
60 Northland Rd
Unit 1

N2V 2B8 WATERLOO ON
Canada

8-1
12.6

Origin:
YHM

Contact: +15198866910

To : **ALS Environmental Fort Collins**
Sample Login
225 Commerce Drive

Contact:
Sample Login
+18004431511

80524 FORT COLLINS CO
United States of America

US-DEN-DEN

C [redacted] Day Time

Ref:

Pce/Shpt Weight **10.4 lbs** Piece **1/1**

Contents: Water Sample

YBILL 49 6537 5741

0524+48000001

Client:	ALS Environmental	**Date:**	*17-Jul-19*
Project:	L2297608	**Work Order:**	1906685
Sample ID:	L2297608-1	**Lab ID:**	1906685-1
Legal Location:		**Matrix:**	WATER
Collection Date:	6/24/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1			**SOP 783**		Prep Date: **7/9/2019**	PrepBy: **JXH**
Ra-226	**0.0086 (+/- 0.0059)**		**0.0075**	**BQ/l**	NA	7/17/2019 12:29
Carr: BARIUM	*95.7*		*40-110*	*%REC*	DL = NA	7/17/2019 12:29

Client:	ALS Environmental	**Date:**	*17-Jul-19*
Project:	L2297608	**Work Order:**	1906685
Sample ID:	L2297608-2	**Lab ID:**	1906685-2
Legal Location:		**Matrix:**	WATER
Collection Date:	6/24/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **7/9/2019**		PrepBy: **JXH**
Ra-226	0.0037 (+/- 0.0045)	U	0.0071	BQ/l	NA	7/17/2019 12:29
Carr: BARIUM	*93.5*		*40-110*	*%REC*	DL = NA	7/17/2019 12:29

Client:	ALS Environmental	**Date:**	*17-Jul-19*
Project:	L2297608	**Work Order:**	1906685
Sample ID:	L2297608-2	**Lab ID:**	1906685-2
Legal Location:		**Matrix:**	WATER
Collection Date:	6/24/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed

Explanation of Qualifiers

Radiochemistry:

- "Report Limit" is the MDC

U or ND - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

Y2 - Chemical Yield outside default limits.

W - DER is greater than Warning Limit of 1.42

* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.
# - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.
G - Sample density differs by more than 15% of LCS density.
D - DER is greater than Control Limit

M - Requested MDC not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS, Matrix Spike Recovery within control limits.

N - Matrix Spike Recovery outside control limits

NC - Not Calculated for duplicate results less than 5 times MDC

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

Inorganics:

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).

U or ND - Indicates that the compound was analyzed for but not detected.

E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.

M - Duplicate injection precision was not met.

N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.

Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.

* - Duplicate analysis (relative percent difference) not within control limits.

S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

Organics:

U or ND - Indicates that the compound was analyzed for but not detected.

B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.

E - Analyte concentration exceeds the upper level of the calibration range.

J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).

A - A tentatively identified compound is a suspected aldol-condensation product.

X - The analyte was diluted below an accurate quantitation level.

* - The spike recovery is equal to or outside the control criteria used.

+ - The relative percent difference (RPD) equals or exceeds the control criteria.

G - A pattern resembling gasoline was detected in this sample.

D - A pattern resembling diesel was detected in this sample.

M - A pattern resembling motor oil was detected in this sample.

C - A pattern resembling crude oil was detected in this sample.

4 - A pattern resembling JP-4 was detected in this sample.

5 - A pattern resembling JP-5 was detected in this sample.

H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.

L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.

Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
- gasoline
- JP-8
- diesel
- mineral spirits
- motor oil
- Stoddard solvent
- bunker C

Batch ID: **RE190709-1-1** Instrument ID **Alpha Scin** Method: **Radium-226 by Radon Emanation**

LCS Sample ID: **RE190709-1** Units: **BQ/l** Analysis Date: **7/17/2019 13:48**

Client ID: Run ID: **RE190709-1A** Prep Date: **7/9/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.83 (+/- 0.456)	0.0165	1.771		103	67-120					P,M3
Carr: BARIUM	15800		16460		95.8	40-110					

LCSD Sample ID: **RE190709-1** Units: **BQ/l** Analysis Date: **7/17/2019 13:48**

Client ID: Run ID: **RE190709-1A** Prep Date: **7/9/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.66 (+/- 0.415)	0.011	1.771		93.6	67-120		1.83	0.3	2.1	P,M3
Carr: BARIUM	15500		16460		94.5	40-110		15800			

MB Sample ID: **RE190709-1** Units: **BQ/l** Analysis Date: **7/17/2019 12:29**

Client ID: Run ID: **RE190709-1A** Prep Date: **7/9/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	0 (+/- 0.0044)	0.0088									U
Carr: BARIUM	15800		16470		95.9	40-110					

The following samples were analyzed in this batch: 1906685-1 1906685-2

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2297608-COFC

COC Number: 15 -

Page 1 of 1

Report To	Contact and company name below will appear on the final report
Company:	Baffinland Iron Mines Corp.
Contact:	Wiliam Bowden and Connor Devereaux
Phone:	647-253-0596 EXT 6016
	Company address below will appear on the final report
Street:	2275 Upper Middle Rd. E., Suite #300
City/Province:	Oakville, ON
Postal Code:	L6H 0C3
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	
Contact:	

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	bimcore@alsglobal.com
Email 2	bimww@alsglobal.com
Email 3	

Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	ap@baffinland.com
Email 2	commercial@baffinland.com

Project Information	
ALS Account # / Quote #:	23642 /Q42455
Job #:	MS-08 DEL
PO / AFE:	4500057496
LSD:	

Oil and Gas Required Fields (client use)	
AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only)	L2297608	ALS Contact:	Sampler: LM/SJS/BW

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☐ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
4 day [P4]	☐	1 Business day [E1]	☐
3 day [P3]	☐	Same Day, Weekend or Statutory holiday [E0]	☑
2 day [P2]	☐		

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	BIM-MMER-DEL	Number of Containers
1	MS-08	24-Jun-19	11:35	Water	E0	8
2	MS-0801	24-Jun-19	11:35	Water	E0	8

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☑ NO	
Are samples for human drinking water use? ☐ YES ☑ NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☑ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☑

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			16.8		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released By: Ben Widdowson	Date: 24-Jun-19	Time: 16:20	Received by: AJ/CV	Date: June 24, 2019	Time: 6pm	Received by:	Date: 26-6-19	Time: 9:30

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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 specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Baffinland Iron Mine's Corporation (Oakville)
ATTN: William Bowden/Connor Devereaux
2275 Upper Middle Rd. E.
Suite #300
Oakville ON L6H 0C3

Date Received: 03-JUL-19
Report Date: 22-JUL-19 14:14 (MT)
Version: FINAL

Client Phone: 647-253-0596

Certificate of Analysis

Lab Work Order #: L2301638

Project P.O. #: 4500057496
Job Reference: MS-08 DEL
C of C Numbers:
Legal Site Desc:

Rick Hawthorne
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2301638-1 MS-08 Sampled By: OM on 30-JUN-19 @ 09:00 Matrix: WATER							
Physical Tests							
Conductivity	1060		3.0	umhos/cm		04-JUL-19	R4693916
pH	7.81		0.10	pH units		30-JUN-19	R4691537
Total Suspended Solids	3.2		2.0	mg/L		01-JUL-19	R4692181
Total Dissolved Solids	985		20	mg/L		02-JUL-19	R4692233
Turbidity	2.30		0.10	NTU		01-JUL-19	R4691540
Anions and Nutrients							
Ammonia, Total (as N)	0.86	DLHC	0.10	mg/L		03-JUL-19	R4693360
Cyanides							
Cyanide, Total	<0.020	DLM	0.020	mg/L		04-JUL-19	R4693835
Total Metals							
Aluminum (Al)-Total	<0.050	DLHC	0.050	mg/L	03-JUL-19	03-JUL-19	R4693191
Antimony (Sb)-Total	<0.0010	DLHC	0.0010	mg/L	03-JUL-19	03-JUL-19	R4693191
Arsenic (As)-Total	<0.0010	DLHC	0.0010	mg/L	03-JUL-19	03-JUL-19	R4693191
Barium (Ba)-Total	0.0110	DLHC	0.0010	mg/L	03-JUL-19	03-JUL-19	R4693191
Beryllium (Be)-Total	<0.0010	DLHC	0.0010	mg/L	03-JUL-19	03-JUL-19	R4693191
Bismuth (Bi)-Total	<0.00050	DLHC	0.00050	mg/L	03-JUL-19	03-JUL-19	R4693191
Boron (B)-Total	<0.10	DLHC	0.10	mg/L	03-JUL-19	03-JUL-19	R4693191
Cadmium (Cd)-Total	<0.000050	DLHC	0.000050	mg/L	03-JUL-19	03-JUL-19	R4693191
Calcium (Ca)-Total	51.6	DLHC	0.50	mg/L	03-JUL-19	03-JUL-19	R4693191
Cesium (Cs)-Total	<0.00010	DLHC	0.00010	mg/L	03-JUL-19	03-JUL-19	R4693191
Chromium (Cr)-Total	<0.0050	DLHC	0.0050	mg/L	03-JUL-19	03-JUL-19	R4693191
Cobalt (Co)-Total	0.0370	DLHC	0.0010	mg/L	03-JUL-19	03-JUL-19	R4693191
Copper (Cu)-Total	<0.010	DLHC	0.010	mg/L	03-JUL-19	03-JUL-19	R4693191
Iron (Fe)-Total	0.60	DLHC	0.10	mg/L	03-JUL-19	04-JUL-19	R4693191
Lead (Pb)-Total	<0.00050	DLHC	0.00050	mg/L	03-JUL-19	03-JUL-19	R4693191
Lithium (Li)-Total	0.016	DLHC	0.010	mg/L	03-JUL-19	03-JUL-19	R4693191
Magnesium (Mg)-Total	146	DLHC	0.050	mg/L	03-JUL-19	03-JUL-19	R4693191
Manganese (Mn)-Total	3.35	DLHC	0.0050	mg/L	03-JUL-19	03-JUL-19	R4693191
Molybdenum (Mo)-Total	0.00076	DLHC	0.00050	mg/L	03-JUL-19	03-JUL-19	R4693191
Nickel (Ni)-Total	0.0389	DLHC	0.0050	mg/L	03-JUL-19	03-JUL-19	R4693191
Phosphorus (P)-Total	<0.50	DLHC	0.50	mg/L	03-JUL-19	03-JUL-19	R4693191
Potassium (K)-Total	2.83	DLHC	0.50	mg/L	03-JUL-19	03-JUL-19	R4693191
Rubidium (Rb)-Total	0.0030	DLHC	0.0020	mg/L	03-JUL-19	03-JUL-19	R4693191
Selenium (Se)-Total	0.00194	DLHC	0.00050	mg/L	03-JUL-19	03-JUL-19	R4693191
Silicon (Si)-Total	<1.0	DLHC	1.0	mg/L	03-JUL-19	03-JUL-19	R4693191
Silver (Ag)-Total	<0.00050	DLHC	0.00050	mg/L	03-JUL-19	03-JUL-19	R4693191
Sodium (Na)-Total	1.62	DLHC	0.50	mg/L	03-JUL-19	03-JUL-19	R4693191
Strontium (Sr)-Total	0.151	DLHC	0.010	mg/L	03-JUL-19	03-JUL-19	R4693191
Sulfur (S)-Total	237	DLHC	5.0	mg/L	03-JUL-19	03-JUL-19	R4693191
Tellurium (Te)-Total	<0.0020	DLHC	0.0020	mg/L	03-JUL-19	03-JUL-19	R4693191
Thallium (Tl)-Total	<0.00010	DLHC	0.00010	mg/L	03-JUL-19	03-JUL-19	R4693191
Thorium (Th)-Total	<0.0010	DLHC	0.0010	mg/L	03-JUL-19	03-JUL-19	R4693191

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2301638-1 MS-08 Sampled By: OM on 30-JUN-19 @ 09:00 Matrix: WATER							
Total Metals							
Tin (Sn)-Total	<0.0010	DLHC	0.0010	mg/L	03-JUL-19	03-JUL-19	R4693191
Titanium (Ti)-Total	<0.0030	DLHC	0.0030	mg/L	03-JUL-19	03-JUL-19	R4693191
Tungsten (W)-Total	<0.0010	DLHC	0.0010	mg/L	03-JUL-19	03-JUL-19	R4693191
Uranium (U)-Total	0.00023	DLHC	0.00010	mg/L	03-JUL-19	03-JUL-19	R4693191
Vanadium (V)-Total	<0.0050	DLHC	0.0050	mg/L	03-JUL-19	03-JUL-19	R4693191
Zinc (Zn)-Total	<0.030	DLHC	0.030	mg/L	03-JUL-19	03-JUL-19	R4693191
Zirconium (Zr)-Total	<0.0020	DLHC	0.0020	mg/L	03-JUL-19	03-JUL-19	R4693191
Radiological Parameters							
Ra-226	<0.0071		0.0071	Bq/L	10-JUL-19	19-JUL-19	R4692536
L2301638-2 MS-0801 Sampled By: OM on 30-JUN-19 @ 09:00 Matrix: WATER							
Physical Tests							
Conductivity	1060		3.0	umhos/cm		04-JUL-19	R4693916
pH	7.75		0.10	pH units		30-JUN-19	R4691537
Total Suspended Solids	4.0		2.0	mg/L		01-JUL-19	R4692181
Total Dissolved Solids	978		20	mg/L		02-JUL-19	R4692233
Turbidity	2.41		0.10	NTU		01-JUL-19	R4691540
Anions and Nutrients							
Ammonia, Total (as N)	0.76	DLHC	0.10	mg/L		03-JUL-19	R4693360
Cyanides							
Cyanide, Total	0.0044		0.0020	mg/L		03-JUL-19	R4693727
Total Metals							
Aluminum (Al)-Total	<0.050	DLHC	0.050	mg/L	03-JUL-19	03-JUL-19	R4693191
Antimony (Sb)-Total	<0.0010	DLHC	0.0010	mg/L	03-JUL-19	03-JUL-19	R4693191
Arsenic (As)-Total	<0.0010	DLHC	0.0010	mg/L	03-JUL-19	03-JUL-19	R4693191
Barium (Ba)-Total	0.0113	DLHC	0.0010	mg/L	03-JUL-19	03-JUL-19	R4693191
Beryllium (Be)-Total	<0.0010	DLHC	0.0010	mg/L	03-JUL-19	03-JUL-19	R4693191
Bismuth (Bi)-Total	<0.00050	DLHC	0.00050	mg/L	03-JUL-19	03-JUL-19	R4693191
Boron (B)-Total	<0.10	DLHC	0.10	mg/L	03-JUL-19	03-JUL-19	R4693191
Cadmium (Cd)-Total	<0.000050	DLHC	0.000050	mg/L	03-JUL-19	03-JUL-19	R4693191
Calcium (Ca)-Total	53.3	DLHC	0.50	mg/L	03-JUL-19	03-JUL-19	R4693191
Cesium (Cs)-Total	<0.00010	DLHC	0.00010	mg/L	03-JUL-19	03-JUL-19	R4693191
Chromium (Cr)-Total	<0.0050	DLHC	0.0050	mg/L	03-JUL-19	03-JUL-19	R4693191
Cobalt (Co)-Total	0.0376	DLHC	0.0010	mg/L	03-JUL-19	03-JUL-19	R4693191
Copper (Cu)-Total	<0.010	DLHC	0.010	mg/L	03-JUL-19	03-JUL-19	R4693191
Iron (Fe)-Total	0.58	DLHC	0.10	mg/L	03-JUL-19	04-JUL-19	R4693191
Lead (Pb)-Total	<0.00050	DLHC	0.00050	mg/L	03-JUL-19	03-JUL-19	R4693191
Lithium (Li)-Total	0.018	DLHC	0.010	mg/L	03-JUL-19	03-JUL-19	R4693191
Magnesium (Mg)-Total	143	DLHC	0.050	mg/L	03-JUL-19	03-JUL-19	R4693191
Manganese (Mn)-Total	3.26	DLHC	0.0050	mg/L	03-JUL-19	03-JUL-19	R4693191
Molybdenum (Mo)-Total	0.00076	DLHC	0.00050	mg/L	03-JUL-19	03-JUL-19	R4693191

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2301638-2 MS-0801 Sampled By: OM on 30-JUN-19 @ 09:00 Matrix: WATER							
Total Metals							
Nickel (Ni)-Total	0.0382	DLHC	0.0050	mg/L	03-JUL-19	03-JUL-19	R4693191
Phosphorus (P)-Total	<0.50	DLHC	0.50	mg/L	03-JUL-19	03-JUL-19	R4693191
Potassium (K)-Total	2.84	DLHC	0.50	mg/L	03-JUL-19	03-JUL-19	R4693191
Rubidium (Rb)-Total	0.0030	DLHC	0.0020	mg/L	03-JUL-19	03-JUL-19	R4693191
Selenium (Se)-Total	0.00191	DLHC	0.00050	mg/L	03-JUL-19	03-JUL-19	R4693191
Silicon (Si)-Total	<1.0	DLHC	1.0	mg/L	03-JUL-19	03-JUL-19	R4693191
Silver (Ag)-Total	<0.00050	DLHC	0.00050	mg/L	03-JUL-19	03-JUL-19	R4693191
Sodium (Na)-Total	1.61	DLHC	0.50	mg/L	03-JUL-19	03-JUL-19	R4693191
Strontium (Sr)-Total	0.156	DLHC	0.010	mg/L	03-JUL-19	03-JUL-19	R4693191
Sulfur (S)-Total	235	DLHC	5.0	mg/L	03-JUL-19	03-JUL-19	R4693191
Tellurium (Te)-Total	<0.0020	DLHC	0.0020	mg/L	03-JUL-19	03-JUL-19	R4693191
Thallium (Tl)-Total	<0.00010	DLHC	0.00010	mg/L	03-JUL-19	03-JUL-19	R4693191
Thorium (Th)-Total	<0.0010	DLHC	0.0010	mg/L	03-JUL-19	03-JUL-19	R4693191
Tin (Sn)-Total	<0.0010	DLHC	0.0010	mg/L	03-JUL-19	03-JUL-19	R4693191
Titanium (Ti)-Total	<0.0030	DLHC	0.0030	mg/L	03-JUL-19	03-JUL-19	R4693191
Tungsten (W)-Total	<0.0010	DLHC	0.0010	mg/L	03-JUL-19	03-JUL-19	R4693191
Uranium (U)-Total	0.00022	DLHC	0.00010	mg/L	03-JUL-19	03-JUL-19	R4693191
Vanadium (V)-Total	<0.0050	DLHC	0.0050	mg/L	03-JUL-19	03-JUL-19	R4693191
Zinc (Zn)-Total	<0.030	DLHC	0.030	mg/L	03-JUL-19	03-JUL-19	R4693191
Zirconium (Zr)-Total	<0.0020	DLHC	0.0020	mg/L	03-JUL-19	03-JUL-19	R4693191
Radiological Parameters							
Ra-226	<0.0084		0.0084	Bq/L	10-JUL-19	19-JUL-19	R4692536

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

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Aluminum (Al)-Total	MS-B	L2301638-1, -2
Matrix Spike	Barium (Ba)-Total	MS-B	L2301638-1, -2
Matrix Spike	Calcium (Ca)-Total	MS-B	L2301638-1, -2
Matrix Spike	Iron (Fe)-Total	MS-B	L2301638-1, -2
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2301638-1, -2
Matrix Spike	Silicon (Si)-Total	MS-B	L2301638-1, -2
Matrix Spike	Sodium (Na)-Total	MS-B	L2301638-1, -2
Matrix Spike	Strontium (Sr)-Total	MS-B	L2301638-1, -2

Sample Parameter Qualifier key listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
CN-TOT-WT	Water	Cyanide, Total	ISO 14403-2

Total cyanide is determined by the combination of UV digestion and distillation. Cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

When using this method, high levels of thiocyanate in samples can cause false positives at ~1-2% of the thiocyanate concentration. For samples with detectable cyanide analyzed by this method, ALS recommends analysis for thiocyanate to check for this potential interference

EC-SCREEN-WT	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

EC-WT	Water	Conductivity	APHA 2510 B

Water samples can be measured directly by immersing the conductivity cell into the sample.

MET-T-CCMS-WT	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

NH3-F-WT	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

PH-BF	Water	pH	APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

RA226-MMER-FC	Water	Ra226 by Alpha Scint, MDC=0.01 Bq/L	EPA 903.1
SOLIDS-TDS-BF	Water	Total Dissolved Solids	APHA 2540C

A well-mixed sample is filtered though glass fibres filter. A known volume of the filtrate is evaporated and dried at 180 +/- 2C for 1hr.

SOLIDS-TSS-BF	Water	Suspended solids	APHA 2540 D-Gravimetric

A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104 +/- 1C for a minimum of four hours or until a constant weight is achieved.

TURBIDITY-BF	Water	Turbidity	APHA 2130 B

Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.

** 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

Reference Information

WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA
FC	ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
BF	ALS ENVIRONMENTAL - BAFFIN ISLAND, NUNAVUT, 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 weight of sample
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

Workorder: L2301638 Report Date: 22-JUL-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3

Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CN-TOT-WT	**Water**							
Batch R4693727								
WG3094352-3 DUP		**L2301745-2**						
Cyanide, Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	03-JUL-19
WG3094352-2 LCS								
Cyanide, Total			81.4		%		80-120	03-JUL-19
WG3094352-1 MB								
Cyanide, Total			<0.0020		mg/L		0.002	03-JUL-19
WG3094352-4 MS		**L2301745-2**						
Cyanide, Total			84.8		%		70-130	03-JUL-19
Batch R4693835								
WG3095421-3 DUP		**L2301267-1**						
Cyanide, Total		<0.020	<0.020	RPD-NA	mg/L	N/A	20	04-JUL-19
WG3095421-2 LCS								
Cyanide, Total			91.7		%		80-120	04-JUL-19
WG3095421-1 MB								
Cyanide, Total			<0.0020		mg/L		0.002	04-JUL-19
WG3095421-4 MS		**L2301267-1**						
Cyanide, Total			95.0		%		70-130	04-JUL-19
EC-WT	**Water**							
Batch R4693916								
WG3095814-4 DUP		**WG3095814-3**						
Conductivity		314	321		umhos/cm	2.2	10	04-JUL-19
WG3095814-2 LCS								
Conductivity			96.2		%		90-110	04-JUL-19
WG3095814-1 MB								
Conductivity			<3.0		umhos/cm		3	04-JUL-19
MET-T-CCMS-WT	**Water**							
Batch R4693191								
WG3094722-4 DUP		**WG3094722-3**						
Aluminum (Al)-Total		0.156	0.147		mg/L	6.0	20	03-JUL-19
Antimony (Sb)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	03-JUL-19
Arsenic (As)-Total		0.00041	0.00042		mg/L	2.7	20	03-JUL-19
Barium (Ba)-Total		0.0353	0.0334		mg/L	5.6	20	03-JUL-19
Beryllium (Be)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	03-JUL-19
Bismuth (Bi)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	03-JUL-19
Boron (B)-Total		0.011	0.010		mg/L	3.4	20	03-JUL-19
Cadmium (Cd)-Total		0.0000074	0.0000085		mg/L	14	20	03-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4693191								
WG3094722-4 DUP		**WG3094722-3**						
Calcium (Ca)-Total		41.0	41.0		mg/L	0.1	20	03-JUL-19
Chromium (Cr)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	03-JUL-19
Cesium (Cs)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	03-JUL-19
Cobalt (Co)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	03-JUL-19
Copper (Cu)-Total		0.0112	0.0108		mg/L	3.7	20	03-JUL-19
Iron (Fe)-Total		0.212	0.257		mg/L	19	20	04-JUL-19
Lead (Pb)-Total		0.00125	0.00124		mg/L	1.5	20	03-JUL-19
Lithium (Li)-Total		0.0011	0.0010		mg/L	8.1	20	03-JUL-19
Magnesium (Mg)-Total		3.98	3.72		mg/L	6.9	20	03-JUL-19
Manganese (Mn)-Total		0.0101	0.00963		mg/L	5.2	20	03-JUL-19
Molybdenum (Mo)-Total		0.000239	0.000260		mg/L	8.6	20	03-JUL-19
Nickel (Ni)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	03-JUL-19
Phosphorus (P)-Total		<0.050	<0.050	RPD-NA	mg/L	N/A	20	03-JUL-19
Potassium (K)-Total		1.13	1.11		mg/L	1.4	20	03-JUL-19
Rubidium (Rb)-Total		0.00147	0.00148		mg/L	0.7	20	03-JUL-19
Selenium (Se)-Total		0.000063	0.000064		mg/L	2.2	20	03-JUL-19
Silicon (Si)-Total		1.92	1.89		mg/L	1.6	20	03-JUL-19
Silver (Ag)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	03-JUL-19
Sodium (Na)-Total		11.5	11.5		mg/L	0.3	20	03-JUL-19
Strontium (Sr)-Total		0.125	0.126		mg/L	0.2	20	03-JUL-19
Sulfur (S)-Total		2.25	2.24		mg/L	0.8	25	03-JUL-19
Thallium (Tl)-Total		0.000012	0.000010		mg/L	16	20	03-JUL-19
Tellurium (Te)-Total		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	03-JUL-19
Thorium (Th)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	25	03-JUL-19
Tin (Sn)-Total		0.00018	0.00020		mg/L	14	20	03-JUL-19
Titanium (Ti)-Total		0.00291	0.00261		mg/L	11	20	03-JUL-19
Tungsten (W)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	03-JUL-19
Uranium (U)-Total		0.000052	0.000053		mg/L	0.2	20	03-JUL-19
Vanadium (V)-Total		0.00054	0.00051		mg/L	5.3	20	03-JUL-19
Zinc (Zn)-Total		0.0049	0.0038	J	mg/L	0.0011	0.006	03-JUL-19
Zirconium (Zr)-Total		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	03-JUL-19
WG3094722-2 LCS								
Aluminum (Al)-Total			104.2		%		80-120	03-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4693191								
WG3094722-2 LCS								
Antimony (Sb)-Total			104.5		%		80-120	03-JUL-19
Arsenic (As)-Total			101.3		%		80-120	03-JUL-19
Barium (Ba)-Total			98.5		%		80-120	03-JUL-19
Beryllium (Be)-Total			111.9		%		80-120	03-JUL-19
Bismuth (Bi)-Total			95.7		%		80-120	03-JUL-19
Boron (B)-Total			106.2		%		80-120	03-JUL-19
Cadmium (Cd)-Total			95.3		%		80-120	03-JUL-19
Calcium (Ca)-Total			106.2		%		80-120	03-JUL-19
Chromium (Cr)-Total			99.4		%		80-120	03-JUL-19
Cesium (Cs)-Total			99.8		%		80-120	03-JUL-19
Cobalt (Co)-Total			98.2		%		80-120	03-JUL-19
Copper (Cu)-Total			98.0		%		80-120	03-JUL-19
Iron (Fe)-Total			96.3		%		80-120	03-JUL-19
Lead (Pb)-Total			95.7		%		80-120	03-JUL-19
Lithium (Li)-Total			112.3		%		80-120	03-JUL-19
Magnesium (Mg)-Total			100.0		%		80-120	03-JUL-19
Manganese (Mn)-Total			101.8		%		80-120	03-JUL-19
Molybdenum (Mo)-Total			102.5		%		80-120	03-JUL-19
Nickel (Ni)-Total			98.9		%		80-120	03-JUL-19
Phosphorus (P)-Total			103.3		%		70-130	03-JUL-19
Potassium (K)-Total			104.6		%		80-120	03-JUL-19
Rubidium (Rb)-Total			100.7		%		80-120	03-JUL-19
Selenium (Se)-Total			101.6		%		80-120	03-JUL-19
Silicon (Si)-Total			103.5		%		60-140	03-JUL-19
Silver (Ag)-Total			98.2		%		80-120	03-JUL-19
Sodium (Na)-Total			98.4		%		80-120	03-JUL-19
Strontium (Sr)-Total			102.5		%		80-120	03-JUL-19
Sulfur (S)-Total			95.9		%		80-120	03-JUL-19
Thallium (Tl)-Total			91.6		%		80-120	03-JUL-19
Tellurium (Te)-Total			99.3		%		80-120	03-JUL-19
Thorium (Th)-Total			93.9		%		70-130	03-JUL-19
Tin (Sn)-Total			96.9		%		80-120	03-JUL-19
Titanium (Ti)-Total			98.8		%		80-120	03-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4693191								
WG3094722-2 LCS								
Tungsten (W)-Total			96.2		%		80-120	03-JUL-19
Uranium (U)-Total			94.6		%		80-120	03-JUL-19
Vanadium (V)-Total			101.7		%		80-120	03-JUL-19
Zinc (Zn)-Total			101.3		%		80-120	03-JUL-19
Zirconium (Zr)-Total			100.0		%		80-120	03-JUL-19
WG3094722-1 MB								
Aluminum (Al)-Total			<0.0050		mg/L		0.005	03-JUL-19
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	03-JUL-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	03-JUL-19
Barium (Ba)-Total			<0.00010		mg/L		0.0001	03-JUL-19
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	03-JUL-19
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	03-JUL-19
Boron (B)-Total			<0.010		mg/L		0.01	03-JUL-19
Cadmium (Cd)-Total			<0.000005C		mg/L		0.000005	03-JUL-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	03-JUL-19
Chromium (Cr)-Total			<0.00050		mg/L		0.0005	03-JUL-19
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	03-JUL-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	03-JUL-19
Copper (Cu)-Total			<0.0010		mg/L		0.001	03-JUL-19
Iron (Fe)-Total			<0.010		mg/L		0.01	03-JUL-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	03-JUL-19
Lithium (Li)-Total			<0.0010		mg/L		0.001	03-JUL-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	03-JUL-19
Manganese (Mn)-Total			<0.00050		mg/L		0.0005	03-JUL-19
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	03-JUL-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	03-JUL-19
Phosphorus (P)-Total			<0.050		mg/L		0.05	03-JUL-19
Potassium (K)-Total			<0.050		mg/L		0.05	03-JUL-19
Rubidium (Rb)-Total			<0.00020		mg/L		0.0002	03-JUL-19
Selenium (Se)-Total			<0.000050		mg/L		0.00005	03-JUL-19
Silicon (Si)-Total			<0.10		mg/L		0.1	03-JUL-19
Silver (Ag)-Total			<0.000050		mg/L		0.00005	03-JUL-19
Sodium (Na)-Total			<0.050		mg/L		0.05	03-JUL-19
Strontium (Sr)-Total			<0.0010		mg/L		0.001	03-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4693191								
WG3094722-1 MB								
Sulfur (S)-Total			<0.50		mg/L		0.5	03-JUL-19
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	03-JUL-19
Tellurium (Te)-Total			<0.00020		mg/L		0.0002	03-JUL-19
Thorium (Th)-Total			<0.00010		mg/L		0.0001	03-JUL-19
Tin (Sn)-Total			<0.00010		mg/L		0.0001	03-JUL-19
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	03-JUL-19
Tungsten (W)-Total			<0.00010		mg/L		0.0001	03-JUL-19
Uranium (U)-Total			<0.000010		mg/L		0.00001	03-JUL-19
Vanadium (V)-Total			<0.00050		mg/L		0.0005	03-JUL-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	03-JUL-19
Zirconium (Zr)-Total			<0.00020		mg/L		0.0002	03-JUL-19
WG3094722-5 MS		**WG3094722-3**						
Aluminum (Al)-Total			N/A	MS-B	%		-	03-JUL-19
Antimony (Sb)-Total			103.4		%		70-130	03-JUL-19
Arsenic (As)-Total			101.7		%		70-130	03-JUL-19
Barium (Ba)-Total			N/A	MS-B	%		-	03-JUL-19
Beryllium (Be)-Total			103.4		%		70-130	03-JUL-19
Bismuth (Bi)-Total			96.4		%		70-130	03-JUL-19
Boron (B)-Total			98.6		%		70-130	03-JUL-19
Cadmium (Cd)-Total			97.4		%		70-130	03-JUL-19
Calcium (Ca)-Total			N/A	MS-B	%		-	03-JUL-19
Chromium (Cr)-Total			101.7		%		70-130	03-JUL-19
Cesium (Cs)-Total			98.8		%		70-130	03-JUL-19
Cobalt (Co)-Total			99.5		%		70-130	03-JUL-19
Copper (Cu)-Total			92.6		%		70-130	03-JUL-19
Iron (Fe)-Total			N/A	MS-B	%		-	03-JUL-19
Lead (Pb)-Total			96.4		%		70-130	03-JUL-19
Lithium (Li)-Total			101.9		%		70-130	03-JUL-19
Magnesium (Mg)-Total			N/A	MS-B	%		-	03-JUL-19
Manganese (Mn)-Total			97.1		%		70-130	03-JUL-19
Molybdenum (Mo)-Total			105.2		%		70-130	03-JUL-19
Nickel (Ni)-Total			98.5		%		70-130	03-JUL-19
Phosphorus (P)-Total			102.9		%		70-130	03-JUL-19
Potassium (K)-Total			103.6		%		70-130	03-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4693191								
WG3094722-5 MS		**WG3094722-3**						
Rubidium (Rb)-Total			101.2		%		70-130	03-JUL-19
Selenium (Se)-Total			99.8		%		70-130	03-JUL-19
Silicon (Si)-Total			N/A	MS-B	%		-	03-JUL-19
Silver (Ag)-Total			98.6		%		70-130	03-JUL-19
Sodium (Na)-Total			N/A	MS-B	%		-	03-JUL-19
Strontium (Sr)-Total			N/A	MS-B	%		-	03-JUL-19
Sulfur (S)-Total			99.0		%		70-130	03-JUL-19
Thallium (Tl)-Total			93.6		%		70-130	03-JUL-19
Tellurium (Te)-Total			91.6		%		70-130	03-JUL-19
Thorium (Th)-Total			98.5		%		70-130	03-JUL-19
Tin (Sn)-Total			100.5		%		70-130	03-JUL-19
Titanium (Ti)-Total			98.0		%		70-130	03-JUL-19
Tungsten (W)-Total			101.2		%		70-130	03-JUL-19
Uranium (U)-Total			103.8		%		70-130	03-JUL-19
Vanadium (V)-Total			103.5		%		70-130	03-JUL-19
Zinc (Zn)-Total			100.9		%		70-130	03-JUL-19
Zirconium (Zr)-Total			104.0		%		70-130	03-JUL-19
NH3-F-WT	**Water**							
Batch R4693360								
WG3094359-19 DUP		**L2302716-1**						
Ammonia, Total (as N)		<0.010	<0.010	RPD-NA	mg/L	N/A	20	03-JUL-19
WG3094359-18 LCS								
Ammonia, Total (as N)			101.4		%		85-115	03-JUL-19
WG3094359-17 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	03-JUL-19
WG3094359-20 MS		**L2302716-1**						
Ammonia, Total (as N)			96.6		%		75-125	03-JUL-19
PH-BF	**Water**							
Batch R4691537								
WG3092921-2 DUP		**L2301607-4**						
pH		6.30	6.31	J	pH units	0.01	0.2	30-JUN-19
WG3092921-1 LCS								
pH			7.02		pH units		6.9-7.1	30-JUN-19
SOLIDS-TDS-BF	**Water**							

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SOLIDS-TDS-BF	**Water**							
Batch R4692233								
WG3092929-3 DUP		**L2301607-1**						
Total Dissolved Solids		897	875		mg/L	2.5	20	02-JUL-19
WG3092929-2 LCS								
Total Dissolved Solids			100.2		%		85-115	02-JUL-19
WG3092929-1 MB								
Total Dissolved Solids			<20		mg/L		20	02-JUL-19
SOLIDS-TSS-BF	**Water**							
Batch R4692181								
WG3092932-6 DUP		**L2301638-1**						
Total Suspended Solids		3.2	3.2		mg/L	0.0	25	01-JUL-19
WG3092932-5 LCS								
Total Suspended Solids			101.6		%		85-115	01-JUL-19
WG3092932-4 MB								
Total Suspended Solids			<2.0		mg/L		2	01-JUL-19
TURBIDITY-BF	**Water**							
Batch R4691540								
WG3092926-3 DUP		**L2301606-1**						
Turbidity		0.83	0.83		NTU	0.2	15	02-JUL-19
WG3092926-2 LCS								
Turbidity			110		%		85-115	02-JUL-19
WG3092926-1 MB								
Turbidity			<0.10		NTU		0.1	02-JUL-19

Quality Control Report

Workorder: L2301638 Report Date: 22-JUL-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

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

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

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.

Friday, July 19, 2019

Rick Hawthorne
ALS Environmental
60 Northland Rd, Unit 1
Waterloo Canada, ON N2V 2B8

Re: ALS Workorder: 1907109
Project Name:
Project Number: L2301638

Dear Mr. Hawthorne:

Two water samples were received from ALS Environmental, on 7/5/2019. The samples were scheduled for the following analysis:

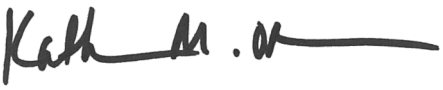
Radium-226

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,



ALS Environmental
Katie M. OBrien
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
AIHA	214884
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280

1907109

Radium-226:
The samples were prepared and analyzed according to the current revision of SOP 783.

All acceptance criteria were met.

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1907109
Client Name: ALS Environmental
Client Project Name:
Client Project Number: L2301638
Client PO Number: L2301638

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
L2301638-1	1907109-1		WATER	30-Jun-19	
L2301638-2	1907109-2		WATER	30-Jun-19	

ALS Environmental

L2301638

WATERLOO

190709

Subcontract Request Form

Subcontract To:

ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
225 COMMERCE DRIVE
FORT COLLINS,CO 80524

NOTES: Please reference on final report and invoice: PO# *L2301638*
ALS requires QC data to be provided with your final results.

2x950mL HDPE.

Please see enclosed 2 sample(s) in 2 Container(s)

	SAMPLE NUMBER	ANALYTICAL REQUIRED	DATE SAMPLED / DUE DATE	Priority Flag
1	**L2301638-1 MS-08**		6/ 30/ 2019	E
		Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	7/19/2019	
2	**L2301638-2 MS-0801**		6/ 30/ 2019	E
		Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	7/19/2019	

Subcontract Info Contact: Mary-Lynn Pike (519) 886-6910
Analysis and reporting info contact: Rick Hawthorne
60 NORTHLAND ROAD, UNIT 1
WATERLOO,ON N2V 2B8
Phone: (519) 886-6910 Email: Rick.Hawthorne@alsglobal.com

Please email confirmation of receipt to: Rick.Hawthorne@alsglobal.com

Shipped By: _____ Date Shipped: _____

Received By: [signature] Date Received: 7/5/19 1350

Verified By: _____ Date Verified: _____

Temperature: _____

Sample Integrity Issues: _____

ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: ALS Waterloo Workorder No: 1907109

Project Manager: KMO Initials: EE Date: 7/5/19

1.	Are airbills / shipping documents present and/or removable?	DROP OFF	(YES)	NO
2.	Are custody seals on **shipping** containers intact?	(NONE)	YES	NO *
3.	Are custody seals on **sample** containers intact?	(NONE)	YES	NO *
4.	Is there a COC (chain-of-custody) present?		(YES)	NO *
5.	Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)		(YES)	NO *
6.	Are short-hold samples present?		YES	(NO)
7.	Are all samples within holding times for the requested analyses?		(YES)	NO *
8.	Were all sample containers received intact? (not broken or leaking)		(YES)	NO *
9.	Is there sufficient sample for the requested analyses?		(YES)	NO *
10.	Are all samples in the proper containers for the requested analyses?		(YES)	NO *
11.	Are all aqueous samples preserved correctly, if required? (excluding volatiles)	N/A	(YES)	NO *
12.	Are all aqueous non-preserved samples pH 4-9?	(N/A)	YES	NO *
13.	Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm (1/4 inch) diameter? (i.e. size of green pea)	(N/A)	YES	NO
14.	Were the samples shipped on ice?		(YES)	NO
15.	Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: #1 #3 #4	RAD ONLY	YES	(NO)

Cooler #:	1								
Temperature (°C):	22.4								
No. of custody seals on cooler:	0								
DOT Survey/ Acceptance Information — External µR/hr reading:	10								
Background µR/hr reading:	10								

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? (YES) / NO / NA (If no, see Form 008.)

*** Please provide details here for NO responses to gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.**

All client bottle ID's vs ALS lab ID's double-checked by: EE

If applicable, was the client contacted? **YES / NO / NA** Contact: _____ Date/Time: _____

Project Manager Signature / Date: 7/8/19

Form 201r27.xls
(02/11/2019)

*IR Gun #1, VWR SN 170560549
*IR Gun #3, VWR SN 170647571
*IR Gun #4, Oakton, SN 2372220101-0002

1907109

EXPRESS WORLDWIDE **WPX** DHL

2018-07-03 MYDHL+ 1.0 / *30-0821*

From : ALS Environmental
Ed Hill
60 Northland Rd
Unit 1

N2V 2B8 WATERLOO ON
Canada

Origin:
YHM

Contact: +15198866910

To : **ALS Environmental Fort Collins**
Sample Login
225 Commerce Drive

Contact:
Sample Login
+18004431511

10-0

80524 FORT COLLINS CO
United States of America

US-DEN-DEN

C [redacted] Day Time

Ref:

Pce/Shpt Weight: **10.4 lbs** Piece: **1/1**

22.4°C

WAYBILL 79 1851 1930

(2L)US80524+48000001

Contents: Water Samples

Client:	ALS Environmental	**Date:**	*19-Jul-19*
Project:	L2301638	**Work Order:**	1907109
Sample ID:	L2301638-1	**Lab ID:**	1907109-1
Legal Location:		**Matrix:**	WATER
Collection Date:	6/30/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **7/10/2019**		PrepBy: **JXH**
Ra-226	0.0070 (+/- 0.0055)	U	0.0071	BQ/l	NA	7/19/2019 13:00
Carr: BARIUM	*90.7*		*40-110*	*%REC*	DL = NA	7/19/2019 13:00

Client:	ALS Environmental	**Date:**	*19-Jul-19*
Project:	L2301638	**Work Order:**	1907109
Sample ID:	L2301638-2	**Lab ID:**	1907109-2
Legal Location:		**Matrix:**	WATER
Collection Date:	6/30/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **7/10/2019**		PrepBy: **JXH**
Ra-226	0.0030 (+/- 0.0050)	U	0.0084	BQ/l	NA	7/19/2019 13:00
Carr: BARIUM	*94.4*		*40-110*	*%REC*	DL = NA	7/19/2019 13:00

Client:	ALS Environmental	**Date:**	*19-Jul-19*
Project:	L2301638	**Work Order:**	1907109
Sample ID:	L2301638-2	**Lab ID:**	1907109-2
Legal Location:		**Matrix:**	WATER
Collection Date:	6/30/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed

Explanation of Qualifiers

Radiochemistry:

- "Report Limit" is the MDC

U or ND - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

Y2 - Chemical Yield outside default limits.

W - DER is greater than Warning Limit of 1.42

* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.
# - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.
G - Sample density differs by more than 15% of LCS density.
D - DER is greater than Control Limit

M - Requested MDC not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS, Matrix Spike Recovery within control limits.

N - Matrix Spike Recovery outside control limits

NC - Not Calculated for duplicate results less than 5 times MDC

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

Inorganics:

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).

U or ND - Indicates that the compound was analyzed for but not detected.

E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.

M - Duplicate injection precision was not met.

N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.

Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.

* - Duplicate analysis (relative percent difference) not within control limits.

S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

Organics:

U or ND - Indicates that the compound was analyzed for but not detected.

B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.

E - Analyte concentration exceeds the upper level of the calibration range.

J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).

A - A tentatively identified compound is a suspected aldol-condensation product.

X - The analyte was diluted below an accurate quantitation level.

* - The spike recovery is equal to or outside the control criteria used.

+ - The relative percent difference (RPD) equals or exceeds the control criteria.

G - A pattern resembling gasoline was detected in this sample.

D - A pattern resembling diesel was detected in this sample.

M - A pattern resembling motor oil was detected in this sample.

C - A pattern resembling crude oil was detected in this sample.

4 - A pattern resembling JP-4 was detected in this sample.

5 - A pattern resembling JP-5 was detected in this sample.

H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.

L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.

Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
- gasoline
- JP-8
- diesel
- mineral spirits
- motor oil
- Stoddard solvent
- bunker C

QC BATCH REPORT

Batch ID: **RE190710-2-1** Instrument ID **Alpha Scin** Method: **Radium-226 by Radon Emanation**

LCS Sample ID: **RE190710-2** Units: **BQ/l** Analysis Date: **7/19/2019 13:33**
Client ID: Run ID: **RE190710-2A** Prep Date: **7/10/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.99 (+/- 0.496)	0.0282	1.771		112	67-120					P,M3
Carr: BARIUM	15600		16500		94.3	40-110					

LCSD Sample ID: **RE190710-2** Units: **BQ/l** Analysis Date: **7/19/2019 13:33**
Client ID: Run ID: **RE190710-2A** Prep Date: **7/10/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.98 (+/- 0.493)	0.0249	1.771		112	67-120		1.99	0.01	2.1	P,M3
Carr: BARIUM	15500		16410		94.4	40-110		15600			

MB Sample ID: **RE190710-2** Units: **BQ/l** Analysis Date: **7/19/2019 13:00**
Client ID: Run ID: **RE190710-2A** Prep Date: **7/10/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	0.00059 (+/- 0.0052)	0.0099									U
Carr: BARIUM	15900		16370		97.3	40-110					

The following samples were analyzed in this batch: 1907109-1 1907109-2

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here (lab use only)

COC Number: 15 -

Report To	Contact and company name below will appear on the final report
Company:	Baffinland Iron Mines Corp.
Contact:	Wiliam Bowden and Connor Devereaux
Phone:	647-253-0596 EXT 6016
	Company address below will appear on the final report
Street:	2275 Upper Middle Rd. E., Suite #300
City/Province:	Oakville, ON
Postal Code:	L6H 0C3

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)

Quality Control (QC) Report with Report ☑ YES ☐ NO

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax bimcore@alsglobal.com

Email 2 bimww@alsglobal.com

Email 3

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☐ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): **4 day [P4]** ☐ | **3 day [P3]** ☐ | **2 day [P2]** ☐

EMERGENCY: **1 Business day [E1]** ☐ | **Same Day, Weekend or Statutory holiday [E0]** ☑

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	
Contact:	

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax ap@baffinland.com

Email 2 commercial@baffinland.com

Project Information

ALS Account # / Quote #:	23642 /Q42455
Job #:	MS-08 DEL
PO / AFE:	4500057496
LSD:	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only)

ALS Contact:

Sampler: OM

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	MMER-DEL	Number of Containers
	MS-08	30-Jun-19	9:00	Water	E0	8
	MS-0801	30-Jun-19	9:00	Water	E0	8

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human drinking water use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES ºC			FINAL COOLER TEMPERATURES ºC		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Stephanie Sawchuk	Date: 30-Jun-19	Time: 18:20	Received by:	Date:	Time:	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

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 specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2301638-COFC

COC Number: 15 -

Report To	Contact and company name below will appear on the final report
Company:	Baffinland Iron Mines Corp.
Contact:	Wiliam Bowden and Connor Devereaux
Phone:	647-253-0596 EXT 6016
	Company address below will appear on the final report
Street:	2275 Upper Middle Rd. E., Suite #300
City/Province:	Oakville, ON
Postal Code:	L6H 0C3
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	
Contact:	

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	bimcore@alsglobal.com
Email 2	bimww@alsglobal.com
Email 3	

Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	ap@baffinland.com
Email 2	commercial@baffinland.com

Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	23642 /Q42455	AFE/Cost Center:	PO#
Job #:	MS-08	Major/Minor Code:	Routing Code:
PO / AFE:	4500057496	Requisitioner:	
LSD:		Location:	

ALS Lab Work Order # (lab use only)	L2301638	ALS Contact:	Sampler: OM

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☐ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
4 day [P4]	☐	1 Business day [E1]	☐
3 day [P3]	☐	Same Day, Weekend or Statutory holiday [E0]	☑
2 day [P2]	☐		

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	MMER-DEL	Number of Containers
	MS-08	30-Jun-19	9:00	Water	E0	8
	MS-0801	30-Jun-19	9:00	Water	E0	8

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☑ NO	
Are samples for human drinking water use? ☐ YES ☑ NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen	☐	SIF Observations	Yes ☐	No ☐	
Ice Packs ☐	Ice Cubes ☒	Custody seal intact	Yes ☐	No ☐	
Cooling Initiated ☐					

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			18.1		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Stephanie Sawchuk	Date: 30-Jun-19	Time: 18:20	Received by:	Date:	Time:	Received by: AP	Date: 3-JUL-19	Time: 09:30

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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 specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Baffinland Iron Mine's Corporation (Oakville)
ATTN: William Bowden/Connor Devereaux
2275 Upper Middle Rd. E.
Suite #300
Oakville ON L6H 0C3

Date Received: 09-JUL-19
Report Date: 29-JUL-19 13:26 (MT)
Version: FINAL

Client Phone: 647-253-0596

Certificate of Analysis

Lab Work Order #: L2305882

Project P.O. #: 4500057496
Job Reference: MS-08 WT TOX
C of C Numbers:
Legal Site Desc:

Rick Hawthorne
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2305882-1 MS-08 Sampled By: KB/BC on 08-JUL-19 @ 14:50 Matrix: WATER							
Physical Tests							
Conductivity	4440		3.0	umhos/cm		09-JUL-19	R4702724
Hardness (as CaCO3)	3150		1.3	mg/L		09-JUL-19	
pH	7.50		0.10	pH units		09-JUL-19	R4701528
Total Suspended Solids	12.0		2.0	mg/L		08-JUL-19	R4701468
Total Dissolved Solids	4670		20	mg/L		09-JUL-19	R4701789
Turbidity	14.1		0.10	NTU		09-JUL-19	R4701569
Anions and Nutrients							
Acidity (as CaCO3)	9.3		5.0	mg/L		11-JUL-19	R4708064
Alkalinity, Total (as CaCO3)	18		10	mg/L		09-JUL-19	R4702724
Ammonia, Total (as N)	7.4	DLHC	1.0	mg/L		10-JUL-19	R4704649
Chloride (Cl)	9.5	DLDS	2.5	mg/L		09-JUL-19	R4702730
Fluoride (F)	0.11	DLDS	0.10	mg/L		09-JUL-19	R4702730
Nitrate (as N)	14.2	DLDS	0.10	mg/L		09-JUL-19	R4702730
Total Kjeldahl Nitrogen	3.75	RRV	0.15	mg/L	09-JUL-19	10-JUL-19	R4704933
Phosphorus, Total	<0.0030		0.0030	mg/L	09-JUL-19	10-JUL-19	R4703451
Sulfate (SO4)	3130	DLDS	1.5	mg/L		09-JUL-19	R4702730
Cyanides							
Cyanide, Total	0.021	DLM	0.020	mg/L		10-JUL-19	R4704470
Organic / Inorganic Carbon							
Dissolved Carbon Filtration Location	LAB					09-JUL-19	R4700868
Dissolved Organic Carbon	3.05		0.50	mg/L	09-JUL-19	10-JUL-19	R4703168
Total Organic Carbon	3.65		0.50	mg/L		10-JUL-19	R4703169
Total Metals							
Aluminum (Al)-Total	<0.050	DLHC	0.050	mg/L	09-JUL-19	09-JUL-19	R4701850
Antimony (Sb)-Total	<0.0010	DLHC	0.0010	mg/L	09-JUL-19	09-JUL-19	R4701850
Arsenic (As)-Total	<0.0010	DLHC	0.0010	mg/L	09-JUL-19	09-JUL-19	R4701850
Barium (Ba)-Total	0.0337	DLHC	0.0010	mg/L	09-JUL-19	09-JUL-19	R4701850
Beryllium (Be)-Total	<0.0010	DLHC	0.0010	mg/L	09-JUL-19	09-JUL-19	R4701850
Bismuth (Bi)-Total	<0.00050	DLHC	0.00050	mg/L	09-JUL-19	09-JUL-19	R4701850
Boron (B)-Total	<0.10	DLHC	0.10	mg/L	09-JUL-19	09-JUL-19	R4701850
Cadmium (Cd)-Total	<0.000050	DLHC	0.000050	mg/L	09-JUL-19	09-JUL-19	R4701850
Calcium (Ca)-Total	305	DLHC	0.50	mg/L	09-JUL-19	09-JUL-19	R4701850
Cesium (Cs)-Total	<0.00010	DLHC	0.00010	mg/L	09-JUL-19	09-JUL-19	R4701850
Chromium (Cr)-Total	<0.0050	DLHC	0.0050	mg/L	09-JUL-19	09-JUL-19	R4701850
Cobalt (Co)-Total	0.0271	DLHC	0.0010	mg/L	09-JUL-19	09-JUL-19	R4701850
Copper (Cu)-Total	<0.010	DLHC	0.010	mg/L	09-JUL-19	09-JUL-19	R4701850
Iron (Fe)-Total	4.50	DLHC	0.10	mg/L	09-JUL-19	09-JUL-19	R4701850
Lead (Pb)-Total	<0.00050	DLHC	0.00050	mg/L	09-JUL-19	09-JUL-19	R4701850
Lithium (Li)-Total	0.050	DLHC	0.010	mg/L	09-JUL-19	09-JUL-19	R4701850
Magnesium (Mg)-Total	646	DLHC	0.050	mg/L	09-JUL-19	09-JUL-19	R4701850
Manganese (Mn)-Total	14.7	DLHC	0.0050	mg/L	09-JUL-19	09-JUL-19	R4701850
Mercury (Hg)-Total	<0.000010		0.000010	mg/L		10-JUL-19	R4703589

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2305882-1 MS-08 Sampled By: KB/BC on 08-JUL-19 @ 14:50 Matrix: WATER							
Total Metals							
Molybdenum (Mo)-Total	<0.00050	DLHC	0.00050	mg/L	09-JUL-19	09-JUL-19	R4701850
Nickel (Ni)-Total	0.0252	DLHC	0.0050	mg/L	09-JUL-19	09-JUL-19	R4701850
Phosphorus (P)-Total	<0.50	DLHC	0.50	mg/L	09-JUL-19	09-JUL-19	R4701850
Potassium (K)-Total	6.18	DLHC	0.50	mg/L	09-JUL-19	09-JUL-19	R4701850
Rubidium (Rb)-Total	0.0104	DLHC	0.0020	mg/L	09-JUL-19	09-JUL-19	R4701850
Selenium (Se)-Total	0.00622	DLHC	0.00050	mg/L	09-JUL-19	09-JUL-19	R4701850
Silicon (Si)-Total	<1.0	DLHC	1.0	mg/L	09-JUL-19	09-JUL-19	R4701850
Silver (Ag)-Total	<0.00050	DLHC	0.00050	mg/L	09-JUL-19	09-JUL-19	R4701850
Sodium (Na)-Total	4.51	DLHC	0.50	mg/L	09-JUL-19	09-JUL-19	R4701850
Strontium (Sr)-Total	0.663	DLHC	0.010	mg/L	09-JUL-19	09-JUL-19	R4701850
Sulfur (S)-Total	1180	DLHC	5.0	mg/L	09-JUL-19	09-JUL-19	R4701850
Tellurium (Te)-Total	<0.0020	DLHC	0.0020	mg/L	09-JUL-19	09-JUL-19	R4701850
Thallium (Tl)-Total	0.00014	DLHC	0.00010	mg/L	09-JUL-19	09-JUL-19	R4701850
Thorium (Th)-Total	<0.0010	DLHC	0.0010	mg/L	09-JUL-19	09-JUL-19	R4701850
Tin (Sn)-Total	<0.0010	DLHC	0.0010	mg/L	09-JUL-19	09-JUL-19	R4701850
Titanium (Ti)-Total	<0.0030	DLHC	0.0030	mg/L	09-JUL-19	09-JUL-19	R4701850
Tungsten (W)-Total	<0.0010	DLHC	0.0010	mg/L	09-JUL-19	09-JUL-19	R4701850
Uranium (U)-Total	0.00032	DLHC	0.00010	mg/L	09-JUL-19	09-JUL-19	R4701850
Vanadium (V)-Total	<0.0050	DLHC	0.0050	mg/L	09-JUL-19	09-JUL-19	R4701850
Zinc (Zn)-Total	<0.030	DLHC	0.030	mg/L	09-JUL-19	09-JUL-19	R4701850
Zirconium (Zr)-Total	<0.0020	DLHC	0.0020	mg/L	09-JUL-19	09-JUL-19	R4701850
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					10-JUL-19	R4702349
Dissolved Metals Filtration Location	LAB					09-JUL-19	R4700212
Aluminum (Al)-Dissolved	<0.050	DLHC	0.050	mg/L	09-JUL-19	09-JUL-19	R4701774
Antimony (Sb)-Dissolved	<0.0010	DLHC	0.0010	mg/L	09-JUL-19	09-JUL-19	R4701774
Arsenic (As)-Dissolved	<0.0010	DLHC	0.0010	mg/L	09-JUL-19	09-JUL-19	R4701774
Barium (Ba)-Dissolved	0.0310	DLHC	0.0010	mg/L	09-JUL-19	09-JUL-19	R4701774
Beryllium (Be)-Dissolved	<0.0010	DLHC	0.0010	mg/L	09-JUL-19	09-JUL-19	R4701774
Bismuth (Bi)-Dissolved	<0.00050	DLHC	0.00050	mg/L	09-JUL-19	09-JUL-19	R4701774
Boron (B)-Dissolved	<0.10	DLHC	0.10	mg/L	09-JUL-19	09-JUL-19	R4701774
Cadmium (Cd)-Dissolved	<0.000050	DLHC	0.000050	mg/L	09-JUL-19	09-JUL-19	R4701774
Calcium (Ca)-Dissolved	290	DLHC	0.50	mg/L	09-JUL-19	09-JUL-19	R4701774
Cesium (Cs)-Dissolved	<0.00010	DLHC	0.00010	mg/L	09-JUL-19	09-JUL-19	R4701774
Chromium (Cr)-Dissolved	<0.0050	DLHC	0.0050	mg/L	09-JUL-19	09-JUL-19	R4701774
Cobalt (Co)-Dissolved	0.0207	DLHC	0.0010	mg/L	09-JUL-19	09-JUL-19	R4701774
Copper (Cu)-Dissolved	0.0064	DLHC	0.0020	mg/L	09-JUL-19	09-JUL-19	R4701774
Iron (Fe)-Dissolved	<0.10	DLHC	0.10	mg/L	09-JUL-19	09-JUL-19	R4701774
Lead (Pb)-Dissolved	<0.00050	DLHC	0.00050	mg/L	09-JUL-19	09-JUL-19	R4701774
Lithium (Li)-Dissolved	0.048	DLHC	0.010	mg/L	09-JUL-19	09-JUL-19	R4701774
Magnesium (Mg)-Dissolved	589	DLHC	0.050	mg/L	09-JUL-19	09-JUL-19	R4701774

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2305882-1 MS-08 Sampled By: KB/BC on 08-JUL-19 @ 14:50 Matrix: WATER							
Dissolved Metals							
Manganese (Mn)-Dissolved	13.0	DLHC	0.0050	mg/L	09-JUL-19	09-JUL-19	R4701774
Mercury (Hg)-Dissolved	<0.000010		0.000010	mg/L	10-JUL-19	10-JUL-19	R4703592
Molybdenum (Mo)-Dissolved	<0.00050	DLHC	0.00050	mg/L	09-JUL-19	09-JUL-19	R4701774
Nickel (Ni)-Dissolved	0.0192	DLHC	0.0050	mg/L	09-JUL-19	09-JUL-19	R4701774
Phosphorus (P)-Dissolved	<0.50	DLHC	0.50	mg/L	09-JUL-19	09-JUL-19	R4701774
Potassium (K)-Dissolved	5.56	DLHC	0.50	mg/L	09-JUL-19	09-JUL-19	R4701774
Rubidium (Rb)-Dissolved	0.0092	DLHC	0.0020	mg/L	09-JUL-19	09-JUL-19	R4701774
Selenium (Se)-Dissolved	0.00581	DLHC	0.00050	mg/L	09-JUL-19	09-JUL-19	R4701774
Silicon (Si)-Dissolved	<0.50	DLHC	0.50	mg/L	09-JUL-19	09-JUL-19	R4701774
Silver (Ag)-Dissolved	<0.00050	DLHC	0.00050	mg/L	09-JUL-19	09-JUL-19	R4701774
Sodium (Na)-Dissolved	3.93	DLHC	0.50	mg/L	09-JUL-19	09-JUL-19	R4701774
Strontium (Sr)-Dissolved	0.612	DLHC	0.010	mg/L	09-JUL-19	09-JUL-19	R4701774
Sulfur (S)-Dissolved	1060	DLHC	5.0	mg/L	09-JUL-19	09-JUL-19	R4701774
Tellurium (Te)-Dissolved	<0.0020	DLHC	0.0020	mg/L	09-JUL-19	09-JUL-19	R4701774
Thallium (Tl)-Dissolved	0.00013	DLHC	0.00010	mg/L	09-JUL-19	09-JUL-19	R4701774
Thorium (Th)-Dissolved	<0.0010	DLHC	0.0010	mg/L	09-JUL-19	09-JUL-19	R4701774
Tin (Sn)-Dissolved	<0.0010	DLHC	0.0010	mg/L	09-JUL-19	09-JUL-19	R4701774
Titanium (Ti)-Dissolved	<0.0030	DLHC	0.0030	mg/L	09-JUL-19	09-JUL-19	R4701774
Tungsten (W)-Dissolved	<0.0010	DLHC	0.0010	mg/L	09-JUL-19	09-JUL-19	R4701774
Uranium (U)-Dissolved	0.00018	DLHC	0.00010	mg/L	09-JUL-19	09-JUL-19	R4701774
Vanadium (V)-Dissolved	<0.0050	DLHC	0.0050	mg/L	09-JUL-19	09-JUL-19	R4701774
Zinc (Zn)-Dissolved	<0.010	DLHC	0.010	mg/L	09-JUL-19	09-JUL-19	R4701774
Zirconium (Zr)-Dissolved	<0.0020	DLHC	0.0020	mg/L	09-JUL-19	09-JUL-19	R4701774
Radiological Parameters							
Ra-226	0.041		0.0049	Bq/L	16-JUL-19	26-JUL-19	R4692536
L2305882-2 MS-0803 Sampled By: KB/BC on 08-JUL-19 @ 14:50 Matrix: WATER							
Physical Tests							
Conductivity	<3.0		3.0	umhos/cm		09-JUL-19	R4702724
Hardness (as CaCO3)	<0.50		0.50	mg/L		09-JUL-19	
pH	5.71		0.10	pH units		09-JUL-19	R4701528
Total Suspended Solids	<2.0		2.0	mg/L		08-JUL-19	R4701468
Total Dissolved Solids	<20		20	mg/L		09-JUL-19	R4701789
Turbidity	<0.10		0.10	NTU		09-JUL-19	R4701569
Anions and Nutrients							
Acidity (as CaCO3)	<5.0	DLM	5.0	mg/L		11-JUL-19	R4708064
Alkalinity, Total (as CaCO3)	<10		10	mg/L		09-JUL-19	R4702724
Ammonia, Total (as N)	0.22	DLHC	0.10	mg/L		10-JUL-19	R4704649
Chloride (Cl)	<0.50		0.50	mg/L		09-JUL-19	R4702730
Fluoride (F)	<0.020		0.020	mg/L		09-JUL-19	R4702730
Nitrate (as N)	<0.020		0.020	mg/L		09-JUL-19	R4702730

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2305882-2 MS-0803 Sampled By: KB/BC on 08-JUL-19 @ 14:50 Matrix: WATER							
Anions and Nutrients							
Total Kjeldahl Nitrogen	<0.15		0.15	mg/L	09-JUL-19	10-JUL-19	R4704933
Phosphorus, Total	0.0037		0.0030	mg/L	09-JUL-19	10-JUL-19	R4703451
Sulfate (SO4)	<0.30		0.30	mg/L		09-JUL-19	R4702730
Cyanides							
Cyanide, Total	<0.0020		0.0020	mg/L		09-JUL-19	R4699634
Organic / Inorganic Carbon							
Dissolved Carbon Filtration Location	LAB					09-JUL-19	R4700868
Dissolved Organic Carbon	0.53		0.50	mg/L	09-JUL-19	10-JUL-19	R4703168
Total Organic Carbon	0.83		0.50	mg/L		10-JUL-19	R4703169
Total Metals							
Aluminum (Al)-Total	<0.0050		0.0050	mg/L	09-JUL-19	09-JUL-19	R4701850
Antimony (Sb)-Total	<0.00010		0.00010	mg/L	09-JUL-19	09-JUL-19	R4701850
Arsenic (As)-Total	<0.00010		0.00010	mg/L	09-JUL-19	09-JUL-19	R4701850
Barium (Ba)-Total	<0.00010		0.00010	mg/L	09-JUL-19	09-JUL-19	R4701850
Beryllium (Be)-Total	<0.00010		0.00010	mg/L	09-JUL-19	09-JUL-19	R4701850
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L	09-JUL-19	09-JUL-19	R4701850
Boron (B)-Total	<0.010		0.010	mg/L	09-JUL-19	09-JUL-19	R4701850
Cadmium (Cd)-Total	<0.0000050		0.0000050	mg/L	09-JUL-19	09-JUL-19	R4701850
Calcium (Ca)-Total	<0.050		0.050	mg/L	09-JUL-19	09-JUL-19	R4701850
Cesium (Cs)-Total	<0.000010		0.000010	mg/L	09-JUL-19	09-JUL-19	R4701850
Chromium (Cr)-Total	<0.00050		0.00050	mg/L	09-JUL-19	09-JUL-19	R4701850
Cobalt (Co)-Total	<0.00010		0.00010	mg/L	09-JUL-19	09-JUL-19	R4701850
Copper (Cu)-Total	<0.0010		0.0010	mg/L	09-JUL-19	09-JUL-19	R4701850
Iron (Fe)-Total	<0.010		0.010	mg/L	09-JUL-19	09-JUL-19	R4701850
Lead (Pb)-Total	<0.000050		0.000050	mg/L	09-JUL-19	09-JUL-19	R4701850
Lithium (Li)-Total	<0.0010		0.0010	mg/L	09-JUL-19	09-JUL-19	R4701850
Magnesium (Mg)-Total	<0.0050		0.0050	mg/L	09-JUL-19	09-JUL-19	R4701850
Manganese (Mn)-Total	<0.00050		0.00050	mg/L	09-JUL-19	09-JUL-19	R4701850
Mercury (Hg)-Total	<0.000010		0.000010	mg/L		10-JUL-19	R4703589
Molybdenum (Mo)-Total	<0.000050		0.000050	mg/L	09-JUL-19	09-JUL-19	R4701850
Nickel (Ni)-Total	<0.00050		0.00050	mg/L	09-JUL-19	09-JUL-19	R4701850
Phosphorus (P)-Total	<0.050		0.050	mg/L	09-JUL-19	09-JUL-19	R4701850
Potassium (K)-Total	<0.050		0.050	mg/L	09-JUL-19	09-JUL-19	R4701850
Rubidium (Rb)-Total	<0.00020		0.00020	mg/L	09-JUL-19	09-JUL-19	R4701850
Selenium (Se)-Total	<0.000050		0.000050	mg/L	09-JUL-19	09-JUL-19	R4701850
Silicon (Si)-Total	<0.10		0.10	mg/L	09-JUL-19	09-JUL-19	R4701850
Silver (Ag)-Total	<0.000050		0.000050	mg/L	09-JUL-19	09-JUL-19	R4701850
Sodium (Na)-Total	<0.050		0.050	mg/L	09-JUL-19	09-JUL-19	R4701850
Strontium (Sr)-Total	<0.0010		0.0010	mg/L	09-JUL-19	09-JUL-19	R4701850
Sulfur (S)-Total	<0.50		0.50	mg/L	09-JUL-19	09-JUL-19	R4701850
Tellurium (Te)-Total	<0.00020		0.00020	mg/L	09-JUL-19	09-JUL-19	R4701850
Thallium (Tl)-Total	<0.000010		0.000010	mg/L	09-JUL-19	09-JUL-19	R4701850

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ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2305882-2 MS-0803 Sampled By: KB/BC on 08-JUL-19 @ 14:50 Matrix: WATER							
Total Metals							
Thorium (Th)-Total	<0.00010		0.00010	mg/L	09-JUL-19	09-JUL-19	R4701850
Tin (Sn)-Total	<0.00010		0.00010	mg/L	09-JUL-19	09-JUL-19	R4701850
Titanium (Ti)-Total	<0.00030		0.00030	mg/L	09-JUL-19	09-JUL-19	R4701850
Tungsten (W)-Total	<0.00010		0.00010	mg/L	09-JUL-19	09-JUL-19	R4701850
Uranium (U)-Total	<0.000010		0.000010	mg/L	09-JUL-19	09-JUL-19	R4701850
Vanadium (V)-Total	<0.00050		0.00050	mg/L	09-JUL-19	09-JUL-19	R4701850
Zinc (Zn)-Total	<0.0030		0.0030	mg/L	09-JUL-19	09-JUL-19	R4701850
Zirconium (Zr)-Total	<0.00020		0.00020	mg/L	09-JUL-19	09-JUL-19	R4701850
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					10-JUL-19	R4702349
Dissolved Metals Filtration Location	LAB					09-JUL-19	R4700212
Aluminum (Al)-Dissolved	<0.0050		0.0050	mg/L	09-JUL-19	09-JUL-19	R4701774
Antimony (Sb)-Dissolved	<0.00010		0.00010	mg/L	09-JUL-19	09-JUL-19	R4701774
Arsenic (As)-Dissolved	<0.00010		0.00010	mg/L	09-JUL-19	09-JUL-19	R4701774
Barium (Ba)-Dissolved	<0.00010		0.00010	mg/L	09-JUL-19	09-JUL-19	R4701774
Beryllium (Be)-Dissolved	<0.00010		0.00010	mg/L	09-JUL-19	09-JUL-19	R4701774
Bismuth (Bi)-Dissolved	<0.000050		0.000050	mg/L	09-JUL-19	09-JUL-19	R4701774
Boron (B)-Dissolved	<0.010		0.010	mg/L	09-JUL-19	09-JUL-19	R4701774
Cadmium (Cd)-Dissolved	<0.0000050		0.0000050	mg/L	09-JUL-19	09-JUL-19	R4701774
Calcium (Ca)-Dissolved	<0.050		0.050	mg/L	09-JUL-19	09-JUL-19	R4701774
Cesium (Cs)-Dissolved	<0.000010		0.000010	mg/L	09-JUL-19	09-JUL-19	R4701774
Chromium (Cr)-Dissolved	<0.00050		0.00050	mg/L	09-JUL-19	09-JUL-19	R4701774
Cobalt (Co)-Dissolved	<0.00010		0.00010	mg/L	09-JUL-19	09-JUL-19	R4701774
Copper (Cu)-Dissolved	<0.00020		0.00020	mg/L	09-JUL-19	09-JUL-19	R4701774
Iron (Fe)-Dissolved	<0.010		0.010	mg/L	09-JUL-19	09-JUL-19	R4701774
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L	09-JUL-19	09-JUL-19	R4701774
Lithium (Li)-Dissolved	<0.0010		0.0010	mg/L	09-JUL-19	09-JUL-19	R4701774
Magnesium (Mg)-Dissolved	<0.0050		0.0050	mg/L	09-JUL-19	09-JUL-19	R4701774
Manganese (Mn)-Dissolved	<0.00050		0.00050	mg/L	09-JUL-19	09-JUL-19	R4701774
Mercury (Hg)-Dissolved	<0.000010		0.000010	mg/L	10-JUL-19	10-JUL-19	R4703592
Molybdenum (Mo)-Dissolved	<0.000050		0.000050	mg/L	09-JUL-19	09-JUL-19	R4701774
Nickel (Ni)-Dissolved	<0.00050		0.00050	mg/L	09-JUL-19	09-JUL-19	R4701774
Phosphorus (P)-Dissolved	<0.050		0.050	mg/L	09-JUL-19	09-JUL-19	R4701774
Potassium (K)-Dissolved	<0.050		0.050	mg/L	09-JUL-19	09-JUL-19	R4701774
Rubidium (Rb)-Dissolved	<0.00020		0.00020	mg/L	09-JUL-19	09-JUL-19	R4701774
Selenium (Se)-Dissolved	<0.000050		0.000050	mg/L	09-JUL-19	09-JUL-19	R4701774
Silicon (Si)-Dissolved	<0.050		0.050	mg/L	09-JUL-19	09-JUL-19	R4701774
Silver (Ag)-Dissolved	<0.000050		0.000050	mg/L	09-JUL-19	09-JUL-19	R4701774
Sodium (Na)-Dissolved	<0.050		0.050	mg/L	09-JUL-19	09-JUL-19	R4701774
Strontium (Sr)-Dissolved	<0.0010		0.0010	mg/L	09-JUL-19	09-JUL-19	R4701774
Sulfur (S)-Dissolved	<0.50		0.50	mg/L	09-JUL-19	09-JUL-19	R4701774

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2305882-2 MS-0803 Sampled By: KB/BC on 08-JUL-19 @ 14:50 Matrix: WATER							
Dissolved Metals							
Tellurium (Te)-Dissolved	<0.00020		0.00020	mg/L	09-JUL-19	09-JUL-19	R4701774
Thallium (Tl)-Dissolved	<0.000010		0.000010	mg/L	09-JUL-19	09-JUL-19	R4701774
Thorium (Th)-Dissolved	<0.00010		0.00010	mg/L	09-JUL-19	09-JUL-19	R4701774
Tin (Sn)-Dissolved	<0.00010		0.00010	mg/L	09-JUL-19	09-JUL-19	R4701774
Titanium (Ti)-Dissolved	<0.00030		0.00030	mg/L	09-JUL-19	09-JUL-19	R4701774
Tungsten (W)-Dissolved	<0.00010		0.00010	mg/L	09-JUL-19	09-JUL-19	R4701774
Uranium (U)-Dissolved	<0.000010		0.000010	mg/L	09-JUL-19	09-JUL-19	R4701774
Vanadium (V)-Dissolved	<0.00050		0.00050	mg/L	09-JUL-19	09-JUL-19	R4701774
Zinc (Zn)-Dissolved	<0.0010		0.0010	mg/L	09-JUL-19	09-JUL-19	R4701774
Zirconium (Zr)-Dissolved	<0.00020		0.00020	mg/L	09-JUL-19	09-JUL-19	R4701774
Radiological Parameters							
Ra-226	<0.0071		0.0071	Bq/L	16-JUL-19	26-JUL-19	R4692536

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

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Tin (Sn)-Total	B	L2305882-1, -2
Matrix Spike	Calcium (Ca)-Total	MS-B	L2305882-1, -2
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2305882-1, -2
Matrix Spike	Potassium (K)-Total	MS-B	L2305882-1, -2
Matrix Spike	Silicon (Si)-Total	MS-B	L2305882-1, -2
Matrix Spike	Sodium (Na)-Total	MS-B	L2305882-1, -2
Matrix Spike	Strontium (Sr)-Total	MS-B	L2305882-1, -2
Matrix Spike	Sulfur (S)-Total	MS-B	L2305882-1, -2
Matrix Spike	Ammonia, Total (as N)	MS-B	L2305882-1, -2

Sample Parameter Qualifier key listed:

Qualifier	Description
B	Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRV	Reported Result Verified By Repeat Analysis

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACY-TITR-TB	Water	Acidity	APHA 2310 B modified

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

ALK-WT	Water	Alkalinity, Total (as CaCO3)	EPA 310.2

This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.

CL-IC-N-WT	Water	Chloride by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

CN-TOT-WT	Water	Cyanide, Total	ISO 14403-2

Total cyanide is determined by the combination of UV digestion and distillation. Cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

When using this method, high levels of thiocyanate in samples can cause false positives at ~1-2% of the thiocyanate concentration. For samples with detectable cyanide analyzed by this method, ALS recommends analysis for thiocyanate to check for this potential interference

DOC-WT	Water	Dissolved Organic Carbon	APHA 5310B

Sample is filtered through a 0.45um filter, then injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic carbon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.

EC-SCREEN-WT	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

EC-WT	Water	Conductivity	APHA 2510 B

Water samples can be measured directly by immersing the conductivity cell into the sample.

F-IC-N-WT	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-WT	Water	Hardness	APHA 2340 B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-WT	Water	Dissolved Mercury in Water by CVAAS	EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental

Reference Information

Protection Act (July 1, 2011).

HG-T-CVAA-WT	Water	Total Mercury in Water by CVAAS	EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

MET-D-CCMS-WT	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

MET-T-CCMS-WT	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

NH3-F-WT	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO3-IC-WT	Water	Nitrate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-COL-WT	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is deteremined colourimetrically after persulphate digestion of the sample.

PH-BF	Water	pH	APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

RA226-MMER-FC	Water	Ra226 by Alpha Scint, MDC=0.01 Bq/L	EPA 903.1
SO4-IC-N-WT	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-BF	Water	Total Dissolved Solids	APHA 2540C

A well-mixed sample is filtered though glass fibres filter. A known volume of the filtrate is evaporated and dried at 180 +/- 2C for 1hr.

SOLIDS-TSS-BF	Water	Suspended solids	APHA 2540 D-Gravimetric

A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104 +/- 1C for a minimum of four hours or until a constant weight is achieved.

TKN-WT	Water	Total Kjeldahl Nitrogen	APHA 4500-Norg D

This analysis is carried out using procedures adapted from APHA Method 4500-Norg "Nitrogen (Organic)". Total Kjeldahl Nitrogen is determined by sample digestion at 380 Celsius with analysis using an automated colorimetric method.

TOC-WT	Water	Total Organic Carbon	APHA 5310B

Sample is injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic cabon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.

TURBIDITY-BF	Water	Turbidity	APHA 2130 B

Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.

** 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
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA
	ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA

Reference Information

FC	TB
	ALS ENVIRONMENTAL - THUNDER BAY, ONTARIO, CANADA
BF	ALS ENVIRONMENTAL - BAFFIN ISLAND, NUNAVUT, 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 weight of sample
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

Workorder: L2305882 Report Date: 29-JUL-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3

Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACY-TITR-TB	**Water**							
Batch R4708064								
WG3101858-2 LCS								
Acidity (as CaCO3)			96.5		%		85-115	11-JUL-19
WG3101858-1 MB								
Acidity (as CaCO3)			<2.0		mg/L		2	11-JUL-19
ALK-WT	**Water**							
Batch R4702724								
WG3099946-4 DUP		**WG3099946-3**						
Alkalinity, Total (as CaCO3)		25	25		mg/L	0.2	20	09-JUL-19
WG3099946-2 LCS								
Alkalinity, Total (as CaCO3)			103.6		%		85-115	09-JUL-19
WG3099946-1 MB								
Alkalinity, Total (as CaCO3)			<10		mg/L		10	09-JUL-19
CL-IC-N-WT	**Water**							
Batch R4702730								
WG3099831-10 DUP		**WG3099831-8**						
Chloride (Cl)		20.4	20.4		mg/L	0.3	20	09-JUL-19
WG3099831-7 LCS								
Chloride (Cl)			101.9		%		90-110	09-JUL-19
WG3099831-6 MB								
Chloride (Cl)			<0.50		mg/L		0.5	09-JUL-19
WG3099831-9 MS		**WG3099831-8**						
Chloride (Cl)			99.4		%		75-125	09-JUL-19
CN-TOT-WT	**Water**							
Batch R4699634								
WG3099686-3 DUP		**L2305454-1**						
Cyanide, Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	09-JUL-19
WG3099686-2 LCS								
Cyanide, Total			91.6		%		80-120	09-JUL-19
WG3099686-1 MB								
Cyanide, Total			<0.0020		mg/L		0.002	09-JUL-19
WG3099686-4 MS		**L2305454-1**						
Cyanide, Total			91.4		%		70-130	09-JUL-19
Batch R4704470								
WG3100914-3 DUP		**L2305882-1**						
Cyanide, Total		0.021	0.020		mg/L	5.9	20	10-JUL-19
WG3100914-2 LCS								
Cyanide, Total			86.3		%		80-120	10-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CN-TOT-WT	**Water**							
Batch R4704470								
WG3100914-1 MB								
Cyanide, Total			<0.0020		mg/L		0.002	10-JUL-19
WG3100914-4 MS		**L2305882-1**						
Cyanide, Total			82.6		%		70-130	10-JUL-19
DOC-WT	**Water**							
Batch R4703168								
WG3100247-3 DUP		**L2305271-1**						
Dissolved Organic Carbon		2.04	2.11		mg/L	3.4	25	10-JUL-19
WG3100247-2 LCS								
Dissolved Organic Carbon			110.4		%		70-130	10-JUL-19
WG3100247-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	10-JUL-19
WG3100247-4 MS		**L2305271-1**						
Dissolved Organic Carbon			113.6		%		70-130	10-JUL-19
EC-WT	**Water**							
Batch R4702724								
WG3099946-4 DUP		**WG3099946-3**						
Conductivity		51.6	51.3		umhos/cm	0.6	10	09-JUL-19
WG3099946-2 LCS								
Conductivity			101.8		%		90-110	09-JUL-19
WG3099946-1 MB								
Conductivity			<3.0		umhos/cm		3	09-JUL-19
F-IC-N-WT	**Water**							
Batch R4702730								
WG3099831-10 DUP		**WG3099831-8**						
Fluoride (F)		0.038	0.038		mg/L	0.4	20	09-JUL-19
WG3099831-7 LCS								
Fluoride (F)			105.3		%		90-110	09-JUL-19
WG3099831-6 MB								
Fluoride (F)			<0.020		mg/L		0.02	09-JUL-19
WG3099831-9 MS		**WG3099831-8**						
Fluoride (F)			95.4		%		75-125	09-JUL-19
HG-D-CVAA-WT	**Water**							
Batch R4703592								
WG3100701-4 DUP		**WG3100701-3**						
Mercury (Hg)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	10-JUL-19
WG3100701-2 LCS								

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-D-CVAA-WT	**Water**							
Batch R4703592								
WG3100701-2 LCS								
Mercury (Hg)-Dissolved			99.9		%		80-120	10-JUL-19
WG3100701-1 MB								
Mercury (Hg)-Dissolved			<0.000010		mg/L		0.00001	10-JUL-19
WG3100701-6 MS		**WG3100701-5**						
Mercury (Hg)-Dissolved			97.1		%		70-130	10-JUL-19
HG-T-CVAA-WT	**Water**							
Batch R4703589								
WG3100694-6 DUP		**WG3100694-5**						
Mercury (Hg)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	10-JUL-19
WG3100694-2 LCS								
Mercury (Hg)-Total			101.0		%		80-120	10-JUL-19
WG3100694-1 MB								
Mercury (Hg)-Total			<0.000010		mg/L		0.00001	10-JUL-19
WG3100694-8 MS		**WG3100694-7**						
Mercury (Hg)-Total			91.7		%		70-130	10-JUL-19
MET-D-CCMS-WT	**Water**							
Batch R4701774								
WG3100068-4 DUP		**WG3100068-3**						
Aluminum (Al)-Dissolved		<0.050	<0.050	RPD-NA	mg/L	N/A	20	09-JUL-19
Antimony (Sb)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	09-JUL-19
Arsenic (As)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	09-JUL-19
Barium (Ba)-Dissolved		0.0310	0.0284		mg/L	8.9	20	09-JUL-19
Beryllium (Be)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	09-JUL-19
Bismuth (Bi)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	09-JUL-19
Boron (B)-Dissolved		<0.10	<0.10	RPD-NA	mg/L	N/A	20	09-JUL-19
Cadmium (Cd)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	09-JUL-19
Calcium (Ca)-Dissolved		290	251		mg/L	14	20	09-JUL-19
Cesium (Cs)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	09-JUL-19
Chromium (Cr)-Dissolved		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	09-JUL-19
Cobalt (Co)-Dissolved		0.0207	0.0190		mg/L	8.5	20	09-JUL-19
Copper (Cu)-Dissolved		0.0064	0.0054		mg/L	17	20	09-JUL-19
Iron (Fe)-Dissolved		<0.10	<0.10	RPD-NA	mg/L	N/A	20	09-JUL-19
Lead (Pb)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	09-JUL-19
Lithium (Li)-Dissolved		0.048	0.033	J	mg/L	0.014	0.02	09-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4701774								
WG3100068-4 DUP		**WG3100068-3**						
Magnesium (Mg)-Dissolved		589	556		mg/L	5.7	20	09-JUL-19
Manganese (Mn)-Dissolved		13.0	12.4		mg/L	4.9	20	09-JUL-19
Molybdenum (Mo)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	09-JUL-19
Nickel (Ni)-Dissolved		0.0192	0.0189		mg/L	1.4	20	09-JUL-19
Phosphorus (P)-Dissolved		<0.50	<0.50	RPD-NA	mg/L	N/A	20	09-JUL-19
Potassium (K)-Dissolved		5.56	4.80		mg/L	15	20	09-JUL-19
Rubidium (Rb)-Dissolved		0.0092	0.0081		mg/L	13	20	09-JUL-19
Selenium (Se)-Dissolved		0.00581	0.00552		mg/L	5.3	20	09-JUL-19
Silicon (Si)-Dissolved		<0.50	<0.50	RPD-NA	mg/L	N/A	20	09-JUL-19
Silver (Ag)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	09-JUL-19
Sodium (Na)-Dissolved		3.93	3.43		mg/L	14	20	09-JUL-19
Strontium (Sr)-Dissolved		0.612	0.569		mg/L	7.3	20	09-JUL-19
Sulfur (S)-Dissolved		1060	958		mg/L	10	20	09-JUL-19
Tellurium (Te)-Dissolved		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	09-JUL-19
Thallium (Tl)-Dissolved		0.00013	0.00013		mg/L	3.5	20	09-JUL-19
Thorium (Th)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	09-JUL-19
Tin (Sn)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	09-JUL-19
Titanium (Ti)-Dissolved		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	09-JUL-19
Tungsten (W)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	09-JUL-19
Uranium (U)-Dissolved		0.00018	0.00018		mg/L	2.6	20	09-JUL-19
Vanadium (V)-Dissolved		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	09-JUL-19
Zinc (Zn)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	09-JUL-19
Zirconium (Zr)-Dissolved		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	09-JUL-19
WG3100068-2 LCS								
Aluminum (Al)-Dissolved			101.4		%		80-120	09-JUL-19
Antimony (Sb)-Dissolved			97.4		%		80-120	09-JUL-19
Arsenic (As)-Dissolved			100.7		%		80-120	09-JUL-19
Barium (Ba)-Dissolved			102.3		%		80-120	09-JUL-19
Beryllium (Be)-Dissolved			94.7		%		80-120	09-JUL-19
Bismuth (Bi)-Dissolved			97.6		%		80-120	09-JUL-19
Boron (B)-Dissolved			95.0		%		80-120	09-JUL-19
Cadmium (Cd)-Dissolved			101.2		%		80-120	09-JUL-19
Calcium (Ca)-Dissolved			98.0		%		80-120	09-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4701774								
WG3100068-2 LCS								
Cesium (Cs)-Dissolved			100.6		%		80-120	09-JUL-19
Chromium (Cr)-Dissolved			99.96		%		80-120	09-JUL-19
Cobalt (Co)-Dissolved			98.5		%		80-120	09-JUL-19
Copper (Cu)-Dissolved			96.7		%		80-120	09-JUL-19
Iron (Fe)-Dissolved			97.2		%		80-120	09-JUL-19
Lead (Pb)-Dissolved			100.5		%		80-120	09-JUL-19
Lithium (Li)-Dissolved			91.0		%		80-120	09-JUL-19
Magnesium (Mg)-Dissolved			98.7		%		80-120	09-JUL-19
Manganese (Mn)-Dissolved			100.6		%		80-120	09-JUL-19
Molybdenum (Mo)-Dissolved			100.9		%		80-120	09-JUL-19
Nickel (Ni)-Dissolved			98.7		%		80-120	09-JUL-19
Phosphorus (P)-Dissolved			95.6		%		80-120	09-JUL-19
Potassium (K)-Dissolved			94.6		%		80-120	09-JUL-19
Rubidium (Rb)-Dissolved			103.3		%		80-120	09-JUL-19
Selenium (Se)-Dissolved			101.5		%		80-120	09-JUL-19
Silicon (Si)-Dissolved			103.2		%		60-140	09-JUL-19
Silver (Ag)-Dissolved			102.2		%		80-120	09-JUL-19
Sodium (Na)-Dissolved			103.5		%		80-120	09-JUL-19
Strontium (Sr)-Dissolved			99.3		%		80-120	09-JUL-19
Sulfur (S)-Dissolved			101.8		%		80-120	09-JUL-19
Tellurium (Te)-Dissolved			94.6		%		80-120	09-JUL-19
Thallium (Tl)-Dissolved			101.3		%		80-120	09-JUL-19
Thorium (Th)-Dissolved			96.5		%		80-120	09-JUL-19
Tin (Sn)-Dissolved			101.7		%		80-120	09-JUL-19
Titanium (Ti)-Dissolved			96.3		%		80-120	09-JUL-19
Tungsten (W)-Dissolved			97.6		%		80-120	09-JUL-19
Uranium (U)-Dissolved			100.2		%		80-120	09-JUL-19
Vanadium (V)-Dissolved			100.5		%		80-120	09-JUL-19
Zinc (Zn)-Dissolved			101.4		%		80-120	09-JUL-19
Zirconium (Zr)-Dissolved			97.8		%		80-120	09-JUL-19
WG3100068-1 MB								
Aluminum (Al)-Dissolved			<0.0050		mg/L		0.005	09-JUL-19
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	09-JUL-19
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	09-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4701774								
WG3100068-1 MB								
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	09-JUL-19
Beryllium (Be)-Dissolved			<0.00010		mg/L		0.0001	09-JUL-19
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	09-JUL-19
Boron (B)-Dissolved			<0.010		mg/L		0.01	09-JUL-19
Cadmium (Cd)-Dissolved			<0.000005(		mg/L		0.000005	09-JUL-19
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	09-JUL-19
Cesium (Cs)-Dissolved			<0.000010		mg/L		0.00001	09-JUL-19
Chromium (Cr)-Dissolved			<0.00050		mg/L		0.0005	09-JUL-19
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	09-JUL-19
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	09-JUL-19
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	09-JUL-19
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	09-JUL-19
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	09-JUL-19
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	09-JUL-19
Manganese (Mn)-Dissolved			<0.00050		mg/L		0.0005	09-JUL-19
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	09-JUL-19
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	09-JUL-19
Phosphorus (P)-Dissolved			<0.050		mg/L		0.05	09-JUL-19
Potassium (K)-Dissolved			<0.050		mg/L		0.05	09-JUL-19
Rubidium (Rb)-Dissolved			<0.00020		mg/L		0.0002	09-JUL-19
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	09-JUL-19
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	09-JUL-19
Silver (Ag)-Dissolved			<0.000050		mg/L		0.00005	09-JUL-19
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	09-JUL-19
Strontium (Sr)-Dissolved			<0.0010		mg/L		0.001	09-JUL-19
Sulfur (S)-Dissolved			<0.50		mg/L		0.5	09-JUL-19
Tellurium (Te)-Dissolved			<0.00020		mg/L		0.0002	09-JUL-19
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	09-JUL-19
Thorium (Th)-Dissolved			<0.00010		mg/L		0.0001	09-JUL-19
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	09-JUL-19
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	09-JUL-19
Tungsten (W)-Dissolved			<0.00010		mg/L		0.0001	09-JUL-19
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	09-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4701774								
WG3100068-1 MB								
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	09-JUL-19
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	09-JUL-19
Zirconium (Zr)-Dissolved			<0.00020		mg/L		0.0002	09-JUL-19
WG3100068-5 MS		**WG3100068-6**						
Aluminum (Al)-Dissolved			95.6		%		70-130	09-JUL-19
Antimony (Sb)-Dissolved			94.9		%		70-130	09-JUL-19
Arsenic (As)-Dissolved			97.9		%		70-130	09-JUL-19
Barium (Ba)-Dissolved			100.4		%		70-130	09-JUL-19
Beryllium (Be)-Dissolved			93.7		%		70-130	09-JUL-19
Bismuth (Bi)-Dissolved			96.5		%		70-130	09-JUL-19
Boron (B)-Dissolved			91.4		%		70-130	09-JUL-19
Cadmium (Cd)-Dissolved			99.4		%		70-130	09-JUL-19
Calcium (Ca)-Dissolved			96.1		%		70-130	09-JUL-19
Cesium (Cs)-Dissolved			97.6		%		70-130	09-JUL-19
Chromium (Cr)-Dissolved			95.6		%		70-130	09-JUL-19
Cobalt (Co)-Dissolved			95.2		%		70-130	09-JUL-19
Copper (Cu)-Dissolved			95.3		%		70-130	09-JUL-19
Iron (Fe)-Dissolved			93.2		%		70-130	09-JUL-19
Lead (Pb)-Dissolved			97.2		%		70-130	09-JUL-19
Lithium (Li)-Dissolved			87.3		%		70-130	09-JUL-19
Magnesium (Mg)-Dissolved			94.2		%		70-130	09-JUL-19
Manganese (Mn)-Dissolved			96.8		%		70-130	09-JUL-19
Molybdenum (Mo)-Dissolved			98.5		%		70-130	09-JUL-19
Nickel (Ni)-Dissolved			93.7		%		70-130	09-JUL-19
Phosphorus (P)-Dissolved			93.3		%		70-130	09-JUL-19
Potassium (K)-Dissolved			90.9		%		70-130	09-JUL-19
Rubidium (Rb)-Dissolved			98.5		%		70-130	09-JUL-19
Selenium (Se)-Dissolved			97.6		%		70-130	09-JUL-19
Silicon (Si)-Dissolved			94.1		%		70-130	09-JUL-19
Silver (Ag)-Dissolved			97.8		%		70-130	09-JUL-19
Sodium (Na)-Dissolved			96.6		%		70-130	09-JUL-19
Strontium (Sr)-Dissolved			95.1		%		70-130	09-JUL-19
Sulfur (S)-Dissolved			99.99		%		70-130	09-JUL-19
Tellurium (Te)-Dissolved			93.9		%		70-130	09-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4701774								
WG3100068-5 MS		**WG3100068-6**						
Thallium (Tl)-Dissolved			94.0		%		70-130	09-JUL-19
Thorium (Th)-Dissolved			92.6		%		70-130	09-JUL-19
Tin (Sn)-Dissolved			98.7		%		70-130	09-JUL-19
Titanium (Ti)-Dissolved			95.6		%		70-130	09-JUL-19
Tungsten (W)-Dissolved			94.0		%		70-130	09-JUL-19
Uranium (U)-Dissolved			96.4		%		70-130	09-JUL-19
Vanadium (V)-Dissolved			97.2		%		70-130	09-JUL-19
Zinc (Zn)-Dissolved			96.7		%		70-130	09-JUL-19
Zirconium (Zr)-Dissolved			92.5		%		70-130	09-JUL-19
MET-T-CCMS-WT	**Water**							
Batch R4701850								
WG3100205-4 DUP		**WG3100205-3**						
Aluminum (Al)-Total		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	09-JUL-19
Antimony (Sb)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	09-JUL-19
Arsenic (As)-Total		0.00012	0.00013		mg/L	5.5	20	09-JUL-19
Barium (Ba)-Total		0.0157	0.0146		mg/L	7.2	20	09-JUL-19
Beryllium (Be)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	09-JUL-19
Bismuth (Bi)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	09-JUL-19
Boron (B)-Total		0.054	0.055		mg/L	1.8	20	09-JUL-19
Cadmium (Cd)-Total		0.0000396	0.0000404		mg/L	2.0	20	09-JUL-19
Calcium (Ca)-Total		109	108		mg/L	0.8	20	09-JUL-19
Chromium (Cr)-Total		0.0618	0.0595		mg/L	3.8	20	09-JUL-19
Cesium (Cs)-Total		0.000011	0.000012		mg/L	3.5	20	09-JUL-19
Cobalt (Co)-Total		0.00014	0.00013		mg/L	5.4	20	09-JUL-19
Copper (Cu)-Total		0.0014	0.0014		mg/L	3.8	20	09-JUL-19
Iron (Fe)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	09-JUL-19
Lead (Pb)-Total		0.000179	0.000175		mg/L	2.1	20	09-JUL-19
Lithium (Li)-Total		0.0017	0.0019		mg/L	8.3	20	09-JUL-19
Magnesium (Mg)-Total		20.2	19.5		mg/L	3.2	20	09-JUL-19
Manganese (Mn)-Total		0.00101	0.00104		mg/L	2.3	20	09-JUL-19
Molybdenum (Mo)-Total		0.000069	0.000066		mg/L	4.0	20	09-JUL-19
Nickel (Ni)-Total		0.0101	0.00965		mg/L	4.4	20	09-JUL-19
Phosphorus (P)-Total		<0.050	<0.050	RPD-NA	mg/L	N/A	20	09-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4701850								
WG3100205-4 DUP		**WG3100205-3**						
Potassium (K)-Total		3.59	3.45		mg/L	4.1	20	09-JUL-19
Rubidium (Rb)-Total		0.00114	0.00118		mg/L	3.3	20	09-JUL-19
Selenium (Se)-Total		0.000340	0.000363		mg/L	6.5	20	09-JUL-19
Silicon (Si)-Total		3.37	3.33		mg/L	1.3	20	09-JUL-19
Silver (Ag)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	09-JUL-19
Sodium (Na)-Total		101	98.4		mg/L	2.7	20	09-JUL-19
Strontium (Sr)-Total		0.180	0.181		mg/L	0.6	20	09-JUL-19
Sulfur (S)-Total		14.4	14.0		mg/L	2.5	25	09-JUL-19
Thallium (Tl)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	09-JUL-19
Tellurium (Te)-Total		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	09-JUL-19
Thorium (Th)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	25	09-JUL-19
Tin (Sn)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	09-JUL-19
Titanium (Ti)-Total		<0.00030	<0.00030	RPD-NA	mg/L	N/A	20	09-JUL-19
Tungsten (W)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	09-JUL-19
Uranium (U)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	09-JUL-19
Vanadium (V)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	09-JUL-19
Zinc (Zn)-Total		0.0056	0.0052		mg/L	7.8	20	09-JUL-19
Zirconium (Zr)-Total		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	09-JUL-19
WG3100205-2 LCS								
Aluminum (Al)-Total			97.8		%		80-120	09-JUL-19
Antimony (Sb)-Total			102.6		%		80-120	09-JUL-19
Arsenic (As)-Total			100.6		%		80-120	09-JUL-19
Barium (Ba)-Total			104.6		%		80-120	09-JUL-19
Beryllium (Be)-Total			97.0		%		80-120	09-JUL-19
Bismuth (Bi)-Total			99.9		%		80-120	09-JUL-19
Boron (B)-Total			96.8		%		80-120	09-JUL-19
Cadmium (Cd)-Total			97.7		%		80-120	09-JUL-19
Calcium (Ca)-Total			99.0		%		80-120	09-JUL-19
Chromium (Cr)-Total			98.9		%		80-120	09-JUL-19
Cesium (Cs)-Total			102.7		%		80-120	09-JUL-19
Cobalt (Co)-Total			97.2		%		80-120	09-JUL-19
Copper (Cu)-Total			96.9		%		80-120	09-JUL-19
Iron (Fe)-Total			95.5		%		80-120	09-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4701850								
WG3100205-2 LCS								
Lead (Pb)-Total			99.5		%		80-120	09-JUL-19
Lithium (Li)-Total			93.3		%		80-120	09-JUL-19
Magnesium (Mg)-Total			98.7		%		80-120	09-JUL-19
Manganese (Mn)-Total			99.8		%		80-120	09-JUL-19
Molybdenum (Mo)-Total			102.6		%		80-120	09-JUL-19
Nickel (Ni)-Total			97.1		%		80-120	09-JUL-19
Phosphorus (P)-Total			105.7		%		70-130	09-JUL-19
Potassium (K)-Total			94.7		%		80-120	09-JUL-19
Rubidium (Rb)-Total			99.8		%		80-120	09-JUL-19
Selenium (Se)-Total			97.9		%		80-120	09-JUL-19
Silicon (Si)-Total			100.9		%		60-140	09-JUL-19
Silver (Ag)-Total			104.6		%		80-120	09-JUL-19
Sodium (Na)-Total			103.6		%		80-120	09-JUL-19
Strontium (Sr)-Total			101.5		%		80-120	09-JUL-19
Sulfur (S)-Total			101.6		%		80-120	09-JUL-19
Thallium (Tl)-Total			95.1		%		80-120	09-JUL-19
Tellurium (Te)-Total			102.6		%		80-120	09-JUL-19
Thorium (Th)-Total			94.8		%		70-130	09-JUL-19
Tin (Sn)-Total			99.7		%		80-120	09-JUL-19
Titanium (Ti)-Total			95.7		%		80-120	09-JUL-19
Tungsten (W)-Total			97.1		%		80-120	09-JUL-19
Uranium (U)-Total			99.5		%		80-120	09-JUL-19
Vanadium (V)-Total			100.8		%		80-120	09-JUL-19
Zinc (Zn)-Total			99.9		%		80-120	09-JUL-19
Zirconium (Zr)-Total			100.0		%		80-120	09-JUL-19
WG3100205-1 MB								
Aluminum (Al)-Total			<0.0050		mg/L		0.005	09-JUL-19
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	09-JUL-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	09-JUL-19
Barium (Ba)-Total			<0.00010		mg/L		0.0001	09-JUL-19
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	09-JUL-19
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	09-JUL-19
Boron (B)-Total			<0.010		mg/L		0.01	09-JUL-19
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	09-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4701850								
WG3100205-1 MB								
Calcium (Ca)-Total			<0.050		mg/L		0.05	09-JUL-19
Chromium (Cr)-Total			<0.00050		mg/L		0.0005	09-JUL-19
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	09-JUL-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	09-JUL-19
Copper (Cu)-Total			<0.0010		mg/L		0.001	09-JUL-19
Iron (Fe)-Total			<0.010		mg/L		0.01	09-JUL-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	09-JUL-19
Lithium (Li)-Total			<0.0010		mg/L		0.001	09-JUL-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	09-JUL-19
Manganese (Mn)-Total			<0.00050		mg/L		0.0005	09-JUL-19
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	09-JUL-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	09-JUL-19
Phosphorus (P)-Total			<0.050		mg/L		0.05	09-JUL-19
Potassium (K)-Total			<0.050		mg/L		0.05	09-JUL-19
Rubidium (Rb)-Total			<0.00020		mg/L		0.0002	09-JUL-19
Selenium (Se)-Total			<0.000050		mg/L		0.00005	09-JUL-19
Silicon (Si)-Total			<0.10		mg/L		0.1	09-JUL-19
Silver (Ag)-Total			<0.000050		mg/L		0.00005	09-JUL-19
Sodium (Na)-Total			<0.050		mg/L		0.05	09-JUL-19
Strontium (Sr)-Total			<0.0010		mg/L		0.001	09-JUL-19
Sulfur (S)-Total			<0.50		mg/L		0.5	09-JUL-19
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	09-JUL-19
Tellurium (Te)-Total			<0.00020		mg/L		0.0002	09-JUL-19
Thorium (Th)-Total			<0.00010		mg/L		0.0001	09-JUL-19
Tin (Sn)-Total			0.00011	B	mg/L		0.0001	09-JUL-19
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	09-JUL-19
Tungsten (W)-Total			<0.00010		mg/L		0.0001	09-JUL-19
Uranium (U)-Total			<0.000010		mg/L		0.00001	09-JUL-19
Vanadium (V)-Total			<0.00050		mg/L		0.0005	09-JUL-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	09-JUL-19
Zirconium (Zr)-Total			<0.00020		mg/L		0.0002	09-JUL-19
WG3100205-5 MS		**WG3100205-6**						
Aluminum (Al)-Total			93.7		%		70-130	09-JUL-19
Antimony (Sb)-Total			99.0		%		70-130	09-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4701850								
WG3100205-5 MS		**WG3100205-6**						
Arsenic (As)-Total			97.5		%		70-130	09-JUL-19
Barium (Ba)-Total			95.2		%		70-130	09-JUL-19
Beryllium (Be)-Total			95.9		%		70-130	09-JUL-19
Bismuth (Bi)-Total			89.9		%		70-130	09-JUL-19
Boron (B)-Total			92.6		%		70-130	09-JUL-19
Cadmium (Cd)-Total			96.7		%		70-130	09-JUL-19
Calcium (Ca)-Total			N/A	MS-B	%		-	09-JUL-19
Chromium (Cr)-Total			94.2		%		70-130	09-JUL-19
Cesium (Cs)-Total			100.1		%		70-130	09-JUL-19
Cobalt (Co)-Total			93.5		%		70-130	09-JUL-19
Copper (Cu)-Total			88.8		%		70-130	09-JUL-19
Iron (Fe)-Total			92.4		%		70-130	09-JUL-19
Lead (Pb)-Total			92.0		%		70-130	09-JUL-19
Lithium (Li)-Total			94.3		%		70-130	09-JUL-19
Magnesium (Mg)-Total			N/A	MS-B	%		-	09-JUL-19
Manganese (Mn)-Total			95.4		%		70-130	09-JUL-19
Molybdenum (Mo)-Total			102.9		%		70-130	09-JUL-19
Nickel (Ni)-Total			88.6		%		70-130	09-JUL-19
Phosphorus (P)-Total			99.1		%		70-130	09-JUL-19
Potassium (K)-Total			N/A	MS-B	%		-	09-JUL-19
Rubidium (Rb)-Total			98.3		%		70-130	09-JUL-19
Selenium (Se)-Total			96.7		%		70-130	09-JUL-19
Silicon (Si)-Total			N/A	MS-B	%		-	09-JUL-19
Silver (Ag)-Total			94.2		%		70-130	09-JUL-19
Sodium (Na)-Total			N/A	MS-B	%		-	09-JUL-19
Strontium (Sr)-Total			N/A	MS-B	%		-	09-JUL-19
Sulfur (S)-Total			N/A	MS-B	%		-	09-JUL-19
Thallium (Tl)-Total			89.5		%		70-130	09-JUL-19
Tellurium (Te)-Total			89.1		%		70-130	09-JUL-19
Thorium (Th)-Total			95.7		%		70-130	09-JUL-19
Tin (Sn)-Total			100.2		%		70-130	09-JUL-19
Titanium (Ti)-Total			98.3		%		70-130	09-JUL-19
Tungsten (W)-Total			95.0		%		70-130	09-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4701850								
WG3100205-5 MS		**WG3100205-6**						
Uranium (U)-Total			99.2		%		70-130	09-JUL-19
Vanadium (V)-Total			100.7		%		70-130	09-JUL-19
Zinc (Zn)-Total			87.6		%		70-130	09-JUL-19
Zirconium (Zr)-Total			100.6		%		70-130	09-JUL-19
NH3-F-WT	**Water**							
Batch R4704649								
WG3100763-11 DUP		**L2303372-1**						
Ammonia, Total (as N)		3.75	3.76		mg/L	0.3	20	10-JUL-19
WG3100763-10 LCS								
Ammonia, Total (as N)			105.1		%		85-115	10-JUL-19
WG3100763-9 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	10-JUL-19
WG3100763-12 MS		**L2303372-1**						
Ammonia, Total (as N)			N/A	MS-B	%		-	10-JUL-19
NO3-IC-WT	**Water**							
Batch R4702730								
WG3099831-10 DUP		**WG3099831-8**						
Nitrate (as N)		0.208	0.192		mg/L	8.1	20	09-JUL-19
WG3099831-7 LCS								
Nitrate (as N)			102.1		%		90-110	09-JUL-19
WG3099831-6 MB								
Nitrate (as N)			<0.020		mg/L		0.02	09-JUL-19
WG3099831-9 MS		**WG3099831-8**						
Nitrate (as N)			94.3		%		75-125	09-JUL-19
P-T-COL-WT	**Water**							
Batch R4703451								
WG3100370-3 DUP		**L2305882-1**						
Phosphorus, Total		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	10-JUL-19
WG3100370-2 LCS								
Phosphorus, Total			102.0		%		80-120	10-JUL-19
WG3100370-1 MB								
Phosphorus, Total			<0.0030		mg/L		0.003	10-JUL-19
WG3100370-4 MS		**L2305882-1**						
Phosphorus, Total			93.8		%		70-130	10-JUL-19
PH-BF	**Water**							

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PH-BF	**Water**							
Batch R4701528								
WG3100337-2 DUP		**L2305805-1**						
pH		6.58	6.59	J	pH units	0.01	0.2	09-JUL-19
WG3100337-1 LCS								
pH			7.01		pH units		6.9-7.1	09-JUL-19
SO4-IC-N-WT	**Water**							
Batch R4702730								
WG3099831-10 DUP		**WG3099831-8**						
Sulfate (SO4)		32.6	32.7		mg/L	0.5	20	09-JUL-19
WG3099831-7 LCS								
Sulfate (SO4)			102.4		%		90-110	09-JUL-19
WG3099831-6 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	09-JUL-19
WG3099831-9 MS		**WG3099831-8**						
Sulfate (SO4)			98.0		%		75-125	09-JUL-19
SOLIDS-TDS-BF	**Water**							
Batch R4701789								
WG3099304-3 DUP		**L2305805-1**						
Total Dissolved Solids		2360	2440		mg/L	3.4	20	09-JUL-19
WG3099304-2 LCS								
Total Dissolved Solids			103.2		%		85-115	09-JUL-19
WG3099304-1 MB								
Total Dissolved Solids			<20		mg/L		20	09-JUL-19
SOLIDS-TSS-BF	**Water**							
Batch R4701468								
WG3099303-3 DUP		**L2305805-1**						
Total Suspended Solids		52.0	58.4		mg/L	12	25	08-JUL-19
WG3099303-2 LCS								
Total Suspended Solids			99.4		%		85-115	08-JUL-19
WG3099303-1 MB								
Total Suspended Solids			<2.0		mg/L		2	08-JUL-19
TKN-WT	**Water**							
Batch R4704933								
WG3100183-3 DUP		**L2300071-1**						
Total Kjeldahl Nitrogen		0.41	0.36		mg/L	13	20	10-JUL-19
WG3100183-2 LCS								
Total Kjeldahl Nitrogen			95.7		%		75-125	10-JUL-19
WG3100183-1 MB								

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TKN-WT	**Water**							
Batch R4704933								
WG3100183-1 MB								
Total Kjeldahl Nitrogen			<0.15		mg/L		0.15	10-JUL-19
WG3100183-4 MS		**L2300071-1**						
Total Kjeldahl Nitrogen			92.0		%		70-130	10-JUL-19
TOC-WT	**Water**							
Batch R4703169								
WG3100605-3 DUP		**L2305882-1**						
Total Organic Carbon		3.65	3.68		mg/L	0.8	20	10-JUL-19
WG3100605-2 LCS								
Total Organic Carbon			102.7		%		80-120	10-JUL-19
WG3100605-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	10-JUL-19
WG3100605-4 MS		**L2305882-1**						
Total Organic Carbon			112.4		%		70-130	10-JUL-19
TURBIDITY-BF	**Water**							
Batch R4701569								
WG3100347-3 DUP		**L2305805-1**						
Turbidity		125	124		NTU	0.8	15	09-JUL-19
WG3100347-2 LCS								
Turbidity			101.0		%		85-115	09-JUL-19
WG3100347-1 MB								
Turbidity			<0.10		NTU		0.1	09-JUL-19

Quality Control Report

Workorder: L2305882 Report Date: 29-JUL-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

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

Sample Parameter Qualifier Definitions:

Qualifier	Description
B	Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

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.

Sunday, July 28, 2019

Rick Hawthorne
ALS Environmental
60 Northland Rd, Unit 1
Waterloo Canada, ON N2V 2B8

Re: ALS Workorder: 1907200
Project Name:
Project Number: L2305882

Dear Mr. Hawthorne:

Two water samples were received from ALS Environmental, on 7/10/2019. The samples were scheduled for the following analysis:

Radium-226

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,

ALS Environmental
Katie M. OBrien
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
AIHA	214884
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280

1907200

Radium-226:

The samples were prepared and analyzed according to the current revision of SOP 783.

All acceptance criteria were met.

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1907200
Client Name: ALS Environmental
Client Project Name:
Client Project Number: L2305882
Client PO Number: L2305882

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
L2305882-1	1907200-1		WATER	08-Jul-19	
L2305882-2	1907200-2		WATER	08-Jul-19	

ALS Environmental

L2305882

WATERLOO

1907200

Subcontract Request Form

Subcontract To:

ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA 2x 1L HDPE

225 COMMERCE DRIVE
FORT COLLINS,CO 80524

NOTES: Please reference on final report and invoice: PO# *L2305882*
ALS requires QC data to be provided with your final results.

Please see enclosed 2 sample(s) in 2 Container(s)

SAMPLE NUMBER	ANALYTICAL REQUIRED	DATE SAMPLED / DUE DATE	Priority Flag
L2305882-1 MS-08		7/ 8/ 2019	E
	Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	7/26/2019	
L2305882-2 MS-0803		7/ 8/ 2019	E
	Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	7/26/2019	

Subcontract Info Contact: Mary-Lynn Pike (519) 886-6910
Analysis and reporting info contact: Rick Hawthorne
60 NORTHLAND ROAD, UNIT 1
WATERLOO,ON N2V 2B8
Phone: (519) 886-6910 Email: Rick.Hawthorne@alsglobal.com

Please email confirmation of receipt to: Rick.Hawthorne@alsglobal.com

Shipped By: _____ Date Shipped: _____

Received By: EWE Date Received: 7/10/19 1445

Verified By: _____ Date Verified: _____

Temperature: _____

Sample Integrity Issues: _____

ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: ALS Waterloo Workorder No: 1907200

Project Manager: KMO Initials: EE Date: 7/10/19

1.	Are airbills / shipping documents present and/or removable?	DROP OFF	(YES)	NO
2.	Are custody seals on **shipping** containers intact?	(NONE)	YES	NO *
3.	Are custody seals on **sample** containers intact?	(NONE)	YES	NO *
4.	Is there a COC (chain-of-custody) present?		(YES)	NO *
5.	Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)		(YES)	NO *
6.	Are short-hold samples present?		YES	(NO)
7.	Are all samples within holding times for the requested analyses?		(YES)	NO *
8.	Were all sample containers received intact? (not broken or leaking)		(YES)	NO *
9.	Is there sufficient sample for the requested analyses?		(YES)	NO *
10.	Are all samples in the proper containers for the requested analyses?		(YES)	NO *
11.	Are all aqueous samples preserved correctly, if required? (excluding volatiles)	N/A	(YES)	NO *
12.	Are all aqueous non-preserved samples pH 4-9?	(N/A)	YES	NO *
13.	Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm (1/4 inch) diameter? (i.e. size of green pea)	(N/A)	YES	NO
14.	Were the samples shipped on ice?		(YES)	NO
15.	Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: #1 #3 #4	RAD ONLY	YES	(NO)

Cooler #:	1							
Temperature (°C):	18.8							
No. of custody seals on cooler:	0							
DOT Survey/ Acceptance Information — External µR/hr reading:	8							
Background µR/hr reading:	10							

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? (YES) / NO / NA (If no, see Form 008.)

*** Please provide details here for NO responses to gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.**

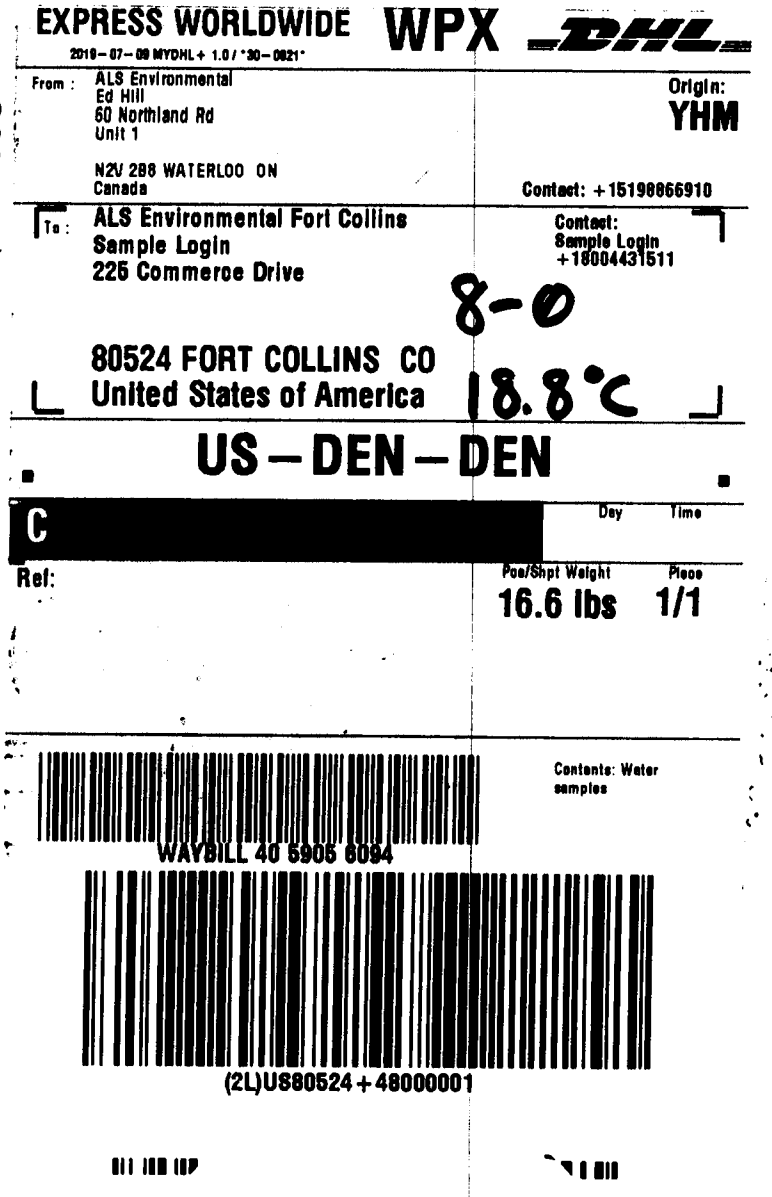
All client bottle ID's vs ALS lab ID's double-checked by: EE

If applicable, was the client contacted? **YES / NO / NA** Contact: _____ Date/Time: _____

Project Manager Signature / Date: 7/11/19

Form 201r27.xls
(02/11/2019)

*IR Gun #1, VWR SN 170560549
*IR Gun #3, VWR SN 170647571
*IR Gun #4, Oakton, SN 2372220101-0002



EXPRESS WORLDWIDE WPX DHL

2019-07-09 MYDHL+ 1.0 / *30-0821*

1907200

From : ALS Environmental
Ed Hill
60 Northland Rd
Unit 1

N2V 2B8 WATERLOO ON
Canada

Origin:
YHM

Contact: +15198666910

To : ALS Environmental Fort Collins
Sample Login
225 Commerce Drive

Contact:
Sample Login
+18004431511

8-0

80524 FORT COLLINS CO
United States of America

18.8°C

US-DEN-DEN

C [redacted] Day Time

Ref:

Pce/Shpt Weight 16.6 lbs

Piece 1/1

Contents: Water samples

WAYBILL 40 5905 6094

(2L)US80524+48000001

Client:	ALS Environmental	**Date:**	*28-Jul-19*
Project:	L2305882	**Work Order:**	1907200
Sample ID:	L2305882-1	**Lab ID:**	1907200-1
Legal Location:		**Matrix:**	WATER
Collection Date:	7/8/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1			**SOP 783**		Prep Date: **7/16/2019**	PrepBy: **JXH**
Ra-226	**0.041 (+/- 0.013)**		**0.0049**	**BQ/l**	NA	7/26/2019 13:56
Carr: BARIUM	*98.7*		*40-110*	*%REC*	DL = NA	7/26/2019 13:56

Client:	ALS Environmental	**Date:**	*28-Jul-19*
Project:	L2305882	**Work Order:**	1907200
Sample ID:	L2305882-2	**Lab ID:**	1907200-2
Legal Location:		**Matrix:**	WATER
Collection Date:	7/8/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1			**SOP 783**		Prep Date: **7/16/2019**	PrepBy: **JXH**
Ra-226	0.0032 (+/- 0.0044)	U	0.0071	BQ/l	NA	7/26/2019 13:56
Carr: BARIUM	*97.5*		*40-110*	*%REC*	DL = NA	7/26/2019 13:56

Client:	ALS Environmental	**Date:**	*28-Jul-19*
Project:	L2305882	**Work Order:**	1907200
Sample ID:	L2305882-2	**Lab ID:**	1907200-2
Legal Location:		**Matrix:**	WATER
Collection Date:	7/8/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed

Explanation of Qualifiers

Radiochemistry:

- "Report Limit" is the MDC

U or ND - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

Y2 - Chemical Yield outside default limits.

W - DER is greater than Warning Limit of 1.42

* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.
# - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.
G - Sample density differs by more than 15% of LCS density.
D - DER is greater than Control Limit

M - Requested MDC not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS, Matrix Spike Recovery within control limits.

N - Matrix Spike Recovery outside control limits

NC - Not Calculated for duplicate results less than 5 times MDC

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

Inorganics:

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).

U or ND - Indicates that the compound was analyzed for but not detected.

E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.

M - Duplicate injection precision was not met.

N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.

Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.

* - Duplicate analysis (relative percent difference) not within control limits.

S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

Organics:

U or ND - Indicates that the compound was analyzed for but not detected.

B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.

E - Analyte concentration exceeds the upper level of the calibration range.

J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).

A - A tentatively identified compound is a suspected aldol-condensation product.

X - The analyte was diluted below an accurate quantitation level.

* - The spike recovery is equal to or outside the control criteria used.

+ - The relative percent difference (RPD) equals or exceeds the control criteria.

G - A pattern resembling gasoline was detected in this sample.

D - A pattern resembling diesel was detected in this sample.

M - A pattern resembling motor oil was detected in this sample.

C - A pattern resembling crude oil was detected in this sample.

4 - A pattern resembling JP-4 was detected in this sample.

5 - A pattern resembling JP-5 was detected in this sample.

H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.

L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.

Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
- gasoline
- JP-8
- diesel
- mineral spirits
- motor oil
- Stoddard solvent
- bunker C

QC BATCH REPORT

Batch ID: **RE190716-1-1** Instrument ID **Alpha Scin** Method: **Radium-226 by Radon Emanation**

LCS Sample ID: **RE190716-1** Units: **BQ/l** Analysis Date: **7/26/2019 14:28**

Client ID: Run ID: **RE190716-1A** Prep Date: **7/16/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.79 (+/- 0.446)	0.0221	1.771		101	67-120					P,M3
Carr: BARIUM	16200		16550		98.1	40-110					

LCSD Sample ID: **RE190716-1** Units: **BQ/l** Analysis Date: **7/26/2019 14:28**

Client ID: Run ID: **RE190716-1A** Prep Date: **7/16/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.94 (+/- 0.481)	0.0136	1.771		109	67-120		1.79	0.2	2.1	P,M3
Carr: BARIUM	15900		16550		96.2	40-110		16200			

MB Sample ID: **RE190716-1** Units: **BQ/l** Analysis Date: **7/26/2019 13:56**

Client ID: Run ID: **RE190716-1A** Prep Date: **7/16/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	0.0050 (+/- 0.0055)	0.0083									U
Carr: BARIUM	16300		16550		98.4	40-110					

The following samples were analyzed in this batch: 1907200-1 1907200-2

AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

TOXICITY TEST REPORT

Daphnia magna
EPS 1/RM/14

Work Order : 239668
Sample Number : 59794

SAMPLE IDENTIFICATION

Company :	ALS Laboratory Group, Waterloo	Date Collected :	2019-07-08
Location :	Waterloo ON	Time Collected :	14:50
Job Number :	L2305882	Date Received :	2019-07-09
Substance :	MS-08 (L2305882)	Time Received :	12:15
Sampling Method :	Grab	Temperature on Receipt :	12.0 °C
Sampled By :	KB/BC	Date Tested :	2019-07-09
Sample Description :	Clear, yellow, odourless		

Test Method : Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna* . Environment Canada EPS 1/RM/14 (Second Edition, December 2000, with February 2016 amendments).

48-HOUR TEST RESULTS

Substance	Effect	Value
Control	Mean Immobility	0.0 %
	Mean Mortality	0.0 %
100%	Mean Immobility	0.0 %
	Mean Mortality	0.0 %

The results reported relate only to the sample tested and as received.

TEST ORGANISM

Species :	*Daphnia magna*	Time to First Brood :	7 days
Organism Batch :	Dm19-13	Average Brood Size :	31.1 young
Culture Mortality :	1.5% (previous 7 days)		

TEST CONDITIONS

Sample Treatment :	None	Number of Replicates :	3
pH Adjustment :	None	Organisms / Replicate :	10
Pre-aeration Rate :	~30 mL/min/L	Organisms / Test Level :	30
Pre-aeration Time :	0 minutes	Organism Loading Rate :	15.0 mL/organism
Test Aeration :	None	Impaired Control Organisms :	0.0%
Hardness Adjustment :	None	Test Method Deviation(s) :	None

REFERENCE TOXICANT DATA

Toxicant :	Sodium Chloride	Historical Mean LC50 :	6.3 g/L
Date Tested :	2019-07-09	Warning Limits (± 2SD) :	5.7 - 7.0 g/L
LC50 :	6.5 g/L	Organism Batch :	Dm19-13
95% Confidence Limits :	6.1 - 7.2 g/L	Analyst(s) :	SV, KP
Statistical Method :	Linear Regression (MLE)		

COMMENTS

All test validity criteria as specified in the test method were satisfied.

Date : 2019-07-15
yyyy-mm-dd

Approved By : *Project Manager*

AQUATOX

TOXICITY TEST REPORT

Daphnia magna

EPS 1/RM/14

Work Order : 239668
Sample Number : 59794

TEST DATA

	pH	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	Temperature (°C)	O_2 Saturation (%)*	Hardness (as $CaCO_3$)
Initial Water Chemistry (100%) :	7.7	7.5	4470	20.0	88	70 mg/L

0 HOURS

Date & Time 2019-07-09 13:25
Analyst(s) : SV/NM (SV)

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O_2	Conductivity	Temperature	O_2 Saturation (%)*	Hardness
100	A	0	0	7.7	7.5	4470	20.0	88	70
100	B	0	0	7.7	7.5	4470	20.0	88	70
100	C	0	0	7.7	7.5	4470	20.0	88	70
Control	A	0	0	8.6	8.7	813	20.0	100	220
Control	B	0	0	8.6	8.7	813	20.0	100	220
Control	C	0	0	8.6	8.7	813	20.0	100	220

Notes:

24 HOURS

Date & Time 2019-07-10 13:25
Analyst(s) : KP

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O_2	Conductivity	Temperature
100	A	–	**	–	–	–	20.0
100	B	–	**	–	–	–	20.0
100	C	–	**	–	–	–	20.0
Control	A	–	0	–	–	–	20.0
Control	B	–	0	–	–	–	20.0
Control	C	–	0	–	–	–	20.0

Notes: **Test organisms in the 100% concentration were not all visible due to settled solids. KP

48 HOURS

Date & Time 2019-07-11 13:25
Analyst(s) : NM (SV)/NK

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O_2	Conductivity	Temperature
100	A	0	0	7.4	8.0	4440	20.0
100	B	0	0	7.4	7.9	4430	20.0
100	C	0	0	7.3	8.1	4470	20.0
Control	A	0	0	8.4	8.2	824	20.0
Control	B	0	0	8.5	8.2	823	20.0
Control	C	0	0	8.5	8.3	823	20.0

Notes:

Number immobile does not include number dead.

– = not measured/not required
* adjusted for temperature and barometric pressure

Test Data Reviewed By : JL
Date : 2019-07-12

AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

TOXICITY TEST REPORT

Rainbow Trout
EPS 1/RM/13

Work Order : 239668
Sample Number : 59794

SAMPLE IDENTIFICATION

Company :	ALS Laboratory Group, Waterloo	Date Collected :	2019-07-08
Location :	Waterloo ON	Time Collected :	14:50
Job Number :	L2305882	Date Received :	2019-07-09
Substance :	MS-08 (L2305882)	Time Received :	12:15
Sampling Method :	Grab	Temperature on Receipt :	12.0 °C
Sampled By :	KB/BC	Date Tested :	2019-07-09
Sample Description :	Clear, yellow, odourless		

Test Method(s) : Reference Method for Determining Acute Lethality of Liquid Effluents to Rainbow Trout. Environment Canada, EPS 1/RM/13 (2nd Edition, December 2000, with May 2007 and February 2016 amendments).

96-HOUR TEST RESULTS

Substance	Effect	Value
Control	Mean Impairment	0.0 %
	Mean Mortality	0.0 %
100%	Mean Impairment	0.0 %
	Mean Mortality	0.0 %

The results reported relate only to the sample tested and as received.

TEST ORGANISM

Test Organism :	*Oncorhynchus mykiss*	Average Fork Length (± 2 SD) :	38.9 mm (±5.1)
Organism Batch :	T19-12	Range of Fork Lengths :	35 - 42 mm
Control Sample Size :	10	Average Wet Weight (± 2 SD) :	0.53 g (±0.22)
Cumulative stock tank mortality rate :	0% (previous 7 days)	Range of Wet Weights :	0.38 - 0.70 g
Control organisms showing stress :	0 (at test completion)	Organism Loading Rate :	0.3 g/L

TEST CONDITIONS

Sample Treatment :	None	Volume Tested (L) :	21
pH Adjustment :	None	Number of Replicates :	1
Test Aeration :	Yes	Organisms Per Replicate :	10
Pre-aeration/Aeration Rate :	6.5 ± 1 mL/min/L	Organisms Per Test Level :	10
Total Pre-Aeration Time :	30 minutes	Test Method Deviation(s) :	None

REFERENCE TOXICANT DATA

Toxicant :	Potassium Chloride	Date Tested :	2019-07-02
Organism Batch :	T19-12	Historical Mean LC50 :	3795 mg/L
LC50 :	3200 mg/L *	Warning Limits (± 2SD) :	3242 - 4442 mg/L
95% Confidence Limits :	2672 - 3581 mg/L	Analyst(s) :	KP, ALC, MDH
Statistical Method :	Linear Regression (MLE)		

COMMENTS

*Note: The reference toxicant test result exceeded the 95% warning limits for historical data. Approximately 5% of the test results would be expected to fall outside the warning limits. No other unusual circumstances were observed and therefore the test result is considered acceptable.

•All test validity criteria as specified in the test method were satisfied.

Date : 2019-07-15
yyyy-mm-dd

Approved By : *Project Manager*

Work Order : 239668
Sample Number : 59794

TEST DATA

	pH	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	Temperature (°C)	O_2 Saturation (%)*
Initial Water Chemistry (100%) :	7.6	7.6	4537	15.5	–
After 30 min pre-aeration :	7.6	9.1	4533	15.5	86

0 HOURS

Date & Time 2019-07-09 14:00
Analyst(s) : TA

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature	O_2 Saturation*
100%	0	0	7.6	9.1	4533	15.5	86
Control	0	0	8.2	9.7	912	14.5	100

Notes:

24 HOURS

Date & Time 2019-07-10 14:00
Analyst(s) : FS

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	7.6	8.5	–	15.0
Control	0	0	–	–	–	15.0

Notes:

48 HOURS

Date & Time 2019-07-11 14:00
Analyst(s) : TA

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	7.4	9.0	–	15.0
Control	0	0	–	–	–	15.0

Notes:

72 HOURS

Date & Time 2019-07-12 14:00
Analyst(s) : TA

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	7.3	9.2	–	15.0
Control	0	0	–	–	–	15.0

Notes:

96 HOURS

Date & Time 2019-07-13 14:00
Analyst(s) : TA

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	7.3	9.3	4559	14.5
Control	0	0	8.2	9.4	856	14.5

Notes:

"–" = not measured/not required
Number impaired does not include number dead.
* adjusted for temperature and barometric pressure

Test Data Reviewed By : FS
Date : 2019-07-15

CHAIN OF CUSTODY RECORD

AQUATOX

AquaTox Work Order No: 239668

Shipping Address: AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, Ontario Canada N0B 2J0

Voice: (519) 763-4412 **Fax:** (519) 763-4419

P.O. Number: 4500057496

Field Sampler Name (print): KB/BC

Signature:

Affiliation: Baffinland Iron Mine / ALS Environmental

Sample Storage (prior to shipping):

Custody Relinquished by: Kendra Button

Date/Time Shipped: 8-Jul-19/ 20:00

Client: ALS Environmental c/o Baffinland Iron Mine

Quote # (2019): 162705399-19

Phone: (519) 886-6910

Fax: (519) 886-9047

Contact: Rick Hawthorne (ALS) / Martina Rendas (Aquatox)

Sample Identification					Analyses Requested									Sample Method and Volume		
Date Collected (yyyy-mm-dd)	Time Collected (e.g. 14:30, 24 hr clock)	Sample Name	AquaTox Sample Number	Temp. on arrival	Rainbow Trout Single Concentration	Rainbow Trout LC50	*Daphnia magna* Single Concentration	*Daphnia magna* LC50	Fathead Minnow Survival & Growth	*Ceriodaphnia dubia* Survival & Reproduction	*Lemna minor* Growth	*Pseudokirchneriella subcapitata* Growth	Other (please specify below)	Grab	Composite	# of Containers and Volume (eg. 2 x 1L, 3 x 10L, etc.)
2019-07-08	14:50	MS-08 (L2305882)	59794	12.0	✓		✓							✓		2 x 10LCarboy

For Lab Use Only

Received By: MV/MJT

Date: 2019-07-09

Time: 12:15

Storage Location:

Storage Temp.(°C)

Please list any special requests or instructions:

Rush TAT w/ Daily updates. PH required.

Report Distribution: bimcore@alsglobal.com, rick.hawthorne@alsglobal.com

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2305882-COFC

COC Number: 15 -

Report To	Contact and company name below will appear on the final report
Company:	Baffinland Iron Mines Corp.
Contact:	Wiliam Bowden and Connor Devereaux
Phone:	647-253-0596 EXT 6016
	Company address below will appear on the final report
Street:	2275 Upper Middle Rd. E., Suite #300
City/Province:	Oakville, ON
Postal Code:	L6H 0C3

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	bimcore@alsglobal.com
Email 2	bimww@alsglobal.com
Email 3	

Confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☐ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
4 day [P4]	☐	1 Business day [E1]	☑
3 day [P3]	☐	Same Day, Weekend or Statutory holiday [E0]	☑
2 day [P2]	☐		

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	
Contact:	

Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	ap@baffinland.com
Email 2	commercial@baffinland.com

Project Information	
ALS Account # / Quote #:	23642 /Q42455
Job #:	MS-08 WT TOX
PO / AFE:	4500057496
LSD:	

Oil and Gas Required Fields (client use)	
AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only): L2305882 AP

ALS Contact: Sampler: KB/BC

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	F/P	BIM-MMER-WT	Group 3	Number of Containers
	MS-08	8-Jul-19	14:50	Water		E0	E1	11
	MS-0803	8-Jul-19	14:50	Water		E0		9

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☑ NO	
Are samples for human drinking water use? ☐ YES ☑ NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			13.3		

SHIPMENT RELEASE (client use)		
Released by: Kendra Button	Date: 8-Jul-19	Time: 3:55

INITIAL SHIPMENT RECEPTION (lab use only)		
Received by:	Date:	Time:

FINAL SHIPMENT RECEPTION (lab use only)		
Received by: AP	Date: 9-7-19	Time: 10:00

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

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 specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

August 09, 2019

Jonathan Mesher, Water Resource Officer
Nunavut Field Operations
Crown Indigenous Relations and Northern Affairs Canada
Iqaluit Office
Box 100
Iqaluit, NU X0A 0H0

Monika Trottier, Enforcement Officer
Curtis Didham, Enforcement Officer
Environment and Climate Change Canada
933 Mivvik Street
Iqaluit, NU X0A 0H0

Re: Follow-up to Spill #19-279, Reported on July 11, 2019, Mary River Project - Water Licence No. 2AM-MRY1325

On July 10th 2019, at approximately 14:00, during an inspection of the Crusher Facility (CF) with Environment and Climate Change Canada (ECCC) it was observed that water was flowing out of the east collection ditch at the toe in two (2) separate locations. Water entering this ditch was immediately diverted to prevent entry into the east ditch, and pumped directly from the source into the CF sedimentation pond (MS-06). It was determined that the source of water on the pad was ice and water entrained in the ore stockpile that melted as the pile was reclaimed. During this period the site was experiencing dry and warm conditions which compounded melting. Initial in situ field readings of the releases demonstrated neutral pH. Prior to this event, field monitoring completed on July 8th indicated that no water was observed entering, or pooling, in the east collection ditch.

Water quality monitoring was conducted downstream of the CF sedimentation pond at the Water License sampling location MS-C-C on June 30th, July 7th, 10th and 16th. Water quality monitoring was conducted at both release locations on July 10th and 11th. CP-SEEPAGE-1 was dry during the July 11th site visit, and was not sampled. Field monitoring was conducted on July 14th and field readings were taken at CP-SEEPAGE-1. CP-SEEPAGE-2 was dry. Lab results for all parameters analyzed were compliant with applicable regulatory criteria with the exception of total suspended solids (TSS). Field personnel noted that substrate entered bottle during sample collection due to low water level.

Appendix A outlines water quality results from monitoring conducted at the release locations and the downstream Water License location. Appendix B includes the Certificates of Analyses (COAs) for these sampling events.

As per Section 31 of the Metal and Diamond Mining Effluent Regulations (MDMER):

a) Surface water at the CF sedimentation pond collection ditch.
b) Unknown quantity
c) The release was first observed at approximately 14:00 on July 10th, 2019. A summary is provided in Appendix A of the sampling events that occurred upon observation of the uncontrolled release which includes date, time and respective water quality results.
d) The quantity of surface water released from the collection ditch is unknown. The two locations of the release are listed below.

ID	Location
CP-SEEPAGE-1	17W 561645 7912653
CP-SEEPAGE-2	17W 561580 7912914

e) N/A. The release did not occur through a final discharge point.
f) Sheardown Lake tributary is the receiving body of water. The release was contained to the adjacent tundra of the crusher pad which is over 1km from Sheardown Lake tributary, the nearest fish bearing waters.

g) No acute lethality test was able to be taken at the time of deposit.
h) See summary above for circumstances of deposit. Extent of release was minimal and prohibited proper water sampling procedures. As per Baffinland's Emergency Response Plan and Spill Contingency Plan a berm was immediately constructed to prevent water from entering the ditch and the water was pumped directly into the CF sedimentation pond (MS-06).
i) The water from the pad continues to be diverted from the ditch and pumped directly into the CF sedimentation pond. Field monitoring continues at the crusher pad facility and no further releases have been observed. A third party engineering firm has been contracted to complete a field visit to determine corrective actions.

Should you require further information or clarification on the above noted spill, please feel free to contact William Bowden or Connor Devereaux at (647) 253-0596 x6016.

Prepared by:

Connor Devereaux
Environmental Superintendent

Reviewed by:

Shawn Stevens
Manager Health, Safety, Environment and Security

Attach: Photos, Map, NT-NU Spill Report, Water Quality Results, Certificates of Analyses

cc. Grant Goddard, Megan Lord-Hoyle, Sylvain Proulx, Tim Sewell, Shawn Stevens, William Bowden, Francois Gaudreau, Christopher Murray, Lou Kamermans (Baffinland), Justin Hack, Jeremy Fraser (CIRNAC), Curtis Didham (ECCC).

Photo 1. July 8th, 2019 – Dry collection ditch.

Photo 2. July 8th, 2019 – Dry collection ditch.

2275 Upper Middle Road East, Suite 300 | Oakville, ON, Canada L6H 0C3
Main: 416.364.8820 | Fax: 416.364.0193 | www.baffinland.com

Photo 3. July 10th, 2019 – CP-SEEPAGE-1 sample location.

Photo 4. July 10th, 2019 – CP-SEEPAGE-2 sample location.

Photo 5. July 10th, 2019 – Pump set up to bypass ditch.

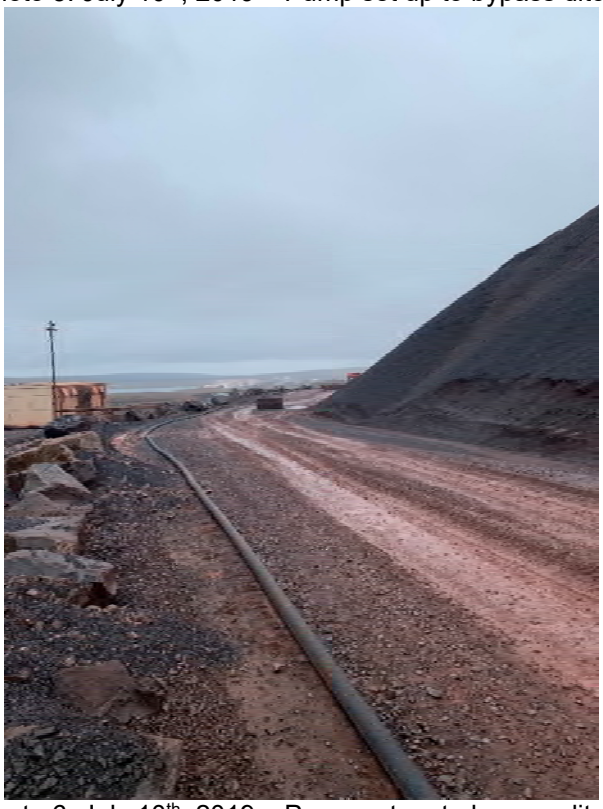


Photo 6. July 10th, 2019 – Pump set up to bypass ditch.

Photo 7. July 11th, 2019 – Dry collection ditch.

Photo 8. July 11th, 2019 – Dry collection ditch.

Photo 9. July 11th, 2019 – CP-SEEPAGE-1 sample location.

Photo 10. July 11th, 2019 – CP-SEEPAGE-2 sample location.

Photo 11. July 11th, 2019 – Collection Ditch.

Figure 1 – Overview map of spill location

Northwest Territories | Nunavut | Canada

NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND OTHER HAZARDOUS MATERIALS

NT-NU 24-HOUR SPILL REPORT LINE
TEL: (867) 920-8130
FAX: (867) 873-6924
EMAIL: spills@gov.nt.ca

REPORT LINE USE ONLY

A	REPORT DATE: MONTH – DAY – YEAR: 07-11-2019	REPORT TIME: 18:00	☒ ORIGINAL SPILL REPORT OR ☐ UPDATE # _____ TO THE ORIGINAL SPILL REPORT	REPORT NUMBER: 19 - 279
B	OCCURRENCE DATE: MONTH – DAY – YEAR: 07-10-2019	OCCURRENCE TIME: 14:00		
C	LAND USE PERMIT NUMBER (IF APPLICABLE): IOL - Commercial Lease: Q13C301	WATER LICENCE NUMBER (IF APPLICABLE): 2AM-MRY1325 Type "A"		
D	GEOGRAPHIC PLACE NAME OR DISTANCE AND DIRECTION FROM NAMED LOCATION: Mary River Mine Site, Baffin Island, NU	REGION: ☐ NWT ☒ NUNAVUT ☐ ADJACENT JURISDICTION OR OCEAN		
E	LATITUDE: DEGREES 71 MINUTES 18 SECONDS 30	LONGITUDE: DEGREES 79 MINUTES 16 SECONDS 35		
F	RESPONSIBLE PARTY OR VESSEL NAME: Baffinland Iron Mines Corp.	RESPONSIBLE PARTY ADDRESS OR OFFICE LOCATION: 2275 Middle Road East, Suite 300, Oakville, ON L6H 0C3		
G	ANY CONTRACTOR INVOLVED: N/A	CONTRACTOR ADDRESS OR OFFICE LOCATION: N/A		
H	PRODUCT SPILLED: Surface Water	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES: Unknown	U.N. NUMBER: N/A	
	SECOND PRODUCT SPILLED (IF APPLICABLE): N/A	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES: N/A	U.N. NUMBER: N/A	
I	SPILL SOURCE: Crusher Pad	SPILL CAUSE: Seepage through ditch	AREA OF CONTAMINATION IN SQUARE METRES: N/A	
J	FACTORS AFFECTING SPILL OR RECOVERY: Drainage to tundra	DESCRIBE ANY ASSISTANCE REQUIRED: N/A	HAZARDS TO PERSONS, PROPERTY OR EQUIPMENT: N/A	

K — ADDITIONAL INFORMATION, COMMENTS, ACTIONS PROPOSED OR TAKEN TO CONTAIN, RECOVER OR DISPOSE OF SPILLED PRODUCT AND CONTAMINATED MATERIALS:

On July 10th 2019, at approx. 14:00, on an inspection of the Crusher Ore Stockpile pond with Environment and Climate Change Canada it was observed that water was flowing out of the east collection ditch at the toe in two separate locations. Water entering this ditch was immediately diverted to prevent entry into the east ditch, and pumped directly from the source into the MS-06 pond. It was determined that the source of water on the pad was from water entrained in the ore stockpile that melted as the pile was reclaimed. During this period the site was experiencing dry and warm conditions which compounded melting. Initial field readings of the releases were compliant with applicable water license criteria. During field monitoring completed on July 8th no water was observed entering, or pooling, in the east collection ditch. The incident occurred on IOL located > 1km from Sheardown Lake tributary, the nearest fish bearing waters and did not migrate from vicinity of release. Water quality monitoring and corrective actions will be presented in the follow-up report.

L	REPORTED TO SPILL LINE BY: Connor Devereaux	POSITION: Env. Superintendent	EMPLOYER: Baffinland	LOCATION CALLING FROM: 416-364-8820	TELEPHONE: ext. 6016
M	ANY ALTERNATE CONTACT: Shawn Stevens	POSITION: Manager of HSES	EMPLOYER: Baffinland	ALTERNATE CONTACT LOCATION: 416-364-8820	ALTERNATE TELEPHONE: ext. 6006

REPORT LINE USE ONLY

N	RECEIVED AT SPILL LINE BY	POSITION: STATION OPERATOR	EMPLOYER	LOCATION CALLED: YELLOWKNIFE, NT	REPORT LINE NUMBER: (867) 920-8130

LEAD AGENCY ☐ EC ☐ CCG ☐ GNWT ☐ GN ☐ ILA ☐ INAC ☐ NEB ☐ TC | SIGNIFICANCE ☐ MINOR ☐ MAJOR ☐ UNKNOWN | FILE STATUS ☐ OPEN ☐ CLOSED

AGENCY	CONTACT NAME	CONTACT TIME	REMARKS
LEAD AGENCY			
FIRST SUPPORT AGENCY			
SECOND SUPPORT AGENCY			
THIRD SUPPORT AGENCY			

PAGE 1 OF 1

Figure 2 – NT-NU Spill report

Appendix A

Water Quality Results Summary

Baffinland

Table 1 - Summary of Analytical Results
Crusher Facility Seepage, Mary River Project

	ALS Laboratory Sample ID			MS-C-C	MS-C-C	CP-SEEPAGE-1 [2]	CP-SEEPAGE-2 [2]	MS-C-C	CP-SEEPAGE-2	MS-C-C
	ALS ID			L2303454-6	L2305271-9	L2307800-2	L2307800-1	L2307800-4	L2308650-4	L2311077-14
	Sample Date & Time			6/30/2019 1:55:00 PM	7/7/2019 12:30:00 PM	7/10/2019 3:55:00 PM	7/10/2019 3:10:00 PM	7/10/2019 4:25:00 PM	7/11/2019 3:10:00 PM	7/16/2019 1:55:00 PM
	QA/QC Sample Type			N/A	N/A	N/A	N/A	N/A	N/A	N/A
	Units	LOR	MDMER Grab Sample Limits							
pH	pH units	0.1	6.0-9.5	7.48	7.71	6.94	7.32	7.63	7.27	7.88
Total Suspended Solids	mg/L	2	30	<2.0	<2.0	481.00	99.40	<2.0	6	<2.0
Total Dissolved Solids	mg/L	20	-	1400	1180	6960	4360	1290	4320	909
Turbidity	NTU	0.1	-	0.4	0.3	51.2	31.6	1.04	14.6	0.58

Notes:

[1]Metal and Diamond Mining Effluent Regulations - Schedule 4

[2]Field personnel indicated substrate entered bottle during sample collection due to low water level

Appendix B

Certificates of Analyses

Baffinland Iron Mine's Corporation
(Oakville)
ATTN: William Bowden/Connor Devereaux
2275 Upper Middle Rd. E.
Suite #300
Oakville ON L6H 0C3

Date Received: 04-JUL-19
Report Date: 05-JUL-19 10:58 (MT)
Version: FINAL

Client Phone: 647-253-0596

Certificate of Analysis

Lab Work Order #: L2303454

Project P.O. #: 4500057496
Job Reference: MS SNP MONITORING
C of C Numbers:
Legal Site Desc:

Rick Hawthorne
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2303454-1 MQ-C-D Sampled By: BR/JK on 30-JUN-19 @ 10:25 Matrix: WATER							
Physical Tests							
pH	7.91		0.10	pH units		04-JUL-19	R4693283
Total Suspended Solids	6.4		2.0	mg/L		04-JUL-19	R4694193
Total Dissolved Solids	167		20	mg/L		04-JUL-19	R4694209
Turbidity	14.5		0.10	NTU		04-JUL-19	R4693286
L2303454-2 MQ-C-D03 Sampled By: BR/JK on 30-JUN-19 @ 10:25 Matrix: WATER							
Physical Tests							
pH	5.28		0.10	pH units		04-JUL-19	R4693283
Total Suspended Solids	<2.0		2.0	mg/L		04-JUL-19	R4694193
Total Dissolved Solids	<20		20	mg/L		04-JUL-19	R4694209
Turbidity	<0.10		0.10	NTU		04-JUL-19	R4693286
L2303454-3 MQ-C-B Sampled By: BR/JK on 30-JUN-19 @ 11:10 Matrix: WATER							
Physical Tests							
pH	8.06		0.10	pH units		04-JUL-19	R4693283
Total Suspended Solids	4.0		2.0	mg/L		04-JUL-19	R4694193
Total Dissolved Solids	415		20	mg/L		04-JUL-19	R4694209
Turbidity	6.43		0.10	NTU		04-JUL-19	R4693286
L2303454-4 MS-C-E Sampled By: BR/JK on 30-JUN-19 @ 13:25 Matrix: WATER							
Physical Tests							
pH	8.08		0.10	pH units		04-JUL-19	R4693283
Total Suspended Solids	<2.0		2.0	mg/L		04-JUL-19	R4694193
Total Dissolved Solids	851		20	mg/L		04-JUL-19	R4694209
Turbidity	0.73		0.10	NTU		04-JUL-19	R4693286
L2303454-5 MS-C-D Sampled By: BR/JK on 30-JUN-19 @ 13:45 Matrix: WATER							
Physical Tests							
pH	8.39		0.10	pH units		04-JUL-19	R4693283
Total Suspended Solids	<2.0		2.0	mg/L		04-JUL-19	R4694193
Total Dissolved Solids	1040		20	mg/L		04-JUL-19	R4694209
Turbidity	2.59		0.10	NTU		04-JUL-19	R4693286
L2303454-6 MS-C-C Sampled By: BR/JK on 30-JUN-19 @ 13:55 Matrix: WATER							
Physical Tests							
pH	7.48		0.10	pH units		04-JUL-19	R4693283
Total Suspended Solids	<2.0		2.0	mg/L		04-JUL-19	R4694193
Total Dissolved Solids	1400		20	mg/L		04-JUL-19	R4694209

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2303454-6 MS-C-C Sampled By: BR/JK on 30-JUN-19 @ 13:55 Matrix: WATER							
Physical Tests							
Turbidity	0.39		0.10	NTU		04-JUL-19	R4693286
L2303454-7 MS-MRY-13B Sampled By: BR/JK on 30-JUN-19 @ 14:55 Matrix: WATER							
Physical Tests							
pH	8.38		0.10	pH units		04-JUL-19	R4693283
Total Suspended Solids	2.4		2.0	mg/L		04-JUL-19	R4694193
Total Dissolved Solids	351		20	mg/L		04-JUL-19	R4694209
Turbidity	0.67		0.10	NTU		04-JUL-19	R4693286
L2303454-8 MS-MRY-13A Sampled By: BR/JK on 30-JUN-19 @ 15:15 Matrix: WATER							
Physical Tests							
pH	8.14		0.10	pH units		04-JUL-19	R4693283
Total Suspended Solids	<2.0		2.0	mg/L		04-JUL-19	R4694193
Total Dissolved Solids	206		20	mg/L		04-JUL-19	R4694209
Turbidity	0.55		0.10	NTU		04-JUL-19	R4693286
L2303454-9 MS-C-A Sampled By: BR/JK on 30-JUN-19 @ 16:25 Matrix: WATER							
Physical Tests							
pH	7.86		0.10	pH units		04-JUL-19	R4693283
Total Suspended Solids	<2.0		2.0	mg/L		04-JUL-19	R4694193
Total Dissolved Solids	89		20	mg/L		04-JUL-19	R4694209
Turbidity	0.74		0.10	NTU		04-JUL-19	R4693286
L2303454-10 MS-C-A01 Sampled By: BR/JK on 30-JUN-19 @ 16:25 Matrix: WATER							
Physical Tests							
pH	7.86		0.10	pH units		04-JUL-19	R4693283
Total Suspended Solids	<2.0		2.0	mg/L		04-JUL-19	R4694193
Total Dissolved Solids	73		20	mg/L		04-JUL-19	R4694209
Turbidity	0.75		0.10	NTU		04-JUL-19	R4693286
L2303454-11 MS-C-B Sampled By: BR/JK on 30-JUN-19 @ 17:00 Matrix: WATER							
Physical Tests							
pH	7.77		0.10	pH units		04-JUL-19	R4693283
Total Suspended Solids	<2.0		2.0	mg/L		04-JUL-19	R4694193
Total Dissolved Solids	81		20	mg/L		04-JUL-19	R4694209
Turbidity	0.91		0.10	NTU		04-JUL-19	R4693286
L2303454-12 MS-C-F Sampled By: BR/JK on 30-JUN-19 @ 17:25 Matrix: WATER							

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2303454-12 MS-C-F Sampled By: BR/JK on 30-JUN-19 @ 17:25 Matrix: WATER							
Physical Tests							
pH	8.03		0.10	pH units		04-JUL-19	R4693283
Total Suspended Solids	<2.0		2.0	mg/L		04-JUL-19	R4694193
Total Dissolved Solids	74		20	mg/L		04-JUL-19	R4694209
Turbidity	3.62		0.10	NTU		04-JUL-19	R4693286
L2303454-13 MS-MRY-09 Sampled By: BR/JK on 01-JUL-19 @ 10:30 Matrix: WATER							
Physical Tests							
pH	7.78		0.10	pH units		04-JUL-19	R4693283
Total Suspended Solids	<2.0		2.0	mg/L		04-JUL-19	R4694193
Total Dissolved Solids	21		20	mg/L		04-JUL-19	R4694209
Turbidity	1.23		0.10	NTU		04-JUL-19	R4693286
L2303454-14 MS-D1-02 Sampled By: BR/JK on 01-JUL-19 @ 11:00 Matrix: WATER							
Physical Tests							
pH	8.09		0.10	pH units		04-JUL-19	R4693283
Total Suspended Solids	<2.0		2.0	mg/L		04-JUL-19	R4694193
Total Dissolved Solids	<20		20	mg/L		04-JUL-19	R4694209
Turbidity	1.02		0.10	NTU		04-JUL-19	R4693286
L2303454-15 MS-C-H Sampled By: BR/JK on 01-JUL-19 @ 11:30 Matrix: WATER							
Physical Tests							
pH	7.81		0.10	pH units		04-JUL-19	R4693283
Total Suspended Solids	<2.0		2.0	mg/L		04-JUL-19	R4694193
Total Dissolved Solids	119		20	mg/L		04-JUL-19	R4694209
Turbidity	0.42		0.10	NTU		04-JUL-19	R4693286
L2303454-16 MS-C-G Sampled By: BR/JK on 01-JUL-19 @ 15:15 Matrix: WATER							
Physical Tests							
pH	7.60		0.10	pH units		04-JUL-19	R4693283
Total Suspended Solids	<2.0		2.0	mg/L		04-JUL-19	R4694193
Total Dissolved Solids	96		20	mg/L		04-JUL-19	R4694209
Turbidity	0.15		0.10	NTU		04-JUL-19	R4693286

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

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
PH-BF	Water	pH	APHA 4500 H-Electrode
Water samples are analyzed directly by a calibrated pH meter.			
SOLIDS-TDS-BF	Water	Total Dissolved Solids	APHA 2540C
A well-mixed sample is filtered though glass fibres filter. A known volume of the filtrate is evaporated and dried at 180 +/- 2C for 1hr.			
SOLIDS-TSS-BF	Water	Suspended solids	APHA 2540 D-Gravimetric
A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104 +/- 1C for a minimum of four hours or until a constant weight is achieved.			
TURBIDITY-BF	Water	Turbidity	APHA 2130 B
Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.			

** 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
BF	ALS ENVIRONMENTAL - BAFFIN ISLAND, NUNAVUT, 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 weight of sample
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

Workorder: L2303454 Report Date: 05-JUL-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PH-BF	**Water**							
Batch R4693283								
WG3095103-2 DUP		**L2303454-1**						
pH		7.91	7.89	J	pH units	0.02	0.2	04-JUL-19
WG3095103-1 LCS								
pH			7.01		pH units		6.9-7.1	04-JUL-19
SOLIDS-TDS-BF	**Water**							
Batch R4694209								
WG3095086-3 DUP		**L2303454-1**						
Total Dissolved Solids		167	159		mg/L	5.3	20	04-JUL-19
WG3095086-2 LCS								
Total Dissolved Solids			105.6		%		85-115	04-JUL-19
WG3095086-1 MB								
Total Dissolved Solids			<20		mg/L		20	04-JUL-19
SOLIDS-TSS-BF	**Water**							
Batch R4694193								
WG3095085-3 DUP		**L2303454-1**						
Total Suspended Solids		6.4	5.2		mg/L	21	25	04-JUL-19
WG3095085-2 LCS								
Total Suspended Solids			102.0		%		85-115	04-JUL-19
WG3095085-1 MB								
Total Suspended Solids			<2.0		mg/L		2	04-JUL-19
TURBIDITY-BF	**Water**							
Batch R4693286								
WG3095105-3 DUP		**L2303454-1**						
Turbidity		14.5	14.4		NTU	0.7	15	04-JUL-19
WG3095105-2 LCS								
Turbidity			105		%		85-115	04-JUL-19
WG3095105-1 MB								
Turbidity			<0.10		NTU		0.1	04-JUL-19

Quality Control Report

Workorder: L2303454 Report Date: 05-JUL-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

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

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.

Quality Control Report

Workorder: L2303454 Report Date: 05-JUL-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Turbidity							
	1	30-JUN-19 10:25	04-JUL-19 03:00	48	89	hours	EHTR
	2	30-JUN-19 10:25	04-JUL-19 03:00	48	89	hours	EHTR
	3	30-JUN-19 11:10	04-JUL-19 03:00	48	88	hours	EHTR
	4	30-JUN-19 13:25	04-JUL-19 03:00	48	86	hours	EHTR
	5	30-JUN-19 13:45	04-JUL-19 03:00	48	85	hours	EHTR
	6	30-JUN-19 13:55	04-JUL-19 03:00	48	85	hours	EHTR
	7	30-JUN-19 14:55	04-JUL-19 03:00	48	84	hours	EHTR
	8	30-JUN-19 15:15	04-JUL-19 03:00	48	84	hours	EHTR
	9	30-JUN-19 16:25	04-JUL-19 03:00	48	83	hours	EHTR
	10	30-JUN-19 16:25	04-JUL-19 03:00	48	83	hours	EHTR
	11	30-JUN-19 17:00	04-JUL-19 03:00	48	82	hours	EHTR
	12	30-JUN-19 17:25	04-JUL-19 03:00	48	82	hours	EHTR
	13	01-JUL-19 10:30	04-JUL-19 03:00	48	65	hours	EHTR
	14	01-JUL-19 11:00	04-JUL-19 03:00	48	64	hours	EHTR
	15	01-JUL-19 11:30	04-JUL-19 03:00	48	64	hours	EHTR
	16	01-JUL-19 15:15	04-JUL-19 03:00	48	60	hours	EHTR

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2303454 were received on 04-JUL-19 01:59.

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.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

L2303454-COFC

COC Number: 15 -

Report To	Contact and company name below will appear on the final report
Company:	Baffinland Iron Mines Corp.
Contact:	Wiliam Bowden and Connor Devereaux
Phone:	647-253-0596 EXT 6016
	Company address below will appear on the final report
Street:	2275 Upper Middle Rd. E., Suite #300
City/Province:	Oakville, ON
Postal Code:	L6H 0C3
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)

Quality Control (QC) Report with Report ☑ YES ☐ NO

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax bimcore@alsglobal.com

Email 2 bimww@alsglobal.com

Email 3

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax ap@baffinland.com

Email 2 commercial@baffinland.com

Project Information

ALS Account # / Quote #:	23642 /Q42455
Job #:	MS SNP Monitoring
PO / AFE:	4500057496
LSD:	
ALS Lab Work Order # (lab use only)	L2303454

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	
ALS Contact:	**Sampler:** BR/JK

ase confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4] ☐ | 3 day [P3] ☐ | 2 day [P2] ☐

EMERGENCY: 1 Business day [E1] ☐ | Same Day, Weekend or Statutory holiday [E0] ☐

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	pH, TSS, TDS, Turbidity	Number of Containers
	MQ-C-D	30-Jun-19	10:25	Water	R	2
	MQ-C-D03	30-Jun-19	10:25	Water	R	2
	MQ-C-B	30-Jun-19	11:10	Water	R	2
	MS-C-E	30-Jun-19	13:25	Water	R	2
	MS-C-D	30-Jun-19	13:45	Water	R	2
	MS-C-C	30-Jun-19	13:55	Water	R	2
	MS-MRY-13B	30-Jun-19	14:55	Water	R	2
	MS-MRY-13A	30-Jun-19	15:15	Water	R	2
	MS-C-A	30-Jun-19	16:25	Water	R	2
	MS-C-A01	30-Jun-19	16:25	Water	R	2
	MS-C-B	30-Jun-19	17:00	Water	R	2

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human drinking water use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
5					

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Stephanie Sawchuk	Release Date: 02-Jul-19	Time: 21:00	Received by:	Date:	Time:	Received by:J.STREETER	Date:JULY 3/19	Time:6:30PM

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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 specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2303454-COFC

COC Number: 15 -

Report To	Contact and company name below will appear on the final report
Company:	Baffinland Iron Mines Corp.
Contact:	Wiliam Bowden and Connor Devereaux
Phone:	647-253-0596 EXT 6016
	Company address below will appear on the final report
Street:	2275 Upper Middle Rd. E., Suite #300
City/Province:	Oakville, ON
Postal Code:	L6H 0C3
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	
Contact:	

Report Format

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)

Quality Control (QC) Report with Report ☑ YES ☐ NO

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax bimcore@alsglobal.com

Email 2 bimww@alsglobal.com

Email 3

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax ap@baffinland.com

Email 2 commercial@baffinland.com

Project Information

ALS Account # / Quote #:	23642 /Q42455
Job #:	MS SNP Monitoring
PO / AFE:	4500057496
LSD:	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only)

ALS Contact: **Sampler:** BR/JK

onfirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4] ☐ | 3 day [P3] ☐ | 2 day [P2] ☐

EMERGENCY: 1 Business day [E1] ☐ | Same Day, Weekend or Statutory holiday [E0] ☐

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	pH, TSS, TDS, Turbidity	Number of Containers
	MS-C-F	30-Jun-19	17:25	Water	R	2
	MS-MRY-09	1-Jul-19	10:30	Water	R	2
	MS-D1-02	1-Jul-19	11:00	Water	R	2
	MS-C-H	1-Jul-19	11:30	Water	R	2
	MS-C-G	1-Jul-19	15:15	Water	R	2

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human drinking water use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Release Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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 specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Baffinland Iron Mine's Corporation
(Oakville)
ATTN: William Bowden/Connor Devereaux
2275 Upper Middle Rd. E.
Suite #300
Oakville ON L6H 0C3

Date Received: 07-JUL-19
Report Date: 16-JUL-19 13:58 (MT)
Version: FINAL

Client Phone: 647-253-0596

Certificate of Analysis

Lab Work Order #: L2305271

Project P.O. #: 4500057496
Job Reference: MS SNP MONITORING
C of C Numbers:
Legal Site Desc:

Rick Hawthorne
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2305271-1 MS-MRY-9 Sampled By: VP/SP/BC on 07-JUL-19 @ 08:35 Matrix: WATER							
Physical Tests							
Hardness (as CaCO3)	42.5		0.50	mg/L		11-JUL-19	
pH	7.81		0.10	pH units		09-JUL-19	R4701568
Total Suspended Solids	<2.0		2.0	mg/L		11-JUL-19	R4708384
Total Dissolved Solids	59		20	mg/L		12-JUL-19	R4709351
Turbidity	0.79		0.10	NTU		09-JUL-19	R4701590
Anions and Nutrients							
Alkalinity, Total (as CaCO3)	47		10	mg/L		11-JUL-19	R4709474
Ammonia, Total (as N)	<0.010		0.010	mg/L		12-JUL-19	R4709000
Chloride (Cl)	0.56		0.50	mg/L		10-JUL-19	R4707156
Fluoride (F)	<0.020		0.020	mg/L		10-JUL-19	R4707156
Nitrate (as N)	0.116		0.020	mg/L		10-JUL-19	R4707156
Total Kjeldahl Nitrogen	<0.15		0.15	mg/L	11-JUL-19	12-JUL-19	R4709135
Phosphorus, Total	0.0033		0.0030	mg/L	10-JUL-19	11-JUL-19	R4707849
Sulfate (SO4)	2.31		0.30	mg/L		10-JUL-19	R4707156
Organic / Inorganic Carbon							
Dissolved Carbon Filtration Location	LAB					09-JUL-19	R4700868
Dissolved Organic Carbon	2.04		0.50	mg/L	09-JUL-19	10-JUL-19	R4703168
Total Organic Carbon	2.44		0.50	mg/L		10-JUL-19	R4703169
Total Metals							
Aluminum (Al)-Total	0.0213		0.0050	mg/L	10-JUL-19	10-JUL-19	R4703429
Arsenic (As)-Total	<0.00010		0.00010	mg/L	10-JUL-19	10-JUL-19	R4703429
Cadmium (Cd)-Total	<0.0000050		0.0000050	mg/L	10-JUL-19	10-JUL-19	R4703429
Calcium (Ca)-Total	9.00		0.50	mg/L	10-JUL-19	10-JUL-19	R4703429
Copper (Cu)-Total	0.0023		0.0010	mg/L	10-JUL-19	10-JUL-19	R4703429
Iron (Fe)-Total	<0.050		0.050	mg/L	10-JUL-19	10-JUL-19	R4703429
Lead (Pb)-Total	<0.000050		0.000050	mg/L	10-JUL-19	10-JUL-19	R4703429
Magnesium (Mg)-Total	5.60		0.050	mg/L	10-JUL-19	10-JUL-19	R4703429
Manganese (Mn)-Total	0.00077		0.00050	mg/L	10-JUL-19	10-JUL-19	R4703429
Mercury (Hg)-Total	<0.000010		0.000010	mg/L		10-JUL-19	R4703589
Molybdenum (Mo)-Total	0.000659		0.000050	mg/L	10-JUL-19	10-JUL-19	R4703429
Nickel (Ni)-Total	<0.00050		0.00050	mg/L	10-JUL-19	10-JUL-19	R4703429
Potassium (K)-Total	1.59		0.050	mg/L	10-JUL-19	10-JUL-19	R4703429
Selenium (Se)-Total	<0.000050		0.000050	mg/L	10-JUL-19	10-JUL-19	R4703429
Sodium (Na)-Total	0.401		0.050	mg/L	10-JUL-19	10-JUL-19	R4703429
Thallium (Tl)-Total	0.000015		0.000010	mg/L	10-JUL-19	10-JUL-19	R4703429
Uranium (U)-Total	0.00100		0.000010	mg/L	10-JUL-19	10-JUL-19	R4703429
Zinc (Zn)-Total	<0.0030		0.0030	mg/L	10-JUL-19	10-JUL-19	R4703429
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					10-JUL-19	R4702349
Dissolved Metals Filtration Location	FIELD					10-JUL-19	R4702046
Aluminum (Al)-Dissolved	0.0090		0.0050	mg/L	10-JUL-19	10-JUL-19	R4706329
Arsenic (As)-Dissolved	<0.00010		0.00010	mg/L	10-JUL-19	10-JUL-19	R4706329

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2305271-1 MS-MRY-9 Sampled By: VP/SP/BC on 07-JUL-19 @ 08:35 Matrix: WATER							
Dissolved Metals							
Cadmium (Cd)-Dissolved	<0.000010		0.000010	mg/L	10-JUL-19	10-JUL-19	R4706329
Calcium (Ca)-Dissolved	8.21		0.050	mg/L	10-JUL-19	10-JUL-19	R4706329
Copper (Cu)-Dissolved	0.00212		0.00020	mg/L	10-JUL-19	10-JUL-19	R4706329
Iron (Fe)-Dissolved	<0.010		0.010	mg/L	10-JUL-19	10-JUL-19	R4706329
Lead (Pb)-Dissolved	<0.000050		0.000050	mg/L	10-JUL-19	10-JUL-19	R4706329
Magnesium (Mg)-Dissolved	5.34		0.050	mg/L	10-JUL-19	10-JUL-19	R4706329
Manganese (Mn)-Dissolved	<0.00050		0.00050	mg/L	10-JUL-19	10-JUL-19	R4706329
Mercury (Hg)-Dissolved	<0.000010		0.000010	mg/L	10-JUL-19	10-JUL-19	R4703592
Molybdenum (Mo)-Dissolved	0.000585		0.000050	mg/L	10-JUL-19	10-JUL-19	R4706329
Nickel (Ni)-Dissolved	<0.00050		0.00050	mg/L	10-JUL-19	10-JUL-19	R4706329
Potassium (K)-Dissolved	1.57		0.050	mg/L	10-JUL-19	10-JUL-19	R4706329
Selenium (Se)-Dissolved	<0.000050		0.000050	mg/L	10-JUL-19	10-JUL-19	R4706329
Sodium (Na)-Dissolved	<0.50		0.50	mg/L	10-JUL-19	10-JUL-19	R4706329
Thallium (Tl)-Dissolved	0.000011		0.000010	mg/L	10-JUL-19	10-JUL-19	R4706329
Uranium (U)-Dissolved	0.000909		0.000010	mg/L	10-JUL-19	10-JUL-19	R4706329
Zinc (Zn)-Dissolved	<0.0010		0.0010	mg/L	10-JUL-19	10-JUL-19	R4706329
L2305271-2 MS-C-F Sampled By: VP/SP/BC on 07-JUL-19 @ 08:35 Matrix: WATER							
Physical Tests							
Conductivity	193		3.0	umhos/cm		11-JUL-19	R4709474
pH	8.10		0.10	pH units		09-JUL-19	R4701568
Total Suspended Solids	<2.0		2.0	mg/L		11-JUL-19	R4708384
Total Dissolved Solids	120		20	mg/L		12-JUL-19	R4709351
Turbidity	3.00		0.10	NTU		09-JUL-19	R4701590
Anions and Nutrients							
Ammonia, Total (as N)	<0.010		0.010	mg/L		12-JUL-19	R4709000
Nitrate (as N)	0.132		0.020	mg/L		10-JUL-19	R4707156
Aggregate Organics							
Oil and Grease, Total	<2.0		2.0	mg/L	11-JUL-19	11-JUL-19	R4708742
L2305271-3 MS-C-F01 Sampled By: VP/SP/BC on 07-JUL-19 @ 08:35 Matrix: WATER							
Physical Tests							
Conductivity	192		3.0	umhos/cm		11-JUL-19	R4709474
pH	8.10		0.10	pH units		09-JUL-19	R4701568
Total Suspended Solids	<2.0		2.0	mg/L		11-JUL-19	R4708384
Total Dissolved Solids	110		20	mg/L		12-JUL-19	R4709351
Turbidity	3.26		0.10	NTU		09-JUL-19	R4701590
Anions and Nutrients							
Ammonia, Total (as N)	0.012		0.010	mg/L		12-JUL-19	R4709000
Nitrate (as N)	0.135		0.020	mg/L		10-JUL-19	R4707156
Aggregate Organics							

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2305271-3 MS-C-F01 Sampled By: VP/SP/BC on 07-JUL-19 @ 08:35 Matrix: WATER							
Aggregate Organics							
Oil and Grease, Total	<2.0		2.0	mg/L	11-JUL-19	11-JUL-19	R4708742
L2305271-4 MS-C-G Sampled By: VP/SP/BC on 07-JUL-19 @ 09:10 Matrix: WATER							
Physical Tests							
Conductivity	207		3.0	umhos/cm		11-JUL-19	R4709474
pH	7.58		0.10	pH units		09-JUL-19	R4701568
Total Suspended Solids	<2.0		2.0	mg/L		11-JUL-19	R4708384
Total Dissolved Solids	124		20	mg/L		12-JUL-19	R4709351
Turbidity	0.16		0.10	NTU		09-JUL-19	R4701590
Anions and Nutrients							
Ammonia, Total (as N)	<0.010		0.010	mg/L		12-JUL-19	R4709000
Nitrate (as N)	2.47		0.020	mg/L		10-JUL-19	R4707156
Aggregate Organics							
Oil and Grease, Total	<2.0		2.0	mg/L	11-JUL-19	11-JUL-19	R4708742
L2305271-5 MS-C-H Sampled By: VP/SP/BC on 07-JUL-19 @ 09:40 Matrix: WATER							
Physical Tests							
Conductivity	241		3.0	umhos/cm		11-JUL-19	R4709474
pH	7.80		0.10	pH units		09-JUL-19	R4701568
Total Suspended Solids	<2.0		2.0	mg/L		11-JUL-19	R4708384
Total Dissolved Solids	135		20	mg/L		12-JUL-19	R4709351
Turbidity	0.38		0.10	NTU		09-JUL-19	R4701590
Anions and Nutrients							
Ammonia, Total (as N)	<0.010		0.010	mg/L		12-JUL-19	R4709000
Nitrate (as N)	0.053		0.020	mg/L		10-JUL-19	R4707156
Aggregate Organics							
Oil and Grease, Total	<2.0		2.0	mg/L	11-JUL-19	11-JUL-19	R4708742
L2305271-6 MQ-C-B Sampled By: VP/SP/BC on 07-JUL-19 @ 09:45 Matrix: WATER							
Physical Tests							
Conductivity	927		3.0	umhos/cm		11-JUL-19	R4709474
pH	7.92		0.10	pH units		09-JUL-19	R4701568
Total Suspended Solids	<2.0		2.0	mg/L		11-JUL-19	R4708384
Total Dissolved Solids	547		20	mg/L		12-JUL-19	R4709351
Turbidity	3.51		0.10	NTU		09-JUL-19	R4701590
Anions and Nutrients							
Ammonia, Total (as N)	3.9	DLHC	1.0	mg/L		15-JUL-19	R4712011
Nitrate (as N)	29.3	DLDS	0.040	mg/L		10-JUL-19	R4707156
Aggregate Organics							
Oil and Grease, Total	<2.0		2.0	mg/L	11-JUL-19	11-JUL-19	R4708001

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2305271-7 MS-MRY-13B Sampled By: VP/SP/BC on 07-JUL-19 @ 10:35 Matrix: WATER							
Physical Tests							
Conductivity	725		3.0	umhos/cm		11-JUL-19	R4709476
pH	8.23		0.10	pH units		09-JUL-19	R4701568
Total Suspended Solids	<2.0		2.0	mg/L		11-JUL-19	R4708384
Total Dissolved Solids	402		20	mg/L		12-JUL-19	R4709351
Turbidity	0.48		0.10	NTU		09-JUL-19	R4701590
Anions and Nutrients							
Alkalinity, Total (as CaCO3)	155		10	mg/L		11-JUL-19	R4709476
Organic / Inorganic Carbon							
Dissolved Carbon Filtration Location	LAB					09-JUL-19	R4700868
Dissolved Organic Carbon	5.98		0.50	mg/L	09-JUL-19	10-JUL-19	R4703168
Total Organic Carbon	6.64		0.50	mg/L		10-JUL-19	R4703169
Total Metals							
Aluminum (Al)-Total	0.0216		0.0050	mg/L	10-JUL-19	10-JUL-19	R4703429
Antimony (Sb)-Total	<0.00010		0.00010	mg/L	10-JUL-19	10-JUL-19	R4703429
Arsenic (As)-Total	0.00016		0.00010	mg/L	10-JUL-19	10-JUL-19	R4703429
Barium (Ba)-Total	0.0510		0.00010	mg/L	10-JUL-19	10-JUL-19	R4703429
Beryllium (Be)-Total	<0.00010		0.00010	mg/L	10-JUL-19	10-JUL-19	R4703429
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L	10-JUL-19	10-JUL-19	R4703429
Boron (B)-Total	0.088		0.010	mg/L	10-JUL-19	10-JUL-19	R4703429
Cadmium (Cd)-Total	0.0000080		0.0000050	mg/L	10-JUL-19	10-JUL-19	R4703429
Calcium (Ca)-Total	71.3		0.050	mg/L	10-JUL-19	10-JUL-19	R4703429
Chromium (Cr)-Total	<0.00050		0.00050	mg/L	10-JUL-19	10-JUL-19	R4703429
Cobalt (Co)-Total	<0.00010		0.00010	mg/L	10-JUL-19	10-JUL-19	R4703429
Copper (Cu)-Total	0.0016		0.0010	mg/L	10-JUL-19	10-JUL-19	R4703429
Iron (Fe)-Total	0.048		0.010	mg/L	10-JUL-19	10-JUL-19	R4703429
Lead (Pb)-Total	<0.000050		0.000050	mg/L	10-JUL-19	10-JUL-19	R4703429
Lithium (Li)-Total	0.0190		0.0010	mg/L	10-JUL-19	10-JUL-19	R4703429
Magnesium (Mg)-Total	35.5		0.0050	mg/L	10-JUL-19	10-JUL-19	R4703429
Manganese (Mn)-Total	0.00137		0.00050	mg/L	10-JUL-19	10-JUL-19	R4703429
Mercury (Hg)-Total	<0.000010		0.000010	mg/L		10-JUL-19	R4703589
Molybdenum (Mo)-Total	0.000287		0.000050	mg/L	10-JUL-19	10-JUL-19	R4703429
Nickel (Ni)-Total	0.00898		0.00050	mg/L	10-JUL-19	10-JUL-19	R4703429
Potassium (K)-Total	1.99		0.050	mg/L	10-JUL-19	10-JUL-19	R4703429
Selenium (Se)-Total	0.000086		0.000050	mg/L	10-JUL-19	10-JUL-19	R4703429
Silicon (Si)-Total	4.76		0.10	mg/L	10-JUL-19	10-JUL-19	R4703429
Silver (Ag)-Total	<0.000050		0.000050	mg/L	10-JUL-19	10-JUL-19	R4703429
Sodium (Na)-Total	14.5		0.050	mg/L	10-JUL-19	10-JUL-19	R4703429
Strontium (Sr)-Total	0.0786		0.0010	mg/L	10-JUL-19	10-JUL-19	R4703429
Thallium (Tl)-Total	0.000015		0.000010	mg/L	10-JUL-19	10-JUL-19	R4703429
Tin (Sn)-Total	<0.00010		0.00010	mg/L	10-JUL-19	10-JUL-19	R4703429
Titanium (Ti)-Total	0.00096		0.00030	mg/L	10-JUL-19	10-JUL-19	R4703429
Tungsten (W)-Total	<0.00010		0.00010	mg/L	10-JUL-19	10-JUL-19	R4703429

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2305271-7 MS-MRY-13B Sampled By: VP/SP/BC on 07-JUL-19 @ 10:35 Matrix: WATER							
Total Metals							
Uranium (U)-Total	0.00192		0.000010	mg/L	10-JUL-19	10-JUL-19	R4703429
Vanadium (V)-Total	<0.00050		0.00050	mg/L	10-JUL-19	10-JUL-19	R4703429
Zinc (Zn)-Total	<0.0030		0.0030	mg/L	10-JUL-19	10-JUL-19	R4703429
Zirconium (Zr)-Total	<0.00030		0.00030	mg/L	10-JUL-19	10-JUL-19	R4703429
Aggregate Organics							
Oil and Grease, Total	<2.0		2.0	mg/L	11-JUL-19	11-JUL-19	R4708001
Phenols (4AAP)	0.0017		0.0010	mg/L		12-JUL-19	R4708458
Hydrocarbons							
F1 (C6-C10)	<100		100	ug/L		16-JUL-19	R4712645
F2 (C10-C16)	<100		100	ug/L	09-JUL-19	10-JUL-19	R4705753
F3 (C16-C34)	<250		250	ug/L	09-JUL-19	10-JUL-19	R4705753
F4 (C34-C50)	<250		250	ug/L	09-JUL-19	10-JUL-19	R4705753
Total Hydrocarbons (C6-C50)	<380		380	ug/L		16-JUL-19	
Chrom. to baseline at nC50	YES				09-JUL-19	10-JUL-19	R4705753
Surrogate: 2-Bromobenzotrifluoride	89.4		60-140	%	09-JUL-19	10-JUL-19	R4705753
Surrogate: 3,4-Dichlorotoluene	91.2		60-140	%		16-JUL-19	R4712645
L2305271-8 MS-C-D Sampled By: VP/SP/BC on 07-JUL-19 @ 12:15 Matrix: WATER							
Physical Tests							
Conductivity	1460		3.0	umhos/cm		11-JUL-19	R4709476
pH	8.32		0.10	pH units		09-JUL-19	R4701568
Total Suspended Solids	<2.0		2.0	mg/L		11-JUL-19	R4708384
Total Dissolved Solids	1120		20	mg/L		12-JUL-19	R4709351
Turbidity	2.87		0.10	NTU		09-JUL-19	R4701590
Anions and Nutrients							
Ammonia, Total (as N)	0.020		0.010	mg/L		15-JUL-19	R4712011
Nitrate (as N)	11.4	DLDS	0.040	mg/L		10-JUL-19	R4707156
Aggregate Organics							
Oil and Grease, Total	<2.0		2.0	mg/L	11-JUL-19	11-JUL-19	R4708001
L2305271-9 MS-C-C Sampled By: VP/SP/BC on 07-JUL-19 @ 12:30 Matrix: WATER							
Physical Tests							
Conductivity	1530		3.0	umhos/cm		11-JUL-19	R4709476
pH	7.71		0.10	pH units		09-JUL-19	R4701568
Total Suspended Solids	<2.0		2.0	mg/L		11-JUL-19	R4708384
Total Dissolved Solids	1180		20	mg/L		12-JUL-19	R4709351
Turbidity	0.32		0.10	NTU		09-JUL-19	R4701590
Anions and Nutrients							
Ammonia, Total (as N)	<0.010		0.010	mg/L		15-JUL-19	R4712011
Nitrate (as N)	11.8	DLDS	0.10	mg/L		10-JUL-19	R4707156
Aggregate Organics							

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2305271-9 MS-C-C Sampled By: VP/SP/BC on 07-JUL-19 @ 12:30 Matrix: WATER							
Aggregate Organics							
Oil and Grease, Total	<2.0		2.0	mg/L	11-JUL-19	11-JUL-19	R4708001
L2305271-10 MS-C-A Sampled By: VP/SP/BC on 07-JUL-19 @ 10:40 Matrix: WATER							
Physical Tests							
Conductivity	173		3.0	umhos/cm		11-JUL-19	R4709476
pH	7.87		0.10	pH units		09-JUL-19	R4701568
Total Suspended Solids	<2.0		2.0	mg/L		11-JUL-19	R4708384
Total Dissolved Solids	113		20	mg/L		12-JUL-19	R4709351
Turbidity	0.49		0.10	NTU		09-JUL-19	R4701590
Anions and Nutrients							
Ammonia, Total (as N)	<0.010		0.010	mg/L		12-JUL-19	R4709000
Nitrate (as N)	0.149		0.020	mg/L		10-JUL-19	R4707156
Aggregate Organics							
Oil and Grease, Total	<2.0		2.0	mg/L	11-JUL-19	11-JUL-19	R4708001
L2305271-11 MS-C-B Sampled By: VP/SP/BC on 07-JUL-19 @ 11:10 Matrix: WATER							
Physical Tests							
Conductivity	179		3.0	umhos/cm		11-JUL-19	R4709476
pH	7.74		0.10	pH units		09-JUL-19	R4701568
Total Suspended Solids	<2.0		2.0	mg/L		11-JUL-19	R4708384
Total Dissolved Solids	115		20	mg/L		12-JUL-19	R4709351
Turbidity	0.56		0.10	NTU		09-JUL-19	R4701590
Anions and Nutrients							
Ammonia, Total (as N)	<0.010		0.010	mg/L		12-JUL-19	R4709000
Nitrate (as N)	0.178		0.020	mg/L		10-JUL-19	R4707156
Aggregate Organics							
Oil and Grease, Total	<2.0		2.0	mg/L	11-JUL-19	11-JUL-19	R4708001
L2305271-12 MS-C-E Sampled By: VP/SP/BC on 07-JUL-19 @ 11:50 Matrix: WATER							
Physical Tests							
Conductivity	1350		3.0	umhos/cm		11-JUL-19	R4709476
pH	8.01		0.10	pH units		09-JUL-19	R4701568
Total Suspended Solids	<2.0		2.0	mg/L		11-JUL-19	R4708384
Total Dissolved Solids	1020		20	mg/L		12-JUL-19	R4709351
Turbidity	0.68		0.10	NTU		09-JUL-19	R4701590
Anions and Nutrients							
Ammonia, Total (as N)	<0.010		0.010	mg/L		12-JUL-19	R4709000
Nitrate (as N)	7.31	DLDS	0.040	mg/L		10-JUL-19	R4707156
Aggregate Organics							
Oil and Grease, Total	<2.0		2.0	mg/L	11-JUL-19	11-JUL-19	R4708001

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2305271-13 MS-C-E03 Sampled By: VP/SP/BC on 07-JUL-19 @ 11:50 Matrix: WATER							
Physical Tests							
Conductivity	<3.0		3.0	umhos/cm		11-JUL-19	R4709476
pH	5.83		0.10	pH units		09-JUL-19	R4701568
Total Suspended Solids	<2.0		2.0	mg/L		11-JUL-19	R4708384
Total Dissolved Solids	<20		20	mg/L		12-JUL-19	R4709351
Turbidity	<0.10		0.10	NTU		09-JUL-19	R4701590
Anions and Nutrients							
Ammonia, Total (as N)	<0.010		0.010	mg/L		12-JUL-19	R4709000
Nitrate (as N)	<0.020		0.020	mg/L		10-JUL-19	R4707156
Aggregate Organics							
Oil and Grease, Total	<2.0		2.0	mg/L	11-JUL-19	11-JUL-19	R4708001

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

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2305271-1
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2305271-1
Matrix Spike	Uranium (U)-Dissolved	MS-B	L2305271-1
Matrix Spike	Calcium (Ca)-Total	MS-B	L2305271-1, -7
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2305271-1, -7
Matrix Spike	Silicon (Si)-Total	MS-B	L2305271-1, -7
Matrix Spike	Uranium (U)-Total	MS-B	L2305271-1, -7

Sample Parameter Qualifier key listed:

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-WT	Water	Alkalinity, Total (as CaCO3)	EPA 310.2

This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.

CL-IC-N-WT	Water	Chloride by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

DOC-WT	Water	Dissolved Organic Carbon	APHA 5310B

Sample is filtered through a 0.45um filter, then injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic carbon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.

EC-SCREEN-WT	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

EC-WT	Water	Conductivity	APHA 2510 B

Water samples can be measured directly by immersing the conductivity cell into the sample.

F-IC-N-WT	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

F1-F4-CALC-WT	Water	CCME Total Hydrocarbons	CCME CWS-PHC, Pub #1310, Dec 2001-L

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-HS-WT	Water	F1 (O.Reg.153/04)	E3421/CCME (HS)

Fraction F1 is determined by analyzing by headspace-GC/FID.

		F2-F4 (O.Reg.153/04)	MOE DECPH-E3421/CCME TIER 1

Reference Information

F2-F4-WT Water
Petroleum Hydrocarbons (F2-F4 fractions) are extracted from water using a hexane micro-extraction technique. Instrumental analysis is by GC-FID, as per the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Tier 1 Method, CCME, 2001.

HARDNESS-CALC-WT Water Hardness APHA 2340 B
Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-WT Water Dissolved Mercury in Water by CVAAS EPA 1631E (mod)
Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

HG-T-CVAA-WT Water Total Mercury in Water by CVAAS EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

MET-D-CCMS-WT Water Dissolved Metals in Water by CRC ICPMS APHA 3030B/6020A (mod)
Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

MET-T-CCMS-WT Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)
Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

NH3-F-WT Water Ammonia in Water by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO3-IC-WT Water Nitrate in Water by IC EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

OGG-TOT-WT Water Oil and Grease, Total APHA 5520 B
The procedure involves an extraction of the entire water sample with hexane. This extract is then evaporated to dryness, and the residue weighed to determine Oil and Grease.

P-T-COL-WT Water Total P in Water by Colour APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is deteremined colourimetrically after persulphate digestion of the sample.

PH-BF Water pH APHA 4500 H-Electrode
Water samples are analyzed directly by a calibrated pH meter.

PHENOLS-4AAP-WT Water Phenol (4AAP) EPA 9066
An automated method is used to distill the sample. The distillate is then buffered to pH 9.4 which reacts with 4AAP and potassium ferricyanide to form a red complex which is measured colorimetrically.

SO4-IC-N-WT Water Sulfate in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-BF Water Total Dissolved Solids APHA 2540C
A well-mixed sample is filtered though glass fibres filter. A known volume of the filtrate is evaporated and dried at 180 +/- 2C for 1hr.

SOLIDS-TSS-BF Water Suspended solids APHA 2540 D-Gravimetric
A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104 +/- 1C for a minimum of four hours or until a constant weight is achieved.

TKN-WT Water Total Kjeldahl Nitrogen APHA 4500-Norg D
This analysis is carried out using procedures adapted from APHA Method 4500-Norg "Nitrogen (Organic)". Total Kjeldahl Nitrogen is determined by

Reference Information

sample digestion at 380 Celsius with analysis using an automated colorimetric method.

TOC-WT Water Total Organic Carbon APHA 5310B

Sample is injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic cabon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.

TURBIDITY-BF Water Turbidity APHA 2130 B

Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.

** 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
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA
BF	ALS ENVIRONMENTAL - BAFFIN ISLAND, NUNAVUT, 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 weight of sample
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

Workorder: L2305271 Report Date: 16-JUL-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3

Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ALK-WT	**Water**							
Batch R4709474								
WG3101990-4 DUP		**WG3101990-3**						
Alkalinity, Total (as CaCO3)		106	106		mg/L	0.2	20	11-JUL-19
WG3101990-2 LCS								
Alkalinity, Total (as CaCO3)			103.9		%		85-115	11-JUL-19
WG3101990-1 MB								
Alkalinity, Total (as CaCO3)			<10		mg/L		10	11-JUL-19
Batch R4709476								
WG3101993-4 DUP		**WG3101993-3**						
Alkalinity, Total (as CaCO3)		155	155		mg/L	0.0	20	11-JUL-19
WG3101993-2 LCS								
Alkalinity, Total (as CaCO3)			102.6		%		85-115	11-JUL-19
WG3101993-1 MB								
Alkalinity, Total (as CaCO3)			<10		mg/L		10	11-JUL-19
CL-IC-N-WT	**Water**							
Batch R4707156								
WG3100909-4 DUP		**WG3100909-3**						
Chloride (Cl)		62.9	62.9		mg/L	0.0	20	10-JUL-19
WG3100909-2 LCS								
Chloride (Cl)			101.9		%		90-110	10-JUL-19
WG3100909-1 MB								
Chloride (Cl)			<0.50		mg/L		0.5	10-JUL-19
WG3100909-5 MS		**WG3100909-3**						
Chloride (Cl)			101.6		%		75-125	10-JUL-19
DOC-WT	**Water**							
Batch R4703168								
WG3100247-3 DUP		**L2305271-1**						
Dissolved Organic Carbon		2.04	2.11		mg/L	3.4	25	10-JUL-19
WG3100247-2 LCS								
Dissolved Organic Carbon			110.4		%		70-130	10-JUL-19
WG3100247-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	10-JUL-19
WG3100247-4 MS		**L2305271-1**						
Dissolved Organic Carbon			113.6		%		70-130	10-JUL-19
EC-WT	**Water**							

Quality Control Report

Workorder: L2305271 Report Date: 16-JUL-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
EC-WT	**Water**							
Batch R4709474								
WG3101990-4 DUP		**WG3101990-3**						
Conductivity		1460	1450		umhos/cm	0.5	10	11-JUL-19
WG3101990-2 LCS								
Conductivity			98.7		%		90-110	11-JUL-19
WG3101990-1 MB								
Conductivity			<3.0		umhos/cm		3	11-JUL-19
Batch R4709476								
WG3101993-4 DUP		**WG3101993-3**						
Conductivity		725	728		umhos/cm	0.4	10	11-JUL-19
WG3101993-2 LCS								
Conductivity			97.8		%		90-110	11-JUL-19
WG3101993-1 MB								
Conductivity			<3.0		umhos/cm		3	11-JUL-19
F-IC-N-WT	**Water**							
Batch R4707156								
WG3100909-4 DUP		**WG3100909-3**						
Fluoride (F)		0.094	0.096		mg/L	1.9	20	10-JUL-19
WG3100909-2 LCS								
Fluoride (F)			105.4		%		90-110	10-JUL-19
WG3100909-1 MB								
Fluoride (F)			<0.020		mg/L		0.02	10-JUL-19
WG3100909-5 MS		**WG3100909-3**						
Fluoride (F)			106.5		%		75-125	10-JUL-19
F1-HS-WT	**Water**							
Batch R4712645								
WG3105835-6 LCS								
F1 (C6-C10)			107.8		%		80-120	16-JUL-19
WG3105835-7 MB								
F1 (C6-C10)			<100		ug/L		100	16-JUL-19
Surrogate: 3,4-Dichlorotoluene			104.4		%		60-140	16-JUL-19
F2-F4-WT	**Water**							
Batch R4705753								
WG3100424-2 LCS								
F2 (C10-C16)			97.4		%		65-135	10-JUL-19
F3 (C16-C34)			103.0		%		65-135	10-JUL-19
F4 (C34-C50)			94.1		%		65-135	10-JUL-19
WG3100424-1 MB								

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F2-F4-WT	**Water**							
Batch R4705753								
WG3100424-1 MB								
F2 (C10-C16)			<100		ug/L		100	10-JUL-19
F3 (C16-C34)			<250		ug/L		250	10-JUL-19
F4 (C34-C50)			<250		ug/L		250	10-JUL-19
Surrogate: 2-Bromobenzotrifluoride			90.1		%		60-140	10-JUL-19
HG-D-CVAA-WT	**Water**							
Batch R4703592								
WG3100701-4 DUP		**WG3100701-3**						
Mercury (Hg)-Dissolved		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	10-JUL-19
WG3100701-2 LCS								
Mercury (Hg)-Dissolved			99.9		%		80-120	10-JUL-19
WG3100701-1 MB								
Mercury (Hg)-Dissolved			<0.000010		mg/L		0.00001	10-JUL-19
WG3100701-6 MS		**WG3100701-5**						
Mercury (Hg)-Dissolved			97.1		%		70-130	10-JUL-19
HG-T-CVAA-WT	**Water**							
Batch R4703589								
WG3100694-6 DUP		**WG3100694-5**						
Mercury (Hg)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	10-JUL-19
WG3100694-2 LCS								
Mercury (Hg)-Total			101.0		%		80-120	10-JUL-19
WG3100694-1 MB								
Mercury (Hg)-Total			<0.000010		mg/L		0.00001	10-JUL-19
WG3100694-8 MS		**WG3100694-7**						
Mercury (Hg)-Total			91.7		%		70-130	10-JUL-19
MET-D-CCMS-WT	**Water**							
Batch R4706329								
WG3100531-4 DUP		**WG3100531-3**						
Aluminum (Al)-Dissolved		0.0090	0.0082		mg/L	8.9	20	10-JUL-19
Arsenic (As)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	10-JUL-19
Cadmium (Cd)-Dissolved		<0.0000050	<0.000005C	RPD-NA	mg/L	N/A	20	10-JUL-19
Calcium (Ca)-Dissolved		8.21	8.01		mg/L	2.4	20	10-JUL-19
Copper (Cu)-Dissolved		0.00212	0.00211		mg/L	0.7	20	10-JUL-19
Iron (Fe)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	10-JUL-19
Lead (Pb)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	10-JUL-19
Magnesium (Mg)-Dissolved		5.34	5.39		mg/L	0.9	20	10-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4706329								
WG3100531-4 DUP		**WG3100531-3**						
Manganese (Mn)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	10-JUL-19
Molybdenum (Mo)-Dissolved		0.000585	0.000566		mg/L	3.2	20	10-JUL-19
Nickel (Ni)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	10-JUL-19
Potassium (K)-Dissolved		1.57	1.59		mg/L	1.4	20	10-JUL-19
Selenium (Se)-Dissolved		<0.000050	0.000057	RPD-NA	mg/L	N/A	20	10-JUL-19
Sodium (Na)-Dissolved		0.382	0.388		mg/L	1.6	20	10-JUL-19
Thallium (Tl)-Dissolved		0.000011	0.000010		mg/L	7.5	20	10-JUL-19
Uranium (U)-Dissolved		0.000909	0.000888		mg/L	2.4	20	10-JUL-19
Zinc (Zn)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	10-JUL-19
WG3100531-2 LCS								
Aluminum (Al)-Dissolved			96.5		%		80-120	10-JUL-19
Arsenic (As)-Dissolved			94.8		%		80-120	10-JUL-19
Cadmium (Cd)-Dissolved			93.1		%		80-120	10-JUL-19
Calcium (Ca)-Dissolved			93.6		%		80-120	10-JUL-19
Copper (Cu)-Dissolved			95.4		%		80-120	10-JUL-19
Iron (Fe)-Dissolved			101.5		%		80-120	10-JUL-19
Lead (Pb)-Dissolved			101.2		%		80-120	10-JUL-19
Magnesium (Mg)-Dissolved			101.4		%		80-120	10-JUL-19
Manganese (Mn)-Dissolved			97.1		%		80-120	10-JUL-19
Molybdenum (Mo)-Dissolved			94.9		%		80-120	10-JUL-19
Nickel (Ni)-Dissolved			95.7		%		80-120	10-JUL-19
Potassium (K)-Dissolved			98.5		%		80-120	10-JUL-19
Selenium (Se)-Dissolved			98.3		%		80-120	10-JUL-19
Sodium (Na)-Dissolved			101.8		%		80-120	10-JUL-19
Thallium (Tl)-Dissolved			102.1		%		80-120	10-JUL-19
Uranium (U)-Dissolved			100.4		%		80-120	10-JUL-19
Zinc (Zn)-Dissolved			96.2		%		80-120	10-JUL-19
WG3100531-1 MB								
Aluminum (Al)-Dissolved			<0.0050		mg/L		0.005	10-JUL-19
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	10-JUL-19
Cadmium (Cd)-Dissolved			<0.000005(		mg/L		0.000005	10-JUL-19
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	10-JUL-19
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	10-JUL-19
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	10-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4706329								
WG3100531-1 MB								
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	10-JUL-19
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	10-JUL-19
Manganese (Mn)-Dissolved			<0.00050		mg/L		0.0005	10-JUL-19
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	10-JUL-19
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	10-JUL-19
Potassium (K)-Dissolved			<0.050		mg/L		0.05	10-JUL-19
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	10-JUL-19
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	10-JUL-19
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	10-JUL-19
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	10-JUL-19
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	10-JUL-19
WG3100531-5 MS		**WG3100531-3**						
Aluminum (Al)-Dissolved			94.6		%		70-130	10-JUL-19
Arsenic (As)-Dissolved			105.3		%		70-130	10-JUL-19
Cadmium (Cd)-Dissolved			98.8		%		70-130	10-JUL-19
Calcium (Ca)-Dissolved			N/A	MS-B	%		-	10-JUL-19
Copper (Cu)-Dissolved			94.4		%		70-130	10-JUL-19
Iron (Fe)-Dissolved			97.2		%		70-130	10-JUL-19
Lead (Pb)-Dissolved			97.0		%		70-130	10-JUL-19
Magnesium (Mg)-Dissolved			N/A	MS-B	%		-	10-JUL-19
Manganese (Mn)-Dissolved			95.4		%		70-130	10-JUL-19
Molybdenum (Mo)-Dissolved			92.6		%		70-130	10-JUL-19
Nickel (Ni)-Dissolved			93.6		%		70-130	10-JUL-19
Potassium (K)-Dissolved			98.5		%		70-130	10-JUL-19
Selenium (Se)-Dissolved			122.4		%		70-130	10-JUL-19
Sodium (Na)-Dissolved			99.7		%		70-130	10-JUL-19
Thallium (Tl)-Dissolved			97.9		%		70-130	10-JUL-19
Uranium (U)-Dissolved			N/A	MS-B	%		-	10-JUL-19
Zinc (Zn)-Dissolved			108.3		%		70-130	10-JUL-19
MET-T-CCMS-WT	**Water**							
Batch R4703429								
WG3100488-4 DUP		**WG3100488-3**						
Aluminum (Al)-Total		0.0213	0.0206		mg/L	3.2	20	10-JUL-19
Antimony (Sb)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	10-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4703429								
WG3100488-4 DUP		**WG3100488-3**						
Arsenic (As)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	10-JUL-19
Barium (Ba)-Total		0.00715	0.00695		mg/L	2.8	20	10-JUL-19
Beryllium (Be)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	10-JUL-19
Bismuth (Bi)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	10-JUL-19
Boron (B)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	10-JUL-19
Cadmium (Cd)-Total		<0.0000050	<0.000005(	RPD-NA	mg/L	N/A	20	10-JUL-19
Calcium (Ca)-Total		9.00	8.94		mg/L	0.7	20	10-JUL-19
Chromium (Cr)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	10-JUL-19
Cobalt (Co)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	10-JUL-19
Copper (Cu)-Total		0.0023	0.0023		mg/L	3.4	20	10-JUL-19
Iron (Fe)-Total		0.026	0.025		mg/L	3.6	20	10-JUL-19
Lead (Pb)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	10-JUL-19
Lithium (Li)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	10-JUL-19
Magnesium (Mg)-Total		5.60	5.43		mg/L	3.0	20	10-JUL-19
Manganese (Mn)-Total		0.00077	0.00065		mg/L	17	20	10-JUL-19
Molybdenum (Mo)-Total		0.000659	0.000651		mg/L	1.1	20	10-JUL-19
Nickel (Ni)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	10-JUL-19
Potassium (K)-Total		1.59	1.56		mg/L	1.7	20	10-JUL-19
Selenium (Se)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	10-JUL-19
Silicon (Si)-Total		0.70	0.68		mg/L	1.9	20	10-JUL-19
Silver (Ag)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	10-JUL-19
Sodium (Na)-Total		0.401	0.392		mg/L	2.3	20	10-JUL-19
Strontium (Sr)-Total		0.0056	0.0056		mg/L	0.6	20	10-JUL-19
Thallium (Tl)-Total		0.000015	0.000015		mg/L	2.6	20	10-JUL-19
Tin (Sn)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	10-JUL-19
Titanium (Ti)-Total		0.00070	0.00064		mg/L	8.3	20	10-JUL-19
Tungsten (W)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	10-JUL-19
Uranium (U)-Total		0.00100	0.00101		mg/L	0.8	20	10-JUL-19
Vanadium (V)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	10-JUL-19
Zinc (Zn)-Total		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	10-JUL-19
Zirconium (Zr)-Total		0.00021	0.00021		mg/L	3.4	20	10-JUL-19
WG3100488-2 LCS								
Aluminum (Al)-Total			104.0		%		80-120	10-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4703429								
WG3100488-2 LCS								
Antimony (Sb)-Total			103.2		%		80-120	10-JUL-19
Arsenic (As)-Total			99.9		%		80-120	10-JUL-19
Barium (Ba)-Total			101.6		%		80-120	10-JUL-19
Beryllium (Be)-Total			101.9		%		80-120	10-JUL-19
Bismuth (Bi)-Total			98.2		%		80-120	10-JUL-19
Boron (B)-Total			98.7		%		80-120	10-JUL-19
Cadmium (Cd)-Total			100.5		%		80-120	10-JUL-19
Calcium (Ca)-Total			100.9		%		80-120	10-JUL-19
Chromium (Cr)-Total			99.9		%		80-120	10-JUL-19
Cobalt (Co)-Total			98.0		%		80-120	10-JUL-19
Copper (Cu)-Total			99.0		%		80-120	10-JUL-19
Iron (Fe)-Total			96.9		%		80-120	10-JUL-19
Lead (Pb)-Total			98.4		%		80-120	10-JUL-19
Lithium (Li)-Total			102.8		%		80-120	10-JUL-19
Magnesium (Mg)-Total			101.4		%		80-120	10-JUL-19
Manganese (Mn)-Total			100.1		%		80-120	10-JUL-19
Molybdenum (Mo)-Total			99.4		%		80-120	10-JUL-19
Nickel (Ni)-Total			98.5		%		80-120	10-JUL-19
Potassium (K)-Total			97.6		%		80-120	10-JUL-19
Selenium (Se)-Total			98.4		%		80-120	10-JUL-19
Silicon (Si)-Total			101.5		%		60-140	10-JUL-19
Silver (Ag)-Total			101.6		%		80-120	10-JUL-19
Sodium (Na)-Total			103.3		%		80-120	10-JUL-19
Strontium (Sr)-Total			103.0		%		80-120	10-JUL-19
Thallium (Tl)-Total			100.2		%		80-120	10-JUL-19
Tin (Sn)-Total			99.3		%		80-120	10-JUL-19
Titanium (Ti)-Total			97.4		%		80-120	10-JUL-19
Tungsten (W)-Total			99.5		%		80-120	10-JUL-19
Uranium (U)-Total			103.0		%		80-120	10-JUL-19
Vanadium (V)-Total			100.4		%		80-120	10-JUL-19
Zinc (Zn)-Total			99.1		%		80-120	10-JUL-19
Zirconium (Zr)-Total			98.4		%		80-120	10-JUL-19
WG3100488-1 MB								
Aluminum (Al)-Total			<0.0050		mg/L		0.005	10-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4703429								
WG3100488-1 MB								
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	10-JUL-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	10-JUL-19
Barium (Ba)-Total			<0.00010		mg/L		0.0001	10-JUL-19
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	10-JUL-19
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	10-JUL-19
Boron (B)-Total			<0.010		mg/L		0.01	10-JUL-19
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	10-JUL-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	10-JUL-19
Chromium (Cr)-Total			<0.00050		mg/L		0.0005	10-JUL-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	10-JUL-19
Copper (Cu)-Total			<0.0010		mg/L		0.001	10-JUL-19
Iron (Fe)-Total			<0.010		mg/L		0.01	10-JUL-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	10-JUL-19
Lithium (Li)-Total			<0.0010		mg/L		0.001	10-JUL-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	10-JUL-19
Manganese (Mn)-Total			<0.00050		mg/L		0.0005	10-JUL-19
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	10-JUL-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	10-JUL-19
Potassium (K)-Total			<0.050		mg/L		0.05	10-JUL-19
Selenium (Se)-Total			<0.000050		mg/L		0.00005	10-JUL-19
Silicon (Si)-Total			<0.10		mg/L		0.1	10-JUL-19
Silver (Ag)-Total			<0.000050		mg/L		0.00005	10-JUL-19
Sodium (Na)-Total			<0.050		mg/L		0.05	10-JUL-19
Strontium (Sr)-Total			<0.0010		mg/L		0.001	10-JUL-19
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	10-JUL-19
Tin (Sn)-Total			<0.00010		mg/L		0.0001	10-JUL-19
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	10-JUL-19
Tungsten (W)-Total			<0.00010		mg/L		0.0001	10-JUL-19
Uranium (U)-Total			<0.000010		mg/L		0.00001	10-JUL-19
Vanadium (V)-Total			<0.00050		mg/L		0.0005	10-JUL-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	10-JUL-19
Zirconium (Zr)-Total			<0.00020		mg/L		0.0002	10-JUL-19
WG3100488-5 MS		**WG3100488-3**						
Aluminum (Al)-Total			95.4		%		70-130	10-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4703429								
WG3100488-5 MS		**WG3100488-3**						
Antimony (Sb)-Total			103.4		%		70-130	10-JUL-19
Arsenic (As)-Total			98.7		%		70-130	10-JUL-19
Barium (Ba)-Total			95.7		%		70-130	10-JUL-19
Beryllium (Be)-Total			95.1		%		70-130	10-JUL-19
Bismuth (Bi)-Total			97.7		%		70-130	10-JUL-19
Boron (B)-Total			95.3		%		70-130	10-JUL-19
Cadmium (Cd)-Total			102.6		%		70-130	10-JUL-19
Calcium (Ca)-Total			N/A	MS-B	%		-	10-JUL-19
Chromium (Cr)-Total			98.3		%		70-130	10-JUL-19
Cobalt (Co)-Total			94.4		%		70-130	10-JUL-19
Copper (Cu)-Total			94.3		%		70-130	10-JUL-19
Iron (Fe)-Total			86.2		%		70-130	10-JUL-19
Lead (Pb)-Total			96.0		%		70-130	10-JUL-19
Lithium (Li)-Total			95.5		%		70-130	10-JUL-19
Magnesium (Mg)-Total			N/A	MS-B	%		-	10-JUL-19
Manganese (Mn)-Total			95.1		%		70-130	10-JUL-19
Molybdenum (Mo)-Total			100.7		%		70-130	10-JUL-19
Nickel (Ni)-Total			95.5		%		70-130	10-JUL-19
Potassium (K)-Total			89.3		%		70-130	10-JUL-19
Selenium (Se)-Total			99.1		%		70-130	10-JUL-19
Silicon (Si)-Total			N/A	MS-B	%		-	10-JUL-19
Silver (Ag)-Total			101.3		%		70-130	10-JUL-19
Sodium (Na)-Total			99.7		%		70-130	10-JUL-19
Strontium (Sr)-Total			99.2		%		70-130	10-JUL-19
Thallium (Tl)-Total			98.2		%		70-130	10-JUL-19
Tin (Sn)-Total			99.4		%		70-130	10-JUL-19
Titanium (Ti)-Total			94.7		%		70-130	10-JUL-19
Tungsten (W)-Total			99.0		%		70-130	10-JUL-19
Uranium (U)-Total			N/A	MS-B	%		-	10-JUL-19
Vanadium (V)-Total			98.2		%		70-130	10-JUL-19
Zinc (Zn)-Total			91.9		%		70-130	10-JUL-19
Zirconium (Zr)-Total			99.5		%		70-130	10-JUL-19
NH3-F-WT	**Water**							

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NH3-F-WT	**Water**							
Batch R4709000								
WG3103451-19 DUP		**L2305271-1**						
Ammonia, Total (as N)		<0.010	<0.010	RPD-NA	mg/L	N/A	20	12-JUL-19
WG3103451-18 LCS								
Ammonia, Total (as N)			95.7		%		85-115	12-JUL-19
WG3103451-17 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	12-JUL-19
WG3103451-20 MS		**L2305271-1**						
Ammonia, Total (as N)			92.4		%		75-125	12-JUL-19
Batch R4712011								
WG3105265-3 DUP		**L2305271-8**						
Ammonia, Total (as N)		0.020	0.021		mg/L	4.8	20	15-JUL-19
WG3105265-2 LCS								
Ammonia, Total (as N)			102.8		%		85-115	15-JUL-19
WG3105265-1 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	15-JUL-19
WG3105265-4 MS		**L2305271-8**						
Ammonia, Total (as N)			103.5		%		75-125	15-JUL-19
NO3-IC-WT	**Water**							
Batch R4707156								
WG3100909-4 DUP		**WG3100909-3**						
Nitrate (as N)		1.70	1.70		mg/L	0.2	20	10-JUL-19
WG3100909-2 LCS								
Nitrate (as N)			102.0		%		90-110	10-JUL-19
WG3100909-1 MB								
Nitrate (as N)			<0.020		mg/L		0.02	10-JUL-19
WG3100909-5 MS		**WG3100909-3**						
Nitrate (as N)			100.5		%		75-125	10-JUL-19
OGG-TOT-WT	**Water**							
Batch R4708001								
WG3102010-2 LCS								
Oil and Grease, Total			85.1		%		70-130	11-JUL-19
WG3102010-1 MB								
Oil and Grease, Total			<2.0		mg/L		2	11-JUL-19
Batch R4708742								
WG3101776-2 LCS								
Oil and Grease, Total			92.1		%		70-130	11-JUL-19
WG3101776-1 MB								
							2	

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
OGG-TOT-WT	**Water**							
Batch R4708742								
WG3101776-1 MB								
Oil and Grease, Total			<2.0		mg/L		2	11-JUL-19
P-T-COL-WT	**Water**							
Batch R4707849								
WG3101589-3 DUP		**L2305272-1**						
Phosphorus, Total		0.0054	0.0069	J	mg/L	0.0016	0.006	11-JUL-19
WG3101589-2 LCS								
Phosphorus, Total			100.3		%		80-120	11-JUL-19
WG3101589-1 MB								
Phosphorus, Total			<0.0030		mg/L		0.003	11-JUL-19
WG3101589-4 MS		**L2305272-1**						
Phosphorus, Total			93.3		%		70-130	11-JUL-19
PH-BF	**Water**							
Batch R4701568								
WG3100344-2 DUP		**L2305271-1**						
pH		7.81	7.83	J	pH units	0.02	0.2	09-JUL-19
WG3100344-1 LCS								
pH			7.02		pH units		6.9-7.1	09-JUL-19
PHENOLS-4AAP-WT	**Water**							
Batch R4708458								
WG3102168-3 DUP		**L2305271-7**						
Phenols (4AAP)		0.0017	0.0019		mg/L	12	20	12-JUL-19
WG3102168-2 LCS								
Phenols (4AAP)			107.4		%		85-115	12-JUL-19
WG3102168-1 MB								
Phenols (4AAP)			<0.0010		mg/L		0.001	12-JUL-19
WG3102168-4 MS		**L2305271-7**						
Phenols (4AAP)			107.2		%		75-125	12-JUL-19
SO4-IC-N-WT	**Water**							
Batch R4707156								
WG3100909-4 DUP		**WG3100909-3**						
Sulfate (SO4)		18.0	18.0		mg/L	0.0	20	10-JUL-19
WG3100909-2 LCS								
Sulfate (SO4)			102.3		%		90-110	10-JUL-19
WG3100909-1 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	10-JUL-19

Quality Control Report

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Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SO4-IC-N-WT	**Water**							
Batch R4707156								
WG3100909-5 MS		**WG3100909-3**						
Sulfate (SO4)			103.9		%		75-125	10-JUL-19
SOLIDS-TDS-BF	**Water**							
Batch R4709351								
WG3102972-3 DUP		**L2305271-13**						
Total Dissolved Solids		<20	<20	RPD-NA	mg/L	N/A	20	12-JUL-19
WG3102972-2 LCS								
Total Dissolved Solids			100.7		%		85-115	12-JUL-19
WG3102972-1 MB								
Total Dissolved Solids			<20		mg/L		20	12-JUL-19
SOLIDS-TSS-BF	**Water**							
Batch R4708384								
WG3102894-3 DUP		**L2305271-4**						
Total Suspended Solids		<2.0	<2.0	RPD-NA	mg/L	N/A	25	11-JUL-19
WG3102894-2 LCS								
Total Suspended Solids			101.2		%		85-115	11-JUL-19
WG3102894-1 MB								
Total Suspended Solids			<2.0		mg/L		2	11-JUL-19
TKN-WT	**Water**							
Batch R4709135								
WG3101807-3 DUP		**L2305271-1**						
Total Kjeldahl Nitrogen		<0.15	<0.15	RPD-NA	mg/L	N/A	20	12-JUL-19
WG3101807-2 LCS								
Total Kjeldahl Nitrogen			97.5		%		75-125	12-JUL-19
WG3101807-1 MB								
Total Kjeldahl Nitrogen			<0.15		mg/L		0.15	12-JUL-19
WG3101807-4 MS		**L2305271-1**						
Total Kjeldahl Nitrogen			97.3		%		70-130	12-JUL-19
TOC-WT	**Water**							
Batch R4703169								
WG3100605-3 DUP		**L2305882-1**						
Total Organic Carbon		3.65	3.68		mg/L	0.8	20	10-JUL-19
WG3100605-2 LCS								
Total Organic Carbon			102.7		%		80-120	10-JUL-19
WG3100605-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	10-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TOC-WT	**Water**							
Batch R4703169								
WG3100605-4 MS		**L2305882-1**						
Total Organic Carbon			112.4		%		70-130	10-JUL-19
TURBIDITY-BF	**Water**							
Batch R4701590								
WG3100350-3 DUP		**L2305271-1**						
Turbidity		0.79	0.80		NTU	1.3	15	09-JUL-19
WG3100350-2 LCS								
Turbidity			103.0		%		85-115	09-JUL-19
WG3100350-1 MB								
Turbidity			<0.10		NTU		0.1	09-JUL-19

Quality Control Report

Workorder: L2305271 Report Date: 16-JUL-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

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

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

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

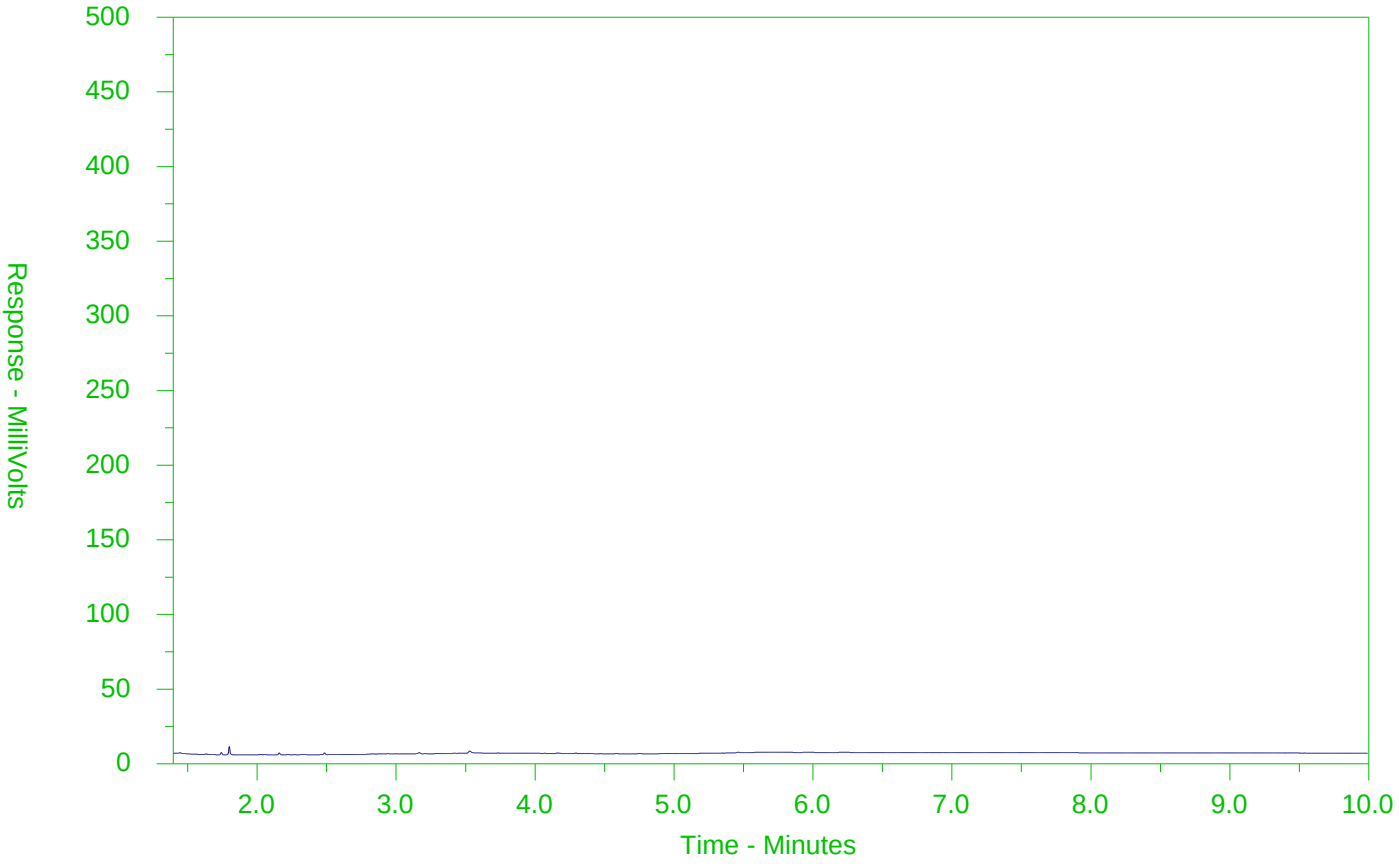
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where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

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2305271-7
Client Sample ID: MS-MRY-13B



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2305271-COFC

COC Number: 15 -

Report To	Contact and company name below will appear on the final report
Company:	Baffinland Iron Mines Corp.
Contact:	Wiliam Bowden and Connor Devereaux
Phone:	647-253-0596 EXT 6016
	Company address below will appear on the final report
Street:	2275 Upper Middle Rd. E., Suite #300
City/Province:	Oakville, ON
Postal Code:	L6H 0C3
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)

Quality Control (QC) Report with Report ☑ YES ☐ NO

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax bimcore@alsglobal.com

Email 2 bimww@alsglobal.com

Email 3

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax ap@baffinland.com

Email 2 commercial@baffinland.com

Project Information

ALS Account # / Quote #:	23642 /Q42455
Job #:	MS SNP Monitoring
PO / AFE:	4500057496
LSD:	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only) L2305271

ALS Contact: **Sampler:** VP/SP/BC

Confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4] ☐ | 3 day [P3] ☐ | 2 day [P2] ☐

EMERGENCY: 1 Business day [E1] ☐ | Same Day, Weekend or Statutory holiday [E0] ☐

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Group 7	Group 6	Group 8	Number of Containers
					F/P	P	P	
	MS-MRY-9	7-Jul-19	8:35	Water	R			7
	MS-C-F	7-Jul-19	8:35	Water			R	5
	MS-C-F01	7-Jul-19	8:35	Water			R	5
	MS-C-G	7-Jul-19	9:10	Water			R	6
	MS-C-H	7-Jul-19	9:40	Water			R	5
	MQ-C-B	7-Jul-19	9:45	Water			R	5
	MS-MRY-13B	7-Jul-19	10:35	Water		R		12
	MS-C-D	7-Jul-19	12:15	Water			R	5
	MS-C-C	7-Jul-19	12:30	Water			R	5
	MS-C-A	7-Jul-19	10:40	Water			R	5
	MS-C-B	7-Jul-19	11:10	Water			R	5
	MS-C-E	7-Jul-19	11:50	Water			R	5

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human drinking water use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			11.6		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Kendra Button	Release Date: 7-Jul-19	Time: 20:20	Received by:	Date:	Time:	Received by:	Date: 9-7-19	Time: 10:00

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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 specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2305271-COFC

COC Number: 15 -

Report To	Contact and company name below will appear on the final report
Company:	Baffinland Iron Mines Corp.
Contact:	Wiliam Bowden and Connor Devereaux
Phone:	647-253-0596 EXT 6016
	Company address below will appear on the final report
Street:	2275 Upper Middle Rd. E., Suite #300
City/Province:	Oakville, ON
Postal Code:	L6H 0C3
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	
Contact:	

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	bimcore@alsglobal.com
Email 2	bimww@alsglobal.com
Email 3	

Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	ap@baffinland.com
Email 2	commercial@baffinland.com

Project Information	
ALS Account # / Quote #:	23642 /Q42455
Job #:	MS SNP Monitoring
PO / AFE:	4500057496
LSD:	

Oil and Gas Required Fields (client use)	
AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only)

ALS Contact: **Sampler:** VP/SP/BC

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4] ☐ | 3 day [P3] ☐ | 2 day [P2] ☐

EMERGENCY: 1 Business day [E1] ☐ | Same Day, Weekend or Statutory holiday [E0] ☐

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Group 8	Number of Containers
	MS-C-E03	7-Jul-19	11:50	Water	R	5

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human drinking water use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			11.6		

SHIPMENT RELEASE (client use)		
Released by: Kendra Button	Release Date: 7-Jul-19	Time: 20:20

INITIAL SHIPMENT RECEPTION (lab use only)		
Received by:	Date:	Time:

FINAL SHIPMENT RECEPTION (lab use only)		
Received by:	Date: 9-7-19	Time: 10.00

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Baffinland Iron Mine's Corporation (Oakville)
ATTN: William Bowden/Connor Devereaux
2275 Upper Middle Rd. E.
Suite #300
Oakville ON L6H 0C3

Date Received: 10-JUL-19
Report Date: 12-JUL-19 10:01 (MT)
Version: FINAL

Client Phone: 647-253-0596

Certificate of Analysis

Lab Work Order #: L2307800

Project P.O. #: 4500057496
Job Reference: CRUSHER PERIMETER
C of C Numbers:
Legal Site Desc:

Rick Hawthorne
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2307800-1 CP-SEEPAGE-2 Sampled By: KB/LM on 10-JUL-19 @ 15:10 Matrix: Water							
Physical Tests							
pH	7.32		0.10	pH units		10-JUL-19	R4705949
Total Suspended Solids	99.4		2.0	mg/L		11-JUL-19	R4708445
Total Dissolved Solids	4360		20	mg/L		11-JUL-19	R4708370
Turbidity	31.6		0.10	NTU		11-JUL-19	R4706129
L2307800-2 CP-SEEPAGE-1 Sampled By: KB/LM on 10-JUL-19 @ 15:55 Matrix: Water							
Physical Tests							
pH	6.94		0.10	pH units		10-JUL-19	R4705949
Total Suspended Solids	481		2.0	mg/L		11-JUL-19	R4708445
Total Dissolved Solids	6960		20	mg/L		11-JUL-19	R4708370
Turbidity	51.2		0.10	NTU		11-JUL-19	R4706129
L2307800-3 CP-CONDUIT-CULVERT Sampled By: KB/LM on 10-JUL-19 @ 16:10 Matrix: Water							
Physical Tests							
pH	7.96		0.10	pH units		10-JUL-19	R4705949
Total Suspended Solids	47.6		2.0	mg/L		11-JUL-19	R4706168
Total Dissolved Solids	2910		20	mg/L		11-JUL-19	R4708370
Turbidity	59.2		0.10	NTU		11-JUL-19	R4706129
L2307800-4 MS-C-C Sampled By: KB/LM on 10-JUL-19 @ 16:25 Matrix: Water							
Physical Tests							
pH	7.63		0.10	pH units		10-JUL-19	R4705949
Total Suspended Solids	<2.0		2.0	mg/L		11-JUL-19	R4706168
Total Dissolved Solids	1290		20	mg/L		11-JUL-19	R4708370
Turbidity	1.04		0.10	NTU		11-JUL-19	R4706129

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

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
PH-BF	Water	pH	APHA 4500 H-Electrode
Water samples are analyzed directly by a calibrated pH meter.			
SOLIDS-TDS-BF	Water	Total Dissolved Solids	APHA 2540C
A well-mixed sample is filtered though glass fibres filter. A known volume of the filtrate is evaporated and dried at 180 +/- 2C for 1hr.			
SOLIDS-TSS-BF	Water	Suspended solids	APHA 2540 D-Gravimetric
A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104 +/- 1C for a minimum of four hours or until a constant weight is achieved.			
TURBIDITY-BF	Water	Turbidity	APHA 2130 B
Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.			

** 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
BF	ALS ENVIRONMENTAL - BAFFIN ISLAND, NUNAVUT, 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 weight of sample
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

Workorder: L2307800 Report Date: 12-JUL-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PH-BF	**Water**							
Batch R4705949								
WG3101666-2 DUP		**L2307800-4**						
pH		7.63	7.64	J	pH units	0.01	0.2	10-JUL-19
WG3101666-1 LCS								
pH			7.02		pH units		6.9-7.1	10-JUL-19
SOLIDS-TDS-BF	**Water**							
Batch R4708370								
WG3101718-3 DUP		**L2306750-1**						
Total Dissolved Solids		1960	1990		mg/L	1.1	20	11-JUL-19
WG3101718-2 LCS								
Total Dissolved Solids			103.4		%		85-115	11-JUL-19
WG3101718-1 MB								
Total Dissolved Solids			<20		mg/L		20	11-JUL-19
SOLIDS-TSS-BF	**Water**							
Batch R4706168								
WG3101667-3 DUP		**L2307801-2**						
Total Suspended Solids		9.2	10.0		mg/L	8.3	25	11-JUL-19
WG3101667-2 LCS								
Total Suspended Solids			98.6		%		85-115	11-JUL-19
WG3101667-1 MB								
Total Suspended Solids			<2.0		mg/L		2	11-JUL-19
Batch R4708445								
WG3103079-3 DUP		**L2307800-2**						
Total Suspended Solids		481	416		mg/L	14	25	11-JUL-19
WG3103079-2 LCS								
Total Suspended Solids			100.8		%		85-115	11-JUL-19
WG3103079-1 MB								
Total Suspended Solids			<2.0		mg/L		2	11-JUL-19
TURBIDITY-BF	**Water**							
Batch R4706129								
WG3101708-3 DUP		**L2307800-1**						
Turbidity		31.6	31.9		NTU	0.9	15	11-JUL-19
WG3101708-2 LCS								
Turbidity			103.0		%		85-115	11-JUL-19
WG3101708-1 MB								
Turbidity			<0.10		NTU		0.1	11-JUL-19

Quality Control Report

Workorder: L2307800 Report Date: 12-JUL-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

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

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.

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.

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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.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here
(lab use only)

COC Number: 15 -

Report To	Contact and company name below will appear on the final report
Company:	Baffinland Iron Mines Corp.
Contact:	Wiliam Bowden and Connor Devereaux
Phone:	647-253-0596 EXT 6016
	Company address below will appear on the final report
Street:	2275 Upper Middle Rd. E., Suite #300
City/Province:	Oakville, ON
Postal Code:	L6H 0C3

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report ☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax bimcore@alsglobal.com
Email 2 bimww@alsglobal.com
Email 3

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☐ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
	4 day [P4] ☐		1 Business day [E1] ☐
	3 day [P3] ☐		Same Day, Weekend or Statutory holiday [E0] ☑
	2 day [P2] ☐		

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	
Contact:	

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax ap@baffinland.com
Email 2 commercial@baffinland.com

Project Information

ALS Account # / Quote #: 23642 /Q42455
Job #: CRUSHER PERIMETER
PO / AFE: 4500057496
LSD:

Oil and Gas Required Fields (client use)

AFE/Cost Center: PO#
Major/Minor Code: Routing Code:
Requisitioner:
Location:

ALS Lab Work Order # (lab use only) L2307800 **ALS Contact:** **Sampler:** KB/LM

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	pH, TSS, TDS, Turbidity													Number of Containers
1	CP-SEEPAGE-2	10-Jul-19	15:10	Water	E0													2
2	CP-SEEPAGE-1	10-Jul-19	15:55	Water	E0													1
3	CP-CONDUIT-CULVERT	10-Jul-19	16:10	Water	E0													2
4	MS-C-C	10-Jul-19	16:25	Water	E0													2

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System?
☐ YES ☑ NO

Are samples for human drinking water use?
☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐
Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES ºC			FINAL COOLER TEMPERATURES ºC		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released By: Kendra Button	Date: 10-Jul-19	Time: 17:45	Received by: CV	Date: July 10, 2019	Time:6pm	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION WHITE - LABORATORY COPY YELLOW - CLIENT COPY

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 specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Baffinland Iron Mine's Corporation (Oakville)
ATTN: William Bowden/Connor Devereaux
2275 Upper Middle Rd. E.
Suite #300
Oakville ON L6H 0C3

Date Received: 11-JUL-19
Report Date: 15-JUL-19 08:42 (MT)
Version: FINAL

Client Phone: 647-253-0596

Certificate of Analysis

Lab Work Order #: L2308650

Project P.O. #: 4500057496
Job Reference: CRUSHER PAD PERIMETER
C of C Numbers:
Legal Site Desc:

Rick Hawthorne
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2308650-1 CRUSHERPAD-SW Sampled By: RH/AZ/CP on 11-JUL-19 @ 13:50 Matrix: Water							
Physical Tests							
pH	7.96		0.10	pH units		12-JUL-19	R4708382
Total Suspended Solids	<2.0		2.0	mg/L		12-JUL-19	R4708422
Total Dissolved Solids	231		20	mg/L		12-JUL-19	R4709355
Turbidity	1.36		0.10	NTU		12-JUL-19	R4708383
L2308650-2 CRUSHERPAD-SOUTHSUMP Sampled By: RH/AZ/CP on 11-JUL-19 @ 14:10 Matrix: Water							
Physical Tests							
pH	7.39		0.10	pH units		12-JUL-19	R4708382
Total Suspended Solids	<2.0		2.0	mg/L		12-JUL-19	R4708422
Total Dissolved Solids	790		20	mg/L		12-JUL-19	R4709355
Turbidity	3.16		0.10	NTU		12-JUL-19	R4708383
L2308650-3 CP-CONDUIT-CULVERT Sampled By: RH/AZ/CP on 11-JUL-19 @ 15:30 Matrix: Water							
Physical Tests							
pH	7.59		0.10	pH units		12-JUL-19	R4708382
Total Suspended Solids	4.4		2.0	mg/L		12-JUL-19	R4708422
Total Dissolved Solids	2330		20	mg/L		12-JUL-19	R4709355
Turbidity	30.2		0.10	NTU		12-JUL-19	R4708383
L2308650-4 CP-SEEPAGE-2 Sampled By: RH/AZ/CP on 11-JUL-19 @ 15:10 Matrix: Water							
Physical Tests							
pH	7.27		0.10	pH units		12-JUL-19	R4708382
Total Suspended Solids	6.0		2.0	mg/L		12-JUL-19	R4708422
Total Dissolved Solids	4320		20	mg/L		12-JUL-19	R4709355
Turbidity	14.6		0.10	NTU		12-JUL-19	R4708383
L2308650-5 CP-SEEPAGE-3 Sampled By: RH/AZ/CP on 11-JUL-19 @ 16:10 Matrix: Water							
Physical Tests							
pH	7.25		0.10	pH units		12-JUL-19	R4708382
Total Suspended Solids	13.6		2.0	mg/L		12-JUL-19	R4708422
Total Dissolved Solids	4830		20	mg/L		12-JUL-19	R4709355
Turbidity	39.9		0.10	NTU		12-JUL-19	R4708383

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

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
PH-BF	Water	pH	APHA 4500 H-Electrode
Water samples are analyzed directly by a calibrated pH meter.			
SOLIDS-TDS-BF	Water	Total Dissolved Solids	APHA 2540C
A well-mixed sample is filtered though glass fibres filter. A known volume of the filtrate is evaporated and dried at 180 +/- 2C for 1hr.			
SOLIDS-TSS-BF	Water	Suspended solids	APHA 2540 D-Gravimetric
A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104 +/- 1C for a minimum of four hours or until a constant weight is achieved.			
TURBIDITY-BF	Water	Turbidity	APHA 2130 B
Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.			

** 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
BF	ALS ENVIRONMENTAL - BAFFIN ISLAND, NUNAVUT, 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 weight of sample
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

Workorder: L2308650 Report Date: 15-JUL-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PH-BF	**Water**							
Batch R4708382								
WG3102933-2 DUP		**L2308632-1**						
pH		4.53	4.51	J	pH units	0.02	0.2	12-JUL-19
WG3102933-1 LCS								
pH			7.02		pH units		6.9-7.1	12-JUL-19
SOLIDS-TDS-BF	**Water**							
Batch R4709355								
WG3102987-3 DUP		**L2306752-2**						
Total Dissolved Solids		80	82		mg/L	2.4	20	12-JUL-19
WG3102987-2 LCS								
Total Dissolved Solids			99.8		%		85-115	12-JUL-19
WG3102987-1 MB								
Total Dissolved Solids			<20		mg/L		20	12-JUL-19
SOLIDS-TSS-BF	**Water**							
Batch R4708422								
WG3102895-3 DUP		**L2308632-1**						
Total Suspended Solids		3.4	3.4		mg/L	0.0	25	12-JUL-19
WG3102895-2 LCS								
Total Suspended Solids			100.2		%		85-115	12-JUL-19
WG3102895-1 MB								
Total Suspended Solids			<2.0		mg/L		2	12-JUL-19
TURBIDITY-BF	**Water**							
Batch R4708383								
WG3102936-3 DUP		**L2308632-1**						
Turbidity		24.0	24.4		NTU	1.7	15	12-JUL-19
WG3102936-2 LCS								
Turbidity			105.0		%		85-115	12-JUL-19
WG3102936-1 MB								
Turbidity			<0.10		NTU		0.1	12-JUL-19

Quality Control Report

Workorder: L2308650 Report Date: 15-JUL-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

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

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.

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.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here
(lab use only)

COC Number: 15 -

Report To	Contact and company name below will appear on the final report
Company:	Baffinland Iron Mines Corp.
Contact:	Wiliam Bowden and Connor Devereaux
Phone:	647-253-0596 EXT 6016
	Company address below will appear on the final report
Street:	2275 Upper Middle Rd. E., Suite #300
City/Province:	Oakville, ON
Postal Code:	L6H 0C3
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report ☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax: bimcore@alsglobal.com
Email 2: bimww@alsglobal.com
Email 3:

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax: ap@baffinland.com
Email 2: commercial@baffinland.com

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☐ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): **4 day [P4]** ☐ | **3 day [P3]** ☐ | **2 day [P2]** ☑
EMERGENCY: **1 Business day [E1]** ☐ | **Same Day, Weekend or Statutory holiday [E0]** ☐

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information

ALS Account # / Quote #: 23642 /Q42455
Job #: Crusher Pad Perimeter
PO / AFE: 4500057496
LSD:

Oil and Gas Required Fields (client use)

AFE/Cost Center: | PO#
Major/Minor Code: | Routing Code:
Requisitioner:
Location:

ALS Lab Work Order # (lab use only): L2308650
ALS Contact:
Sampler: RH/AZ/CP

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	pH, TSS, TDS, Turbidity	Number of Containers
1	CRUSHERPAD-SW	11-Jul-19	13:50	Water	P2	1
2	CRUSHERPAD-SOUTHSUMP	11-Jul-19	14:10	Water	P2	1
3	CP-CONDUIT-CULVERT	11-Jul-19	15:30	Water	P2	1
4	CP-SEEPAGE-2	11-Jul-19	15:10	Water	P2	1
5	CP-SEEPAGE-3	11-Jul-19	16:10	Water	P2	1

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System?
☐ YES ☑ NO

Are samples for human drinking water use?
☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ | SIF Observations Yes ☐ No ☐
Ice Packs ☐ Ice Cubes ☐ | Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released By: Kendra Button	Date: 11-Jul-19	Time: 20:20	Received by: CV	Date: July 11, 2019	Time: 7pm	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

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 specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Baffinland Iron Mine's Corporation
(Oakville)
ATTN: William Bowden/Connor Devereaux
2275 Upper Middle Rd. E.
Suite #300
Oakville ON L6H 0C3

Date Received: 16-JUL-19
Report Date: 24-JUL-19 08:51 (MT)
Version: FINAL

Client Phone: 647-253-0596

Certificate of Analysis

Lab Work Order #: L2311077

Project P.O. #: 4500057496
Job Reference: MS SNP MONITORING
C of C Numbers:
Legal Site Desc:

Rick Hawthorne
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2311077-1 MQ-C-A Sampled By: AM/BC/JK on 15-JUL-19 @ 14:15 Matrix: Water							
Physical Tests							
pH	8.19		0.10	pH units		17-JUL-19	R4713120
Total Suspended Solids	<2.0		2.0	mg/L		16-JUL-19	R4713148
Total Dissolved Solids	147		20	mg/L		17-JUL-19	R4715007
Turbidity	0.50		0.10	NTU		17-JUL-19	R4713144
L2311077-2 MQ-C-A03 Sampled By: AM/BC/JK on 15-JUL-19 @ 14:15 Matrix: Water							
Physical Tests							
pH	5.92		0.10	pH units		17-JUL-19	R4713120
Total Suspended Solids	<2.0		2.0	mg/L		16-JUL-19	R4713148
Total Dissolved Solids	24		20	mg/L		17-JUL-19	R4715007
Turbidity	0.12		0.10	NTU		17-JUL-19	R4713144
L2311077-3 MQ-C-D Sampled By: AM/BC/JK on 15-JUL-19 @ 14:25 Matrix: Water							
Physical Tests							
pH	8.12		0.10	pH units		17-JUL-19	R4713120
Total Suspended Solids	3.6		2.0	mg/L		16-JUL-19	R4713148
Total Dissolved Solids	214		20	mg/L		17-JUL-19	R4715007
Turbidity	9.43		0.10	NTU		17-JUL-19	R4713144
L2311077-4 MS-C-A Sampled By: AM/BC/JK on 15-JUL-19 @ 15:15 Matrix: Water							
Physical Tests							
pH	7.91		0.10	pH units		17-JUL-19	R4713120
Total Suspended Solids	<2.0		2.0	mg/L		16-JUL-19	R4713148
Total Dissolved Solids	102		20	mg/L		17-JUL-19	R4715007
Turbidity	2.22		0.10	NTU		17-JUL-19	R4713144
L2311077-5 MS-C-B Sampled By: AM/BC/JK on 15-JUL-19 @ 14:40 Matrix: Water							
Physical Tests							
pH	7.91		0.10	pH units		17-JUL-19	R4713120
Total Suspended Solids	<2.0		2.0	mg/L		16-JUL-19	R4713148
Total Dissolved Solids	94		20	mg/L		17-JUL-19	R4715007
Turbidity	2.75		0.10	NTU		17-JUL-19	R4713144
L2311077-6 MS-C-F Sampled By: AM/BC/JK on 15-JUL-19 @ 16:15 Matrix: Water							
Physical Tests							
pH	7.94		0.10	pH units		17-JUL-19	R4713120
Total Suspended Solids	<2.0		2.0	mg/L		16-JUL-19	R4713148
Total Dissolved Solids	96		20	mg/L		17-JUL-19	R4715007

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2311077-6 MS-C-F Sampled By: AM/BC/JK on 15-JUL-19 @ 16:15 Matrix: Water							
Physical Tests							
Turbidity	5.28		0.10	NTU		17-JUL-19	R4713144
L2311077-7 MS-C-F01 Sampled By: AM/BC/JK on 15-JUL-19 @ 16:15 Matrix: Water							
Physical Tests							
pH	7.95		0.10	pH units		17-JUL-19	R4713120
Total Suspended Solids	<2.0		2.0	mg/L		16-JUL-19	R4713148
Total Dissolved Solids	103		20	mg/L		17-JUL-19	R4715007
Turbidity	5.19		0.10	NTU		17-JUL-19	R4713144
L2311077-8 MS-MRY-9 Sampled By: AM/BC/JK on 15-JUL-19 @ 14:00 Matrix: Water							
Physical Tests							
pH	7.92		0.10	pH units		17-JUL-19	R4713120
Total Suspended Solids	<2.0		2.0	mg/L		16-JUL-19	R4713148
Total Dissolved Solids	68		20	mg/L		17-JUL-19	R4715007
Turbidity	0.70		0.10	NTU		17-JUL-19	R4713144
L2311077-9 MQ-C-B Sampled By: AM/BC/JK on 16-JUL-19 @ 09:25 Matrix: Water							
Physical Tests							
pH	8.19		0.10	pH units		17-JUL-19	R4713120
Total Suspended Solids	<2.0		2.0	mg/L		16-JUL-19	R4713148
Total Dissolved Solids	206		20	mg/L		17-JUL-19	R4715007
Turbidity	1.65		0.10	NTU		17-JUL-19	R4713144
L2311077-10 MS-C-G Sampled By: AM/BC/JK on 16-JUL-19 @ 10:00 Matrix: Water							
Physical Tests							
pH	8.02		0.10	pH units		17-JUL-19	R4713120
Total Suspended Solids	<2.0		2.0	mg/L		16-JUL-19	R4713148
Total Dissolved Solids	128		20	mg/L		17-JUL-19	R4715007
Turbidity	0.33		0.10	NTU		17-JUL-19	R4713144
L2311077-11 MS-C-H Sampled By: AM/BC/JK on 16-JUL-19 @ 10:45 Matrix: Water							
Physical Tests							
pH	8.16		0.10	pH units		17-JUL-19	R4713120
Total Suspended Solids	<2.0		2.0	mg/L		16-JUL-19	R4713148
Total Dissolved Solids	143		20	mg/L		17-JUL-19	R4715007
Turbidity	0.46		0.10	NTU		17-JUL-19	R4713144
L2311077-12 MS-C-D Sampled By: AM/BC/JK on 16-JUL-19 @ 13:45 Matrix: Water							

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2311077-12 MS-C-D Sampled By: AM/BC/JK on 16-JUL-19 @ 13:45 Matrix: Water							
Physical Tests							
pH	8.21		0.10	pH units		17-JUL-19	R4713120
Total Suspended Solids	2.8		2.0	mg/L		16-JUL-19	R4713148
Total Dissolved Solids	830		20	mg/L		17-JUL-19	R4715007
Turbidity	7.07		0.10	NTU		17-JUL-19	R4713144
L2311077-13 MS-C-E Sampled By: AM/BC/JK on 16-JUL-19 @ 13:20 Matrix: Water							
Physical Tests							
pH	8.03		0.10	pH units		17-JUL-19	R4713120
Total Suspended Solids	<2.0		2.0	mg/L		16-JUL-19	R4713148
Total Dissolved Solids	872		20	mg/L		17-JUL-19	R4715007
Turbidity	0.92		0.10	NTU		17-JUL-19	R4713144
L2311077-14 MS-C-C Sampled By: AM/BC/JK on 16-JUL-19 @ 14:00 Matrix: Water							
Physical Tests							
pH	7.88		0.10	pH units		17-JUL-19	R4713120
Total Suspended Solids	<2.0		2.0	mg/L		16-JUL-19	R4713148
Total Dissolved Solids	909		20	mg/L		17-JUL-19	R4715007
Turbidity	0.58		0.10	NTU		17-JUL-19	R4713144
L2311077-15 MS-MRY-13B Sampled By: AM/BC/JK on 16-JUL-19 @ 11:40 Matrix: Water							
Physical Tests							
pH	8.10		0.10	pH units		17-JUL-19	R4713120
Total Suspended Solids	<2.0		2.0	mg/L		16-JUL-19	R4713148
Total Dissolved Solids	680		20	mg/L		17-JUL-19	R4715007
Turbidity	0.23		0.10	NTU		17-JUL-19	R4713144
L2311077-16 MS-MRY-13A Sampled By: AM/BC/JK on 16-JUL-19 @ 11:55 Matrix: Water							
Physical Tests							
Conductivity	476		3.0	umhos/cm		18-JUL-19	R4716090
pH	8.09		0.10	pH units		17-JUL-19	R4713120
Total Suspended Solids	<2.0		2.0	mg/L		16-JUL-19	R4713148
Total Dissolved Solids	297		20	mg/L		17-JUL-19	R4715007
Anions and Nutrients							
Alkalinity, Total (as CaCO3)	178		10	mg/L		18-JUL-19	R4716090
Organic / Inorganic Carbon							
Dissolved Carbon Filtration Location	LAB					18-JUL-19	R4715019
Dissolved Organic Carbon	4.82		0.50	mg/L	18-JUL-19	19-JUL-19	R4719664
Total Organic Carbon	5.25		0.50	mg/L		23-JUL-19	R4722414
Total Metals							

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2311077-16 MS-MRY-13A Sampled By: AM/BC/JK on 16-JUL-19 @ 11:55 Matrix: Water							
Total Metals							
Aluminum (Al)-Total	0.0066		0.0050	mg/L	18-JUL-19	19-JUL-19	R4715311
Antimony (Sb)-Total	0.00019		0.00010	mg/L	18-JUL-19	19-JUL-19	R4715311
Arsenic (As)-Total	0.00020		0.00010	mg/L	18-JUL-19	19-JUL-19	R4715311
Barium (Ba)-Total	0.0307		0.00010	mg/L	18-JUL-19	19-JUL-19	R4715311
Beryllium (Be)-Total	<0.00010		0.00010	mg/L	18-JUL-19	19-JUL-19	R4715311
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L	18-JUL-19	19-JUL-19	R4715311
Boron (B)-Total	0.029		0.010	mg/L	18-JUL-19	19-JUL-19	R4715311
Cadmium (Cd)-Total	0.0000072		0.0000050	mg/L	18-JUL-19	19-JUL-19	R4715311
Calcium (Ca)-Total	41.9		0.050	mg/L	18-JUL-19	19-JUL-19	R4715311
Chromium (Cr)-Total	<0.00050		0.00050	mg/L	18-JUL-19	19-JUL-19	R4715311
Cobalt (Co)-Total	<0.00010		0.00010	mg/L	18-JUL-19	19-JUL-19	R4715311
Copper (Cu)-Total	0.0014		0.0010	mg/L	18-JUL-19	19-JUL-19	R4715311
Iron (Fe)-Total	0.014		0.010	mg/L	18-JUL-19	19-JUL-19	R4715311
Lead (Pb)-Total	<0.000050		0.000050	mg/L	18-JUL-19	19-JUL-19	R4715311
Lithium (Li)-Total	0.0029		0.0010	mg/L	18-JUL-19	19-JUL-19	R4715311
Magnesium (Mg)-Total	32.2		0.0050	mg/L	18-JUL-19	19-JUL-19	R4715311
Manganese (Mn)-Total	0.00405		0.00050	mg/L	18-JUL-19	19-JUL-19	R4715311
Mercury (Hg)-Total	<0.000010		0.000010	mg/L		19-JUL-19	R4716330
Molybdenum (Mo)-Total	0.000346		0.000050	mg/L	18-JUL-19	19-JUL-19	R4715311
Nickel (Ni)-Total	0.00954		0.00050	mg/L	18-JUL-19	19-JUL-19	R4715311
Potassium (K)-Total	1.66		0.050	mg/L	18-JUL-19	19-JUL-19	R4715311
Selenium (Se)-Total	0.000056		0.000050	mg/L	18-JUL-19	19-JUL-19	R4715311
Silicon (Si)-Total	4.54		0.10	mg/L	18-JUL-19	19-JUL-19	R4715311
Silver (Ag)-Total	<0.000050		0.000050	mg/L	18-JUL-19	19-JUL-19	R4715311
Sodium (Na)-Total	7.36		0.050	mg/L	18-JUL-19	19-JUL-19	R4715311
Strontium (Sr)-Total	0.0343		0.0010	mg/L	18-JUL-19	19-JUL-19	R4715311
Thallium (Tl)-Total	0.000013		0.000010	mg/L	18-JUL-19	19-JUL-19	R4715311
Tin (Sn)-Total	<0.00010		0.00010	mg/L	18-JUL-19	19-JUL-19	R4715311
Titanium (Ti)-Total	<0.00030		0.00030	mg/L	18-JUL-19	19-JUL-19	R4715311
Tungsten (W)-Total	<0.00010		0.00010	mg/L	18-JUL-19	19-JUL-19	R4715311
Uranium (U)-Total	0.00106		0.000010	mg/L	18-JUL-19	19-JUL-19	R4715311
Vanadium (V)-Total	<0.00050		0.00050	mg/L	18-JUL-19	19-JUL-19	R4715311
Zinc (Zn)-Total	0.0041		0.0030	mg/L	18-JUL-19	19-JUL-19	R4715311
Zirconium (Zr)-Total	<0.00030		0.00030	mg/L	18-JUL-19	19-JUL-19	R4715311
Aggregate Organics							
Oil and Grease, Total	<2.0		2.0	mg/L	22-JUL-19	22-JUL-19	R4721008
Phenols (4AAP)	0.0029		0.0010	mg/L		19-JUL-19	R4719699
Hydrocarbons							
F1 (C6-C10)	<100		100	ug/L		24-JUL-19	R4720754
F2 (C10-C16)	<100		100	ug/L	18-JUL-19	19-JUL-19	R4719837
F3 (C16-C34)	<250		250	ug/L	18-JUL-19	19-JUL-19	R4719837

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2311077-16 MS-MRY-13A Sampled By: AM/BC/JK on 16-JUL-19 @ 11:55 Matrix: Water							
Hydrocarbons							
F4 (C34-C50)	<250		250	ug/L	18-JUL-19	19-JUL-19	R4719837
Total Hydrocarbons (C6-C50)	<380		380	ug/L		24-JUL-19	
Chrom. to baseline at nC50	YES				18-JUL-19	19-JUL-19	R4719837
Surrogate: 2-Bromobenzotrifluoride	91.6		60-140	%	18-JUL-19	19-JUL-19	R4719837
Surrogate: 3,4-Dichlorotoluene	104.1		60-140	%		24-JUL-19	R4720754
L2311077-17 MQ-C-A Sampled By: AM/BC/JK on 16-JUL-19 @ 09:05 Matrix: Water							
Physical Tests							
Conductivity	255		3.0	umhos/cm		23-JUL-19	R4720571
pH	8.18		0.10	pH units		17-JUL-19	R4713120
Total Suspended Solids	<2.0		2.0	mg/L		16-JUL-19	R4713148
Total Dissolved Solids	171		20	mg/L		17-JUL-19	R4715007
Turbidity	0.43		0.10	NTU		17-JUL-19	R4713144
Anions and Nutrients							
Ammonia, Total (as N)	<0.010		0.010	mg/L		22-JUL-19	R4719920
Nitrate (as N)	<0.020		0.020	mg/L		19-JUL-19	R4719726
Aggregate Organics							
Oil and Grease, Total	<2.0		2.0	mg/L	22-JUL-19	22-JUL-19	R4721008

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

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Barium (Ba)-Total	MS-B	L2311077-16
Matrix Spike	Calcium (Ca)-Total	MS-B	L2311077-16
Matrix Spike	Copper (Cu)-Total	MS-B	L2311077-16
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2311077-16
Matrix Spike	Potassium (K)-Total	MS-B	L2311077-16
Matrix Spike	Silicon (Si)-Total	MS-B	L2311077-16
Matrix Spike	Sodium (Na)-Total	MS-B	L2311077-16
Matrix Spike	Strontium (Sr)-Total	MS-B	L2311077-16

Sample Parameter Qualifier key listed:

Qualifier	Description
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-WT	Water	Alkalinity, Total (as CaCO3)	EPA 310.2

This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.

DOC-WT | Water | Dissolved Organic Carbon | APHA 5310B

Sample is filtered through a 0.45um filter, then injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic carbon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.

EC-SCREEN-WT | Water | Conductivity Screen (Internal Use Only) | APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

EC-WT | Water | Conductivity | APHA 2510 B

Water samples can be measured directly by immersing the conductivity cell into the sample.

F1-F4-CALC-WT | Water | CCME Total Hydrocarbons | CCME CWS-PHC, Pub #1310, Dec 2001-L

Analytical methods used for analysis of CCME Petroleum Hydrocarbons have been validated and comply with the Reference Method for the CWS PHC.

In cases where results for both F4 and F4G are reported, the greater of the two results must be used in any application of the CWS PHC guidelines and the gravimetric heavy hydrocarbons cannot be added to the C6 to C50 hydrocarbons.
In samples where BTEX and F1 were analyzed , F1-BTEX represents a value where the sum of Benzene, Toluene, Ethylbenzene and total Xylenes has been subtracted from F1.

In samples where PAHs, F2 and F3 were analyzed, F2-Naphth represents the result where Naphthalene has been subtracted from F2. F3-PAH represents a result where the sum of Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, Indeno(1,2,3-cd)pyrene, Phenanthrene, and Pyrene has been subtracted from F3.

Unless otherwise qualified, the following quality control criteria have been met for the F1 hydrocarbon range:
1. All extraction and analysis holding times were met.
2. Instrument performance showing response factors for C6 and C10 within 30% of the response factor for toluene.
3. Linearity of gasoline response within 15% throughout the calibration range.

Unless otherwise qualified, the following quality control criteria have been met for the F2-F4 hydrocarbon ranges:
1. All extraction and analysis holding times were met.
2. Instrument performance showing C10, C16 and C34 response factors within 10% of their average.
3. Instrument performance showing the C50 response factor within 30% of the average of the C10, C16 and C34 response factors.
4. Linearity of diesel or motor oil response within 15% throughout the calibration range.

F1-HS-WT | Water | F1 (O.Reg.153/04) | E3421/CCME (HS)

Fraction F1 is determined by analyzing by headspace-GC/FID.

F2-F4-WT | Water | F2-F4 (O.Reg.153/04) | MOE DECPH-E3421/CCME TIER 1

Petroleum Hydrocarbons (F2-F4 fractions) are extracted from water using a hexane micro-extraction technique. Instrumental analysis is by GC-FID, as per the Reference Method for the Canada-Wide Standard for Petroleum Hydrocarbons in Soil Tier 1 Method, CCME, 2001.

HG-T-CVAA-WT | Water | Total Mercury in Water by CVAAS | EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

MET-T-CCMS-WT | Water | Total Metals in Water by CRC ICPMS | EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Reference Information

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

NH3-F-WT	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO3-IC-WT	Water	Nitrate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

OGG-TOT-WT	Water	Oil and Grease, Total	APHA 5520 B

The procedure involves an extraction of the entire water sample with hexane. This extract is then evaporated to dryness, and the residue weighed to determine Oil and Grease.

PH-BF	Water	pH	APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

PHENOLS-4AAP-WT	Water	Phenol (4AAP)	EPA 9066

An automated method is used to distill the sample. The distillate is then buffered to pH 9.4 which reacts with 4AAP and potassium ferricyanide to form a red complex which is measured colorimetrically.

SOLIDS-TDS-BF	Water	Total Dissolved Solids	APHA 2540C

A well-mixed sample is filtered though glass fibres filter. A known volume of the filtrate is evaporated and dried at 180 +/- 2C for 1hr.

SOLIDS-TSS-BF	Water	Suspended solids	APHA 2540 D-Gravimetric

A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104 +/- 1C for a minimum of four hours or until a constant weight is achieved.

TOC-WT	Water	Total Organic Carbon	APHA 5310B

Sample is injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic cabon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.

TURBIDITY-BF	Water	Turbidity	APHA 2130 B

Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.

** 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
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA
BF	ALS ENVIRONMENTAL - BAFFIN ISLAND, NUNAVUT, 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 weight of sample
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

Workorder: L2311077 Report Date: 24-JUL-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ALK-WT	**Water**							
Batch R4716090								
WG3108626-4 DUP		**WG3108626-3**						
Alkalinity, Total (as CaCO3)		52	56		mg/L	7.5	20	18-JUL-19
WG3108626-2 LCS								
Alkalinity, Total (as CaCO3)			102.9		%		85-115	18-JUL-19
WG3108626-1 MB								
Alkalinity, Total (as CaCO3)			<10		mg/L		10	18-JUL-19
DOC-WT	**Water**							
Batch R4719664								
WG3109390-3 DUP		**L2311626-1**						
Dissolved Organic Carbon		5.86	5.92		mg/L	1.0	25	19-JUL-19
WG3109390-2 LCS								
Dissolved Organic Carbon			102.0		%		70-130	19-JUL-19
WG3109390-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	19-JUL-19
WG3109390-4 MS		**L2311626-1**						
Dissolved Organic Carbon			105.1		%		70-130	19-JUL-19
EC-WT	**Water**							
Batch R4716090								
WG3108626-4 DUP		**WG3108626-3**						
Conductivity		2020	2020		umhos/cm	0.0	10	18-JUL-19
WG3108626-2 LCS								
Conductivity			98.7		%		90-110	18-JUL-19
WG3108626-1 MB								
Conductivity			<3.0		umhos/cm		3	18-JUL-19
Batch R4720571								
WG3112605-4 DUP		**WG3112605-3**						
Conductivity		748	746		umhos/cm	0.3	10	23-JUL-19
WG3112605-2 LCS								
Conductivity			100.6		%		90-110	23-JUL-19
WG3112605-1 MB								
Conductivity			<3.0		umhos/cm		3	23-JUL-19
F1-HS-WT	**Water**							
Batch R4720754								
WG3112475-4 DUP		**WG3112475-3**						
F1 (C6-C10)		<100	<100	RPD-NA	ug/L	N/A	50	23-JUL-19
WG3112475-1 LCS								
F1 (C6-C10)			103.2		%		80-120	23-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F1-HS-WT	**Water**							
Batch R4720754								
WG3112475-2 MB								
F1 (C6-C10)			<100		ug/L		100	23-JUL-19
Surrogate: 3,4-Dichlorotoluene			130.6		%		60-140	23-JUL-19
WG3112475-5 MS		**WG3112475-3**						
F1 (C6-C10)			79.0		%		50-150	23-JUL-19
F2-F4-WT	**Water**							
Batch R4719837								
WG3109410-2 LCS								
F2 (C10-C16)			97.0		%		65-135	19-JUL-19
F3 (C16-C34)			101.1		%		65-135	19-JUL-19
F4 (C34-C50)			104.8		%		65-135	19-JUL-19
WG3109410-1 MB								
F2 (C10-C16)			<100		ug/L		100	19-JUL-19
F3 (C16-C34)			<250		ug/L		250	19-JUL-19
F4 (C34-C50)			<250		ug/L		250	19-JUL-19
Surrogate: 2-Bromobenzotrifluoride			88.5		%		60-140	19-JUL-19
HG-T-CVAA-WT	**Water**							
Batch R4716330								
WG3108866-3 DUP		**L2311819-1**						
Mercury (Hg)-Total		0.000042	0.000044		mg/L	4.4	20	19-JUL-19
WG3108866-2 LCS								
Mercury (Hg)-Total			100.0		%		80-120	19-JUL-19
WG3108866-1 MB								
Mercury (Hg)-Total			<0.000010		mg/L		0.00001	19-JUL-19
WG3108866-4 MS		**L2311819-2**						
Mercury (Hg)-Total			107.4		%		70-130	19-JUL-19
MET-T-CCMS-WT	**Water**							
Batch R4715311								
WG3109048-4 DUP		**WG3109048-3**						
Aluminum (Al)-Total		15.5	15.5		mg/L	0.3	20	18-JUL-19
Antimony (Sb)-Total		0.0050	0.0049		mg/L	1.6	20	18-JUL-19
Arsenic (As)-Total		0.0017	0.0016		mg/L	12	20	18-JUL-19
Barium (Ba)-Total		0.0766	0.0749		mg/L	2.2	20	18-JUL-19
Beryllium (Be)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	18-JUL-19
Bismuth (Bi)-Total		0.00053	0.00052		mg/L	1.4	20	18-JUL-19
Boron (B)-Total		0.44	0.45		mg/L	3.5	20	18-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4715311								
WG3109048-4 DUP		**WG3109048-3**						
Cadmium (Cd)-Total		0.000993	0.00100		mg/L	1.0	20	18-JUL-19
Calcium (Ca)-Total		106	107		mg/L	1.5	20	18-JUL-19
Chromium (Cr)-Total		0.0259	0.0257		mg/L	0.9	20	18-JUL-19
Cobalt (Co)-Total		0.0120	0.0123		mg/L	2.8	20	18-JUL-19
Copper (Cu)-Total		0.067	0.067		mg/L	0.8	20	18-JUL-19
Iron (Fe)-Total		16.8	16.4		mg/L	2.6	20	18-JUL-19
Lead (Pb)-Total		0.0959	0.0965		mg/L	0.6	20	18-JUL-19
Lithium (Li)-Total		0.082	0.085		mg/L	3.4	20	18-JUL-19
Magnesium (Mg)-Total		21.9	22.0		mg/L	0.7	20	18-JUL-19
Manganese (Mn)-Total		0.336	0.337		mg/L	0.1	20	18-JUL-19
Molybdenum (Mo)-Total		0.0371	0.0370		mg/L	0.2	20	18-JUL-19
Nickel (Ni)-Total		0.0333	0.0323		mg/L	3.0	20	18-JUL-19
Potassium (K)-Total		15.0	15.2		mg/L	1.0	20	18-JUL-19
Selenium (Se)-Total		0.00150	0.00145		mg/L	3.2	20	18-JUL-19
Silicon (Si)-Total		31.2	30.4		mg/L	2.7	20	18-JUL-19
Silver (Ag)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	18-JUL-19
Sodium (Na)-Total		69.1	69.1		mg/L	0.1	20	18-JUL-19
Strontium (Sr)-Total		0.554	0.587		mg/L	5.8	20	18-JUL-19
Thallium (Tl)-Total		0.00017	0.00016		mg/L	4.7	20	18-JUL-19
Tin (Sn)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	18-JUL-19
Titanium (Ti)-Total		0.852	0.849		mg/L	0.5	20	18-JUL-19
Tungsten (W)-Total		0.0296	0.0296		mg/L	0.2	20	18-JUL-19
Uranium (U)-Total		0.00517	0.00521		mg/L	0.9	20	18-JUL-19
Vanadium (V)-Total		0.0453	0.0460		mg/L	1.5	20	18-JUL-19
Zinc (Zn)-Total		0.172	0.166		mg/L	3.4	20	18-JUL-19
Zirconium (Zr)-Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	18-JUL-19
WG3109048-2 LCS								
Aluminum (Al)-Total			104.6		%		80-120	18-JUL-19
Antimony (Sb)-Total			106.0		%		80-120	18-JUL-19
Arsenic (As)-Total			99.6		%		80-120	18-JUL-19
Barium (Ba)-Total			100.2		%		80-120	18-JUL-19
Beryllium (Be)-Total			102.8		%		80-120	18-JUL-19
Bismuth (Bi)-Total			98.7		%		80-120	18-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4715311								
WG3109048-2 LCS								
Boron (B)-Total			102.4		%		80-120	18-JUL-19
Cadmium (Cd)-Total			103.1		%		80-120	18-JUL-19
Calcium (Ca)-Total			101.2		%		80-120	18-JUL-19
Chromium (Cr)-Total			100.4		%		80-120	18-JUL-19
Cobalt (Co)-Total			100.7		%		80-120	18-JUL-19
Copper (Cu)-Total			99.8		%		80-120	18-JUL-19
Iron (Fe)-Total			94.5		%		80-120	18-JUL-19
Lead (Pb)-Total			101.7		%		80-120	18-JUL-19
Lithium (Li)-Total			106.7		%		80-120	18-JUL-19
Magnesium (Mg)-Total			103.3		%		80-120	18-JUL-19
Manganese (Mn)-Total			99.5		%		80-120	18-JUL-19
Molybdenum (Mo)-Total			102.6		%		80-120	18-JUL-19
Nickel (Ni)-Total			100.1		%		80-120	18-JUL-19
Potassium (K)-Total			94.1		%		80-120	18-JUL-19
Selenium (Se)-Total			99.8		%		80-120	18-JUL-19
Silicon (Si)-Total			105.8		%		60-140	18-JUL-19
Silver (Ag)-Total			101.5		%		80-120	18-JUL-19
Sodium (Na)-Total			106.0		%		80-120	18-JUL-19
Strontium (Sr)-Total			101.1		%		80-120	18-JUL-19
Thallium (Tl)-Total			101.5		%		80-120	18-JUL-19
Tin (Sn)-Total			102.8		%		80-120	18-JUL-19
Titanium (Ti)-Total			99.7		%		80-120	18-JUL-19
Tungsten (W)-Total			101.5		%		80-120	18-JUL-19
Uranium (U)-Total			107.3		%		80-120	18-JUL-19
Vanadium (V)-Total			102.1		%		80-120	18-JUL-19
Zinc (Zn)-Total			95.1		%		80-120	18-JUL-19
Zirconium (Zr)-Total			96.1		%		80-120	18-JUL-19
WG3109048-1 MB								
Aluminum (Al)-Total			<0.0050		mg/L		0.005	18-JUL-19
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	18-JUL-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	18-JUL-19
Barium (Ba)-Total			<0.00010		mg/L		0.0001	18-JUL-19
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	18-JUL-19
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	18-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4715311								
WG3109048-1 MB								
Boron (B)-Total			<0.010		mg/L		0.01	18-JUL-19
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	18-JUL-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	18-JUL-19
Chromium (Cr)-Total			<0.00050		mg/L		0.0005	18-JUL-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	18-JUL-19
Copper (Cu)-Total			<0.0010		mg/L		0.001	18-JUL-19
Iron (Fe)-Total			<0.010		mg/L		0.01	18-JUL-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	18-JUL-19
Lithium (Li)-Total			<0.0010		mg/L		0.001	18-JUL-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	18-JUL-19
Manganese (Mn)-Total			<0.00050		mg/L		0.0005	18-JUL-19
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	18-JUL-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	18-JUL-19
Potassium (K)-Total			<0.050		mg/L		0.05	18-JUL-19
Selenium (Se)-Total			<0.000050		mg/L		0.00005	18-JUL-19
Silicon (Si)-Total			<0.10		mg/L		0.1	18-JUL-19
Silver (Ag)-Total			<0.000050		mg/L		0.00005	18-JUL-19
Sodium (Na)-Total			<0.050		mg/L		0.05	18-JUL-19
Strontium (Sr)-Total			<0.0010		mg/L		0.001	18-JUL-19
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	18-JUL-19
Tin (Sn)-Total			<0.00010		mg/L		0.0001	18-JUL-19
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	18-JUL-19
Tungsten (W)-Total			<0.00010		mg/L		0.0001	18-JUL-19
Uranium (U)-Total			<0.000010		mg/L		0.00001	18-JUL-19
Vanadium (V)-Total			<0.00050		mg/L		0.0005	18-JUL-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	18-JUL-19
Zirconium (Zr)-Total			<0.00020		mg/L		0.0002	18-JUL-19
WG3109048-5 MS		**WG3109048-6**						
Aluminum (Al)-Total			95.3		%		70-130	18-JUL-19
Antimony (Sb)-Total			108.8		%		70-130	18-JUL-19
Arsenic (As)-Total			100.7		%		70-130	18-JUL-19
Barium (Ba)-Total			N/A	MS-B	%		-	18-JUL-19
Beryllium (Be)-Total			99.9		%		70-130	18-JUL-19
Bismuth (Bi)-Total			102.5		%		70-130	18-JUL-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4715311								
WG3109048-5 MS		**WG3109048-6**						
Boron (B)-Total			98.0		%		70-130	18-JUL-19
Cadmium (Cd)-Total			100.8		%		70-130	18-JUL-19
Calcium (Ca)-Total			N/A	MS-B	%		-	18-JUL-19
Chromium (Cr)-Total			99.3		%		70-130	18-JUL-19
Cobalt (Co)-Total			100.2		%		70-130	18-JUL-19
Copper (Cu)-Total			N/A	MS-B	%		-	18-JUL-19
Iron (Fe)-Total			88.9		%		70-130	18-JUL-19
Lead (Pb)-Total			102.0		%		70-130	18-JUL-19
Lithium (Li)-Total			103.8		%		70-130	18-JUL-19
Magnesium (Mg)-Total			N/A	MS-B	%		-	18-JUL-19
Manganese (Mn)-Total			100.3		%		70-130	18-JUL-19
Molybdenum (Mo)-Total			106.3		%		70-130	18-JUL-19
Nickel (Ni)-Total			98.3		%		70-130	18-JUL-19
Potassium (K)-Total			N/A	MS-B	%		-	18-JUL-19
Selenium (Se)-Total			103.8		%		70-130	18-JUL-19
Silicon (Si)-Total			N/A	MS-B	%		-	18-JUL-19
Silver (Ag)-Total			101.0		%		70-130	18-JUL-19
Sodium (Na)-Total			N/A	MS-B	%		-	18-JUL-19
Strontium (Sr)-Total			N/A	MS-B	%		-	18-JUL-19
Thallium (Tl)-Total			103.2		%		70-130	18-JUL-19
Tin (Sn)-Total			104.7		%		70-130	18-JUL-19
Titanium (Ti)-Total			98.7		%		70-130	18-JUL-19
Tungsten (W)-Total			106.6		%		70-130	18-JUL-19
Uranium (U)-Total			107.4		%		70-130	18-JUL-19
Vanadium (V)-Total			103.0		%		70-130	18-JUL-19
Zinc (Zn)-Total			88.2		%		70-130	18-JUL-19
Zirconium (Zr)-Total			100.5		%		70-130	18-JUL-19
NH3-F-WT	**Water**							
Batch R4719920								
WG3111652-7 DUP		**L2311077-17**						
Ammonia, Total (as N)		<0.010	<0.010	RPD-NA	mg/L	N/A	20	22-JUL-19
WG3111652-6 LCS								
Ammonia, Total (as N)			100.6		%		85-115	22-JUL-19
WG3111652-5 MB								

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NH3-F-WT	**Water**							
Batch R4719920								
WG3111652-5 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	22-JUL-19
WG3111652-8 MS		**L2311077-17**						
Ammonia, Total (as N)			92.8		%		75-125	22-JUL-19
NO3-IC-WT	**Water**							
Batch R4719726								
WG3110151-4 DUP		**WG3110151-3**						
Nitrate (as N)		<0.020	<0.020	RPD-NA	mg/L	N/A	20	19-JUL-19
WG3110151-2 LCS								
Nitrate (as N)			101.2		%		90-110	19-JUL-19
WG3110151-1 MB								
Nitrate (as N)			<0.020		mg/L		0.02	19-JUL-19
WG3110151-5 MS		**WG3110151-3**						
Nitrate (as N)			97.9		%		75-125	19-JUL-19
OGG-TOT-WT	**Water**							
Batch R4721008								
WG3111791-2 LCS								
Oil and Grease, Total			88.2		%		70-130	22-JUL-19
WG3111791-1 MB								
Oil and Grease, Total			<2.0		mg/L		2	22-JUL-19
PH-BF	**Water**							
Batch R4713120								
WG3106961-2 DUP		**L2311077-17**						
pH		8.18	8.19	J	pH units	0.01	0.2	17-JUL-19
WG3106961-1 LCS								
pH			7.01		pH units		6.9-7.1	17-JUL-19
PHENOLS-4AAP-WT	**Water**							
Batch R4719699								
WG3109768-3 DUP		**L2307302-2**						
Phenols (4AAP)		0.0021	0.0021		mg/L	0.8	20	19-JUL-19
WG3109768-2 LCS								
Phenols (4AAP)			105.9		%		85-115	19-JUL-19
WG3109768-1 MB								
Phenols (4AAP)			<0.0010		mg/L		0.001	19-JUL-19
WG3109768-4 MS		**L2307302-2**						
Phenols (4AAP)			109.5		%		75-125	19-JUL-19
SOLIDS-TDS-BF	**Water**							

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SOLIDS-TDS-BF	**Water**							
Batch R4715007								
WG3108230-3 DUP		**L2311077-16**						
Total Dissolved Solids		297	279		mg/L	6.1	20	17-JUL-19
WG3108230-2 LCS								
Total Dissolved Solids			101.1		%		85-115	17-JUL-19
WG3108230-1 MB								
Total Dissolved Solids			<20		mg/L		20	17-JUL-19
SOLIDS-TSS-BF	**Water**							
Batch R4713148								
WG3106971-3 DUP		**L2311077-5**						
Total Suspended Solids		<2.0	<2.0	RPD-NA	mg/L	N/A	25	16-JUL-19
WG3106971-2 LCS								
Total Suspended Solids			99.2		%		85-115	16-JUL-19
WG3106971-1 MB								
Total Suspended Solids			<2.0		mg/L		2	16-JUL-19
TOC-WT	**Water**							
Batch R4722414								
WG3112422-3 DUP		**L2312192-21**						
Total Organic Carbon		<0.50	<0.50	RPD-NA	mg/L	N/A	20	23-JUL-19
WG3112422-2 LCS								
Total Organic Carbon			106.7		%		80-120	23-JUL-19
WG3112422-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	23-JUL-19
WG3112422-4 MS		**L2312192-21**						
Total Organic Carbon			110.0		%		70-130	23-JUL-19
TURBIDITY-BF	**Water**							
Batch R4713144								
WG3106975-3 DUP		**L2311077-17**						
Turbidity		0.43	0.50	J	NTU	0.080	0.2	17-JUL-19
WG3106975-2 LCS								
Turbidity			101.0		%		85-115	17-JUL-19
WG3106975-1 MB								
Turbidity			<0.10		NTU		0.1	17-JUL-19

Quality Control Report

Workorder: L2311077 Report Date: 24-JUL-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

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

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Hold Time Exceedances:

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

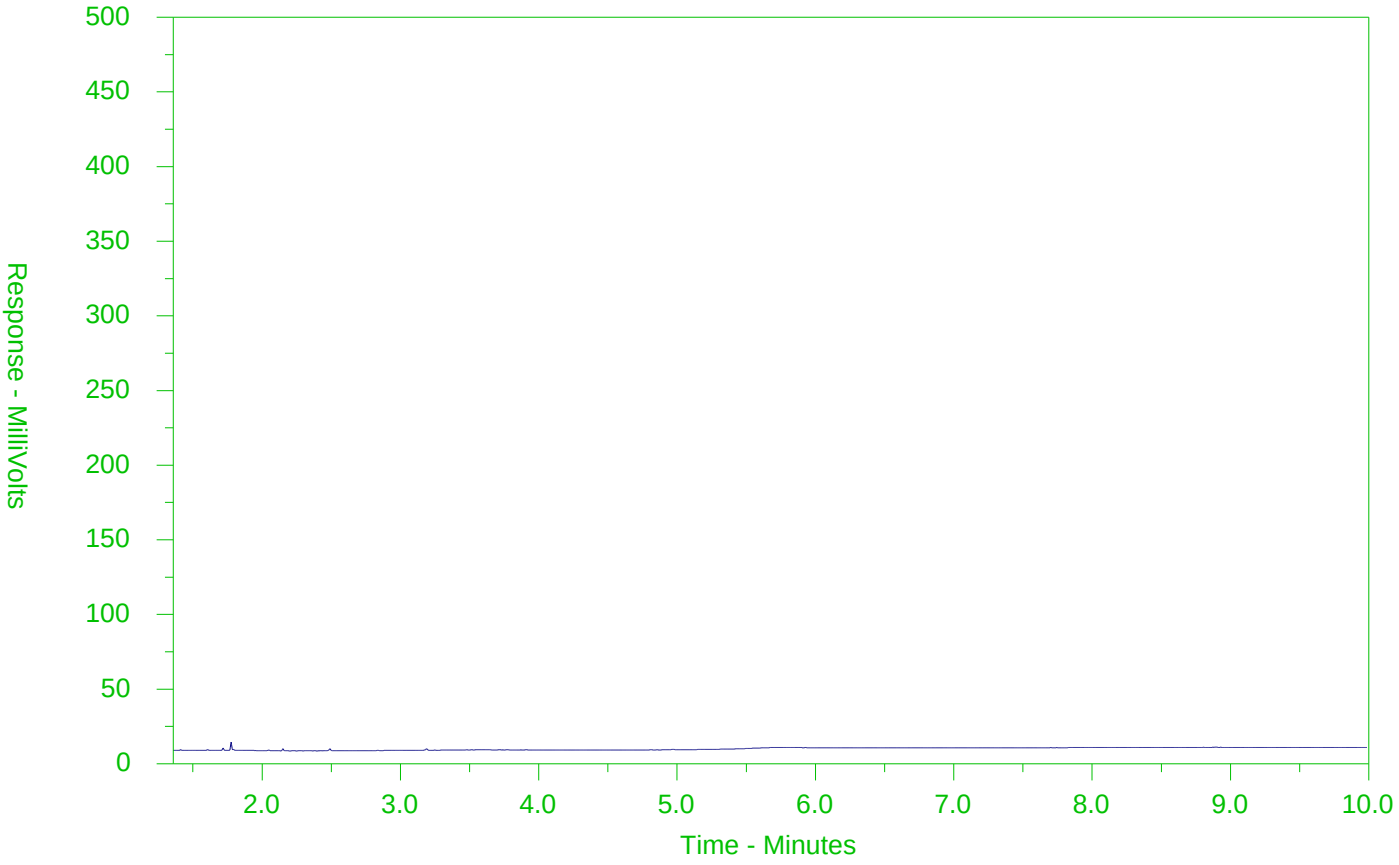
ALS recommended hold times may vary by province. They are assigned to meet known provincial and/or federal government requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by the US EPA, APHA Standard Methods, or Environment Canada (where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

CCME F2-F4 HYDROCARBON DISTRIBUTION REPORT

ALS Sample ID: L2311077-16
Client Sample ID: MS-MRY-13A



←F2→	←F3→	←F4→	
nC10	nC16	nC34	nC50
174°C	287°C	481°C	575°C
346°F	549°F	898°F	1067°F
Gasoline →		← Motor Oils/Lube Oils/Grease →	
← Diesel/Jet Fuels →			

The CCME F2-F4 Hydrocarbon Distribution Report (HDR) is intended to assist you in characterizing hydrocarbon products that may be present in your sample.

The scale at the bottom of the chromatogram indicates the approximate retention times of common petroleum products and four n-alkane hydrocarbon marker compounds. Retention times may vary between samples, but general patterns and distributions will remain similar.

Peak heights in this report are a function of the sample concentration, the sample amount extracted, the sample dilution factor and the scale at the left.

Note: This chromatogram was produced using GC conditions that are specific to ALS Canada CCME F2-F4 method. Refer to the ALS Canada CCME F2-F4 Hydrocarbon Library for a collection of chromatograms from common reference samples (fuels, oils, etc.). The HDR Library can be found at www.alsglobal.com.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2311077-COFC

COC Number: 15 -

Report To	Contact and company name below will appear on the final report
Company:	Baffinland Iron Mines Corp.
Contact:	Wiliam Bowden and Connor Devereaux
Phone:	647-253-0596 EXT 6016
	Company address below will appear on the final report
Street:	2275 Upper Middle Rd. E., Suite #300
City/Province:	Oakville, ON
Postal Code:	L6H 0C3
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	
Contact:	

Report Format / Distribution	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	bimcore@alsglobal.com
Email 2	
Email 3	

Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	ap@baffinland.com
Email 2	commercial@baffinland.com

Project Information	
ALS Account # / Quote #:	23642 /Q42455
Job #:	MS SNP Monitoring
PO / AFE:	4500057496
LSD:	

Oil and Gas Required Fields (client use)	
AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only)	L2311077	ALS Contact:	Sampler: AM/BC/JK

Confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4] ☐ | 3 day [P3] ☐ | 2 day [P2] ☐

EMERGENCY: 1 Business day [E1] ☐ | Same Day, Weekend or Statutory holiday [E0] ☐

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	pH, TSS, TDS, Turbidity	Number of Containers
1	MQ-C-A	15-Jul-19	14:15	Water	R	1
2	MQ-C-A03	15-Jul-19	14:15	Water	R	1
3	MQ-C-D	15-Jul-19	14:25	Water	R	1
4	MS-C-A	15-Jul-19	15:15	Water	R	1
5	MS-C-B	15-Jul-19	14:40	Water	R	2
6	MS-C-F	15-Jul-19	16:15	Water	R	1
7	MS-C-F01	15-Jul-19	16:15	Water	R	1
8	MS-MRY-9	15-Jul-19	14:00	Water	R	1
9	MQ-C-B	16-Jul-19	9:25	Water	R	1
10	MS-C-G	16-Jul-19	10:00	Water	R	1
11	MS-C-H	16-Jul-19	10:45	Water	R	1
12	MS-C-D	16-Jul-19	13:45	Water	R	1

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human drinking water use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ | SIF Observations Yes ☐ No ☐

Ice Packs ☐ | Ice Cubes ☐ | Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
	4C		18.1		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Kendra Button	Release Date: 16-Jul-19	Time: 16:15	Received by: CV	Date: July 16, 2019	Time: 6pm	Received by: AP	Date: 18-7-19	Time: 9:00

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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 specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Chain of Custody (COC) / Analytica Request Form

ALS Environmental

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

L2311077-COFC

COC Number: 15 -

Report To	Contact and company name below will appear on the final report
Company:	Baffinland Iron Mines Corp.
Contact:	Wiliam Bowden and Connor Devereaux
Phone:	647-253-0596 EXT 6016
	Company address below will appear on the final report
Street:	2275 Upper Middle Rd. E., Suite #300
City/Province:	Oakville, ON
Postal Code:	L6H 0C3
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)

Quality Control (QC) Report with Report ☑ YES ☐ NO

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: bimcore@alsglobal.com

Email 2:

Email 3:

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: ap@baffinland.com

Email 2: commercial@baffinland.com

Project Information

ALS Account # / Quote #:	23642 /Q42455
Job #:	MS SNP Monitoring
PO / AFE:	4500057496
LSD:	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#:
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only)	L2311077	ALS Contact:	Sampler: AM/BC/JK

Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☑ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4] ☐ | 3 day [P3] ☐ | 2 day [P2] ☐

EMERGENCY: 1 Business day [E1] ☐ | Same Day, Weekend or Statutory holiday [E0] ☐

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	pH, TSS, TDS, Turbidity	Group 6	Group 8										Number of Containers
					F/P	F/P	P										
13	MS-C-E	16-Jul-19	13:20	Water	R												1
14	MS-C-C	16-Jul-19	14:00	Water	R												1
15	MS-MRY-13B	16-Jul-19	11:40	Water	R												1
16	MS-MRY-13A	16-Jul-19	11:55	Water		R											12
17	MQ-C-A	16-Jul-19	9:05	Water			R										5

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human drinking water use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C		FINAL COOLER TEMPERATURES °C			
	4C		18.1		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Kendra Button	Release Date: 16-Jul-19	Time: 16:15	Received by: CV	Date: July 16, 2019	Time: 6pm	Received by: AP	Date: 18-7-19	Time: 9:00

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Baffinland

September 29, 2019

Jonathan Mesher, Water Resource Officer
Nunavut Field Operations
Crown Indigenous Relations and Northern Affairs Canada
Iqaluit Office
Box 100
Iqaluit, NU X0A 0H0

Monika Trottier, Enforcement Officer
Curtis Didham, Enforcement Officer
Environment and Climate Change Canada
933 Mivvik Street
Iqaluit, NU X0A 0H0

Re: Follow-up to Spill #19-279 – Update 1, Reported on September 01, 2019, Mary River Project - Water Licence No. 2AM-MRY1325

On August 31st, during inspections at the Crusher Facility, personnel observed runoff from the crusher pad entering the east collection ditch. The runoff sourced from the water pooling in the area of the ring road that originated from the ice and water entrained in the ore stockpile that was being reclaimed and was being disturbed from increased equipment traffic through the area at the time. Additional vehicle traffic was present due to the initiation of remedial earthworks in response to Spill No. 19-279. Upon further investigation, it was observed that water was flowing out of the east collection ditch at the toe, in the same location (CP-SEEPAGE-1) as reported on July 11th. The runoff from the crusher pad was immediately arrested from entering the ditch with a reinforced berm and equipment traffic was eliminated from the area with additional berms. Preliminary pH results at the release location at the ditch toe indicate pH levels below 6.0. Water quality monitoring conducted downstream of the release indicate neutral pH in the receiving environment.

Water quality monitoring was conducted at the release location CP-SEEPAGE-1 on August 31st. CP-SEEPAGE-1 was dry on subsequent site visits, and was not sampled. Lab results for CP-SEEPAGE-1 were non-compliant with applicable regulatory criteria for total suspended solids (TSS) and pH. Field personnel noted that substrate entered the sample bottle during sample collection due to low water level and could not be mitigated by sampling technique. Water quality monitoring was conducted downstream of the Crusher Facility at the Water Licence sampling location MS-C-C on August 31st and September 2nd, MS-C-E September 1st and 2nd. Lab results for all parameters analyzed at MS-C-C and MS-C-E, including acute toxicity, were compliant with applicable regulatory criteria.

Appendix A outlines water quality results from monitoring conducted at the release location and the downstream Water License location.

Repairs completed on the ditch were tested on September 6th with treated lake water. The water migrated approximately 50m along the ditch before draining downward emerging at the toe. This test confirmed the ditch was still compromised and Baffinland continues to contain and pump the Crusher Facility water on the pad to the pond.

Further ditch repairs and remedial actions are still under investigation by Golder Associates. Baffinland intends to repair the ditch and restore functionality prior to Freshet 2020.

As per Section 31 of the Metal and Diamond Mining Effluent Regulations (MDMER):

a) Surface water at the CF sedimentation pond collection ditch.
b) Unknown quantity
c) The release was first observed at approximately 14:00 on July 10th, 2019 (Spill No. 19-279), and again on August 31st, 2019. A summary is provided in Appendix A of the sampling events that occurred upon observation of the uncontrolled release which includes date, time and respective water quality results.
d) The quantity of surface water released from the collection ditch is unknown. The location of the release is listed below.

ID	Location
CP-SEEPAGE-1	17W 561645 7912653

e) N/A. The release did not occur through a final discharge point.
f) Sheardown Lake tributary is the receiving body of water. The release was contained to the adjacent tundra of the crusher pad which is over 1km from Sheardown Lake tributary, the nearest fish bearing waters.
g) No acute lethality test was able to be taken at the time of deposit from the release location itself. An acute lethality test was taken from the receiving environment (MS-C-E) and was determined to be not acutely lethal.
h) See summary above for circumstances of deposit. Extent of release was minimal and prohibited proper water sampling procedures. As per Baffinland's Emergency Response Plan and Spill Contingency Plan a berm was immediately constructed to prevent water from entering the ditch and the water was pumped directly into the CF sedimentation pond (MS-06).
i) The water from the pad continues to be diverted from the ditch and pumped directly into the CF sedimentation pond. Field monitoring continues at the crusher pad facility and no further releases have been observed. A third party engineering firm continues with field investigations and corrective actions will occur prior to Freshet 2020.

Should you require further information or clarification on the above noted spill, please feel free to contact Connor Devereaux at (647) 253-0596 x6016.

Prepared by:

Connor Devereaux
Environmental Superintendent

Reviewed by:

Christopher Murray
Environmental & Regulatory Compliance Manager

Attach: Photos, Map, NT-NU Spill Report, Water Quality Results, Certificates of Analyses

cc. Grant Goddard, Megan Lord-Hoyle, Sylvain Proulx, Tim Sewell, Shawn Stevens, Francois Gaudreau, Lou Kamermans (Baffinland), Justin Hack, Jeremy Fraser (CIRNAC), Curtis Didham (ECCC).

Photo 1. August 31st, 2019 – Crusher Facility runoff into ditch.

Photo 2. August 31st, 2019 – CP-SEEPAGE-1 sample location.

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Photo 3. September 1st, 2019 – Crusher Facility runoff berm.

Photo 4. September 1st, 2019 – MS-C-E water quality sampling.

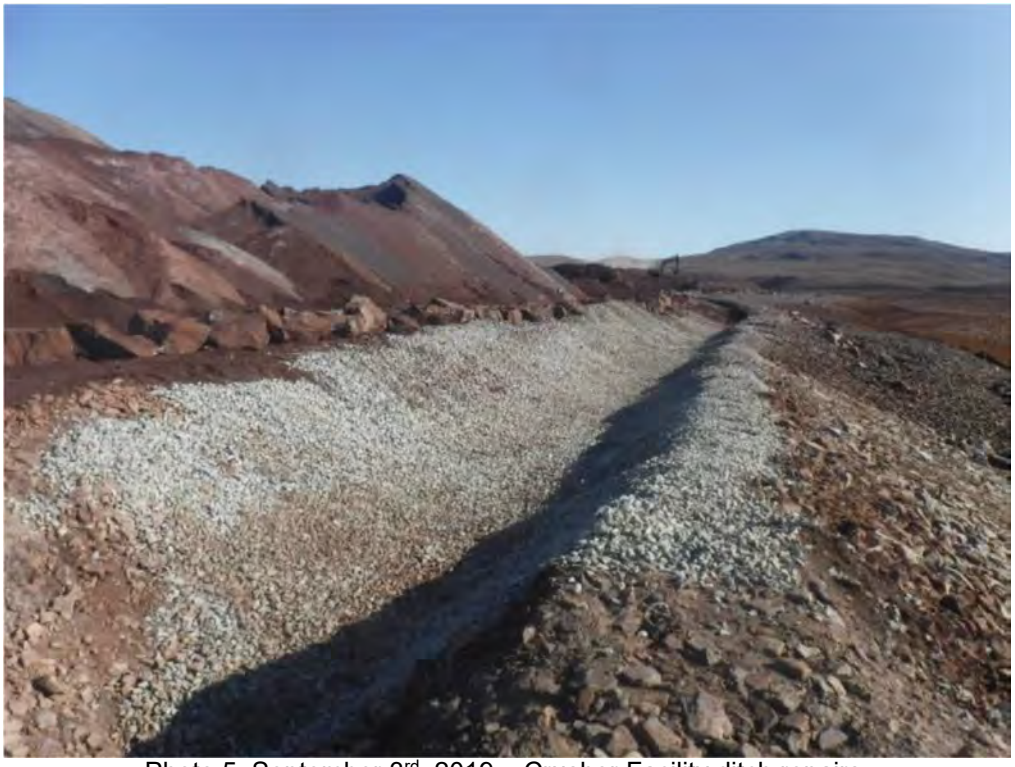

Photo 5. September 3rd, 2019 – Crusher Facility ditch repairs.

Photo 6. September 6th, 2019 – CP-SEEPAGE-1

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Photo 7. September 6th, 2019 – Crusher Facility ditch treated lake water test.

Photo 8. September 12th, 2019 – Crusher Facility ditch dry.

Photo 9. September 14th, 2019 – Crusher Facility pump set up to bypass ditch.

Figure 1 – Overview map of spill location

Northwest Territories | Nunavut | Canada

NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND OTHER HAZARDOUS MATERIALS

NT-NU 24-HOUR SPILL REPORT LINE
TEL: (867) 920-8130
FAX: (867) 873-6924
EMAIL: spills@gov.nt.ca

REPORT LINE USE ONLY

A	REPORT DATE: MONTH – DAY – YEAR: 09-01-2019	REPORT TIME: 22:00	☐ ORIGINAL SPILL REPORT, OR ☒ UPDATE # 19-279 TO THE ORIGINAL SPILL REPORT	REPORT NUMBER
B	OCCURRENCE DATE: MONTH – DAY – YEAR: 08-31-2019	OCCURRENCE TIME: 15:00		
C	LAND USE PERMIT NUMBER (IF APPLICABLE): IOL - Commercial Lease: Q13C301	WATER LICENCE NUMBER (IF APPLICABLE): 2AM-MRY1325 Type "A"		
D	GEOGRAPHIC PLACE NAME OR DISTANCE AND DIRECTION FROM NAMED LOCATION: Mary River Mine Site, Baffin Island, NU	REGION: ☐ NWT ☒ NUNAVUT ☐ ADJACENT JURISDICTION OR OCEAN		
E	LATITUDE: DEGREES 71 MINUTES 18 SECONDS 30	LONGITUDE: DEGREES 79 MINUTES 16 SECONDS 35		
F	RESPONSIBLE PARTY OR VESSEL NAME: Baffinland Iron Mines Corp.	RESPONSIBLE PARTY ADDRESS OR OFFICE LOCATION: 2275 Middle Road East, Suite 300, Oakville, ON L6H 0C3		
G	ANY CONTRACTOR INVOLVED: N/A	CONTRACTOR ADDRESS OR OFFICE LOCATION: N/A		
H	PRODUCT SPILLED: Surface Water	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES: Unknown	U.N. NUMBER: N/A	
	SECOND PRODUCT SPILLED (IF APPLICABLE): N/A	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES: N/A	U.N. NUMBER: N/A	
I	SPILL SOURCE: Crusher Pad	SPILL CAUSE: Seepage through ditch	AREA OF CONTAMINATION IN SQUARE METRES: N/A	
J	FACTORS AFFECTING SPILL OR RECOVERY: Drainage to tundra	DESCRIBE ANY ASSISTANCE REQUIRED: N/A	HAZARDS TO PERSONS, PROPERTY OR EQUIPMENT: N/A	

K — ADDITIONAL INFORMATION, COMMENTS, ACTIONS PROPOSED OR TAKEN TO CONTAIN, RECOVER OR DISPOSE OF SPILLED PRODUCT AND CONTAMINATED MATERIALS:

On August 31st, during inspections at the Crusher Facility, personnel observed runoff from the crusher pad entering the east collection ditch. The runoff sourced from the water pooling in the area of the ring road that originated from the ice and water entrained in the ore stockpile that was being reclaimed and was being disturbed from increased equipment traffic through the area at the time. Additional vehicle traffic was present due to the initiation of remedial earthworks in response to Spill No. 19-279. Upon further investigation, it was observed that water was flowing out of the east collection ditch at the toe, in the same location (CP-SEEPAGE-1) as reported on July 11th. The runoff from the crusher pad was immediately arrested from entering the ditch with a reinforced berm and equipment traffic was eliminated from the area with additional berms. Preliminary pH results at the release location at the ditch toe indicate pH levels below 6.0. Water quality monitoring conducted downstream of the release indicate neutral pH in the receiving environment.

L	REPORTED TO SPILL LINE BY: Connor Devereaux	POSITION: Env. Superintendent	EMPLOYER: Baffinland	LOCATION CALLING FROM: 416-364-8820	TELEPHONE: ext. 6016
M	ANY ALTERNATE CONTACT: Shawn Stevens	POSITION: Manager of HSES	EMPLOYER: Baffinland	ALTERNATE CONTACT LOCATION: 416-364-8820	ALTERNATE TELEPHONE: ext. 6006

REPORT LINE USE ONLY

N	RECEIVED AT SPILL LINE BY	POSITION: STATION OPERATOR	EMPLOYER	LOCATION CALLED: YELLOWKNIFE, NT	REPORT LINE NUMBER: (867) 920-8130

LEAD AGENCY ☐ EC ☐ CCG ☐ GNWT ☐ GN ☐ ILA ☐ INAC ☐ NEB ☐ TC | SIGNIFICANCE ☐ MINOR ☐ MAJOR ☐ UNKNOWN | FILE STATUS ☐ OPEN ☐ CLOSED

AGENCY	CONTACT NAME	CONTACT TIME	REMARKS
LEAD AGENCY			
FIRST SUPPORT AGENCY			
SECOND SUPPORT AGENCY			
THIRD SUPPORT AGENCY			

PAGE 1 OF 1

Figure 2 – NT-NU Spill report

Appendix A

Water Quality Results Summary

Summary of Analytical Results

	ALS Laboratory Sample ID			CP-SEEPAGE-1 [2]	MS-C-C	MS-C-E	MS-C-C	MS-C-E
	ALS ID			L2339962-1	L2339962-2	L2339830-1	L2340254-7	L2340254-5
	Sample Date & Time			8/31/2019 14:35:00 PM	8/31/2019 15:20:00 PM	9/1/2019 10:00:00 AM	9/2/2019 11:35:00 AM	9/2/2019 11:00:00 AM
	QA/QC Sample Type			N/A	N/A	N/A	N/A	N/A
	Units	LOR	MDMER Grab Sample Limits[1]					
Conductivity	umhos/cm	3	-	-	-	1280	1390	1240
pH	pH units	0.1	6.0-9.5	**5.85**	8.01	7.91	7.99	7.94
Total Suspended Solids	mg/L	2	30	**2890**	3	3.7	<2.0	4.0
Total Dissolved Solids	mg/L	10	-	4850	1030	922	1030	885
Turbidity	NTU	0.1	-	4500	1	1.71	0.58	0.96
Ammonia, Total (as N)	mg/L	0.02	-	-	-	<0.010	<0.010	<0.010
Nitrate (as N)	mg/L	0.02	-	-	-	9.27	16.7	11.3
Oil and Grease, Total	mg/L	2	-	-	-	-	<2.0	<2.0
Acute Lethality	-	-	Not acutely toxic	-	-	Not acutely toxic	-	-

Notes:

[1]Metal and Diamond Mining Effluent Regulations - Schedule 4

[2]Field personnel indicated substrate entered bottle during sample collection due to low water level

November 1, 2019

Jonathan Mesher, Water Resource Officer
Nunavut Field Operations
Crown Indigenous Relations and Northern Affairs Canada
Iqaluit Office
Box 100
Iqaluit, NU X0A 0H0

Monika Trottier, Enforcement Officer
Curtis Didham, Enforcement Officer
Environment and Climate Change Canada
933 Mivvik Street
Iqaluit, NU X0A 0H0

Re: Follow-up to Spill #19-409, Reported on October 2, 2019, Mary River Project - Water Licence No. 2AM-MRY1325

On September 28th, 2019, discharge recommenced from MS-08 due to warm conditions and a rain event after ceasing discharge on September 7th due to initial freeze up. Deleterious substances water quality monitoring was conducted from the MS-08 Final Discharge Point (FDP) on September 28th and 30th and lab results indicated total suspended solids (TSS) in exceedance of the grab limit. Monitoring on October 1st indicated a return of the TSS to below the grab limit, and the discharge continued until October 2nd, 2019.

Deleterious substances water quality monitoring was conducted on September 28th, and effluent characterization was conducted on September 30th and October 1st from the MS-08 FDP. Acute lethality samples were collected on October 1st from the MS-08 FDP. Water quality monitoring was conducted at the reference and exposure sites on September 30th and October 1st. The location of the MS-08 FDP and reference and exposure sites are listed below.

ID	Location
Final Discharge Point MS-08	71° 20’ 41.6” 79° 13’ 44.5”
MS-08-US (Reference)	71° 18’ 37.8” 79° 11’ 13.5”
MS-08-DS (Effluent-Exposed)	71° 18’ 38.9” 79° 12’ 09.4”

MS-08 FDP lab results for all parameters analyzed from the September 28th and 30th samples were compliant with applicable regulatory criteria with the exception of total suspended solids. October 1st samples indicated a return of TSS to below applicable regulatory criteria. Reference and exposure site samples from September 30th and October 1st returned compliant samples for all parameters analyzed with applicable regulatory criteria.

Appendix A outlines water quality results from monitoring conducted at the MS-08 FDP and reference and exposure sites. Appendix B includes the Certificates of Analyses (COAs) for these sampling events.

As per Section 31 of the *Metal and Diamond Mining Effluent Regulations* (MDMER):

a) Total Suspended Solids (TSS) grab sample concentration exceedances of 40.5 and 55.5 mg/L on September 28th and 30th, respectively, at the Waste Rock Facility Pond FDP (MS-08). The mean monthly concentration of TSS for September was 35 mg/L.
b) Discharge volume for the month of September was 9617m^3. This was measured using a 4” GPI TM400 turbine flow meter.
c) A summary is provided in Appendix A of the sampling events during the month of September which includes date, time and respective water quality results.
d) N/A. All effluent was discharged through the MS-08 FDP.
e) Appendix A outlines the concentrations of total suspended solids in effluent discharged through the MS-08 FDP in September.
f) Mary River Tributary F (MRTF) and Mary River would be the receiving bodies of water. The effluent is discharged through approximately 475 m of layflat hose overland (no defined channel)

and flows eastnortheast over boulder-cobble till material for approximately 475 m before entering a headwater depression that contains intermittent natural flow. The gradient of the depression continues eastward, eventually forming a clearly defined channel approximately 1,170 m down gradient of the end of the lay-flat hose line. This defined channel drains southeast approximately 740 m before discharging into MRTF. From this confluence, MRTF flows south approximately 3.3 km) before discharging into the Mary River.

g) Acute toxicity samples were collected on October 1st and test results were non-lethal. Certificate of Analyses is attached in Appendix B.

h) See summary above for circumstances of deposit. Extent of release occurred for approximately three days until mitigation measures reduced the elevated TSS to compliant levels. As per Baffinland's Emergency Response Plan and Spill Contingency Plan, bag filters were installed on the discharge line in an effort to reduce TSS concentrations.

i) Bag filters were installed in the discharge line prior to the MS-08 FDP.

Should you require further information or clarification on the above noted spill, please feel free to contact Connor Devereaux at (647) 253-0596 x6016.

Prepared by:

Connor Devereaux
Environmental Superintendent

Reviewed by:

Daniel Janusauskas
Technical Services Superintendent

Attach: Photos, Map, NT-NU Spill Report, Water Quality Results, Certificates of Analyses

cc. Grant Goddard, Megan Lord-Hoyle, Sylvain Proulx, Tim Sewell, Shawn Stevens, Francois Gaudreau, Christopher Murray, Lou Kamermans (Baffinland), Justin Hack, Jeremy Fraser (CIRNAC), Curtis Didham (ECCC).

Photo 1. September 27th, 2019 – MS-08 pond.

Photo 2. September 29th, 2019 – MS-08 Exposure Area.

2275 Upper Middle Road East, Suite 300 | Oakville, ON, Canada L6H 0C3
Main: 416.364.8820 | Fax: 416.364.0193 | www.baffinland.com

Photo 3. September 30th, 2019 – Bag Filters Installed.

Photo 4. October 1st, 2019 – Geotube pond utilized.

Figure 1 – Overview map of spill location

NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND OTHER HAZARDOUS MATERIALS

NT-NU 24-HOUR SPILL REPORT LINE
TEL: (867) 920-8130
FAX: (867) 873-6924
EMAIL: spills@gov.nt.ca

REPORT LINE USE ONLY

A	REPORT DATE: MONTH – DAY – YEAR 10-02-2019	REPORT TIME 22:30	[X] ORIGINAL SPILL REPORT OR: [ ] UPDATE # _____ TO THE ORIGINAL SPILL REPORT	REPORT NUMBER 19 409
B	OCCURRENCE DATE: MONTH – DAY – YEAR 09-28-2019	OCCURRENCE TIME 13:30		
C	LAND USE PERMIT NUMBER (IF APPLICABLE) IOL - Commercial Lease: Q13C301	WATER LICENCE NUMBER (IF APPLICABLE) 2AM-MRY1325 Type "A"		
D	GEOGRAPHIC PLACE NAME OR DISTANCE AND DIRECTION FROM NAMED LOCATION Mary River Mine Site, Baffin Island, NU	REGION [ ] NWT [X] NUNAVUT [ ] ADJACENT JURISDICTION OR OCEAN		
E	LATITUDE DEGREES 71 MINUTES 20 SECONDS 42	LONGITUDE DEGREES 79 MINUTES 13 SECONDS 45		
F	RESPONSIBLE PARTY OR VESSEL NAME Baffinland Iron Mines Corp.	RESPONSIBLE PARTY ADDRESS OR OFFICE LOCATION 2275 Middle Road East, Suite 300, Oakville, ON L6H 0C3		
G	ANY CONTRACTOR INVOLVED N/A	CONTRACTOR ADDRESS OR OFFICE LOCATION N/A		
H	PRODUCT SPILLED Effluent	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES	U.N. NUMBER N/A	
	SECOND PRODUCT SPILLED (IF APPLICABLE) N/A	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES N/A	U.N. NUMBER N/A	
I	SPILL SOURCE Waste rock facility pond	SPILL CAUSE Rain event, rapid melt	AREA OF CONTAMINATION IN SQUARE METRES N/A	
J	FACTORS AFFECTING SPILL OR RECOVERY Drainage to tundra	DESCRIBE ANY ASSISTANCE REQUIRED N/A	HAZARDS TO PERSONS, PROPERTY OR EQUIPMENT N/A	

K — ADDITIONAL INFORMATION, COMMENTS: ACTIONS PROPOSED OR TAKEN TO CONTAIN, RECOVER OR DISPOSE OF SPILLED PRODUCT AND CONTAMINATED MATERIALS:

On September 28th, 2019, discharge recommenced from MS-08 due to warm conditions and a rain event after ceasing discharge on September 7th due to initial freeze up. Deleterious substances water quality monitoring was conducted from the MS-08 FDP. Preliminary lab results from this monitoring indicate total suspended solids (TSS) in exceedance of the grab limit. The discharge continues to be sampled and monitored. Lab analysis of effluent characterization and acute toxicity parameters are in progress and will be presented in the follow-up report. The incident occurred on IOL located > 3km from fish bearing water. This spill is being reported as required by the conditions of water license no. 2AM-MRY1325, Part H, item 9(b); section 31 of the Metal and Diamond Mining Effluent Regulations under the Fisheries Act; and the Government of Nunavut's Environmental Protection Act paragraph 5.1(a).

L	REPORTED TO SPILL LINE BY Connor Devereaux	POSITION Env. Superintendent	EMPLOYER Baffinland	LOCATION CALLING FROM 416-364-8820	TELEPHONE ext. 6016
M	ANY ALTERNATE CONTACT Shawn Stevens	POSITION Manager of HSES	EMPLOYER Baffinland	ALTERNATE CONTACT LOCATION 416-364-8820	ALTERNATE TELEPHONE ext. 6006

REPORT LINE USE ONLY

N	RECEIVED AT SPILL LINE BY	POSITION STATION OPERATOR	EMPLOYER	LOCATION CALLED YELLOWKNIFE, NT	REPORT LINE NUMBER (867) 920-8130

LEAD AGENCY [ ] EC [ ] CCG [ ] GNWT [ ] GN [ ] ILA [ ] INAC [ ] NEB [ ] TC — SIGNIFICANCE [ ] MINOR [ ] MAJOR [ ] UNKNOWN — FILE STATUS [ ] OPEN [ ] CLOSED

AGENCY	CONTACT NAME	CONTACT TIME	REMARKS
LEAD AGENCY			
FIRST SUPPORT AGENCY			
SECOND SUPPORT AGENCY			
THIRD SUPPORT AGENCY			

PAGE 1 OF 1

Figure 2 – NT-NU Spill report

Appendix A

Water Quality Results Summary

	ALS Laboratory Sample ID			MS-08	MS-08	MS-08	MS-08-DS	MS-08-US
	ALS ID			L2339839-1	L2356235-1	L2356892-1	L2356925-1	L2356925-2
	Sample Date & Time			9/2/2019 2:25:00 PM	9/28/2019 1:30:00 PM	9/30/2019 9:20:00 AM	9/30/2019 12:50:00 PM	9/30/2019 1:20:00 PM
	QA/QC Sample Type			N/A	N/A	N/A	N/A	N/A
	Units	LOR	MDMER Grab Sample Limits					
Conductivity	umhos/cm	3	-	3180	1390	870	170	167
Hardness (as CaCO3)	mg/L	10	-	2350	-	479	73.2	72.2
pH	pH units	0.1	6.0-9.5	8.47	6.91	6.92	7.94	7.97
Total Suspended Solids	mg/L	2	30	10	**40.5**	**55.5**	3.2	2.4
Total Dissolved Solids	mg/L	20	-	3190	1080	643	96	107
Turbidity	NTU	0.1	-	9.32	42.1	72.1	3.38	3.32
Acidity (as CaCO3)	mg/L	2	-	5	-	-	-	-
Alkalinity, Total (as CaCO3)	mg/L	10	-	63	-	25	72	73
Ammonia, Total (as N)	mg/L	0.1	-	1.43	0.5	0.39	0.013	<0.010
Chloride (Cl)	mg/L	0.5	-	11	-	2.21	6.98	7.2
Fluoride (F)	mg/L	0.02	-	<0.40	-	0.047	0.025	0.027
Nitrate (as N)	mg/L	0.02	-	10.4	-	2.71	0.074	0.074
Total Kjeldahl Nitrogen	mg/L	0.15	-	1.31	-	<1.5	<0.15	<0.15
Phosphorus, Total	mg/L	0.03	-	0.0036	-	0.052	0.0073	0.0084
Sulfate (SO4)	mg/L	0.3	-	2490	-	424	6.8	4.48
Cyanide, Total	mg/L	0.002	2	<0.0020	<0.020	0.0065	-	-
Dissolved Organic Carbon	mg/L	0.5	-	2.9	-	1.33	2.31	2.24
Total Organic Carbon	mg/L	0.5	-	3.51	-	2.22	2.42	2.47
Aluminum (Al)-Total	mg/L	0.05	-	0.092	1.02	1.88	0.144	0.123
Antimony (Sb)-Total	mg/L	0.001	-	<0.0010	<0.0010	<0.0010	<0.00010	<0.00010
Arsenic (As)-Total	mg/L	0.001	1	<0.0010	<0.0010	<0.0010	<0.00010	<0.00010
Barium (Ba)-Total	mg/L	0.001	-	0.015	0.0148	0.0175	0.00999	0.0102
Beryllium (Be)-Total	mg/L	0.001	-	<0.0010	<0.0010	<0.0010	<0.00010	<0.00010
Bismuth (Bi)-Total	mg/L	0.0005	-	<0.00050	<0.00050	<0.00050	<0.000050	<0.000050
Boron (B)-Total	mg/L	0.1	-	<0.10	<0.10	<0.10	<0.010	<0.010
Cadmium (Cd)-Total	mg/L	0.00005	-	<0.000050	0.000133	0.000066	<0.0000050	<0.0000050
Calcium (Ca)-Total	mg/L	0.5	-	199	44.6	30.5	14.7	14.7
Cesium (Cs)-Total	mg/L	0.0001	-	<0.00010	<0.00010	0.00015	0.000019	0.000019
Chromium (Cr)-Total	mg/L	0.005	-	<0.0050	<0.0050	<0.0050	<0.00050	<0.00050
Cobalt (Co)-Total	mg/L	0.001	-	0.0366	0.0691	0.0359	<0.00010	<0.00010
Copper (Cu)-Total	mg/L	0.01	0.6	<0.010	<0.010	<0.010	0.0012	0.0011
Iron (Fe)-Total	mg/L	0.1	-	0.96	4.43	6.55	0.14	0.121
Lead (Pb)-Total	mg/L	0.0005	0.4	<0.00050	0.0012	0.00227	0.000128	0.000099
Lithium (Li)-Total	mg/L	0.01	-	0.026	<0.010	<0.010	<0.0010	<0.0010
Magnesium (Mg)-Total	mg/L	0.05	-	462	169	97.8	8.88	8.62
Manganese (Mn)-Total	mg/L	0.005	-	9.41	5.85	3.33	0.00469	0.00215
Mercury (Hg)-Total	mg/L	0.00001	-	<0.0000050	-	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Total	mg/L	0.0005	-	0.00082	0.00072	0.00121	0.000286	0.000289
Nickel (Ni)-Total	mg/L	0.005	1	0.0442	0.0774	0.0384	0.00072	0.00055
Phosphorus (P)-Total	mg/L	0.5	-	<0.50	<0.50	<0.50	<0.050	<0.050
Potassium (K)-Total	mg/L	0.5	-	7.38	2.76	3.85	1.01	1.02
Rubidium (Rb)-Total	mg/L	0.002	-	0.0078	0.0051	0.0069	0.00156	0.00151
Selenium (Se)-Total	mg/L	0.0005	-	0.00525	0.00243	0.00123	<0.000050	<0.000050
Silicon (Si)-Total	mg/L	1	-	1.1	2.3	3.6	1.26	1.24
Silver (Ag)-Total	mg/L	0.0005	-	<0.00050	<0.00050	<0.00050	<0.000050	<0.000050
Sodium (Na)-Total	mg/L	0.5	-	5.64	1.52	1.56	2.95	3.13
Strontium (Sr)-Total	mg/L	0.01	-	0.337	0.033	0.027	0.0147	0.0148
Sulfur (S)-Total	mg/L	5	-	781	258	146	2.38	1.66
Tellurium (Te)-Total	mg/L	0.002	-	<0.0020	<0.0020	<0.0020	<0.00020	<0.00020
Thallium (Tl)-Total	mg/L	0.0001	-	<0.00010	<0.00010	<0.00010	<0.000010	<0.000010
Thorium (Th)-Total	mg/L	0.001	-	<0.0010	<0.0010	0.0013	0.00012	0.00013
Tin (Sn)-Total	mg/L	0.001	-	<0.0010	<0.0010	<0.0010	<0.00010	<0.00010
Titanium (Ti)-Total	mg/L	0.003	-	0.006	0.0547	0.0893	0.00799	0.00718
Tungsten (W)-Total	mg/L	0.001	-	<0.0010	<0.0010	<0.0010	<0.00010	<0.00010
Uranium (U)-Total	mg/L	0.0001	-	0.00397	0.00151	0.00263	0.00331	0.00358
Vanadium (V)-Total	mg/L	0.005	-	<0.0050	<0.0050	<0.0050	<0.00050	<0.00050
Zinc (Zn)-Total	mg/L	0.03	1	<0.030	<0.030	<0.030	<0.0030	<0.0030
Zirconium (Zr)-Total	mg/L	0.003	-	<0.0020	<0.0020	<0.0020	0.00031	0.00034
Aluminum (Al)-Dissolved	mg/L	0.05	-	<0.050	-	-	-	-
Antimony (Sb)-Dissolved	mg/L	0.001	-	<0.0010	-	-	-	-
Arsenic (As)-Dissolved	mg/L	0.001	-	<0.0010	-	-	-	-
Barium (Ba)-Dissolved	mg/L	0.001	-	0.0151	-	-	-	-
Beryllium (Be)-Dissolved	mg/L	0.001	-	<0.0010	-	-	-	-
Bismuth (Bi)-Dissolved	mg/L	0.0005	-	<0.00050	-	-	-	-
Boron (B)-Dissolved	mg/L	0.1	-	<0.10	-	-	-	-
Cadmium (Cd)-Dissolved	mg/L	0.00005	-	<0.000050	-	-	-	-
Calcium (Ca)-Dissolved	mg/L	0.5	-	201	-	-	-	-
Cesium (Cs)-Dissolved	mg/L	0.0001	-	<0.00010	-	-	-	-
Chromium (Cr)-Dissolved	mg/L	0.005	-	<0.0050	-	-	-	-
Cobalt (Co)-Dissolved	mg/L	0.001	-	0.0328	-	-	-	-
Copper (Cu)-Dissolved	mg/L	0.002	-	0.0036	-	-	-	-
Iron (Fe)-Dissolved	mg/L	0.1	-	<0.10	-	-	-	-
Lead (Pb)-Dissolved	mg/L	0.0005	-	<0.00050	-	-	-	-
Lithium (Li)-Dissolved	mg/L	0.01	-	0.024	-	-	-	-
Magnesium (Mg)-Dissolved	mg/L	0.05	-	449	-	-	-	-
Manganese (Mn)-Dissolved	mg/L	0.005	-	8.84	-	-	-	-
Mercury (Hg)-Dissolved	mg/L	0.00001	-	<0.0000050	-	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Dissolved	mg/L	0.0005	-	0.00082	-	-	-	-
Nickel (Ni)-Dissolved	mg/L	0.005	-	0.0404	-	-	-	-
Phosphorus (P)-Dissolved	mg/L	0.5	-	<0.50	-	-	-	-
Potassium (K)-Dissolved	mg/L	0.5	-	7.44	-	-	-	-
Rubidium (Rb)-Dissolved	mg/L	0.002	-	0.0074	-	-	-	-
Selenium (Se)-Dissolved	mg/L	0.0005	-	0.00467	-	-	-	-
Silicon (Si)-Dissolved	mg/L	0.5	-	0.92	-	-	-	-
Silver (Ag)-Dissolved	mg/L	0.0005	-	<0.00050	-	-	-	-
Sodium (Na)-Dissolved	mg/L	0.5	-	5.61	-	-	-	-
Strontium (Sr)-Dissolved	mg/L	0.01	-	0.333	-	-	-	-
Sulfur (S)-Dissolved	mg/L	5	-	769	-	-	-	-
Tellurium (Te)-Dissolved	mg/L	0.002	-	<0.0020	-	-	-	-
Thallium (Tl)-Dissolved	mg/L	0.0001	-	<0.00010	-	-	-	-
Thorium (Th)-Dissolved	mg/L	0.001	-	<0.0010	-	-	-	-
Tin (Sn)-Dissolved	mg/L	0.001	-	<0.0010	-	-	-	-
Titanium (Ti)-Dissolved	mg/L	0.003	-	<0.0030	-	-	-	-
Tungsten (W)-Dissolved	mg/L	0.001	-	<0.0010	-	-	-	-
Uranium (U)-Dissolved	mg/L	0.0001	-	0.00381	-	-	-	-
Vanadium (V)-Dissolved	mg/L	0.005	-	<0.0050	-	-	-	-
Zinc (Zn)-Dissolved	mg/L	0.01	-	<0.010	-	-	-	-
Zirconium (Zr)-Dissolved	mg/L	0.003	-	<0.0020	-	-	-	-
Ra-226	Bq/L	0.0044	1.11	0.02	0.017	<0.0068	<0.0080	<0.0069
Acute Toxicity			Not acutely toxic	Not acutely toxic	-	-	-	-

Notes:

[1]Metal and Diamond Mining Effluent Regulations - Schedule 4

	ALS Laboratory Sample ID			MS-08	MS-08-DS	MS-08-US
	ALS ID			L2357232-1	L2357716-1	L2357716-2
	Sample Date & Time			10/1/2019 9:15:00 AM	10/1/2019 5:30:00 PM	10/1/2019 6:00:00 PM
	QA/QC Sample Type			N/A	N/A	N/A
	Units	LOR	MDMER Grab Sample Limits			
Conductivity	umhos/cm	3	-	5040	199	192
Hardness (as CaCO3)	mg/L	10	-	3990	83	81.1
pH	pH units	0.1	6.0-9.5	8.79	8.08	8.08
Total Suspended Solids	mg/L	2	30	6	2.8	2
Total Dissolved Solids	mg/L	20	-	5620	90	85
Turbidity	NTU	0.1	-	4.52	3.36	1.88
Acidity (as CaCO3)	mg/L	2	-	2.3	-	-
Alkalinity, Total (as CaCO3)	mg/L	10	-	39	85	85
Ammonia, Total (as N)	mg/L	0.1	-	3.79	<0.010	<0.010
Chloride (Cl)	mg/L	0.5	-	17.2	8.2	8.41
Fluoride (F)	mg/L	0.02	-	<0.20	0.027	0.03
Nitrate (as N)	mg/L	0.02	-	16.7	0.082	0.074
Total Kjeldahl Nitrogen	mg/L	0.15	-	4.38	<0.15	<0.15
Phosphorus, Total	mg/L	0.03	-	<0.0030	0.005	0.0042
Sulfate (SO4)	mg/L	0.3	-	4070	7.65	5.26
Cyanide, Total	mg/L	0.002	2	0.0128	-	-
Dissolved Organic Carbon	mg/L	0.5	-	3.82	1.6	1.68
Total Organic Carbon	mg/L	0.5	-	4.16	2.19	2.22
Aluminum (Al)-Total	mg/L	0.05	-	0.082	0.118	0.0844
Antimony (Sb)-Total	mg/L	0.001	-	<0.0010	<0.00010	<0.00010
Arsenic (As)-Total	mg/L	0.001	1	<0.0010	<0.00010	<0.00010
Barium (Ba)-Total	mg/L	0.001	-	0.012	0.0112	0.0111
Beryllium (Be)-Total	mg/L	0.001	-	<0.0010	<0.00010	<0.00010
Bismuth (Bi)-Total	mg/L	0.0005	-	<0.00050	<0.000050	<0.000050
Boron (B)-Total	mg/L	0.1	-	<0.10	<0.010	<0.010
Cadmium (Cd)-Total	mg/L	0.00005	-	<0.000050	<0.0000050	<0.0000050
Calcium (Ca)-Total	mg/L	0.5	-	507	16.5	16.6
Cesium (Cs)-Total	mg/L	0.0001	-	<0.00010	0.000014	0.000011
Chromium (Cr)-Total	mg/L	0.005	-	<0.0050	<0.00050	<0.00050
Cobalt (Co)-Total	mg/L	0.001	-	0.005	<0.00010	<0.00010
Copper (Cu)-Total	mg/L	0.01	0.6	<0.010	<0.0010	0.001
Iron (Fe)-Total	mg/L	0.1	-	0.42	0.117	0.066
Lead (Pb)-Total	mg/L	0.0005	0.4	<0.00050	0.000077	0.000062
Lithium (Li)-Total	mg/L	0.01	-	0.03	<0.0010	<0.0010
Magnesium (Mg)-Total	mg/L	0.05	-	664	10.2	9.63
Manganese (Mn)-Total	mg/L	0.005	-	1.12	0.00247	0.00121
Mercury (Hg)-Total	mg/L	0.00001	-	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Total	mg/L	0.0005	-	0.00141	0.000321	0.000364
Nickel (Ni)-Total	mg/L	0.005	1	0.0071	0.00058	<0.00050
Phosphorus (P)-Total	mg/L	0.5	-	<0.50	<0.050	<0.050
Potassium (K)-Total	mg/L	0.5	-	6.91	1.09	1.1
Rubidium (Rb)-Total	mg/L	0.002	-	0.0082	0.00154	0.00161
Selenium (Se)-Total	mg/L	0.0005	-	0.00642	<0.000050	<0.000050
Silicon (Si)-Total	mg/L	1	-	<1.0	1.26	1.31
Silver (Ag)-Total	mg/L	0.0005	-	<0.00050	<0.000050	<0.000050
Sodium (Na)-Total	mg/L	0.5	-	6.41	3.41	3.68
Strontium (Sr)-Total	mg/L	0.01	-	1.58	0.0167	0.017
Sulfur (S)-Total	mg/L	5	-	1350	2.64	1.92
Tellurium (Te)-Total	mg/L	0.002	-	<0.0020	<0.00020	<0.00020
Thallium (Tl)-Total	mg/L	0.0001	-	<0.00010	<0.000010	<0.000010
Thorium (Th)-Total	mg/L	0.001	-	<0.0010	<0.00010	<0.00010
Tin (Sn)-Total	mg/L	0.001	-	<0.0010	<0.00010	<0.00010
Titanium (Ti)-Total	mg/L	0.003	-	0.0037	0.00541	0.00375
Tungsten (W)-Total	mg/L	0.001	-	<0.0010	<0.00010	<0.00010
Uranium (U)-Total	mg/L	0.0001	-	0.0019	0.00415	0.0045
Vanadium (V)-Total	mg/L	0.005	-	<0.0050	<0.00050	<0.00050
Zinc (Zn)-Total	mg/L	0.03	1	<0.030	<0.0030	<0.0030
Zirconium (Zr)-Total	mg/L	0.003	-	<0.0020	0.00026	0.00026
Aluminum (Al)-Dissolved	mg/L	0.05	-	<0.050	-	-
Antimony (Sb)-Dissolved	mg/L	0.001	-	<0.0010	-	-
Arsenic (As)-Dissolved	mg/L	0.001	-	<0.0010	-	-
Barium (Ba)-Dissolved	mg/L	0.001	-	0.0117	-	-
Beryllium (Be)-Dissolved	mg/L	0.001	-	<0.0010	-	-
Bismuth (Bi)-Dissolved	mg/L	0.0005	-	<0.00050	-	-
Boron (B)-Dissolved	mg/L	0.1	-	<0.10	-	-
Cadmium (Cd)-Dissolved	mg/L	0.00005	-	<0.000050	-	-
Calcium (Ca)-Dissolved	mg/L	0.5	-	509	-	-
Cesium (Cs)-Dissolved	mg/L	0.0001	-	<0.00010	-	-
Chromium (Cr)-Dissolved	mg/L	0.005	-	<0.0050	-	-
Cobalt (Co)-Dissolved	mg/L	0.001	-	0.0046	-	-
Copper (Cu)-Dissolved	mg/L	0.002	-	0.005	-	-
Iron (Fe)-Dissolved	mg/L	0.1	-	<0.10	-	-
Lead (Pb)-Dissolved	mg/L	0.0005	-	<0.00050	-	-
Lithium (Li)-Dissolved	mg/L	0.01	-	0.033	-	-
Magnesium (Mg)-Dissolved	mg/L	0.05	-	661	-	-
Manganese (Mn)-Dissolved	mg/L	0.005	-	1.1	-	-
Mercury (Hg)-Dissolved	mg/L	0.00001	-	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Dissolved	mg/L	0.0005	-	0.00156	-	-
Nickel (Ni)-Dissolved	mg/L	0.005	-	0.0067	-	-
Phosphorus (P)-Dissolved	mg/L	0.5	-	<0.50	-	-
Potassium (K)-Dissolved	mg/L	0.5	-	6.97	-	-
Rubidium (Rb)-Dissolved	mg/L	0.002	-	0.0079	-	-
Selenium (Se)-Dissolved	mg/L	0.0005	-	0.0069	-	-
Silicon (Si)-Dissolved	mg/L	0.5	-	<0.50	-	-
Silver (Ag)-Dissolved	mg/L	0.0005	-	<0.00050	-	-
Sodium (Na)-Dissolved	mg/L	0.5	-	6.41	-	-
Strontium (Sr)-Dissolved	mg/L	0.01	-	1.63	-	-
Sulfur (S)-Dissolved	mg/L	5	-	1370	-	-
Tellurium (Te)-Dissolved	mg/L	0.002	-	<0.0020	-	-
Thallium (Tl)-Dissolved	mg/L	0.0001	-	<0.00010	-	-
Thorium (Th)-Dissolved	mg/L	0.001	-	<0.0010	-	-
Tin (Sn)-Dissolved	mg/L	0.001	-	<0.0010	-	-
Titanium (Ti)-Dissolved	mg/L	0.003	-	<0.0030	-	-
Tungsten (W)-Dissolved	mg/L	0.001	-	<0.0010	-	-
Uranium (U)-Dissolved	mg/L	0.0001	-	0.00185	-	-
Vanadium (V)-Dissolved	mg/L	0.005	-	<0.0050	-	-
Zinc (Zn)-Dissolved	mg/L	0.01	-	<0.010	-	-
Zirconium (Zr)-Dissolved	mg/L	0.003	-	<0.0020	-	-
Ra-226	Bq/L	0.0044	1.11	0.018	0.0094	0.0081
Acute Toxicity			Not acutely toxic	Not Acutely Toxic	-	-

Notes:

[1]Metal and Diamond Mining Effluent Regulations - Schedule 4

Appendix B

Certificates of Analyses

Baffinland Iron Mine's Corporation (Oakville)
ATTN: William Bowden/Connor Devereaux
2275 Upper Middle Rd. E.
Suite #300
Oakville ON L6H 0C3

Date Received: 03-SEP-19
Report Date: 24-SEP-19 11:40 (MT)
Version: FINAL

Client Phone: 647-253-0596

Certificate of Analysis

Lab Work Order #: L2339839

Project P.O. #: 4500057496
Job Reference: MS-08 WT TOX
C of C Numbers:
Legal Site Desc:

Rick Hawthorne
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2339839-1 MS-08 Sampled By: KB/CP on 02-SEP-19 @ 14:25 Matrix: WATER							
Physical Tests							
Conductivity	3180		3.0	umhos/cm		04-SEP-19	R4782545
Hardness (as CaCO3)	2350		1.3	mg/L		03-SEP-19	
pH	8.47		0.10	pH units		03-SEP-19	R4781669
Total Suspended Solids	10.0		2.0	mg/L		03-SEP-19	R4781869
Total Dissolved Solids	3190		20	mg/L		03-SEP-19	R4782348
Turbidity	9.32		0.10	NTU		02-SEP-19	R4782363
Anions and Nutrients							
Acidity (as CaCO3)	5.0		5.0	mg/L		05-SEP-19	R4784118
Alkalinity, Total (as CaCO3)	63		10	mg/L		04-SEP-19	R4782545
Ammonia, Total (as N)	1.43	DLHC	0.10	mg/L		03-SEP-19	R4781881
Chloride (Cl)	11	DLDS	10	mg/L		03-SEP-19	R4782656
Fluoride (F)	<0.40	DLDS	0.40	mg/L		03-SEP-19	R4782656
Nitrate (as N)	10.4	DLDS	0.40	mg/L		03-SEP-19	R4782656
Total Kjeldahl Nitrogen	1.31		0.15	mg/L	03-SEP-19	04-SEP-19	R4782526
Phosphorus, Total	0.0036		0.0030	mg/L	03-SEP-19	04-SEP-19	R4782483
Sulfate (SO4)	2490	DLDS	6.0	mg/L		03-SEP-19	R4782656
Cyanides							
Cyanide, Total	<0.0020	SP	0.0020	mg/L		04-SEP-19	R4783059
Organic / Inorganic Carbon							
Dissolved Carbon Filtration Location	LAB					03-SEP-19	R4782235
Dissolved Organic Carbon	2.90		0.50	mg/L	03-SEP-19	04-SEP-19	R4782677
Total Organic Carbon	3.51		0.50	mg/L		04-SEP-19	R4782674
Total Metals							
Aluminum (Al)-Total	0.092	DLHC	0.050	mg/L	03-SEP-19	03-SEP-19	R4782041
Antimony (Sb)-Total	<0.0010	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782041
Arsenic (As)-Total	<0.0010	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782041
Barium (Ba)-Total	0.0150	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782041
Beryllium (Be)-Total	<0.0010	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782041
Bismuth (Bi)-Total	<0.00050	DLHC	0.00050	mg/L	03-SEP-19	03-SEP-19	R4782041
Boron (B)-Total	<0.10	DLHC	0.10	mg/L	03-SEP-19	03-SEP-19	R4782041
Cadmium (Cd)-Total	<0.000050	DLHC	0.000050	mg/L	03-SEP-19	03-SEP-19	R4782041
Calcium (Ca)-Total	199	DLHC	0.50	mg/L	03-SEP-19	03-SEP-19	R4782041
Cesium (Cs)-Total	<0.00010	DLHC	0.00010	mg/L	03-SEP-19	03-SEP-19	R4782041
Chromium (Cr)-Total	<0.0050	DLHC	0.0050	mg/L	03-SEP-19	03-SEP-19	R4782041
Cobalt (Co)-Total	0.0366	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782041
Copper (Cu)-Total	<0.010	DLHC	0.010	mg/L	03-SEP-19	03-SEP-19	R4782041
Iron (Fe)-Total	0.96	DLHC	0.10	mg/L	03-SEP-19	03-SEP-19	R4782041
Lead (Pb)-Total	<0.00050	DLHC	0.00050	mg/L	03-SEP-19	03-SEP-19	R4782041
Lithium (Li)-Total	0.026	DLHC	0.010	mg/L	03-SEP-19	03-SEP-19	R4782041
Magnesium (Mg)-Total	462	DLHC	0.050	mg/L	03-SEP-19	03-SEP-19	R4782041
Manganese (Mn)-Total	9.41	DLHC	0.0050	mg/L	03-SEP-19	03-SEP-19	R4782041
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		04-SEP-19	R4782727

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2339839-1 MS-08 Sampled By: KB/CP on 02-SEP-19 @ 14:25 Matrix: WATER							
Total Metals							
Molybdenum (Mo)-Total	0.00082	DLHC	0.00050	mg/L	03-SEP-19	03-SEP-19	R4782041
Nickel (Ni)-Total	0.0442	DLHC	0.0050	mg/L	03-SEP-19	03-SEP-19	R4782041
Phosphorus (P)-Total	<0.50	DLHC	0.50	mg/L	03-SEP-19	03-SEP-19	R4782041
Potassium (K)-Total	7.38	DLHC	0.50	mg/L	03-SEP-19	03-SEP-19	R4782041
Rubidium (Rb)-Total	0.0078	DLHC	0.0020	mg/L	03-SEP-19	03-SEP-19	R4782041
Selenium (Se)-Total	0.00525	DLHC	0.00050	mg/L	03-SEP-19	03-SEP-19	R4782041
Silicon (Si)-Total	1.1	DLHC	1.0	mg/L	03-SEP-19	03-SEP-19	R4782041
Silver (Ag)-Total	<0.00050	DLHC	0.00050	mg/L	03-SEP-19	03-SEP-19	R4782041
Sodium (Na)-Total	5.64	DLHC	0.50	mg/L	03-SEP-19	03-SEP-19	R4782041
Strontium (Sr)-Total	0.337	DLHC	0.010	mg/L	03-SEP-19	03-SEP-19	R4782041
Sulfur (S)-Total	781	DLHC	5.0	mg/L	03-SEP-19	03-SEP-19	R4782041
Tellurium (Te)-Total	<0.0020	DLHC	0.0020	mg/L	03-SEP-19	03-SEP-19	R4782041
Thallium (Tl)-Total	<0.00010	DLHC	0.00010	mg/L	03-SEP-19	03-SEP-19	R4782041
Thorium (Th)-Total	<0.0010	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782041
Tin (Sn)-Total	<0.0010	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782041
Titanium (Ti)-Total	0.0060	DLHC	0.0030	mg/L	03-SEP-19	03-SEP-19	R4782041
Tungsten (W)-Total	<0.0010	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782041
Uranium (U)-Total	0.00397	DLHC	0.00010	mg/L	03-SEP-19	03-SEP-19	R4782041
Vanadium (V)-Total	<0.0050	DLHC	0.0050	mg/L	03-SEP-19	03-SEP-19	R4782041
Zinc (Zn)-Total	<0.030	DLHC	0.030	mg/L	03-SEP-19	03-SEP-19	R4782041
Zirconium (Zr)-Total	<0.0020	DLHC	0.0020	mg/L	03-SEP-19	03-SEP-19	R4782041
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					03-SEP-19	R4781089
Dissolved Metals Filtration Location	FIELD					03-SEP-19	R4781204
Aluminum (Al)-Dissolved	<0.050	DLHC	0.050	mg/L	03-SEP-19	03-SEP-19	R4782250
Antimony (Sb)-Dissolved	<0.0010	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782250
Arsenic (As)-Dissolved	<0.0010	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782250
Barium (Ba)-Dissolved	0.0151	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782250
Beryllium (Be)-Dissolved	<0.0010	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782250
Bismuth (Bi)-Dissolved	<0.00050	DLHC	0.00050	mg/L	03-SEP-19	03-SEP-19	R4782250
Boron (B)-Dissolved	<0.10	DLHC	0.10	mg/L	03-SEP-19	03-SEP-19	R4782250
Cadmium (Cd)-Dissolved	<0.000050	DLHC	0.000050	mg/L	03-SEP-19	03-SEP-19	R4782250
Calcium (Ca)-Dissolved	201	DLHC	0.50	mg/L	03-SEP-19	03-SEP-19	R4782250
Cesium (Cs)-Dissolved	<0.00010	DLHC	0.00010	mg/L	03-SEP-19	03-SEP-19	R4782250
Chromium (Cr)-Dissolved	<0.0050	DLHC	0.0050	mg/L	03-SEP-19	03-SEP-19	R4782250
Cobalt (Co)-Dissolved	0.0328	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782250
Copper (Cu)-Dissolved	0.0036	DLHC	0.0020	mg/L	03-SEP-19	03-SEP-19	R4782250
Iron (Fe)-Dissolved	<0.10	DLHC	0.10	mg/L	03-SEP-19	03-SEP-19	R4782250
Lead (Pb)-Dissolved	<0.00050	DLHC	0.00050	mg/L	03-SEP-19	03-SEP-19	R4782250
Lithium (Li)-Dissolved	0.024	DLHC	0.010	mg/L	03-SEP-19	03-SEP-19	R4782250
Magnesium (Mg)-Dissolved	449	DLHC	0.050	mg/L	03-SEP-19	03-SEP-19	R4782250

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2339839-1 MS-08 Sampled By: KB/CP on 02-SEP-19 @ 14:25 Matrix: WATER							
Dissolved Metals							
Manganese (Mn)-Dissolved	8.84	DLHC	0.0050	mg/L	03-SEP-19	03-SEP-19	R4782250
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	03-SEP-19	04-SEP-19	R4782733
Molybdenum (Mo)-Dissolved	0.00082	DLHC	0.00050	mg/L	03-SEP-19	03-SEP-19	R4782250
Nickel (Ni)-Dissolved	0.0404	DLHC	0.0050	mg/L	03-SEP-19	03-SEP-19	R4782250
Phosphorus (P)-Dissolved	<0.50	DLHC	0.50	mg/L	03-SEP-19	03-SEP-19	R4782250
Potassium (K)-Dissolved	7.44	DLHC	0.50	mg/L	03-SEP-19	03-SEP-19	R4782250
Rubidium (Rb)-Dissolved	0.0074	DLHC	0.0020	mg/L	03-SEP-19	03-SEP-19	R4782250
Selenium (Se)-Dissolved	0.00467	DLHC	0.00050	mg/L	03-SEP-19	03-SEP-19	R4782250
Silicon (Si)-Dissolved	0.92	DLHC	0.50	mg/L	03-SEP-19	03-SEP-19	R4782250
Silver (Ag)-Dissolved	<0.00050	DLHC	0.00050	mg/L	03-SEP-19	03-SEP-19	R4782250
Sodium (Na)-Dissolved	5.61	DLHC	0.50	mg/L	03-SEP-19	03-SEP-19	R4782250
Strontium (Sr)-Dissolved	0.333	DLHC	0.010	mg/L	03-SEP-19	03-SEP-19	R4782250
Sulfur (S)-Dissolved	769	DLHC	5.0	mg/L	03-SEP-19	03-SEP-19	R4782250
Tellurium (Te)-Dissolved	<0.0020	DLHC	0.0020	mg/L	03-SEP-19	03-SEP-19	R4782250
Thallium (Tl)-Dissolved	<0.00010	DLHC	0.00010	mg/L	03-SEP-19	03-SEP-19	R4782250
Thorium (Th)-Dissolved	<0.0010	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782250
Tin (Sn)-Dissolved	<0.0010	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782250
Titanium (Ti)-Dissolved	<0.0030	DLHC	0.0030	mg/L	03-SEP-19	03-SEP-19	R4782250
Tungsten (W)-Dissolved	<0.0010	DLHC	0.0010	mg/L	03-SEP-19	03-SEP-19	R4782250
Uranium (U)-Dissolved	0.00381	DLHC	0.00010	mg/L	03-SEP-19	03-SEP-19	R4782250
Vanadium (V)-Dissolved	<0.0050	DLHC	0.0050	mg/L	03-SEP-19	03-SEP-19	R4782250
Zinc (Zn)-Dissolved	<0.010	DLHC	0.010	mg/L	03-SEP-19	03-SEP-19	R4782250
Zirconium (Zr)-Dissolved	<0.0020	DLHC	0.0020	mg/L	03-SEP-19	03-SEP-19	R4782250
Radiological Parameters							
Ra-226	0.020		0.0075	Bq/L	09-SEP-19	19-SEP-19	R4780785

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

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Chloride (Cl)	MS-B	L2339839-1
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L2339839-1
Matrix Spike	Boron (B)-Dissolved	MS-B	L2339839-1
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2339839-1
Matrix Spike	Cobalt (Co)-Dissolved	MS-B	L2339839-1
Matrix Spike	Lithium (Li)-Dissolved	MS-B	L2339839-1
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2339839-1
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L2339839-1
Matrix Spike	Nickel (Ni)-Dissolved	MS-B	L2339839-1
Matrix Spike	Potassium (K)-Dissolved	MS-B	L2339839-1
Matrix Spike	Rubidium (Rb)-Dissolved	MS-B	L2339839-1
Matrix Spike	Silicon (Si)-Dissolved	MS-B	L2339839-1
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2339839-1
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2339839-1
Matrix Spike	Sulfur (S)-Dissolved	MS-B	L2339839-1
Matrix Spike	Aluminum (Al)-Total	MS-B	L2339839-1
Matrix Spike	Barium (Ba)-Total	MS-B	L2339839-1
Matrix Spike	Boron (B)-Total	MS-B	L2339839-1
Matrix Spike	Calcium (Ca)-Total	MS-B	L2339839-1
Matrix Spike	Copper (Cu)-Total	MS-B	L2339839-1
Matrix Spike	Iron (Fe)-Total	MS-B	L2339839-1
Matrix Spike	Lithium (Li)-Total	MS-B	L2339839-1
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2339839-1
Matrix Spike	Manganese (Mn)-Total	MS-B	L2339839-1
Matrix Spike	Molybdenum (Mo)-Total	MS-B	L2339839-1
Matrix Spike	Potassium (K)-Total	MS-B	L2339839-1
Matrix Spike	Rubidium (Rb)-Total	MS-B	L2339839-1
Matrix Spike	Silicon (Si)-Total	MS-B	L2339839-1
Matrix Spike	Sodium (Na)-Total	MS-B	L2339839-1
Matrix Spike	Strontium (Sr)-Total	MS-B	L2339839-1
Matrix Spike	Sulfur (S)-Total	MS-B	L2339839-1
Matrix Spike	Titanium (Ti)-Total	MS-B	L2339839-1
Matrix Spike	Uranium (U)-Total	MS-B	L2339839-1
Matrix Spike	Zinc (Zn)-Total	MS-B	L2339839-1
Matrix Spike	Phosphorus, Total	MS-B	L2339839-1

Sample Parameter Qualifier key listed:

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
SP	Sample was Preserved at the laboratory

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACY-TITR-TB	Water	Acidity	APHA 2310 B modified

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

ALK-WT	Water	Alkalinity, Total (as CaCO3)	EPA 310.2

This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.

CL-IC-N-WT	Water	Chloride by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

Reference Information

CN-TOT-WT	Water	Cyanide, Total	ISO 14403-2

Total cyanide is determined by the combination of UV digestion and distillation. Cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

When using this method, high levels of thiocyanate in samples can cause false positives at ~1-2% of the thiocyanate concentration. For samples with detectable cyanide analyzed by this method, ALS recommends analysis for thiocyanate to check for this potential interference

DOC-WT	Water	Dissolved Organic Carbon	APHA 5310B

Sample is filtered through a 0.45um filter, then injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic carbon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.

EC-SCREEN-WT	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

EC-WT	Water	Conductivity	APHA 2510 B

Water samples can be measured directly by immersing the conductivity cell into the sample.

F-IC-N-WT	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-WT	Water	Hardness	APHA 2340 B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-WT	Water	Dissolved Mercury in Water by CVAAS	EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

HG-T-CVAA-WT	Water	Total Mercury in Water by CVAAS	EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

MET-D-CCMS-WT	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

MET-T-CCMS-WT	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

NH3-F-WT	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO3-IC-WT	Water	Nitrate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-COL-WT	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is deteremined colourimetrically after persulphate digestion of the sample.

PH-BF	Water	pH	APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

RA226-MMER-FC	Water	Ra226 by Alpha Scint, MDC=0.01 Bq/L	EPA 903.1

Reference Information

SO4-IC-N-WT	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-BF Water Total Dissolved Solids APHA 2540C

A well-mixed sample is filtered though glass fibres filter. A known volume of the filtrate is evaporated and dried at 180 +/- 2C for 1hr.

SOLIDS-TSS-BF Water Suspended solids APHA 2540 D-Gravimetric

A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104 +/- 1C for a minimum of four hours or until a constant weight is achieved.

TKN-WT Water Total Kjeldahl Nitrogen APHA 4500-Norg D

This analysis is carried out using procedures adapted from APHA Method 4500-Norg "Nitrogen (Organic)". Total Kjeldahl Nitrogen is determined by sample digestion at 380 Celsius with analysis using an automated colorimetric method.

TOC-WT Water Total Organic Carbon APHA 5310B

Sample is injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic cabon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.

TURBIDITY-BF Water Turbidity APHA 2130 B

Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.

** 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
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA
FC	ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
TB	ALS ENVIRONMENTAL - THUNDER BAY, ONTARIO, CANADA
BF	ALS ENVIRONMENTAL - BAFFIN ISLAND, NUNAVUT, 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 weight of sample
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

Workorder: L2339839 Report Date: 24-SEP-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACY-TITR-TB	**Water**							
Batch R4784118								
WG3152901-3 DUP		**L2339862-1**						
Acidity (as CaCO3)		4.1	3.7		mg/L	10	20	05-SEP-19
WG3152901-2 LCS								
Acidity (as CaCO3)			94.6		%		85-115	05-SEP-19
WG3152901-1 MB								
Acidity (as CaCO3)			<2.0		mg/L		2	05-SEP-19
ALK-WT	**Water**							
Batch R4782545								
WG3151110-4 DUP		**WG3151110-3**						
Alkalinity, Total (as CaCO3)		150	150		mg/L	0.3	20	04-SEP-19
WG3151110-2 LCS								
Alkalinity, Total (as CaCO3)			103.0		%		85-115	04-SEP-19
WG3151110-1 MB								
Alkalinity, Total (as CaCO3)			<10		mg/L		10	04-SEP-19
CL-IC-N-WT	**Water**							
Batch R4782656								
WG3150765-10 DUP		**WG3150765-8**						
Chloride (Cl)		212	211		mg/L	0.4	20	03-SEP-19
WG3150765-7 LCS								
Chloride (Cl)			100.8		%		90-110	03-SEP-19
WG3150765-6 MB								
Chloride (Cl)			<0.50		mg/L		0.5	03-SEP-19
WG3150765-9 MS		**WG3150765-8**						
Chloride (Cl)			N/A	MS-B	%		-	03-SEP-19
CN-TOT-WT	**Water**							
Batch R4783059								
WG3151281-3 DUP		**L2339844-2**						
Cyanide, Total		<2.0	<2.0	RPD-NA	mg/L	N/A	20	04-SEP-19
WG3151281-2 LCS								
Cyanide, Total			86.3		%		80-120	04-SEP-19
WG3151281-1 MB								
Cyanide, Total			<0.0020		mg/L		0.002	04-SEP-19
WG3151281-4 MS		**L2339844-2**						
Cyanide, Total			77		%		70-130	04-SEP-19
DOC-WT	**Water**							

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
DOC-WT	**Water**							
Batch R4782677								
WG3150890-3 DUP		**L2339830-1**						
Dissolved Organic Carbon		2.69	2.84		mg/L	5.7	20	04-SEP-19
WG3150890-2 LCS								
Dissolved Organic Carbon			98.0		%		80-120	04-SEP-19
WG3150890-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	04-SEP-19
WG3150890-4 MS		**L2339830-1**						
Dissolved Organic Carbon			99.8		%		70-130	04-SEP-19
EC-WT	**Water**							
Batch R4782545								
WG3151110-4 DUP		**WG3151110-3**						
Conductivity		1280	1270		umhos/cm	0.5	10	04-SEP-19
WG3151110-2 LCS								
Conductivity			100.8		%		90-110	04-SEP-19
WG3151110-1 MB								
Conductivity			<3.0		umhos/cm		3	04-SEP-19
F-IC-N-WT	**Water**							
Batch R4782656								
WG3150765-10 DUP		**WG3150765-8**						
Fluoride (F)		0.132	0.133		mg/L	1.1	20	03-SEP-19
WG3150765-7 LCS								
Fluoride (F)			101.2		%		90-110	03-SEP-19
WG3150765-6 MB								
Fluoride (F)			<0.020		mg/L		0.02	03-SEP-19
WG3150765-9 MS		**WG3150765-8**						
Fluoride (F)			100.0		%		75-125	03-SEP-19
HG-D-CVAA-WT	**Water**							
Batch R4782733								
WG3150261-4 DUP		**WG3150261-3**						
Mercury (Hg)-Dissolved		<0.000050	0.0000360		mg/L	18	20	04-SEP-19
WG3150261-2 LCS								
Mercury (Hg)-Dissolved			98.2		%		80-120	04-SEP-19
WG3150261-1 MB								
Mercury (Hg)-Dissolved			<0.000005(		mg/L		0.000005	04-SEP-19
WG3150261-5 MS		**WG3150261-3**						
Mercury (Hg)-Dissolved			85.1		%		70-130	04-SEP-19
HG-T-CVAA-WT	**Water**							

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-T-CVAA-WT	**Water**							
Batch R4782727								
WG3150240-3 DUP		**L2339830-1**						
Mercury (Hg)-Total		<0.0000050	<0.000005C	RPD-NA	mg/L	N/A	20	04-SEP-19
WG3150240-2 LCS								
Mercury (Hg)-Total			97.6		%		80-120	04-SEP-19
WG3150240-1 MB								
Mercury (Hg)-Total			<0.000005C		mg/L		0.000005	04-SEP-19
WG3150240-4 MS		**L2339839-1**						
Mercury (Hg)-Total			90.9		%		70-130	04-SEP-19
MET-D-CCMS-WT	**Water**							
Batch R4782250								
WG3150303-4 DUP		**WG3150303-3**						
Aluminum (Al)-Dissolved		<0.050	<0.050	RPD-NA	mg/L	N/A	20	03-SEP-19
Antimony (Sb)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	03-SEP-19
Arsenic (As)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	03-SEP-19
Barium (Ba)-Dissolved		0.0199	0.0206		mg/L	3.5	20	03-SEP-19
Beryllium (Be)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	03-SEP-19
Bismuth (Bi)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	03-SEP-19
Boron (B)-Dissolved		<0.10	<0.10	RPD-NA	mg/L	N/A	20	03-SEP-19
Cadmium (Cd)-Dissolved		0.000338	0.000374		mg/L	10	20	03-SEP-19
Calcium (Ca)-Dissolved		107	106		mg/L	1.1	20	03-SEP-19
Cesium (Cs)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	03-SEP-19
Chromium (Cr)-Dissolved		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	03-SEP-19
Cobalt (Co)-Dissolved		0.0816	0.0823		mg/L	0.9	20	03-SEP-19
Copper (Cu)-Dissolved		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	03-SEP-19
Iron (Fe)-Dissolved		<0.10	<0.10	RPD-NA	mg/L	N/A	20	03-SEP-19
Lead (Pb)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	03-SEP-19
Lithium (Li)-Dissolved		0.063	0.059		mg/L	5.4	20	03-SEP-19
Magnesium (Mg)-Dissolved		277	278		mg/L	0.6	20	03-SEP-19
Manganese (Mn)-Dissolved		14.1	14.0		mg/L	0.6	20	03-SEP-19
Molybdenum (Mo)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	03-SEP-19
Nickel (Ni)-Dissolved		0.0918	0.0931		mg/L	1.5	20	03-SEP-19
Phosphorus (P)-Dissolved		<0.50	<0.50	RPD-NA	mg/L	N/A	20	03-SEP-19
Potassium (K)-Dissolved		11.4	11.6		mg/L	1.6	20	03-SEP-19
Rubidium (Rb)-Dissolved		0.0153	0.0156		mg/L	1.9	20	03-SEP-19
Selenium (Se)-Dissolved		0.00232	0.00227		mg/L	2.3	20	03-SEP-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4782250								
WG3150303-4 DUP		**WG3150303-3**						
Silicon (Si)-Dissolved		2.11	2.13		mg/L	1.3	20	03-SEP-19
Silver (Ag)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	03-SEP-19
Sodium (Na)-Dissolved		6.81	6.77		mg/L	0.6	20	03-SEP-19
Strontium (Sr)-Dissolved		0.200	0.200		mg/L	0.1	20	03-SEP-19
Sulfur (S)-Dissolved		480	467		mg/L	2.6	20	03-SEP-19
Tellurium (Te)-Dissolved		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	03-SEP-19
Thallium (Tl)-Dissolved		0.00013	0.00012		mg/L	1.9	20	03-SEP-19
Thorium (Th)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	03-SEP-19
Tin (Sn)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	03-SEP-19
Titanium (Ti)-Dissolved		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	03-SEP-19
Tungsten (W)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	03-SEP-19
Uranium (U)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	03-SEP-19
Vanadium (V)-Dissolved		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	03-SEP-19
Zinc (Zn)-Dissolved		0.013	0.012		mg/L	4.5	20	03-SEP-19
Zirconium (Zr)-Dissolved		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	03-SEP-19
WG3150303-2 LCS								
Aluminum (Al)-Dissolved			104.9		%		80-120	03-SEP-19
Antimony (Sb)-Dissolved			100.8		%		80-120	03-SEP-19
Arsenic (As)-Dissolved			99.0		%		80-120	03-SEP-19
Barium (Ba)-Dissolved			99.9		%		80-120	03-SEP-19
Beryllium (Be)-Dissolved			100.4		%		80-120	03-SEP-19
Bismuth (Bi)-Dissolved			101.0		%		80-120	03-SEP-19
Boron (B)-Dissolved			100.1		%		80-120	03-SEP-19
Cadmium (Cd)-Dissolved			95.7		%		80-120	03-SEP-19
Calcium (Ca)-Dissolved			102.1		%		80-120	03-SEP-19
Cesium (Cs)-Dissolved			100.2		%		80-120	03-SEP-19
Chromium (Cr)-Dissolved			101.2		%		80-120	03-SEP-19
Cobalt (Co)-Dissolved			98.9		%		80-120	03-SEP-19
Copper (Cu)-Dissolved			97.0		%		80-120	03-SEP-19
Iron (Fe)-Dissolved			96.9		%		80-120	03-SEP-19
Lead (Pb)-Dissolved			102.2		%		80-120	03-SEP-19
Lithium (Li)-Dissolved			98.9		%		80-120	03-SEP-19
Magnesium (Mg)-Dissolved			101.5		%		80-120	03-SEP-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4782250								
WG3150303-2 LCS								
Manganese (Mn)-Dissolved			101.2		%		80-120	03-SEP-19
Molybdenum (Mo)-Dissolved			103.8		%		80-120	03-SEP-19
Nickel (Ni)-Dissolved			97.6		%		80-120	03-SEP-19
Phosphorus (P)-Dissolved			98.1		%		80-120	03-SEP-19
Potassium (K)-Dissolved			101.0		%		80-120	03-SEP-19
Rubidium (Rb)-Dissolved			100.2		%		80-120	03-SEP-19
Selenium (Se)-Dissolved			99.8		%		80-120	03-SEP-19
Silicon (Si)-Dissolved			102.0		%		60-140	03-SEP-19
Silver (Ag)-Dissolved			99.2		%		80-120	03-SEP-19
Sodium (Na)-Dissolved			104.4		%		80-120	03-SEP-19
Strontium (Sr)-Dissolved			99.96		%		80-120	03-SEP-19
Sulfur (S)-Dissolved			105.1		%		80-120	03-SEP-19
Tellurium (Te)-Dissolved			95.8		%		80-120	03-SEP-19
Thallium (Tl)-Dissolved			102.1		%		80-120	03-SEP-19
Thorium (Th)-Dissolved			96.9		%		80-120	03-SEP-19
Tin (Sn)-Dissolved			98.1		%		80-120	03-SEP-19
Titanium (Ti)-Dissolved			97.3		%		80-120	03-SEP-19
Tungsten (W)-Dissolved			99.99		%		80-120	03-SEP-19
Uranium (U)-Dissolved			99.0		%		80-120	03-SEP-19
Vanadium (V)-Dissolved			101.0		%		80-120	03-SEP-19
Zinc (Zn)-Dissolved			95.9		%		80-120	03-SEP-19
Zirconium (Zr)-Dissolved			98.1		%		80-120	03-SEP-19
WG3150303-1 MB								
Aluminum (Al)-Dissolved			<0.0050		mg/L		0.005	03-SEP-19
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	03-SEP-19
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	03-SEP-19
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	03-SEP-19
Beryllium (Be)-Dissolved			<0.00010		mg/L		0.0001	03-SEP-19
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	03-SEP-19
Boron (B)-Dissolved			<0.010		mg/L		0.01	03-SEP-19
Cadmium (Cd)-Dissolved			<0.000005(		mg/L		0.000005	03-SEP-19
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	03-SEP-19
Cesium (Cs)-Dissolved			<0.000010		mg/L		0.00001	03-SEP-19
Chromium (Cr)-Dissolved			<0.00050		mg/L		0.0005	03-SEP-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4782250								
WG3150303-1 MB								
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	03-SEP-19
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	03-SEP-19
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	03-SEP-19
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	03-SEP-19
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	03-SEP-19
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	03-SEP-19
Manganese (Mn)-Dissolved			<0.00050		mg/L		0.0005	03-SEP-19
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	03-SEP-19
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	03-SEP-19
Phosphorus (P)-Dissolved			<0.050		mg/L		0.05	03-SEP-19
Potassium (K)-Dissolved			<0.050		mg/L		0.05	03-SEP-19
Rubidium (Rb)-Dissolved			<0.00020		mg/L		0.0002	03-SEP-19
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	03-SEP-19
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	03-SEP-19
Silver (Ag)-Dissolved			<0.000050		mg/L		0.00005	03-SEP-19
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	03-SEP-19
Strontium (Sr)-Dissolved			<0.0010		mg/L		0.001	03-SEP-19
Sulfur (S)-Dissolved			<0.50		mg/L		0.5	03-SEP-19
Tellurium (Te)-Dissolved			<0.00020		mg/L		0.0002	03-SEP-19
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	03-SEP-19
Thorium (Th)-Dissolved			<0.00010		mg/L		0.0001	03-SEP-19
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	03-SEP-19
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	03-SEP-19
Tungsten (W)-Dissolved			<0.00010		mg/L		0.0001	03-SEP-19
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	03-SEP-19
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	03-SEP-19
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	03-SEP-19
Zirconium (Zr)-Dissolved			<0.00020		mg/L		0.0002	03-SEP-19
WG3150303-5 MS		**WG3150303-3**						
Aluminum (Al)-Dissolved			96.0		%		70-130	03-SEP-19
Antimony (Sb)-Dissolved			97.4		%		70-130	03-SEP-19
Arsenic (As)-Dissolved			98.8		%		70-130	03-SEP-19
Barium (Ba)-Dissolved			N/A	MS-B	%		-	03-SEP-19
Beryllium (Be)-Dissolved			96.0		%		70-130	03-SEP-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4782250								
WG3150303-5 MS		**WG3150303-3**						
Bismuth (Bi)-Dissolved			94.8		%		70-130	03-SEP-19
Boron (B)-Dissolved			N/A	MS-B	%		-	03-SEP-19
Cadmium (Cd)-Dissolved			94.7		%		70-130	03-SEP-19
Calcium (Ca)-Dissolved			N/A	MS-B	%		-	03-SEP-19
Cesium (Cs)-Dissolved			97.2		%		70-130	03-SEP-19
Chromium (Cr)-Dissolved			97.5		%		70-130	03-SEP-19
Cobalt (Co)-Dissolved			N/A	MS-B	%		-	03-SEP-19
Copper (Cu)-Dissolved			93.9		%		70-130	03-SEP-19
Iron (Fe)-Dissolved			85.3		%		70-130	03-SEP-19
Lead (Pb)-Dissolved			95.1		%		70-130	03-SEP-19
Lithium (Li)-Dissolved			N/A	MS-B	%		-	03-SEP-19
Magnesium (Mg)-Dissolved			N/A	MS-B	%		-	03-SEP-19
Manganese (Mn)-Dissolved			N/A	MS-B	%		-	03-SEP-19
Molybdenum (Mo)-Dissolved			99.8		%		70-130	03-SEP-19
Nickel (Ni)-Dissolved			N/A	MS-B	%		-	03-SEP-19
Phosphorus (P)-Dissolved			104.8		%		70-130	03-SEP-19
Potassium (K)-Dissolved			N/A	MS-B	%		-	03-SEP-19
Rubidium (Rb)-Dissolved			N/A	MS-B	%		-	03-SEP-19
Selenium (Se)-Dissolved			95.5		%		70-130	03-SEP-19
Silicon (Si)-Dissolved			N/A	MS-B	%		-	03-SEP-19
Silver (Ag)-Dissolved			95.3		%		70-130	03-SEP-19
Sodium (Na)-Dissolved			N/A	MS-B	%		-	03-SEP-19
Strontium (Sr)-Dissolved			N/A	MS-B	%		-	03-SEP-19
Sulfur (S)-Dissolved			N/A	MS-B	%		-	03-SEP-19
Tellurium (Te)-Dissolved			92.1		%		70-130	03-SEP-19
Thallium (Tl)-Dissolved			94.4		%		70-130	03-SEP-19
Thorium (Th)-Dissolved			92.1		%		70-130	03-SEP-19
Tin (Sn)-Dissolved			96.4		%		70-130	03-SEP-19
Titanium (Ti)-Dissolved			94.7		%		70-130	03-SEP-19
Tungsten (W)-Dissolved			94.5		%		70-130	03-SEP-19
Vanadium (V)-Dissolved			99.8		%		70-130	03-SEP-19
Zirconium (Zr)-Dissolved			94.0		%		70-130	03-SEP-19
MET-T-CCMS-WT	**Water**							

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4782041								
WG3150225-4 DUP		**WG3150225-3**						
Aluminum (Al)-Total		1.11	1.15		mg/L	3.7	20	03-SEP-19
Antimony (Sb)-Total		0.0022	0.0022		mg/L	0.0	20	03-SEP-19
Arsenic (As)-Total		0.0034	0.0037		mg/L	8.9	20	03-SEP-19
Barium (Ba)-Total		0.0565	0.0582		mg/L	2.8	20	03-SEP-19
Beryllium (Be)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	03-SEP-19
Bismuth (Bi)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	03-SEP-19
Boron (B)-Total		0.86	0.89		mg/L	3.0	20	03-SEP-19
Cadmium (Cd)-Total		0.000098	0.000099		mg/L	0.8	20	03-SEP-19
Calcium (Ca)-Total		71.6	73.0		mg/L	1.9	20	03-SEP-19
Chromium (Cr)-Total		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	03-SEP-19
Cesium (Cs)-Total		0.00018	0.00018		mg/L	2.9	20	03-SEP-19
Cobalt (Co)-Total		0.0013	0.0013		mg/L	0.2	20	03-SEP-19
Copper (Cu)-Total		0.021	0.022		mg/L	3.3	20	03-SEP-19
Iron (Fe)-Total		1.56	1.56		mg/L	0.0	20	03-SEP-19
Lead (Pb)-Total		0.00317	0.00327		mg/L	3.1	20	03-SEP-19
Lithium (Li)-Total		0.136	0.138		mg/L	1.3	20	03-SEP-19
Magnesium (Mg)-Total		20.7	21.2		mg/L	2.5	20	03-SEP-19
Manganese (Mn)-Total		0.0947	0.0954		mg/L	0.7	20	03-SEP-19
Molybdenum (Mo)-Total		0.325	0.319		mg/L	1.8	20	03-SEP-19
Nickel (Ni)-Total		<0.0050	0.0065	RPD-NA	mg/L	N/A	20	03-SEP-19
Phosphorus (P)-Total		<0.50	<0.50	RPD-NA	mg/L	N/A	20	03-SEP-19
Potassium (K)-Total		32.8	33.1		mg/L	0.9	20	03-SEP-19
Rubidium (Rb)-Total		0.0188	0.0191		mg/L	1.7	20	03-SEP-19
Selenium (Se)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	03-SEP-19
Silicon (Si)-Total		4.1	4.5		mg/L	10	20	03-SEP-19
Silver (Ag)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	03-SEP-19
Sodium (Na)-Total		112	115		mg/L	3.1	20	03-SEP-19
Strontium (Sr)-Total		0.398	0.383		mg/L	3.7	20	03-SEP-19
Sulfur (S)-Total		19.7	19.3		mg/L	1.6	25	03-SEP-19
Thallium (Tl)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	03-SEP-19
Tellurium (Te)-Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	03-SEP-19
Thorium (Th)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	25	03-SEP-19
Tin (Sn)-Total		<0.0010	<0.0010		mg/L			03-SEP-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4782041								
WG3150225-4 DUP		**WG3150225-3**						
Tin (Sn)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	03-SEP-19
Titanium (Ti)-Total		0.0476	0.0471		mg/L	1.1	20	03-SEP-19
Tungsten (W)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	03-SEP-19
Uranium (U)-Total		0.0106	0.0106		mg/L	0.3	20	03-SEP-19
Vanadium (V)-Total		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	03-SEP-19
Zinc (Zn)-Total		0.137	0.137		mg/L	0.2	20	03-SEP-19
Zirconium (Zr)-Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	03-SEP-19
WG3150225-2 LCS								
Aluminum (Al)-Total			103.1		%		80-120	03-SEP-19
Antimony (Sb)-Total			98.0		%		80-120	03-SEP-19
Arsenic (As)-Total			100.4		%		80-120	03-SEP-19
Barium (Ba)-Total			98.8		%		80-120	03-SEP-19
Beryllium (Be)-Total			97.2		%		80-120	03-SEP-19
Bismuth (Bi)-Total			96.9		%		80-120	03-SEP-19
Boron (B)-Total			96.3		%		80-120	03-SEP-19
Cadmium (Cd)-Total			95.4		%		80-120	03-SEP-19
Calcium (Ca)-Total			96.3		%		80-120	03-SEP-19
Chromium (Cr)-Total			98.2		%		80-120	03-SEP-19
Cesium (Cs)-Total			96.2		%		80-120	03-SEP-19
Cobalt (Co)-Total			97.3		%		80-120	03-SEP-19
Copper (Cu)-Total			97.6		%		80-120	03-SEP-19
Iron (Fe)-Total			95.4		%		80-120	03-SEP-19
Lead (Pb)-Total			98.9		%		80-120	03-SEP-19
Lithium (Li)-Total			92.9		%		80-120	03-SEP-19
Magnesium (Mg)-Total			100.6		%		80-120	03-SEP-19
Manganese (Mn)-Total			102.0		%		80-120	03-SEP-19
Molybdenum (Mo)-Total			98.2		%		80-120	03-SEP-19
Nickel (Ni)-Total			97.5		%		80-120	03-SEP-19
Phosphorus (P)-Total			102.8		%		70-130	03-SEP-19
Potassium (K)-Total			100.3		%		80-120	03-SEP-19
Rubidium (Rb)-Total			93.5		%		80-120	03-SEP-19
Selenium (Se)-Total			100.5		%		80-120	03-SEP-19
Silicon (Si)-Total			102.2		%		60-140	03-SEP-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4782041								
WG3150225-2 LCS								
Silver (Ag)-Total			95.4		%		80-120	03-SEP-19
Sodium (Na)-Total			106.3		%		80-120	03-SEP-19
Strontium (Sr)-Total			95.3		%		80-120	03-SEP-19
Sulfur (S)-Total			99.1		%		80-120	03-SEP-19
Thallium (Tl)-Total			98.7		%		80-120	03-SEP-19
Tellurium (Te)-Total			92.7		%		80-120	03-SEP-19
Thorium (Th)-Total			93.9		%		70-130	03-SEP-19
Tin (Sn)-Total			94.5		%		80-120	03-SEP-19
Titanium (Ti)-Total			99.1		%		80-120	03-SEP-19
Tungsten (W)-Total			96.0		%		80-120	03-SEP-19
Uranium (U)-Total			96.0		%		80-120	03-SEP-19
Vanadium (V)-Total			99.6		%		80-120	03-SEP-19
Zinc (Zn)-Total			96.3		%		80-120	03-SEP-19
Zirconium (Zr)-Total			94.6		%		80-120	03-SEP-19
WG3150225-1 MB								
Aluminum (Al)-Total			<0.0050		mg/L		0.005	03-SEP-19
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	03-SEP-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	03-SEP-19
Barium (Ba)-Total			<0.00010		mg/L		0.0001	03-SEP-19
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	03-SEP-19
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	03-SEP-19
Boron (B)-Total			<0.010		mg/L		0.01	03-SEP-19
Cadmium (Cd)-Total			<0.000005C		mg/L		0.000005	03-SEP-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	03-SEP-19
Chromium (Cr)-Total			<0.00050		mg/L		0.0005	03-SEP-19
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	03-SEP-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	03-SEP-19
Copper (Cu)-Total			<0.0010		mg/L		0.001	03-SEP-19
Iron (Fe)-Total			<0.010		mg/L		0.01	03-SEP-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	03-SEP-19
Lithium (Li)-Total			<0.0010		mg/L		0.001	03-SEP-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	03-SEP-19
Manganese (Mn)-Total			<0.00050		mg/L		0.0005	03-SEP-19
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	03-SEP-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4782041								
WG3150225-1 MB								
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	03-SEP-19
Phosphorus (P)-Total			<0.050		mg/L		0.05	03-SEP-19
Potassium (K)-Total			<0.050		mg/L		0.05	03-SEP-19
Rubidium (Rb)-Total			<0.00020		mg/L		0.0002	03-SEP-19
Selenium (Se)-Total			<0.000050		mg/L		0.00005	03-SEP-19
Silicon (Si)-Total			<0.10		mg/L		0.1	03-SEP-19
Silver (Ag)-Total			<0.000050		mg/L		0.00005	03-SEP-19
Sodium (Na)-Total			<0.050		mg/L		0.05	03-SEP-19
Strontium (Sr)-Total			<0.0010		mg/L		0.001	03-SEP-19
Sulfur (S)-Total			<0.50		mg/L		0.5	03-SEP-19
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	03-SEP-19
Tellurium (Te)-Total			<0.00020		mg/L		0.0002	03-SEP-19
Thorium (Th)-Total			<0.00010		mg/L		0.0001	03-SEP-19
Tin (Sn)-Total			<0.00010		mg/L		0.0001	03-SEP-19
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	03-SEP-19
Tungsten (W)-Total			<0.00010		mg/L		0.0001	03-SEP-19
Uranium (U)-Total			<0.000010		mg/L		0.00001	03-SEP-19
Vanadium (V)-Total			<0.00050		mg/L		0.0005	03-SEP-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	03-SEP-19
Zirconium (Zr)-Total			<0.00020		mg/L		0.0002	03-SEP-19
WG3150225-5 MS		**WG3150225-3**						
Aluminum (Al)-Total			N/A	MS-B	%		-	03-SEP-19
Antimony (Sb)-Total			98.6		%		70-130	03-SEP-19
Arsenic (As)-Total			103.6		%		70-130	03-SEP-19
Barium (Ba)-Total			N/A	MS-B	%		-	03-SEP-19
Beryllium (Be)-Total			109.4		%		70-130	03-SEP-19
Bismuth (Bi)-Total			98.2		%		70-130	03-SEP-19
Boron (B)-Total			N/A	MS-B	%		-	03-SEP-19
Cadmium (Cd)-Total			104.8		%		70-130	03-SEP-19
Calcium (Ca)-Total			N/A	MS-B	%		-	03-SEP-19
Chromium (Cr)-Total			103.3		%		70-130	03-SEP-19
Cesium (Cs)-Total			102.0		%		70-130	03-SEP-19
Cobalt (Co)-Total			102.6		%		70-130	03-SEP-19
Copper (Cu)-Total			N/A	MS-B	%		-	03-SEP-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4782041								
WG3150225-5 MS		**WG3150225-3**						
Iron (Fe)-Total			N/A	MS-B	%		-	03-SEP-19
Lead (Pb)-Total			99.1		%		70-130	03-SEP-19
Lithium (Li)-Total			N/A	MS-B	%		-	03-SEP-19
Magnesium (Mg)-Total			N/A	MS-B	%		-	03-SEP-19
Manganese (Mn)-Total			N/A	MS-B	%		-	03-SEP-19
Molybdenum (Mo)-Total			N/A	MS-B	%		-	03-SEP-19
Nickel (Ni)-Total			102.8		%		70-130	03-SEP-19
Phosphorus (P)-Total			90.1		%		70-130	03-SEP-19
Potassium (K)-Total			N/A	MS-B	%		-	03-SEP-19
Rubidium (Rb)-Total			N/A	MS-B	%		-	03-SEP-19
Selenium (Se)-Total			100.8		%		70-130	03-SEP-19
Silicon (Si)-Total			N/A	MS-B	%		-	03-SEP-19
Silver (Ag)-Total			94.3		%		70-130	03-SEP-19
Sodium (Na)-Total			N/A	MS-B	%		-	03-SEP-19
Strontium (Sr)-Total			N/A	MS-B	%		-	03-SEP-19
Sulfur (S)-Total			N/A	MS-B	%		-	03-SEP-19
Thallium (Tl)-Total			98.3		%		70-130	03-SEP-19
Tellurium (Te)-Total			98.3		%		70-130	03-SEP-19
Tin (Sn)-Total			98.5		%		70-130	03-SEP-19
Titanium (Ti)-Total			N/A	MS-B	%		-	03-SEP-19
Tungsten (W)-Total			98.7		%		70-130	03-SEP-19
Uranium (U)-Total			N/A	MS-B	%		-	03-SEP-19
Vanadium (V)-Total			104.1		%		70-130	03-SEP-19
Zinc (Zn)-Total			N/A	MS-B	%		-	03-SEP-19
NH3-F-WT	**Water**							
Batch R4781881								
WG3150401-7 DUP		**L2339522-6**						
Ammonia, Total (as N)		<0.010	<0.010	RPD-NA	mg/L	N/A	20	03-SEP-19
WG3150401-6 LCS								
Ammonia, Total (as N)			97.3		%		85-115	03-SEP-19
WG3150401-5 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	03-SEP-19
WG3150401-8 MS		**L2339522-6**						
Ammonia, Total (as N)			93.2		%		75-125	03-SEP-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO3-IC-WT	**Water**							
Batch R4782656								
WG3150765-10 DUP		**WG3150765-8**						
Nitrate (as N)		2.09	2.08		mg/L	0.1	20	03-SEP-19
WG3150765-7 LCS								
Nitrate (as N)			101.4		%		90-110	03-SEP-19
WG3150765-6 MB								
Nitrate (as N)			<0.020		mg/L		0.02	03-SEP-19
WG3150765-9 MS		**WG3150765-8**						
Nitrate (as N)			96.2		%		75-125	03-SEP-19
P-T-COL-WT	**Water**							
Batch R4782483								
WG3150772-3 DUP		**L2338742-1**						
Phosphorus, Total		0.106	0.110		mg/L	3.5	20	04-SEP-19
WG3150772-2 LCS								
Phosphorus, Total			97.3		%		80-120	04-SEP-19
WG3150772-1 MB								
Phosphorus, Total			<0.0030		mg/L		0.003	04-SEP-19
WG3150772-4 MS		**L2338742-1**						
Phosphorus, Total			N/A	MS-B	%		-	04-SEP-19
PH-BF	**Water**							
Batch R4781669								
WG3150384-2 DUP		**L2339918-1**						
pH		7.04	7.05	J	pH units	0.01	0.2	03-SEP-19
WG3150384-1 LCS								
pH			7.01		pH units		6.9-7.1	03-SEP-19
SO4-IC-N-WT	**Water**							
Batch R4782656								
WG3150765-10 DUP		**WG3150765-8**						
Sulfate (SO4)		43.7	43.4		mg/L	0.6	20	03-SEP-19
WG3150765-7 LCS								
Sulfate (SO4)			100.8		%		90-110	03-SEP-19
WG3150765-6 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	03-SEP-19
WG3150765-9 MS		**WG3150765-8**						
Sulfate (SO4)			96.8		%		75-125	03-SEP-19
SOLIDS-TDS-BF	**Water**							

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SOLIDS-TDS-BF	**Water**							
Batch R4782348								
WG3151105-3 DUP		**L2339753-2**						
Total Dissolved Solids		3310	3210		mg/L	3.1	20	03-SEP-19
WG3151105-2 LCS								
Total Dissolved Solids			101.9		%		85-115	03-SEP-19
WG3151105-1 MB								
Total Dissolved Solids			<20		mg/L		20	03-SEP-19
SOLIDS-TSS-BF	**Water**							
Batch R4781869								
WG3150478-3 DUP		**L2339918-2**						
Total Suspended Solids		94.0	92.0		mg/L	2.2	25	03-SEP-19
WG3150478-2 LCS								
Total Suspended Solids			100.8		%		85-115	03-SEP-19
WG3150478-1 MB								
Total Suspended Solids			<2.0		mg/L		2	03-SEP-19
TKN-WT	**Water**							
Batch R4782526								
WG3150802-3 DUP		**L2334143-2**						
Total Kjeldahl Nitrogen		<0.15	<0.15	RPD-NA	mg/L	N/A	20	04-SEP-19
WG3150802-2 LCS								
Total Kjeldahl Nitrogen			95.3		%		75-125	04-SEP-19
WG3150802-1 MB								
Total Kjeldahl Nitrogen			<0.15		mg/L		0.15	04-SEP-19
WG3150802-4 MS		**L2334143-2**						
Total Kjeldahl Nitrogen			102.8		%		70-130	04-SEP-19
TOC-WT	**Water**							
Batch R4782674								
WG3151130-3 DUP		**L2339830-1**						
Total Organic Carbon		3.06	3.15		mg/L	2.8	20	04-SEP-19
WG3151130-2 LCS								
Total Organic Carbon			97.0		%		80-120	04-SEP-19
WG3151130-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	04-SEP-19
WG3151130-4 MS		**L2339830-1**						
Total Organic Carbon			95.8		%		70-130	04-SEP-19
TURBIDITY-BF	**Water**							

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TURBIDITY-BF	**Water**							
Batch R4782363								
WG3151144-3 DUP		**L2339839-1**						
Turbidity		9.32	9.32		NTU	0.0	15	02-SEP-19
WG3151144-2 LCS								
Turbidity			110.0		%		85-115	02-SEP-19
WG3151144-1 MB								
Turbidity			<0.10		NTU		0.1	02-SEP-19

Quality Control Report

Workorder: L2339839 Report Date: 24-SEP-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

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

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

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.

Thursday, September 19, 2019

Rick Hawthorne
ALS Environmental
60 Northland Rd, Unit 1
Waterloo Canada, ON N2V 2B8

Re: ALS Workorder: 1909038
Project Name:
Project Number: L2339839

Dear Mr. Hawthorne:

One water sample was received from ALS Environmental, on 9/4/2019. The sample was scheduled for the following analysis:

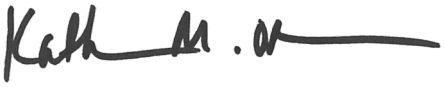
Radium-226

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,



ALS Environmental
Katie M. OBrien
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
AIHA	214884
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1909038
Client Name: ALS Environmental
Client Project Name:
Client Project Number: L2339839
Client PO Number: L2339839

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
L2339839-1	1909038-1		WATER	02-Sep-19	

1909038

Radium-226:

The sample was prepared and analyzed according to the current revision of SOP 783.

All acceptance criteria were met.

ALS Environmental

1909038

Subcontract Request Form

Subcontract To:

ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
225 COMMERCE DRIVE
FORT COLLINS,CO 80524

1 x ILP

NOTES: Please reference on final report and invoice: PO# *L2339839*
ALS requires QC data to be provided with your final results.

Please see enclosed 1 **sample(s) in** 1 **Container(s)**

SAMPLE NUMBER	ANALYTICAL REQUIRED	DATE SAMPLED / DUE DATE	Priority Flag
L2339839-1 MS-08		9/ 2/ 2019	E
	Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	9/20/2019	

Subcontract Info Contact: Mary-Lynn Pike (519) 886-6910
Analysis and reporting info contact: Rick Hawthorne
60 NORTHLAND ROAD, UNIT 1
WATERLOO,ON N2V 2B8
Phone: (519) 886-6910 Email: Rick.Hawthorne@alsglobal.com

Please email confirmation of receipt to: **Rick.Hawthorne@alsglobal.com**

Shipped By: _____ Date Shipped: _____

Received By: EMc Date Received: 9/4/19 1620

Verified By: _____ Date Verified: _____

Temperature: _____

Sample Integrity Issues: _____

ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: ALS Waterloo Workorder No: 1909038

Project Manager: KMO Initials: EE Date: 9/5/19

1. Are airbills / shipping documents present and/or removable?		DROP OFF	YES	NO
2. Are custody seals on **shipping** containers intact?		NONE	YES	NO *
3. Are custody seals on **sample** containers intact?		NONE	YES	NO *
4. Is there a COC (chain-of-custody) present?			YES	NO *
5. Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)			YES	NO *
6. Are short-hold samples present?			YES	NO
7. Are all samples within holding times for the requested analyses?			YES	NO *
8. Were all sample containers received intact? (not broken or leaking)			YES	NO *
9. Is there sufficient sample for the requested analyses?			YES	NO *
10. Are all samples in the proper containers for the requested analyses?			YES	NO *
11. Are all aqueous samples preserved correctly, if required? (excluding volatiles)		N/A	YES	NO *
12. Are all aqueous non-preserved samples pH 4-9?		N/A	YES	NO *
13. Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm (1/4 inch) diameter? (i.e. size of green pea)		N/A	YES	NO
14. Were the samples shipped on ice?			YES	NO
15. Were cooler temperatures measured at 0.1-6.0°C?	IR gun used*: #1 #3 #4	RAD ONLY	YES	NO

Cooler #:	1							
Temperature (°C):	7.6							
No. of custody seals on cooler:	3							
DOT Survey/ Acceptance Information — External µR/hr reading:	11							
Background µR/hr reading:	13							

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? YES / NO / NA (If no, see Form 008.)

*** Please provide details here for NO responses to gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.**

All client bottle ID's vs ALS lab ID's double-checked by: EE

If applicable, was the client contacted? YES / NO / NA Contact: _____ Date/Time: _____

Project Manager Signature / Date: 9/6/19

Form 201r27.xls
(02/11/2019)

*IR Gun #1, VWR SN 170560549
*IR Gun #3, VWR SN 170647571
*IR Gun #4, Oakton, SN 2372220101-0002

K909038

EXPRESS WORLDWIDE **WPX** DHL

2019-09-03 MYDHL+ 1.0 / *30-0821*

From : ALS Environmental
Ed Hill
60 Northland Rd
Unit 1

N2V 2B8 WATERLOO ON
Canada

Origin:
YHM

11-3

Contact: +15198666910

To : **ALS Environmental Fort Collins**
Sample Login
225 Commerce Drive

Contact:
Sample Login
+18004431511

7.60

80524 FORT COLLINS Colorado
United States of America

US-DEN-DEN

C [redacted] Day Time

Ref:

Pce/Shpt Weight: **39.8 lbs**
Piece: **1/1**

Contents: Water Samples

WAYBILL 53 7295 2104

(2L)US80524+48000001

Client:	ALS Environmental	**Date:**	*19-Sep-19*
Project:	L2339839	**Work Order:**	1909038
Sample ID:	L2339839-1	**Lab ID:**	1909038-1
Legal Location:		**Matrix:**	WATER
Collection Date:	9/2/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **9/9/2019**		PrepBy: **JXH**
Ra-226	**0.020 (+/- 0.0088)**		**0.0075**	**BQ/l**	NA	9/19/2019 12:00
Carr: BARIUM	*96.6*		*40-110*	*%REC*	DL = NA	9/19/2019 12:00

Client:	ALS Environmental	**Date:**	*19-Sep-19*
Project:	L2339839	**Work Order:**	1909038
Sample ID:	L2339839-1	**Lab ID:**	1909038-1
Legal Location:		**Matrix:**	WATER
Collection Date:	9/2/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed

Explanation of Qualifiers

Radiochemistry:

- "Report Limit" is the MDC

U or ND - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

Y2 - Chemical Yield outside default limits.

W - DER is greater than Warning Limit of 1.42

* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.
# - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.
G - Sample density differs by more than 15% of LCS density.
D - DER is greater than Control Limit

M - Requested MDC not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS, Matrix Spike Recovery within control limits.

N - Matrix Spike Recovery outside control limits

NC - Not Calculated for duplicate results less than 5 times MDC

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

Inorganics:

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).

U or ND - Indicates that the compound was analyzed for but not detected.

E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.

M - Duplicate injection precision was not met.

N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.

Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.

* - Duplicate analysis (relative percent difference) not within control limits.

S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

Organics:

U or ND - Indicates that the compound was analyzed for but not detected.

B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.

E - Analyte concentration exceeds the upper level of the calibration range.

J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).

A - A tentatively identified compound is a suspected aldol-condensation product.

X - The analyte was diluted below an accurate quantitation level.

* - The spike recovery is equal to or outside the control criteria used.

+ - The relative percent difference (RPD) equals or exceeds the control criteria.

G - A pattern resembling gasoline was detected in this sample.

D - A pattern resembling diesel was detected in this sample.

M - A pattern resembling motor oil was detected in this sample.

C - A pattern resembling crude oil was detected in this sample.

4 - A pattern resembling JP-4 was detected in this sample.

5 - A pattern resembling JP-5 was detected in this sample.

H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.

L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.

Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
- gasoline
- JP-8
- diesel
- mineral spirits
- motor oil
- Stoddard solvent
- bunker C

QC BATCH REPORT

Batch ID: **RE190909-1-1** Instrument ID **Alpha Scin** Method: **Radium-226 by Radon Emanation**

LCS Sample ID: **RE190909-1** Units: **BQ/l** Analysis Date: **9/19/2019 12:32**

Client ID: Run ID: **RE190909-1A** Prep Date: **9/9/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.77 (+/- 0.442)	0.0116	1.72		103	67-120					P,M3
Carr: BARIUM	15500		16020		96.7	40-110					

LCSD Sample ID: **RE190909-1** Units: **BQ/l** Analysis Date: **9/19/2019 12:32**

Client ID: Run ID: **RE190909-1A** Prep Date: **9/9/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.83 (+/- 0.457)	0.012	1.72		106	67-120		1.77	0.1	2.1	P,M3
Carr: BARIUM	15700		16020		98.3	40-110		15500			

MB Sample ID: **RE190909-1** Units: **BQ/l** Analysis Date: **9/19/2019 12:00**

Client ID: Run ID: **RE190909-1A** Prep Date: **9/9/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	0.0021 (+/- 0.0039)	0.0068									U
Carr: BARIUM	15400		16020		95.9	40-110					

The following samples were analyzed in this batch: 1909038-1

AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

TOXICITY TEST REPORT

Daphnia magna
EPS 1/RM/14

Work Order : 240166
Sample Number : 60495

SAMPLE IDENTIFICATION

Company :	ALS Laboratory Group, Waterloo	Date Collected :	2019-09-02
Location :	Waterloo ON	Time Collected :	14:25
Job Number :	L2339839	Date Received :	2019-09-03
Substance :	MS-08	Time Received :	11:55
Sampling Method :	Grab	Temperature on Receipt :	9.0 °C
Sampled By :	KB/CP	Date Tested :	2019-09-03
Sample Description :	Clear, light brown, odourless.		

Test Method : Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna* . Environment Canada EPS 1/RM/14 (Second Edition, December 2000, with February 2016 amendments).

48-HOUR TEST RESULTS

Substance	Effect	Value
Control	Mean Immobility	0.0 %
	Mean Mortality	0.0 %
100%	Mean Immobility	0.0 %
	Mean Mortality	0.0 %

The results reported relate only to the sample tested and as received.

TEST ORGANISM

Species :	*Daphnia magna*	Time to First Brood :	8.4 days
Organism Batch :	Dm19-17	Average Brood Size :	42.0 young
Culture Mortality :	0% (previous 7 days)		

TEST CONDITIONS

Sample Treatment :	None	Number of Replicates :	3
pH Adjustment :	None	Organisms / Replicate :	10
Pre-aeration Rate :	~30 mL/min/L	Organisms / Test Level :	30
Pre-aeration Time :	30 minutes	Organism Loading Rate :	15.0 mL/organism
Test Aeration :	None	Impaired Control Organisms :	0.0%
Hardness Adjustment :	None	Test Method Deviation(s) :	None

REFERENCE TOXICANT DATA

Toxicant :	Sodium Chloride	Historical Mean LC50 :	6.4 g/L
Date Tested :	2019-09-03	Warning Limits (± 2SD) :	5.8 - 7.2 g/L
LC50 :	6.2 g/L	Organism Batch :	Dm19-17
95% Confidence Limits :	6.0 - 6.4 g/L	Analyst(s) :	MJT, RK
Statistical Method :	Spearman-Kärber		

COMMENTS

All test validity criteria as specified in the test method were satisfied.

Date : 2019-09-09
yyyy-mm-dd

Approved By : _____
Project Manager

AQUATOX

TOXICITY TEST REPORT

Daphnia magna

EPS 1/RM/14

Work Order : 240166
Sample Number : 60495

TEST DATA

	pH	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	Temperature (°C)	O_2 Saturation (%)*	Hardness (as $CaCO_3$)
Initial Water Chemistry (100%) :	8.4	10.0	3240	20.0	116	>1000 mg/L

0 HOURS

Date & Time 2019-09-03 14:20
Analyst(s) : KP

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O_2	Conductivity	Temperature	O_2 Saturation (%)*	Hardness
100	A	0	0	8.3	9.5	3240	20.0	110	>1000
100	B	0	0	8.3	9.5	3240	20.0	110	>1000
100	C	0	0	8.3	9.5	3240	20.0	110	>1000
Control	A	0	0	8.5	8.8	780	20.0	100	220
Control	B	0	0	8.5	8.8	780	20.0	100	220
Control	C	0	0	8.5	8.8	780	20.0	100	220

Notes:

24 HOURS

Date & Time 2019-09-04 14:20
Analyst(s) : RK (MJT)

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O_2	Conductivity	Temperature
100	A	–	0	–	–	–	19.0
100	B	–	0	–	–	–	19.0
100	C	–	0	–	–	–	19.0
Control	A	–	0	–	–	–	19.0
Control	B	–	0	–	–	–	19.0
Control	C	–	0	–	–	–	19.0

Notes:

48 HOURS

Date & Time 2019-09-05 14:20
Analyst(s) : KP

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O_2	Conductivity	Temperature
100	A	0	0	8.0	8.5	3280	19.0
100	B	0	0	8.0	8.5	3260	19.0
100	C	0	0	8.0	8.5	3260	19.0
Control	A	0	0	8.5	8.5	795	19.0
Control	B	0	0	8.5	8.5	795	19.0
Control	C	0	0	8.5	8.5	790	19.0

Notes:

Number immobile does not include number dead.

– = not measured/not required
* adjusted for temperature and barometric pressure

Test Data Reviewed By : FS
Date : 2019-09-09

AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

TOXICITY TEST REPORT

Rainbow Trout
EPS 1/RM/13

Work Order : 240166
Sample Number : 60495

SAMPLE IDENTIFICATION

Company :	ALS Laboratory Group, Waterloo	Date Collected :	2019-09-02
Location :	Waterloo ON	Time Collected :	14:25
Job Number :	L2339839	Date Received :	2019-09-03
Substance :	MS-08	Time Received :	11:55
Sampling Method :	Grab	Temperature on Receipt :	9.0 °C
Sampled By :	KB/CP	Date Tested :	2019-09-03
Sample Description :	Clear, light brown, odourless.		

Test Method(s) : Reference Method for Determining Acute Lethality of Liquid Effluents to Rainbow Trout. Environment Canada, EPS 1/RM/13 (2nd Edition, December 2000, with May 2007 and February 2016 amendments).

96-HOUR TEST RESULTS

Substance	Effect	Value
Control	Mean Impairment	0.0 %
	Mean Mortality	0.0 %
100%	Mean Impairment	0.0 %
	Mean Mortality	0.0 %

The results reported relate only to the sample tested and as received.

TEST ORGANISM

Test Organism :	*Oncorhynchus mykiss*	Average Fork Length (± 2 SD) :	44.1 mm (±8.0)
Organism Batch :	T19-16	Range of Fork Lengths :	39 - 50 mm
Control Sample Size :	10	Average Wet Weight (± 2 SD) :	0.73 g (±0.45)
Cumulative stock tank mortality rate :	0% (previous 7 days)	Range of Wet Weights :	0.46 - 1.04 g
Control organisms showing stress :	0 (at test completion)	Organism Loading Rate :	0.4 g/L

TEST CONDITIONS

Sample Treatment :	None	Volume Tested (L) :	20
pH Adjustment :	None	Number of Replicates :	1
Test Aeration :	Yes	Organisms Per Replicate :	10
Pre-aeration/Aeration Rate :	6.5 ± 1 mL/min/L	Organisms Per Test Level :	10
Total Pre-Aeration Time :	120 minutes	Test Method Deviation(s) :	None

REFERENCE TOXICANT DATA

Toxicant :	Potassium Chloride	Date Tested :	2019-09-03
Organism Batch :	T19-16	Historical Mean LC50 :	3760 mg/L
LC50 :	3661 mg/L	Warning Limits (± 2SD) :	3139 - 4503 mg/L
95% Confidence Limits :	3264 - 4089 mg/L	Analyst(s) :	MDH, ALC, KTL, FS
Statistical Method :	Linear Regression (MLE)		

COMMENTS

•All test validity criteria as specified in the test method were satisfied.

Date : 2019-09-09
yyyy-mm-dd

Approved By : *Project Manager*

Work Order : 240166
Sample Number : 60495

TEST DATA

	pH	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	Temperature (°C)	O_2 Saturation (%)*
Initial Water Chemistry (100%) :	8.4	10.1	3430	14.0	105
After 30 min pre-aeration :	8.4	9.9	3417	14.0	103

0 HOURS

Date & Time 2019-09-03 15:50
Analyst(s) : MDH

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature	O_2 Saturation*
100%	0	0	8.4	9.5	3408	14.0	100
Control	0	0	8.1	9.6	927	14.5	100

Notes:

24 HOURS

Date & Time 2019-09-04 15:50
Analyst(s) : FS

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	7.8	–	–	15.0
Control	0	0	–	–	–	15.0

Notes:

48 HOURS

Date & Time 2019-09-05 15:50
Analyst(s) : MDH

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	7.6	–	–	15.0
Control	0	0	8.2	–	–	15.0

Notes:

72 HOURS

Date & Time 2019-09-06 15:50
Analyst(s) : TL

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	7.6	–	–	15.0
Control	0	0	8.2	–	–	15.0

Notes:

96 HOURS

Date & Time 2019-09-07 15:50
Analyst(s) : MDH

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	7.7	9.2	3409	14.5
Control	0	0	8.2	9.3	910	14.5

Notes:

"–" = not measured/not required
Number impaired does not include number dead.
* adjusted for temperature and barometric pressure

Test Data Reviewed By : FS
Date : 2019-09-09

CHAIN OF CUSTODY RECORD

AQUATOX

AquaTox Work Order No: 240 166

Shipping Address: AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, Ontario Canada N0B 2J0

Voice: (519) 763-4412 **Fax:** (519) 763-4419

P.O. Number:	4500057496
Field Sampler Name (print):	KB/CP
Signature:	
Affiliation:	Baffinland Iron Mine / ALS Environmental
Sample Storage (prior to shipping):	
Custody Relinquished by:	Kendra Button
Date/Time Shipped:	2-Sep-19/ 20:00

Client:	ALS Environmental c/o Baffinland Iron Mine Quote # (2019): 162705399-19
Phone:	(519) 886-6910
Fax:	(519) 886-9047
Contact:	Rick Hawthorne (ALS) / Martina Rendas (Aquatox)

Sample Identification					Analyses Requested									Sample Method and Volume		
Date Collected (yyyy-mm-dd)	Time Collected (e.g. 14:30, 24 hr clock)	Sample Name	AquaTox Sample Number	Temp. on arrival	Rainbow Trout Single Concentration	Rainbow Trout LC50	*Daphnia magna* Single Concentration	*Daphnia magna* LC50	Fathead Minnow Survival & Growth	*Ceriodaphnia dubia* Survival & Reproduction	*Lemna minor* Growth	*Pseudokirchneriella subcapitata* Growth	Other (please specify below)	Grab	Composite	# of Containers and Volume (eg. 2 x 1L, 3 x 10L, etc.)
2019-09-02	14:25	MS-08	60495	9°C	✓		✓							✓		2 x 10LCarboy

C23839839

For Lab Use Only	
Received By:	AS / RD
Date:	2019-09-03
Time:	11:55
Storage Location:	
Storage Temp.(°C)	

Please list any special requests or instructions:

Rush TAT w/ Daily updates. PH required.
Report Distribution: bimcore@alsglobal.com, rick.hawthorne@alsglobal.com

ALS Environmental

L2339839

WATERLOO

Subcontract Request Form

Subcontract To:

AQUATOX TESTING AND CONSULTING
11B NICHOLAS BEAVER ROAD
RR3
GUELPH,ON N1H 6H9

NOTES: Please reference on final report and invoice: PO# *L2339839*
ALS requires QC data to be provided with your final results.

Please see enclosed 1 **sample(s) in** 0 **Container(s)**

SAMPLE NUMBER	ANALYTICAL REQUIRED	DATE SAMPLED / DUE DATE	Priority Flag
L2339839-1 MS-08		9/ 2/ 2019	**E**
	Special Request Aquatox (SPECIAL REQUEST2-AQT 14)	9/9/2019	
	Special Request Aquatox (SPECIAL REQUEST-AQT 14)	9/9/2019	

Subcontract Info Contact: Mary-Lynn Pike (519) 886-6910
Analysis and reporting info contact: Rick Hawthorne
60 NORTHLAND ROAD, UNIT 1
WATERLOO,ON N2V 2B8
Phone: (519) 886-6910 Email: Rick.Hawthorne@alsglobal.com

Please email confirmation of receipt to: **Rick.Hawthorne@alsglobal.com**

Shipped By: _____ Date Shipped: _____

Received By: _____ Date Received: _____

Verified By: _____ Date Verified: _____

Temperature: _____

Sample Integrity Issues: _____

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2339839-COFC

Report To	Contact and company name below will appear on the final report
Company:	Baffinland Iron Mines Corp.
Contact:	Wiliam Bowden and Connor Devereaux
Phone:	647-253-0596 EXT 6016
	Company address below will appear on the final report
Street:	2275 Upper Middle Rd. E., Suite #300
City/Province:	Oakville, ON
Postal Code:	L6H 0C3
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report ☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax: bimcore@alsglobal.com
Email 2:
Email 3:

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax: ap@baffinland.com
Email 2: commercial@baffinland.com

Project Information

ALS Account # / Quote #:	23642 /Q42455
Job #:	MS-08 WT TOX
PO / AFE:	4500057496
LSD:	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#:
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only): L2339839

ALS Contact: **Sampler:** KB/CP

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☐ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
	4 day [P4] ☐		1 Business day [E1] ☐
	3 day [P3] ☐		Same Day, Weekend or Statutory holiday [E0] ☑
	2 day [P2] ☐		

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	BIM-MMER-WT	Group 3	Number of Containers
	MS-08	2-Sep-19	14:25	Water	E0	E1	11

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human drinking water use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐
Ice Packs ☐ Ice Cubes ☑ Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			2.0		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released By: Kendra Button	Date: 2-Sep-19	Time: 16:40	Received by:	Date:	Time:	Received by:	Date: 3 Sep 19	Time: 1000

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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 specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Baffinland Iron Mine's Corporation (Oakville)
ATTN: William Bowden/Connor Devereaux
2275 Upper Middle Rd. E.
Suite #300
Oakville ON L6H 0C3

Date Received: 28-SEP-19
Report Date: 21-OCT-19 11:03 (MT)
Version: FINAL

Client Phone: 647-253-0596

Certificate of Analysis

Lab Work Order #: L2356235

Project P.O. #: 4500057496
Job Reference: MS-08 DEL
C of C Numbers:
Legal Site Desc:

Rick Hawthorne
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2356235-1 MS-08 Sampled By: KB/LM on 28-SEP-19 @ 13:30 Matrix: WATER							
Physical Tests							
Conductivity	1390		3.0	umhos/cm		02-OCT-19	R4857597
pH	6.91		0.10	pH units		29-SEP-19	R4849880
Total Suspended Solids	40.5		2.0	mg/L		29-SEP-19	R4849883
Total Dissolved Solids	1080		20	mg/L		29-SEP-19	R4849913
Turbidity	42.1		0.10	NTU		29-SEP-19	R4849881
Anions and Nutrients							
Ammonia, Total (as N)	0.50	DLHC	0.10	mg/L		02-OCT-19	R4856571
Cyanides							
Cyanide, Total	<0.020	DLM	0.020	mg/L		03-OCT-19	R4857913
Total Metals							
Aluminum (Al)-Total	1.02	DLHC	0.050	mg/L	02-OCT-19	02-OCT-19	R4854170
Antimony (Sb)-Total	<0.0010	DLHC	0.0010	mg/L	02-OCT-19	02-OCT-19	R4854170
Arsenic (As)-Total	<0.0010	DLHC	0.0010	mg/L	02-OCT-19	02-OCT-19	R4854170
Barium (Ba)-Total	0.0148	DLHC	0.0010	mg/L	02-OCT-19	02-OCT-19	R4854170
Beryllium (Be)-Total	<0.0010	DLHC	0.0010	mg/L	02-OCT-19	02-OCT-19	R4854170
Bismuth (Bi)-Total	<0.00050	DLHC	0.00050	mg/L	02-OCT-19	02-OCT-19	R4854170
Boron (B)-Total	<0.10	DLHC	0.10	mg/L	02-OCT-19	02-OCT-19	R4854170
Cadmium (Cd)-Total	0.000133	DLHC	0.000050	mg/L	02-OCT-19	02-OCT-19	R4854170
Calcium (Ca)-Total	44.6	DLHC	0.50	mg/L	02-OCT-19	02-OCT-19	R4854170
Cesium (Cs)-Total	<0.00010	DLHC	0.00010	mg/L	02-OCT-19	02-OCT-19	R4854170
Chromium (Cr)-Total	<0.0050	DLHC	0.0050	mg/L	02-OCT-19	02-OCT-19	R4854170
Cobalt (Co)-Total	0.0691	DLHC	0.0010	mg/L	02-OCT-19	02-OCT-19	R4854170
Copper (Cu)-Total	<0.010	DLHC	0.010	mg/L	02-OCT-19	02-OCT-19	R4854170
Iron (Fe)-Total	4.43	DLHC	0.10	mg/L	02-OCT-19	02-OCT-19	R4854170
Lead (Pb)-Total	0.00120	DLHC	0.00050	mg/L	02-OCT-19	02-OCT-19	R4854170
Lithium (Li)-Total	<0.010	DLHC	0.010	mg/L	02-OCT-19	02-OCT-19	R4854170
Magnesium (Mg)-Total	169	DLHC	0.050	mg/L	02-OCT-19	02-OCT-19	R4854170
Manganese (Mn)-Total	5.85	DLHC	0.0050	mg/L	02-OCT-19	02-OCT-19	R4854170
Molybdenum (Mo)-Total	0.00072	DLHC	0.00050	mg/L	02-OCT-19	02-OCT-19	R4854170
Nickel (Ni)-Total	0.0774	DLHC	0.0050	mg/L	02-OCT-19	02-OCT-19	R4854170
Phosphorus (P)-Total	<0.50	DLHC	0.50	mg/L	02-OCT-19	02-OCT-19	R4854170
Potassium (K)-Total	2.76	DLHC	0.50	mg/L	02-OCT-19	02-OCT-19	R4854170
Rubidium (Rb)-Total	0.0051	DLHC	0.0020	mg/L	02-OCT-19	02-OCT-19	R4854170
Selenium (Se)-Total	0.00243	DLHC	0.00050	mg/L	02-OCT-19	02-OCT-19	R4854170
Silicon (Si)-Total	2.3	DLHC	1.0	mg/L	02-OCT-19	02-OCT-19	R4854170
Silver (Ag)-Total	<0.00050	DLHC	0.00050	mg/L	02-OCT-19	02-OCT-19	R4854170
Sodium (Na)-Total	1.52	DLHC	0.50	mg/L	02-OCT-19	02-OCT-19	R4854170
Strontium (Sr)-Total	0.033	DLHC	0.010	mg/L	02-OCT-19	02-OCT-19	R4854170
Sulfur (S)-Total	258	DLHC	5.0	mg/L	02-OCT-19	02-OCT-19	R4854170
Tellurium (Te)-Total	<0.0020	DLHC	0.0020	mg/L	02-OCT-19	02-OCT-19	R4854170
Thallium (Tl)-Total	<0.00010	DLHC	0.00010	mg/L	02-OCT-19	02-OCT-19	R4854170
Thorium (Th)-Total	<0.0010	DLHC	0.0010	mg/L	02-OCT-19	02-OCT-19	R4854170

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2356235-1 MS-08 Sampled By: KB/LM on 28-SEP-19 @ 13:30 Matrix: WATER							
Total Metals							
Tin (Sn)-Total	<0.0010	DLHC	0.0010	mg/L	02-OCT-19	02-OCT-19	R4854170
Titanium (Ti)-Total	0.0547	DLHC	0.0030	mg/L	02-OCT-19	02-OCT-19	R4854170
Tungsten (W)-Total	<0.0010	DLHC	0.0010	mg/L	02-OCT-19	02-OCT-19	R4854170
Uranium (U)-Total	0.00151	DLHC	0.00010	mg/L	02-OCT-19	02-OCT-19	R4854170
Vanadium (V)-Total	<0.0050	DLHC	0.0050	mg/L	02-OCT-19	02-OCT-19	R4854170
Zinc (Zn)-Total	<0.030	DLHC	0.030	mg/L	02-OCT-19	02-OCT-19	R4854170
Zirconium (Zr)-Total	<0.0020	DLHC	0.0020	mg/L	02-OCT-19	02-OCT-19	R4854170
Radiological Parameters							
Ra-226	0.017		0.0048	Bq/L	08-OCT-19	17-OCT-19	R4851666

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

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)

Sample Parameter Qualifier key listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
CN-TOT-WT	Water	Cyanide, Total	ISO 14403-2

Total cyanide is determined by the combination of UV digestion and distillation. Cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

When using this method, high levels of thiocyanate in samples can cause false positives at ~1-2% of the thiocyanate concentration. For samples with detectable cyanide analyzed by this method, ALS recommends analysis for thiocyanate to check for this potential interference

EC-SCREEN-WT	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

EC-WT	Water	Conductivity	APHA 2510 B

Water samples can be measured directly by immersing the conductivity cell into the sample.

MET-T-CCMS-WT	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

NH3-F-WT	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

PH-BF	Water	pH	APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

RA226-MMER-FC	Water	Ra226 by Alpha Scint, MDC=0.01 Bq/L	EPA 903.1
SOLIDS-TDS-BF	Water	Total Dissolved Solids	APHA 2540C

A well-mixed sample is filtered though glass fibres filter. A known volume of the filtrate is evaporated and dried at 180 +/- 2C for 1hr.

SOLIDS-TSS-BF	Water	Suspended solids	APHA 2540 D-Gravimetric

A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104 +/- 1C for a minimum of four hours or until a constant weight is achieved.

TURBIDITY-BF	Water	Turbidity	APHA 2130 B

Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.

** 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
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA
FC	ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
BF	ALS ENVIRONMENTAL - BAFFIN ISLAND, NUNAVUT, CANADA

Chain of Custody Numbers:

Reference Information

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 weight of sample
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

Workorder: L2356235 Report Date: 21-OCT-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3

Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
CN-TOT-WT	**Water**							
Batch R4857913								
WG3180527-3 DUP		**L2357043-2**						
Cyanide, Total		0.025	0.037	J	mg/L	0.013	0.04	03-OCT-19
WG3180527-2 LCS								
Cyanide, Total			102.1		%		80-120	02-OCT-19
WG3180527-1 MB								
Cyanide, Total			<0.0020		mg/L		0.002	02-OCT-19
WG3180527-4 MS		**L2357043-2**						
Cyanide, Total			89.7		%		70-130	03-OCT-19
EC-WT	**Water**							
Batch R4857597								
WG3179309-4 DUP		**WG3179309-3**						
Conductivity		2090	2080		umhos/cm	0.5	10	02-OCT-19
WG3179309-2 LCS								
Conductivity			100.2		%		90-110	02-OCT-19
WG3179309-1 MB								
Conductivity			<3.0		umhos/cm		3	02-OCT-19
MET-T-CCMS-WT	**Water**							
Batch R4854170								
WG3179173-4 DUP		**WG3179173-3**						
Aluminum (Al)-Total		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	02-OCT-19
Antimony (Sb)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	02-OCT-19
Arsenic (As)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	02-OCT-19
Barium (Ba)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	02-OCT-19
Beryllium (Be)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	02-OCT-19
Bismuth (Bi)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	02-OCT-19
Boron (B)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	02-OCT-19
Cadmium (Cd)-Total		<0.0000050	<0.000005(	RPD-NA	mg/L	N/A	20	02-OCT-19
Calcium (Ca)-Total		<0.050	<0.050	RPD-NA	mg/L	N/A	20	02-OCT-19
Chromium (Cr)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	02-OCT-19
Cesium (Cs)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	02-OCT-19
Cobalt (Co)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	02-OCT-19
Copper (Cu)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	02-OCT-19
Iron (Fe)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	02-OCT-19
Lead (Pb)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	02-OCT-19
Lithium (Li)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	02-OCT-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4854170								
WG3179173-4 DUP		**WG3179173-3**						
Magnesium (Mg)-Total		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	02-OCT-19
Manganese (Mn)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	02-OCT-19
Molybdenum (Mo)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	02-OCT-19
Nickel (Ni)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	02-OCT-19
Phosphorus (P)-Total		<0.050	<0.050	RPD-NA	mg/L	N/A	20	02-OCT-19
Potassium (K)-Total		<0.050	<0.050	RPD-NA	mg/L	N/A	20	02-OCT-19
Rubidium (Rb)-Total		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	02-OCT-19
Selenium (Se)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	02-OCT-19
Silicon (Si)-Total		<0.10	<0.10	RPD-NA	mg/L	N/A	20	02-OCT-19
Silver (Ag)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	02-OCT-19
Sodium (Na)-Total		<0.050	<0.050	RPD-NA	mg/L	N/A	20	02-OCT-19
Strontium (Sr)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	02-OCT-19
Sulfur (S)-Total		<0.50	<0.50	RPD-NA	mg/L	N/A	25	02-OCT-19
Thallium (Tl)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	02-OCT-19
Tellurium (Te)-Total		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	02-OCT-19
Thorium (Th)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	25	02-OCT-19
Tin (Sn)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	02-OCT-19
Titanium (Ti)-Total		<0.00030	<0.00030	RPD-NA	mg/L	N/A	20	02-OCT-19
Tungsten (W)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	02-OCT-19
Uranium (U)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	02-OCT-19
Vanadium (V)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	02-OCT-19
Zinc (Zn)-Total		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	02-OCT-19
Zirconium (Zr)-Total		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	02-OCT-19
WG3179173-2 LCS								
Aluminum (Al)-Total			103.6		%		80-120	02-OCT-19
Antimony (Sb)-Total			101.1		%		80-120	02-OCT-19
Arsenic (As)-Total			98.7		%		80-120	02-OCT-19
Barium (Ba)-Total			99.7		%		80-120	02-OCT-19
Beryllium (Be)-Total			95.9		%		80-120	02-OCT-19
Bismuth (Bi)-Total			96.5		%		80-120	02-OCT-19
Boron (B)-Total			93.0		%		80-120	02-OCT-19
Cadmium (Cd)-Total			95.4		%		80-120	02-OCT-19
Calcium (Ca)-Total			95.8		%		80-120	02-OCT-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4854170								
WG3179173-2 LCS								
Chromium (Cr)-Total			99.6		%		80-120	02-OCT-19
Cesium (Cs)-Total			96.1		%		80-120	02-OCT-19
Cobalt (Co)-Total			97.0		%		80-120	02-OCT-19
Copper (Cu)-Total			95.7		%		80-120	02-OCT-19
Iron (Fe)-Total			96.4		%		80-120	02-OCT-19
Lead (Pb)-Total			99.6		%		80-120	02-OCT-19
Lithium (Li)-Total			95.9		%		80-120	02-OCT-19
Magnesium (Mg)-Total			106.9		%		80-120	02-OCT-19
Manganese (Mn)-Total			100.5		%		80-120	02-OCT-19
Molybdenum (Mo)-Total			96.7		%		80-120	02-OCT-19
Nickel (Ni)-Total			95.8		%		80-120	02-OCT-19
Phosphorus (P)-Total			102.6		%		70-130	02-OCT-19
Potassium (K)-Total			98.4		%		80-120	02-OCT-19
Rubidium (Rb)-Total			99.6		%		80-120	02-OCT-19
Selenium (Se)-Total			98.8		%		80-120	02-OCT-19
Silicon (Si)-Total			100.1		%		60-140	02-OCT-19
Silver (Ag)-Total			95.8		%		80-120	02-OCT-19
Sodium (Na)-Total			104.7		%		80-120	02-OCT-19
Strontium (Sr)-Total			101.5		%		80-120	02-OCT-19
Sulfur (S)-Total			96.5		%		80-120	02-OCT-19
Thallium (Tl)-Total			97.4		%		80-120	02-OCT-19
Tellurium (Te)-Total			95.3		%		80-120	02-OCT-19
Thorium (Th)-Total			97.1		%		70-130	02-OCT-19
Tin (Sn)-Total			98.4		%		80-120	02-OCT-19
Titanium (Ti)-Total			98.3		%		80-120	02-OCT-19
Tungsten (W)-Total			96.2		%		80-120	02-OCT-19
Uranium (U)-Total			93.5		%		80-120	02-OCT-19
Vanadium (V)-Total			101.1		%		80-120	02-OCT-19
Zinc (Zn)-Total			96.4		%		80-120	02-OCT-19
Zirconium (Zr)-Total			93.6		%		80-120	02-OCT-19
WG3179173-1 MB								
Aluminum (Al)-Total			<0.0050		mg/L		0.005	02-OCT-19
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	02-OCT-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	02-OCT-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4854170								
WG3179173-1 MB								
Barium (Ba)-Total			<0.00010		mg/L		0.0001	02-OCT-19
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	02-OCT-19
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	02-OCT-19
Boron (B)-Total			<0.010		mg/L		0.01	02-OCT-19
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	02-OCT-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	02-OCT-19
Chromium (Cr)-Total			<0.00050		mg/L		0.0005	02-OCT-19
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	02-OCT-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	02-OCT-19
Copper (Cu)-Total			<0.0010		mg/L		0.001	02-OCT-19
Iron (Fe)-Total			<0.010		mg/L		0.01	02-OCT-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	02-OCT-19
Lithium (Li)-Total			<0.0010		mg/L		0.001	02-OCT-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	02-OCT-19
Manganese (Mn)-Total			<0.00050		mg/L		0.0005	02-OCT-19
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	02-OCT-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	02-OCT-19
Phosphorus (P)-Total			<0.050		mg/L		0.05	02-OCT-19
Potassium (K)-Total			<0.050		mg/L		0.05	02-OCT-19
Rubidium (Rb)-Total			<0.00020		mg/L		0.0002	02-OCT-19
Selenium (Se)-Total			<0.000050		mg/L		0.00005	02-OCT-19
Silicon (Si)-Total			<0.10		mg/L		0.1	02-OCT-19
Silver (Ag)-Total			<0.000050		mg/L		0.00005	02-OCT-19
Sodium (Na)-Total			<0.050		mg/L		0.05	02-OCT-19
Strontium (Sr)-Total			<0.0010		mg/L		0.001	02-OCT-19
Sulfur (S)-Total			<0.50		mg/L		0.5	02-OCT-19
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	02-OCT-19
Tellurium (Te)-Total			<0.00020		mg/L		0.0002	02-OCT-19
Thorium (Th)-Total			<0.00010		mg/L		0.0001	02-OCT-19
Tin (Sn)-Total			<0.00010		mg/L		0.0001	02-OCT-19
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	02-OCT-19
Tungsten (W)-Total			<0.00010		mg/L		0.0001	02-OCT-19
Uranium (U)-Total			<0.000010		mg/L		0.00001	02-OCT-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4854170								
WG3179173-1 MB								
Vanadium (V)-Total			<0.00050		mg/L		0.0005	02-OCT-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	02-OCT-19
Zirconium (Zr)-Total			<0.00020		mg/L		0.0002	02-OCT-19
WG3179173-5 MS		**WG3179173-3**						
Aluminum (Al)-Total			100.4		%		70-130	02-OCT-19
Antimony (Sb)-Total			101.1		%		70-130	02-OCT-19
Arsenic (As)-Total			98.9		%		70-130	02-OCT-19
Barium (Ba)-Total			98.2		%		70-130	02-OCT-19
Beryllium (Be)-Total			97.5		%		70-130	02-OCT-19
Bismuth (Bi)-Total			97.4		%		70-130	02-OCT-19
Boron (B)-Total			95.9		%		70-130	02-OCT-19
Cadmium (Cd)-Total			98.9		%		70-130	02-OCT-19
Calcium (Ca)-Total			98.1		%		70-130	02-OCT-19
Chromium (Cr)-Total			99.9		%		70-130	02-OCT-19
Cesium (Cs)-Total			95.8		%		70-130	02-OCT-19
Cobalt (Co)-Total			98.8		%		70-130	02-OCT-19
Copper (Cu)-Total			99.3		%		70-130	02-OCT-19
Iron (Fe)-Total			98.4		%		70-130	02-OCT-19
Lead (Pb)-Total			101.9		%		70-130	02-OCT-19
Lithium (Li)-Total			97.7		%		70-130	02-OCT-19
Magnesium (Mg)-Total			106.9		%		70-130	02-OCT-19
Manganese (Mn)-Total			103.3		%		70-130	02-OCT-19
Molybdenum (Mo)-Total			95.3		%		70-130	02-OCT-19
Nickel (Ni)-Total			97.5		%		70-130	02-OCT-19
Phosphorus (P)-Total			103.3		%		70-130	02-OCT-19
Potassium (K)-Total			98.3		%		70-130	02-OCT-19
Rubidium (Rb)-Total			100.8		%		70-130	02-OCT-19
Selenium (Se)-Total			100.3		%		70-130	02-OCT-19
Silicon (Si)-Total			99.4		%		70-130	02-OCT-19
Silver (Ag)-Total			96.2		%		70-130	02-OCT-19
Sodium (Na)-Total			105.7		%		70-130	02-OCT-19
Strontium (Sr)-Total			100.7		%		70-130	02-OCT-19
Sulfur (S)-Total			99.8		%		70-130	02-OCT-19
Thallium (Tl)-Total			99.4		%		70-130	02-OCT-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4854170								
WG3179173-5 MS		**WG3179173-3**						
Tellurium (Te)-Total			93.3		%		70-130	02-OCT-19
Thorium (Th)-Total			95.3		%		70-130	02-OCT-19
Tin (Sn)-Total			96.3		%		70-130	02-OCT-19
Titanium (Ti)-Total			99.9		%		70-130	02-OCT-19
Tungsten (W)-Total			97.7		%		70-130	02-OCT-19
Uranium (U)-Total			94.6		%		70-130	02-OCT-19
Vanadium (V)-Total			101.3		%		70-130	02-OCT-19
Zinc (Zn)-Total			96.6		%		70-130	02-OCT-19
Zirconium (Zr)-Total			93.6		%		70-130	02-OCT-19
NH3-F-WT	**Water**							
Batch R4856571								
WG3179170-19 DUP		**L2356009-15**						
Ammonia, Total (as N)		0.035	0.039		mg/L	11	20	02-OCT-19
WG3179170-18 LCS								
Ammonia, Total (as N)			103.1		%		85-115	02-OCT-19
WG3179170-17 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	02-OCT-19
WG3179170-20 MS		**L2356009-15**						
Ammonia, Total (as N)			91.7		%		75-125	02-OCT-19
PH-BF	**Water**							
Batch R4849880								
WG3176164-2 DUP		**L2356235-1**						
pH		6.91	6.91	J	pH units	0.00	0.2	29-SEP-19
WG3176164-1 LCS								
pH			7.01		pH units		6.9-7.1	29-SEP-19
SOLIDS-TDS-BF	**Water**							
Batch R4849913								
WG3176171-3 DUP		**L2356119-2**						
Total Dissolved Solids		711	677		mg/L	5.0	20	29-SEP-19
WG3176171-2 LCS								
Total Dissolved Solids			103.6		%		85-115	29-SEP-19
WG3176171-1 MB								
Total Dissolved Solids			<20		mg/L		20	29-SEP-19
SOLIDS-TSS-BF	**Water**							

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SOLIDS-TSS-BF	**Water**							
Batch R4849883								
WG3176170-3 DUP		**L2356235-1**						
Total Suspended Solids		40.5	40.5		mg/L	0.0	25	29-SEP-19
WG3176170-2 LCS								
Total Suspended Solids			99.4		%		85-115	29-SEP-19
WG3176170-1 MB								
Total Suspended Solids			<2.0		mg/L		2	29-SEP-19
TURBIDITY-BF	**Water**							
Batch R4849881								
WG3176166-3 DUP		**L2356119-2**						
Turbidity		22.2	22.2		NTU	0.0	15	29-SEP-19
WG3176166-2 LCS								
Turbidity			110.0		%		85-115	29-SEP-19
WG3176166-1 MB								
Turbidity			<0.10		NTU		0.1	29-SEP-19

Quality Control Report

Workorder: L2356235 Report Date: 21-OCT-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

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

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

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.

Friday, October 18, 2019

Rick Hawthorne
ALS Environmental
60 Northland Rd, Unit 1
Waterloo Canada, ON N2V 2B8

Re: ALS Workorder: 1910088
Project Name:
Project Number: L2356235

Dear Mr. Hawthorne:

One water sample was received from ALS Environmental, on 10/3/2019. The sample was scheduled for the following analysis:

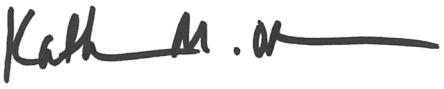
Radium-226

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,



ALS Environmental
Katie M. OBrien
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
AIHA	214884
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280

1910088

Radium-226:
The sample was prepared and analyzed according to the current revision of SOP 783.

All acceptance criteria were met.

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1910088
Client Name: ALS Environmental
Client Project Name:
Client Project Number: L2356235
Client PO Number: L2356235

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
L2356235-1	1910088-1		WATER	28-Sep-19	

ALS Environmental

L2356235

WATERLOO

1910088

Subcontract Request Form

Subcontract To:

ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
225 COMMERCE DRIVE
FORT COLLINS,CO 80524

NOTES: Please reference on final report and invoice: PO# *L2356235*
ALS requires QC data to be provided with your final results.

Please see enclosed 1 **sample(s) in** 1 **Container(s)**

SAMPLE NUMBER	ANALYTICAL REQUIRED	DATE SAMPLED / DUE DATE	Priority Flag
L2356235-1 MS-08		9/28/2019	E
	Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	10/18/2019	

Subcontract Info Contact: Mary-Lynn Pike (519) 886-6910
Analysis and reporting info contact: Rick Hawthorne
60 NORTHLAND ROAD, UNIT 1
WATERLOO,ON N2V 2B8
Phone: (519) 886-6910 Email: Rick.Hawthorne@alsglobal.com

Please email confirmation of receipt to: **Rick.Hawthorne@alsglobal.com**

Shipped By: _____ Date Shipped: _____

Received By: Emily Lyons Date Received: 10·03·19 1005

Verified By: _____ Date Verified: _____

Temperature: _____

Sample Integrity Issues: _____

ALS Environmental - Fort Collins

CONDITION OF SAMPLE UPON RECEIPT FORM

Client: ALS-Waterloo Workorder No: 1910088

Project Manager: KMO Initials: Eur Date: 10.03.19

1.	Are airbills / shipping documents present and/or removable?	DROP OFF	(YES)	NO
2.	Are custody seals on **shipping** containers intact?	(NONE)	YES	NO *
3.	Are custody seals on **sample** containers intact?	(NONE)	YES	NO *
4.	Is there a COC (chain-of-custody) present?		(YES)	NO *
5.	Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)		(YES)	NO *
6.	Are short-hold samples present?		YES	(NO)
7.	Are all samples within holding times for the requested analyses?		(YES)	NO *
8.	Were all sample containers received intact? (not broken or leaking)		(YES)	NO *
9.	Is there sufficient sample for the requested analyses?		(YES)	NO *
10.	Are all samples in the proper containers for the requested analyses?		(YES)	NO *
11.	Are all aqueous samples preserved correctly, if required? (excluding volatiles)	N/A	(YES)	NO *
12.	Are all aqueous non-preserved samples pH 4-9?	(N/A)	YES	NO *
13.	Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm (1/4 inch) diameter? (i.e. size of green pea)	(N/A)	YES	NO
14.	Were the samples shipped on ice?		(YES)	NO
15.	Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: #1 (#3) #4	(RAD ONLY)	YES	NO

Cooler #:	1							
Temperature (°C):	11.8							
No. of custody seals on cooler:	0							
DOT Survey/ Acceptance Information — External µR/hr reading:	12							
Background µR/hr reading:	14							

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? YES / NO / NA (If no, see Form 008.)

*** Please provide details here for NO responses to gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.**

All client bottle ID's vs ALS lab ID's double-checked by: Eur

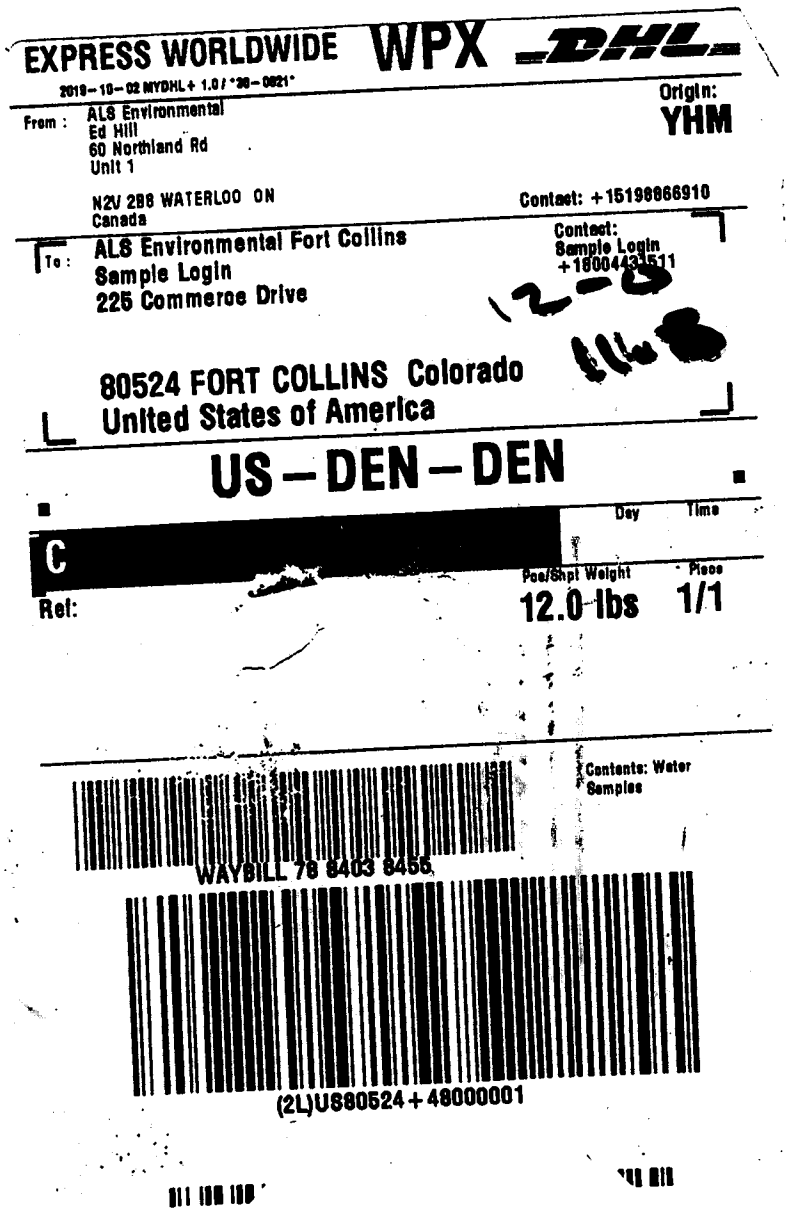
If applicable, was the client contacted? YES / NO / NA Contact: _____ Date/Time: _____

Project Manager Signature / Date: 10/4/19

Form 201r27.xls
(02/11/2019)

*IR Gun #1, VWR SN 170560549
*IR Gun #3, VWR SN 170647571
*IR Gun #4, Oakton, SN 2372220101-0002

1910088



EXPRESS WORLDWIDE WPX DHL

2019-10-02 MYDHL+ 1.0/*36-0921*

From : ALS Environmental
Ed Hill
60 Northland Rd
Unit 1

N2V 2B8 WATERLOO ON
Canada

Origin:
YHM

Contact: +15198866910

To : ALS Environmental Fort Collins
Sample Login
225 Commerce Drive

Contact:
Sample Login
+18004431511

12-8

80524 FORT COLLINS Colorado
United States of America

US-DEN-DEN

Day Time

C

Ref:

Pce/Shpt Weight 12.0 lbs

Piece 1/1

Contents: Water Samples

WAYBILL 78 8403 8455

(2L)US80524+48000001

Client:	ALS Environmental	**Date:**	*18-Oct-19*
Project:	L2356235	**Work Order:**	1910088
Sample ID:	L2356235-1	**Lab ID:**	1910088-1
Legal Location:		**Matrix:**	WATER
Collection Date:	9/28/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**			Prep Date: **10/8/2019**	PrepBy: **TRW**
Ra-226	**0.017 (+/- 0.0070)**	Y1	**0.0048**	**BQ/l**	NA	10/17/2019 14:05
Carr: BARIUM	*102*	Y1	*40-110*	*%REC*	DL = NA	10/17/2019 14:05

Client:	ALS Environmental	**Date:**	*18-Oct-19*
Project:	L2356235	**Work Order:**	1910088
Sample ID:	L2356235-1	**Lab ID:**	1910088-1
Legal Location:		**Matrix:**	WATER
Collection Date:	9/28/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed

Explanation of Qualifiers

Radiochemistry:

- "Report Limit" is the MDC

U or ND - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

Y2 - Chemical Yield outside default limits.

W - DER is greater than Warning Limit of 1.42

* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.
# - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.
G - Sample density differs by more than 15% of LCS density.
D - DER is greater than Control Limit

M - Requested MDC not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS, Matrix Spike Recovery within control limits.

N - Matrix Spike Recovery outside control limits

NC - Not Calculated for duplicate results less than 5 times MDC

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

Inorganics:

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).

U or ND - Indicates that the compound was analyzed for but not detected.

E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.

M - Duplicate injection precision was not met.

N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.

Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.

* - Duplicate analysis (relative percent difference) not within control limits.

S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

Organics:

U or ND - Indicates that the compound was analyzed for but not detected.

B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.

E - Analyte concentration exceeds the upper level of the calibration range.

J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).

A - A tentatively identified compound is a suspected aldol-condensation product.

X - The analyte was diluted below an accurate quantitation level.

* - The spike recovery is equal to or outside the control criteria used.

+ - The relative percent difference (RPD) equals or exceeds the control criteria.

G - A pattern resembling gasoline was detected in this sample.

D - A pattern resembling diesel was detected in this sample.

M - A pattern resembling motor oil was detected in this sample.

C - A pattern resembling crude oil was detected in this sample.

4 - A pattern resembling JP-4 was detected in this sample.

5 - A pattern resembling JP-5 was detected in this sample.

H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.

L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.

Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
- gasoline
- JP-8
- diesel
- mineral spirits
- motor oil
- Stoddard solvent
- bunker C

QC BATCH REPORT

Batch ID: **RE191008-2-1** Instrument ID **Alpha Scin** Method: **Radium-226 by Radon Emanation**

LCS Sample ID: **RE191008-2** Units: **BQ/l** Analysis Date: **10/17/2019 14:40**

Client ID: Run ID: **RE191008-2A** Prep Date: **10/8/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.58 (+/- 0.393)	0.0155	1.72		91.6	67-120					P,Y1,M3
Carr: BARIUM	16500		16380		101	40-110					Y1

LCSD Sample ID: **RE191008-2** Units: **BQ/l** Analysis Date: **10/17/2019 14:40**

Client ID: Run ID: **RE191008-2A** Prep Date: **10/8/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.49 (+/- 0.373)	0.0178	1.72		86.7	67-120		1.58	0.2	2.1	P,Y1,M3
Carr: BARIUM	16500		16390		101	40-110		16500			Y1

MB Sample ID: **RE191008-2** Units: **BQ/l** Analysis Date: **10/17/2019 14:40**

Client ID: Run ID: **RE191008-2A** Prep Date: **10/8/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	0.0023 (+/- 0.0027)	0.0041									Y1,U
Carr: BARIUM	16600		16380		102	40-110					Y1

The following samples were analyzed in this batch: 1910088-1

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2356235-COFC

COC Number: 15 -

Page 1 of 1

Report To	Contact and company name below will appear on the final report
Company:	Baffinland Iron Mines Corp.
Contact:	Wiliam Bowden and Connor Devereaux
Phone:	647-253-0596 EXT 6016
	Company address below will appear on the final report
Street:	2275 Upper Middle Rd. E., Suite #300
City/Province:	Oakville, ON
Postal Code:	L6H 0C3

Invoice To		
	Same as Report To	☑ YES ☐ NO
	Copy of Invoice with Report	☐ YES ☑ NO
Company:		
Contact:		

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)

Quality Control (QC) Report with Report ☑ YES ☐ NO

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: bimcore@alsglobal.com

Email 2:

Email 3:

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: ap@baffinland.com

Email 2: commercial@baffinland.com

Project Information

ALS Account # / Quote #:	23642 /Q42455
Job #:	MS-08 DEL
PO / AFE:	4500057496
LSD:	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#:
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only): L2356235

ALS Contact:

Sampler: KB/LM

Confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☐ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
4 day [P4]	☐	1 Business day [E1]	☐
3 day [P3]	☐	Same Day, Weekend or Statutory holiday [E0]	☑
2 day [P2]	☐		

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	BIM-MMER-DEL	Number of Containers
	MS-08	28-Sep-19	13:30	Water	E0	6

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)
Are samples taken from a Regulated DW System? ☐ YES ☑ NO	
Are samples for human drinking water use? ☐ YES ☑ NO	

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			12.8		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Kendra Button	Release Date: 28-Sep-19	Time: 16:30	Received by:	Date:	Time:	Received by: J.Streeter	Date: Sept 28/19 2-Oct-19	Time: 6:00pm 9:15

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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 specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Baffinland Iron Mine's Corporation (Oakville)
ATTN: William Bowden/Connor Devereaux
2275 Upper Middle Rd. E.
Suite #300
Oakville ON L6H 0C3

Date Received: 30-SEP-19
Report Date: 21-OCT-19 11:04 (MT)
Version: FINAL

Client Phone: 647-253-0596

Certificate of Analysis

Lab Work Order #: L2356892

Project P.O. #: 4500057496
Job Reference: MS-08 EFF CHARACTERIZATION
C of C Numbers:
Legal Site Desc:

Comments: ADDITIONAL 02-OCT-19 07:45

Rick Hawthorne
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2356892-1 MS-08 Sampled By: KB/AZ on 30-SEP-19 @ 09:20 Matrix: WATER							
Physical Tests							
Conductivity	870		3.0	umhos/cm		02-OCT-19	R4857597
Hardness (as CaCO3)	479	HTC	1.3	mg/L		03-OCT-19	
pH	6.92		0.10	pH units		01-OCT-19	R4851198
Total Suspended Solids	55.5		2.0	mg/L		01-OCT-19	R4851221
Total Dissolved Solids	643		20	mg/L		01-OCT-19	R4851401
Turbidity	72.1		0.10	NTU		01-OCT-19	R4851213
Anions and Nutrients							
Alkalinity, Total (as CaCO3)	25		10	mg/L		02-OCT-19	R4857597
Ammonia, Total (as N)	0.39	DLHC	0.10	mg/L		02-OCT-19	R4856571
Chloride (Cl)	2.21		0.50	mg/L		02-OCT-19	R4857755
Fluoride (F)	0.047		0.020	mg/L		02-OCT-19	R4857755
Nitrate (as N)	2.71		0.020	mg/L		02-OCT-19	R4857755
Total Kjeldahl Nitrogen	<1.5	DLM	1.5	mg/L	02-OCT-19	03-OCT-19	R4858209
Phosphorus, Total	0.052	DLM	0.030	mg/L	02-OCT-19	03-OCT-19	R4858093
Sulfate (SO4)	424		0.30	mg/L		02-OCT-19	R4857755
Cyanides							
Cyanide, Total	0.0065		0.0020	mg/L		02-OCT-19	R4857913
Organic / Inorganic Carbon							
Dissolved Carbon Filtration Location	LAB					02-OCT-19	R4857502
Dissolved Organic Carbon	1.33		0.50	mg/L	02-OCT-19	03-OCT-19	R4857987
Total Organic Carbon	2.22		0.50	mg/L		02-OCT-19	R4855629
Total Metals							
Aluminum (Al)-Total	1.88	DLHC	0.050	mg/L	02-OCT-19	02-OCT-19	R4854170
Antimony (Sb)-Total	<0.0010	DLHC	0.0010	mg/L	02-OCT-19	02-OCT-19	R4854170
Arsenic (As)-Total	<0.0010	DLHC	0.0010	mg/L	02-OCT-19	02-OCT-19	R4854170
Barium (Ba)-Total	0.0175	DLHC	0.0010	mg/L	02-OCT-19	02-OCT-19	R4854170
Beryllium (Be)-Total	<0.0010	DLHC	0.0010	mg/L	02-OCT-19	02-OCT-19	R4854170
Bismuth (Bi)-Total	<0.00050	DLHC	0.00050	mg/L	02-OCT-19	02-OCT-19	R4854170
Boron (B)-Total	<0.10	DLHC	0.10	mg/L	02-OCT-19	02-OCT-19	R4854170
Cadmium (Cd)-Total	0.000066	DLHC	0.000050	mg/L	02-OCT-19	02-OCT-19	R4854170
Calcium (Ca)-Total	30.5	DLHC	0.50	mg/L	02-OCT-19	02-OCT-19	R4854170
Cesium (Cs)-Total	0.00015	DLHC	0.00010	mg/L	02-OCT-19	02-OCT-19	R4854170
Chromium (Cr)-Total	<0.0050	DLHC	0.0050	mg/L	02-OCT-19	02-OCT-19	R4854170
Cobalt (Co)-Total	0.0359	DLHC	0.0010	mg/L	02-OCT-19	02-OCT-19	R4854170
Copper (Cu)-Total	<0.010	DLHC	0.010	mg/L	02-OCT-19	02-OCT-19	R4854170
Iron (Fe)-Total	6.55	DLHC	0.10	mg/L	02-OCT-19	02-OCT-19	R4854170
Lead (Pb)-Total	0.00227	DLHC	0.00050	mg/L	02-OCT-19	02-OCT-19	R4854170
Lithium (Li)-Total	<0.010	DLHC	0.010	mg/L	02-OCT-19	02-OCT-19	R4854170
Magnesium (Mg)-Total	97.8	DLHC	0.050	mg/L	02-OCT-19	02-OCT-19	R4854170
Manganese (Mn)-Total	3.33	DLHC	0.0050	mg/L	02-OCT-19	02-OCT-19	R4854170
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		02-OCT-19	R4855211
Molybdenum (Mo)-Total	0.00121	DLHC	0.00050	mg/L	02-OCT-19	02-OCT-19	R4854170

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2356892-1 MS-08 Sampled By: KB/AZ on 30-SEP-19 @ 09:20 Matrix: WATER							
Total Metals							
Nickel (Ni)-Total	0.0384	DLHC	0.0050	mg/L	02-OCT-19	02-OCT-19	R4854170
Phosphorus (P)-Total	<0.50	DLHC	0.50	mg/L	02-OCT-19	02-OCT-19	R4854170
Potassium (K)-Total	3.85	DLHC	0.50	mg/L	02-OCT-19	02-OCT-19	R4854170
Rubidium (Rb)-Total	0.0069	DLHC	0.0020	mg/L	02-OCT-19	02-OCT-19	R4854170
Selenium (Se)-Total	0.00123	DLHC	0.00050	mg/L	02-OCT-19	02-OCT-19	R4854170
Silicon (Si)-Total	3.6	DLHC	1.0	mg/L	02-OCT-19	02-OCT-19	R4854170
Silver (Ag)-Total	<0.00050	DLHC	0.00050	mg/L	02-OCT-19	02-OCT-19	R4854170
Sodium (Na)-Total	1.56	DLHC	0.50	mg/L	02-OCT-19	02-OCT-19	R4854170
Strontium (Sr)-Total	0.027	DLHC	0.010	mg/L	02-OCT-19	02-OCT-19	R4854170
Sulfur (S)-Total	146	DLHC	5.0	mg/L	02-OCT-19	02-OCT-19	R4854170
Tellurium (Te)-Total	<0.0020	DLHC	0.0020	mg/L	02-OCT-19	02-OCT-19	R4854170
Thallium (Tl)-Total	<0.00010	DLHC	0.00010	mg/L	02-OCT-19	02-OCT-19	R4854170
Thorium (Th)-Total	0.0013	DLHC	0.0010	mg/L	02-OCT-19	02-OCT-19	R4854170
Tin (Sn)-Total	<0.0010	DLHC	0.0010	mg/L	02-OCT-19	02-OCT-19	R4854170
Titanium (Ti)-Total	0.0893	DLHC	0.0030	mg/L	02-OCT-19	02-OCT-19	R4854170
Tungsten (W)-Total	<0.0010	DLHC	0.0010	mg/L	02-OCT-19	02-OCT-19	R4854170
Uranium (U)-Total	0.00263	DLHC	0.00010	mg/L	02-OCT-19	02-OCT-19	R4854170
Vanadium (V)-Total	<0.0050	DLHC	0.0050	mg/L	02-OCT-19	02-OCT-19	R4854170
Zinc (Zn)-Total	<0.030	DLHC	0.030	mg/L	02-OCT-19	02-OCT-19	R4854170
Zirconium (Zr)-Total	<0.0020	DLHC	0.0020	mg/L	02-OCT-19	02-OCT-19	R4854170
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					02-OCT-19	R4854329
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	02-OCT-19	02-OCT-19	R4855218
Radiological Parameters							
Ra-226	<0.0068		0.0068	Bq/L	08-OCT-19	17-OCT-19	R4851666
L2356892-2 MS-0802 Sampled By: KB/AZ on 30-SEP-19 @ 09:20 Matrix: WATER							
Physical Tests							
Conductivity	<3.0		3.0	umhos/cm		02-OCT-19	R4857597
Hardness (as CaCO3)	<0.50	HTC	0.50	mg/L		03-OCT-19	
pH	5.77		0.10	pH units		02-OCT-19	R4857597
Total Suspended Solids	<2.0		2.0	mg/L	02-OCT-19	03-OCT-19	R4857622
Total Dissolved Solids	<10		10	mg/L		02-OCT-19	R4857823
Turbidity	0.16	PEHT	0.10	NTU	03-OCT-19	03-OCT-19	R4858080
Anions and Nutrients							
Alkalinity, Total (as CaCO3)	<10		10	mg/L		02-OCT-19	R4857597
Ammonia, Total (as N)	<0.010		0.010	mg/L		02-OCT-19	R4856571
Chloride (Cl)	<0.50		0.50	mg/L		02-OCT-19	R4857755
Fluoride (F)	<0.020		0.020	mg/L		02-OCT-19	R4857755
Nitrate (as N)	<0.020		0.020	mg/L		02-OCT-19	R4857755
Total Kjeldahl Nitrogen	<0.15		0.15	mg/L	02-OCT-19	03-OCT-19	R4858209

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2356892-2 MS-0802 Sampled By: KB/AZ on 30-SEP-19 @ 09:20 Matrix: WATER							
Anions and Nutrients							
Phosphorus, Total	<0.0030		0.0030	mg/L	02-OCT-19	03-OCT-19	R4858093
Sulfate (SO4)	<0.30		0.30	mg/L		02-OCT-19	R4857755
Cyanides							
Cyanide, Total	<0.0020		0.0020	mg/L		02-OCT-19	R4857913
Organic / Inorganic Carbon							
Dissolved Carbon Filtration Location	LAB					02-OCT-19	R4857502
Dissolved Organic Carbon	<0.50		0.50	mg/L	02-OCT-19	03-OCT-19	R4857987
Total Organic Carbon	<0.50		0.50	mg/L		02-OCT-19	R4855629
Total Metals							
Aluminum (Al)-Total	<0.0050		0.0050	mg/L	02-OCT-19	02-OCT-19	R4854170
Antimony (Sb)-Total	<0.00010		0.00010	mg/L	02-OCT-19	02-OCT-19	R4854170
Arsenic (As)-Total	<0.00010		0.00010	mg/L	02-OCT-19	02-OCT-19	R4854170
Barium (Ba)-Total	<0.00010		0.00010	mg/L	02-OCT-19	02-OCT-19	R4854170
Beryllium (Be)-Total	<0.00010		0.00010	mg/L	02-OCT-19	02-OCT-19	R4854170
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L	02-OCT-19	02-OCT-19	R4854170
Boron (B)-Total	<0.010		0.010	mg/L	02-OCT-19	02-OCT-19	R4854170
Cadmium (Cd)-Total	<0.0000050		0.0000050	mg/L	02-OCT-19	02-OCT-19	R4854170
Calcium (Ca)-Total	<0.050		0.050	mg/L	02-OCT-19	02-OCT-19	R4854170
Cesium (Cs)-Total	<0.000010		0.000010	mg/L	02-OCT-19	02-OCT-19	R4854170
Chromium (Cr)-Total	<0.00050		0.00050	mg/L	02-OCT-19	02-OCT-19	R4854170
Cobalt (Co)-Total	<0.00010		0.00010	mg/L	02-OCT-19	02-OCT-19	R4854170
Copper (Cu)-Total	<0.0010		0.0010	mg/L	02-OCT-19	02-OCT-19	R4854170
Iron (Fe)-Total	<0.010		0.010	mg/L	02-OCT-19	02-OCT-19	R4854170
Lead (Pb)-Total	<0.000050		0.000050	mg/L	02-OCT-19	02-OCT-19	R4854170
Lithium (Li)-Total	<0.0010		0.0010	mg/L	02-OCT-19	02-OCT-19	R4854170
Magnesium (Mg)-Total	<0.0050		0.0050	mg/L	02-OCT-19	02-OCT-19	R4854170
Manganese (Mn)-Total	<0.00050		0.00050	mg/L	02-OCT-19	02-OCT-19	R4854170
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		02-OCT-19	R4855211
Molybdenum (Mo)-Total	<0.000050		0.000050	mg/L	02-OCT-19	02-OCT-19	R4854170
Nickel (Ni)-Total	<0.00050		0.00050	mg/L	02-OCT-19	02-OCT-19	R4854170
Phosphorus (P)-Total	<0.050		0.050	mg/L	02-OCT-19	02-OCT-19	R4854170
Potassium (K)-Total	<0.050		0.050	mg/L	02-OCT-19	02-OCT-19	R4854170
Rubidium (Rb)-Total	<0.00020		0.00020	mg/L	02-OCT-19	02-OCT-19	R4854170
Selenium (Se)-Total	<0.000050		0.000050	mg/L	02-OCT-19	02-OCT-19	R4854170
Silicon (Si)-Total	<0.10		0.10	mg/L	02-OCT-19	02-OCT-19	R4854170
Silver (Ag)-Total	<0.000050		0.000050	mg/L	02-OCT-19	02-OCT-19	R4854170
Sodium (Na)-Total	<0.050		0.050	mg/L	02-OCT-19	02-OCT-19	R4854170
Strontium (Sr)-Total	<0.0010		0.0010	mg/L	02-OCT-19	02-OCT-19	R4854170
Sulfur (S)-Total	<0.50		0.50	mg/L	02-OCT-19	02-OCT-19	R4854170
Tellurium (Te)-Total	<0.00020		0.00020	mg/L	02-OCT-19	02-OCT-19	R4854170
Thallium (Tl)-Total	<0.000010		0.000010	mg/L	02-OCT-19	02-OCT-19	R4854170
Thorium (Th)-Total	<0.00010		0.00010	mg/L	02-OCT-19	02-OCT-19	R4854170

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2356892-2 MS-0802 Sampled By: KB/AZ on 30-SEP-19 @ 09:20 Matrix: WATER							
Total Metals							
Tin (Sn)-Total	<0.00010		0.00010	mg/L	02-OCT-19	02-OCT-19	R4854170
Titanium (Ti)-Total	<0.00030		0.00030	mg/L	02-OCT-19	02-OCT-19	R4854170
Tungsten (W)-Total	<0.00010		0.00010	mg/L	02-OCT-19	02-OCT-19	R4854170
Uranium (U)-Total	<0.000010		0.000010	mg/L	02-OCT-19	02-OCT-19	R4854170
Vanadium (V)-Total	<0.00050		0.00050	mg/L	02-OCT-19	02-OCT-19	R4854170
Zinc (Zn)-Total	<0.0030		0.0030	mg/L	02-OCT-19	02-OCT-19	R4854170
Zirconium (Zr)-Total	<0.00020		0.00020	mg/L	02-OCT-19	02-OCT-19	R4854170
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					02-OCT-19	R4854329
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	02-OCT-19	02-OCT-19	R4855218
Radiological Parameters							
Ra-226	0.018		0.0078	Bq/L	08-OCT-19	17-OCT-19	R4851666

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

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)

Sample Parameter Qualifier key listed:

Qualifier	Description
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
HTC	Hardness was calculated from Total Ca and/or Mg concentrations and may be biased high (dissolved Ca/Mg results unavailable).
PEHT	Parameter Exceeded Recommended Holding Time Prior to Analysis

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-WT	Water	Alkalinity, Total (as CaCO3)	EPA 310.2

This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.

CL-IC-N-WT Water Chloride by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

CN-TOT-WT Water Cyanide, Total ISO 14403-2

Total cyanide is determined by the combination of UV digestion and distillation. Cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

When using this method, high levels of thiocyanate in samples can cause false positives at ~1-2% of the thiocyanate concentration. For samples with detectable cyanide analyzed by this method, ALS recommends analysis for thiocyanate to check for this potential interference

DOC-WT Water Dissolved Organic Carbon APHA 5310B

Sample is filtered through a 0.45um filter, then injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic carbon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.

EC-SCREEN-WT Water Conductivity Screen (Internal Use Only) APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

EC-WT Water Conductivity APHA 2510 B

Water samples can be measured directly by immersing the conductivity cell into the sample.

F-IC-N-WT Water Fluoride in Water by IC EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-WT Water Hardness APHA 2340 B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-WT Water Dissolved Mercury in Water by CVAAS EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

HG-T-CVAA-WT Water Total Mercury in Water by CVAAS EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

MET-T-CCMS-WT Water Total Metals in Water by CRC ICPMS EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

NH3-F-WT Water Ammonia in Water by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

Reference Information

NO3-IC-WT	Water	Nitrate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-COL-WT	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is deteremined colourimetrically after persulphate digestion of the sample.

PH-BF	Water	pH	APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

PH-WT	Water	pH	APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011). Holdtime for samples under this regulation is 28 days

RA226-MMER-FC	Water	Ra226 by Alpha Scint, MDC=0.01 Bq/L	EPA 903.1
SO4-IC-N-WT	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-BF	Water	Total Dissolved Solids	APHA 2540C

A well-mixed sample is filtered though glass fibres filter. A known volume of the filtrate is evaporated and dried at 180 +/- 2C for 1hr.

SOLIDS-TDS-WT	Water	Total Dissolved Solids	APHA 2540C

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

SOLIDS-TSS-BF	Water	Suspended solids	APHA 2540 D-Gravimetric

A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104 +/- 1C for a minimum of four hours or until a constant weight is achieved.

SOLIDS-TSS-WT	Water	Suspended solids	APHA 2540 D-Gravimetric

A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104–1°C for a minimum of four hours or until a constant weight is achieved.

TKN-WT	Water	Total Kjeldahl Nitrogen	APHA 4500-Norg D

This analysis is carried out using procedures adapted from APHA Method 4500-Norg "Nitrogen (Organic)". Total Kjeldahl Nitrogen is determined by sample digestion at 380 Celsius with analysis using an automated colorimetric method.

TOC-WT	Water	Total Organic Carbon	APHA 5310B

Sample is injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic cabon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.

TURBIDITY-BF	Water	Turbidity	APHA 2130 B

Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.

TURBIDITY-WT	Water	Turbidity	APHA 2130 B

Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.

** 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
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA
FC	ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
BF	ALS ENVIRONMENTAL - BAFFIN ISLAND, NUNAVUT, CANADA

Chain of Custody Numbers:

Reference Information

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 weight of sample
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

Workorder: L2356892 Report Date: 21-OCT-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ALK-WT	**Water**							
Batch R4857597								
WG3179309-4 DUP		**WG3179309-3**						
Alkalinity, Total (as CaCO3)		86	85		mg/L	1.0	20	02-OCT-19
WG3179309-2 LCS								
Alkalinity, Total (as CaCO3)			101.5		%		85-115	02-OCT-19
WG3179309-1 MB								
Alkalinity, Total (as CaCO3)			<10		mg/L		10	02-OCT-19
CL-IC-N-WT	**Water**							
Batch R4857755								
WG3179166-14 DUP		**WG3179166-13**						
Chloride (Cl)		3.86	3.84		mg/L	0.4	20	02-OCT-19
WG3179166-12 LCS								
Chloride (Cl)			101.9		%		90-110	02-OCT-19
WG3179166-11 MB								
Chloride (Cl)			<0.50		mg/L		0.5	02-OCT-19
WG3179166-15 MS		**WG3179166-13**						
Chloride (Cl)			99.0		%		75-125	02-OCT-19
CN-TOT-WT	**Water**							
Batch R4857913								
WG3180527-3 DUP		**L2357043-2**						
Cyanide, Total		0.025	0.037	J	mg/L	0.013	0.04	03-OCT-19
WG3180527-2 LCS								
Cyanide, Total			102.1		%		80-120	02-OCT-19
WG3180527-1 MB								
Cyanide, Total			<0.0020		mg/L		0.002	02-OCT-19
WG3180527-4 MS		**L2357043-2**						
Cyanide, Total			89.7		%		70-130	03-OCT-19
DOC-WT	**Water**							
Batch R4857987								
WG3180102-3 DUP		**L2356715-1**						
Dissolved Organic Carbon		3.30	3.51		mg/L	6.1	20	03-OCT-19
WG3180102-2 LCS								
Dissolved Organic Carbon			106.0		%		80-120	03-OCT-19
WG3180102-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	03-OCT-19
WG3180102-4 MS		**L2356715-1**						
Dissolved Organic Carbon			102.2		%		70-130	03-OCT-19
EC-WT	**Water**							

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
EC-WT	**Water**							
Batch R4857597								
WG3179309-4 DUP		**WG3179309-3**						
Conductivity		2090	2080		umhos/cm	0.5	10	02-OCT-19
WG3179309-2 LCS								
Conductivity			100.2		%		90-110	02-OCT-19
WG3179309-1 MB								
Conductivity			<3.0		umhos/cm		3	02-OCT-19
F-IC-N-WT	**Water**							
Batch R4857755								
WG3179166-14 DUP		**WG3179166-13**						
Fluoride (F)		0.390	0.389		mg/L	0.3	20	02-OCT-19
WG3179166-12 LCS								
Fluoride (F)			103.0		%		90-110	02-OCT-19
WG3179166-11 MB								
Fluoride (F)			<0.020		mg/L		0.02	02-OCT-19
WG3179166-15 MS		**WG3179166-13**						
Fluoride (F)			99.3		%		75-125	02-OCT-19
HG-D-CVAA-WT	**Water**							
Batch R4855218								
WG3179168-3 DUP		**L2356892-1**						
Mercury (Hg)-Dissolved		<0.0000050	<0.000005(	RPD-NA	mg/L	N/A	20	02-OCT-19
WG3179168-2 LCS								
Mercury (Hg)-Dissolved			102.0		%		80-120	02-OCT-19
WG3179168-1 MB								
Mercury (Hg)-Dissolved			<0.000005(		mg/L		0.000005	02-OCT-19
WG3179168-4 MS		**L2356892-2**						
Mercury (Hg)-Dissolved			104.4		%		70-130	02-OCT-19
HG-T-CVAA-WT	**Water**							
Batch R4855211								
WG3179150-4 DUP		**WG3179150-3**						
Mercury (Hg)-Total		<0.0000050	<0.000005(	RPD-NA	mg/L	N/A	20	02-OCT-19
WG3179150-2 LCS								
Mercury (Hg)-Total			96.9		%		80-120	02-OCT-19
WG3179150-1 MB								
Mercury (Hg)-Total			<0.000005(		mg/L		0.000005	02-OCT-19
WG3179150-6 MS		**WG3179150-5**						
Mercury (Hg)-Total			101.2		%		70-130	02-OCT-19
MET-T-CCMS-WT	**Water**							

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4854170								
WG3179173-4 DUP		**WG3179173-3**						
Aluminum (Al)-Total		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	02-OCT-19
Antimony (Sb)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	02-OCT-19
Arsenic (As)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	02-OCT-19
Barium (Ba)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	02-OCT-19
Beryllium (Be)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	02-OCT-19
Bismuth (Bi)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	02-OCT-19
Boron (B)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	02-OCT-19
Cadmium (Cd)-Total		<0.0000050	<0.000005(	RPD-NA	mg/L	N/A	20	02-OCT-19
Calcium (Ca)-Total		<0.050	<0.050	RPD-NA	mg/L	N/A	20	02-OCT-19
Chromium (Cr)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	02-OCT-19
Cesium (Cs)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	02-OCT-19
Cobalt (Co)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	02-OCT-19
Copper (Cu)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	02-OCT-19
Iron (Fe)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	02-OCT-19
Lead (Pb)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	02-OCT-19
Lithium (Li)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	02-OCT-19
Magnesium (Mg)-Total		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	02-OCT-19
Manganese (Mn)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	02-OCT-19
Molybdenum (Mo)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	02-OCT-19
Nickel (Ni)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	02-OCT-19
Phosphorus (P)-Total		<0.050	<0.050	RPD-NA	mg/L	N/A	20	02-OCT-19
Potassium (K)-Total		<0.050	<0.050	RPD-NA	mg/L	N/A	20	02-OCT-19
Rubidium (Rb)-Total		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	02-OCT-19
Selenium (Se)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	02-OCT-19
Silicon (Si)-Total		<0.10	<0.10	RPD-NA	mg/L	N/A	20	02-OCT-19
Silver (Ag)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	02-OCT-19
Sodium (Na)-Total		<0.050	<0.050	RPD-NA	mg/L	N/A	20	02-OCT-19
Strontium (Sr)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	02-OCT-19
Sulfur (S)-Total		<0.50	<0.50	RPD-NA	mg/L	N/A	25	02-OCT-19
Thallium (Tl)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	02-OCT-19
Tellurium (Te)-Total		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	02-OCT-19
Thorium (Th)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	25	02-OCT-19
Tin (Sn)-Total		<0.00010	<0.00010		mg/L			02-OCT-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4854170								
WG3179173-4 DUP		**WG3179173-3**						
Tin (Sn)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	02-OCT-19
Titanium (Ti)-Total		<0.00030	<0.00030	RPD-NA	mg/L	N/A	20	02-OCT-19
Tungsten (W)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	02-OCT-19
Uranium (U)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	02-OCT-19
Vanadium (V)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	02-OCT-19
Zinc (Zn)-Total		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	02-OCT-19
Zirconium (Zr)-Total		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	02-OCT-19
WG3179173-2 LCS								
Aluminum (Al)-Total			103.6		%		80-120	02-OCT-19
Antimony (Sb)-Total			101.1		%		80-120	02-OCT-19
Arsenic (As)-Total			98.7		%		80-120	02-OCT-19
Barium (Ba)-Total			99.7		%		80-120	02-OCT-19
Beryllium (Be)-Total			95.9		%		80-120	02-OCT-19
Bismuth (Bi)-Total			96.5		%		80-120	02-OCT-19
Boron (B)-Total			93.0		%		80-120	02-OCT-19
Cadmium (Cd)-Total			95.4		%		80-120	02-OCT-19
Calcium (Ca)-Total			95.8		%		80-120	02-OCT-19
Chromium (Cr)-Total			99.6		%		80-120	02-OCT-19
Cesium (Cs)-Total			96.1		%		80-120	02-OCT-19
Cobalt (Co)-Total			97.0		%		80-120	02-OCT-19
Copper (Cu)-Total			95.7		%		80-120	02-OCT-19
Iron (Fe)-Total			96.4		%		80-120	02-OCT-19
Lead (Pb)-Total			99.6		%		80-120	02-OCT-19
Lithium (Li)-Total			95.9		%		80-120	02-OCT-19
Magnesium (Mg)-Total			106.9		%		80-120	02-OCT-19
Manganese (Mn)-Total			100.5		%		80-120	02-OCT-19
Molybdenum (Mo)-Total			96.7		%		80-120	02-OCT-19
Nickel (Ni)-Total			95.8		%		80-120	02-OCT-19
Phosphorus (P)-Total			102.6		%		70-130	02-OCT-19
Potassium (K)-Total			98.4		%		80-120	02-OCT-19
Rubidium (Rb)-Total			99.6		%		80-120	02-OCT-19
Selenium (Se)-Total			98.8		%		80-120	02-OCT-19
Silicon (Si)-Total			100.1		%		60-140	02-OCT-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4854170								
WG3179173-2 LCS								
Silver (Ag)-Total			95.8		%		80-120	02-OCT-19
Sodium (Na)-Total			104.7		%		80-120	02-OCT-19
Strontium (Sr)-Total			101.5		%		80-120	02-OCT-19
Sulfur (S)-Total			96.5		%		80-120	02-OCT-19
Thallium (Tl)-Total			97.4		%		80-120	02-OCT-19
Tellurium (Te)-Total			95.3		%		80-120	02-OCT-19
Thorium (Th)-Total			97.1		%		70-130	02-OCT-19
Tin (Sn)-Total			98.4		%		80-120	02-OCT-19
Titanium (Ti)-Total			98.3		%		80-120	02-OCT-19
Tungsten (W)-Total			96.2		%		80-120	02-OCT-19
Uranium (U)-Total			93.5		%		80-120	02-OCT-19
Vanadium (V)-Total			101.1		%		80-120	02-OCT-19
Zinc (Zn)-Total			96.4		%		80-120	02-OCT-19
Zirconium (Zr)-Total			93.6		%		80-120	02-OCT-19
WG3179173-1 MB								
Aluminum (Al)-Total			<0.0050		mg/L		0.005	02-OCT-19
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	02-OCT-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	02-OCT-19
Barium (Ba)-Total			<0.00010		mg/L		0.0001	02-OCT-19
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	02-OCT-19
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	02-OCT-19
Boron (B)-Total			<0.010		mg/L		0.01	02-OCT-19
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	02-OCT-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	02-OCT-19
Chromium (Cr)-Total			<0.00050		mg/L		0.0005	02-OCT-19
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	02-OCT-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	02-OCT-19
Copper (Cu)-Total			<0.0010		mg/L		0.001	02-OCT-19
Iron (Fe)-Total			<0.010		mg/L		0.01	02-OCT-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	02-OCT-19
Lithium (Li)-Total			<0.0010		mg/L		0.001	02-OCT-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	02-OCT-19
Manganese (Mn)-Total			<0.00050		mg/L		0.0005	02-OCT-19
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	02-OCT-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4854170								
WG3179173-1 MB								
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	02-OCT-19
Phosphorus (P)-Total			<0.050		mg/L		0.05	02-OCT-19
Potassium (K)-Total			<0.050		mg/L		0.05	02-OCT-19
Rubidium (Rb)-Total			<0.00020		mg/L		0.0002	02-OCT-19
Selenium (Se)-Total			<0.000050		mg/L		0.00005	02-OCT-19
Silicon (Si)-Total			<0.10		mg/L		0.1	02-OCT-19
Silver (Ag)-Total			<0.000050		mg/L		0.00005	02-OCT-19
Sodium (Na)-Total			<0.050		mg/L		0.05	02-OCT-19
Strontium (Sr)-Total			<0.0010		mg/L		0.001	02-OCT-19
Sulfur (S)-Total			<0.50		mg/L		0.5	02-OCT-19
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	02-OCT-19
Tellurium (Te)-Total			<0.00020		mg/L		0.0002	02-OCT-19
Thorium (Th)-Total			<0.00010		mg/L		0.0001	02-OCT-19
Tin (Sn)-Total			<0.00010		mg/L		0.0001	02-OCT-19
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	02-OCT-19
Tungsten (W)-Total			<0.00010		mg/L		0.0001	02-OCT-19
Uranium (U)-Total			<0.000010		mg/L		0.00001	02-OCT-19
Vanadium (V)-Total			<0.00050		mg/L		0.0005	02-OCT-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	02-OCT-19
Zirconium (Zr)-Total			<0.00020		mg/L		0.0002	02-OCT-19
WG3179173-5 MS		**WG3179173-3**						
Aluminum (Al)-Total			100.4		%		70-130	02-OCT-19
Antimony (Sb)-Total			101.1		%		70-130	02-OCT-19
Arsenic (As)-Total			98.9		%		70-130	02-OCT-19
Barium (Ba)-Total			98.2		%		70-130	02-OCT-19
Beryllium (Be)-Total			97.5		%		70-130	02-OCT-19
Bismuth (Bi)-Total			97.4		%		70-130	02-OCT-19
Boron (B)-Total			95.9		%		70-130	02-OCT-19
Cadmium (Cd)-Total			98.9		%		70-130	02-OCT-19
Calcium (Ca)-Total			98.1		%		70-130	02-OCT-19
Chromium (Cr)-Total			99.9		%		70-130	02-OCT-19
Cesium (Cs)-Total			95.8		%		70-130	02-OCT-19
Cobalt (Co)-Total			98.8		%		70-130	02-OCT-19
Copper (Cu)-Total			99.3		%		70-130	02-OCT-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4854170								
WG3179173-5 MS		**WG3179173-3**						
Iron (Fe)-Total			98.4		%		70-130	02-OCT-19
Lead (Pb)-Total			101.9		%		70-130	02-OCT-19
Lithium (Li)-Total			97.7		%		70-130	02-OCT-19
Magnesium (Mg)-Total			106.9		%		70-130	02-OCT-19
Manganese (Mn)-Total			103.3		%		70-130	02-OCT-19
Molybdenum (Mo)-Total			95.3		%		70-130	02-OCT-19
Nickel (Ni)-Total			97.5		%		70-130	02-OCT-19
Phosphorus (P)-Total			103.3		%		70-130	02-OCT-19
Potassium (K)-Total			98.3		%		70-130	02-OCT-19
Rubidium (Rb)-Total			100.8		%		70-130	02-OCT-19
Selenium (Se)-Total			100.3		%		70-130	02-OCT-19
Silicon (Si)-Total			99.4		%		70-130	02-OCT-19
Silver (Ag)-Total			96.2		%		70-130	02-OCT-19
Sodium (Na)-Total			105.7		%		70-130	02-OCT-19
Strontium (Sr)-Total			100.7		%		70-130	02-OCT-19
Sulfur (S)-Total			99.8		%		70-130	02-OCT-19
Thallium (Tl)-Total			99.4		%		70-130	02-OCT-19
Tellurium (Te)-Total			93.3		%		70-130	02-OCT-19
Thorium (Th)-Total			95.3		%		70-130	02-OCT-19
Tin (Sn)-Total			96.3		%		70-130	02-OCT-19
Titanium (Ti)-Total			99.9		%		70-130	02-OCT-19
Tungsten (W)-Total			97.7		%		70-130	02-OCT-19
Uranium (U)-Total			94.6		%		70-130	02-OCT-19
Vanadium (V)-Total			101.3		%		70-130	02-OCT-19
Zinc (Zn)-Total			96.6		%		70-130	02-OCT-19
Zirconium (Zr)-Total			93.6		%		70-130	02-OCT-19
NH3-F-WT	**Water**							
Batch R4856571								
WG3179170-15 DUP		**L2356892-2**						
Ammonia, Total (as N)		<0.010	<0.010	RPD-NA	mg/L	N/A	20	02-OCT-19
WG3179170-19 DUP		**L2356009-15**						
Ammonia, Total (as N)		0.035	0.039		mg/L	11	20	02-OCT-19
WG3179170-14 LCS								
Ammonia, Total (as N)			101.2		%		85-115	02-OCT-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NH3-F-WT	**Water**							
Batch R4856571								
WG3179170-18 LCS								
Ammonia, Total (as N)			103.1		%		85-115	02-OCT-19
WG3179170-13 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	02-OCT-19
WG3179170-17 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	02-OCT-19
WG3179170-16 MS		**L2356892-2**						
Ammonia, Total (as N)			99.2		%		75-125	02-OCT-19
WG3179170-20 MS		**L2356009-15**						
Ammonia, Total (as N)			91.7		%		75-125	02-OCT-19
NO3-IC-WT	**Water**							
Batch R4857755								
WG3179166-14 DUP		**WG3179166-13**						
Nitrate (as N)		2.43	2.42		mg/L	0.7	20	02-OCT-19
WG3179166-12 LCS								
Nitrate (as N)			101.2		%		90-110	02-OCT-19
WG3179166-11 MB								
Nitrate (as N)			<0.020		mg/L		0.02	02-OCT-19
WG3179166-15 MS		**WG3179166-13**						
Nitrate (as N)			97.4		%		75-125	02-OCT-19
P-T-COL-WT	**Water**							
Batch R4858093								
WG3180097-3 DUP		**L2355119-2**						
Phosphorus, Total		0.0119	0.0092	J	mg/L	0.0027	0.006	03-OCT-19
WG3180097-2 LCS								
Phosphorus, Total			97.0		%		80-120	03-OCT-19
WG3180097-1 MB								
Phosphorus, Total			<0.0030		mg/L		0.003	03-OCT-19
WG3180097-4 MS		**L2355119-2**						
Phosphorus, Total			105.2		%		70-130	03-OCT-19
PH-BF	**Water**							
Batch R4851198								
WG3177985-2 DUP		**L2356874-1**						
pH		7.16	7.16	J	pH units	0.00	0.2	01-OCT-19
WG3177985-1 LCS								
pH			7.01		pH units		6.9-7.1	01-OCT-19
PH-WT	**Water**							

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
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Oakville ON L6H 0C3
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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
PH-WT	**Water**							
Batch R4857597								
WG3179309-4 DUP		**WG3179309-3**						
pH		7.26	7.23	J	pH units	0.03	0.2	02-OCT-19
WG3179309-2 LCS								
pH			7.01		pH units		6.9-7.1	02-OCT-19
SO4-IC-N-WT	**Water**							
Batch R4857755								
WG3179166-14 DUP		**WG3179166-13**						
Sulfate (SO4)		56.4	56.5		mg/L	0.0	20	02-OCT-19
WG3179166-12 LCS								
Sulfate (SO4)			102.2		%		90-110	02-OCT-19
WG3179166-11 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	02-OCT-19
WG3179166-15 MS		**WG3179166-13**						
Sulfate (SO4)			99.1		%		75-125	02-OCT-19
SOLIDS-TDS-BF	**Water**							
Batch R4851401								
WG3178028-3 DUP		**L2356940-1**						
Total Dissolved Solids		3130	3180		mg/L	1.7	20	01-OCT-19
WG3178028-2 LCS								
Total Dissolved Solids			104.5		%		85-115	01-OCT-19
WG3178028-1 MB								
Total Dissolved Solids			<20		mg/L		20	01-OCT-19
SOLIDS-TDS-WT	**Water**							
Batch R4857823								
WG3179646-3 DUP		**L2354869-2**						
Total Dissolved Solids		275	276		mg/L	0.4	20	02-OCT-19
WG3179646-2 LCS								
Total Dissolved Solids			98.6		%		85-115	02-OCT-19
WG3179646-1 MB								
Total Dissolved Solids			<10		mg/L		10	02-OCT-19
SOLIDS-TSS-BF	**Water**							
Batch R4851221								
WG3178016-3 DUP		**L2356874-2**						
Total Suspended Solids		72.0	73.0		mg/L	1.4	25	01-OCT-19
WG3178016-2 LCS								
Total Suspended Solids			101.0		%		85-115	01-OCT-19
WG3178016-1 MB								

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SOLIDS-TSS-BF	**Water**							
Batch R4851221								
WG3178016-1 MB								
Total Suspended Solids			<2.0		mg/L		2	01-OCT-19
SOLIDS-TSS-WT	**Water**							
Batch R4857622								
WG3179644-3 DUP		**L2355710-11**						
Total Suspended Solids		386	404		mg/L	4.6	20	03-OCT-19
WG3179644-2 LCS								
Total Suspended Solids			100.5		%		85-115	03-OCT-19
WG3179644-1 MB								
Total Suspended Solids			<2.0		mg/L		2	03-OCT-19
TKN-WT	**Water**							
Batch R4858209								
WG3179864-3 DUP		**WG3179864-5**						
Total Kjeldahl Nitrogen		0.50	0.57		mg/L	12	20	03-OCT-19
WG3179864-2 LCS								
Total Kjeldahl Nitrogen			95.2		%		75-125	03-OCT-19
WG3179864-1 MB								
Total Kjeldahl Nitrogen			<0.15		mg/L		0.15	03-OCT-19
WG3179864-4 MS		**WG3179864-5**						
Total Kjeldahl Nitrogen			99.3		%		70-130	03-OCT-19
TOC-WT	**Water**							
Batch R4855629								
WG3179001-3 DUP		**L2353445-1**						
Total Organic Carbon		4.68	4.62		mg/L	1.3	20	02-OCT-19
WG3179001-2 LCS								
Total Organic Carbon			106.1		%		80-120	02-OCT-19
WG3179001-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	02-OCT-19
WG3179001-4 MS		**L2353445-1**						
Total Organic Carbon			94.0		%		70-130	02-OCT-19
TURBIDITY-BF	**Water**							
Batch R4851213								
WG3177999-3 DUP		**L2356874-1**						
Turbidity		14.2	13.9		NTU	2.1	15	01-OCT-19
WG3177999-2 LCS								
Turbidity			114.0		%		85-115	01-OCT-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
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Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TURBIDITY-BF	**Water**							
Batch R4851213								
WG3177999-1 MB								
Turbidity			<0.10		NTU		0.1	01-OCT-19
TURBIDITY-WT	**Water**							
Batch R4858080								
WG3180753-3 DUP		**L2358675-2**						
Turbidity		8.40	8.64		NTU	2.8	15	03-OCT-19
WG3180753-2 LCS								
Turbidity			103.0		%		85-115	03-OCT-19
WG3180753-1 MB								
Turbidity			<0.10		NTU		0.1	03-OCT-19

Quality Control Report

Workorder: L2356892 Report Date: 21-OCT-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

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

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Quality Control Report

Workorder: L2356892 Report Date: 21-OCT-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Turbidity							
	2	30-SEP-19 09:20	03-OCT-19 14:30	48	77	hours	EHT

Legend & Qualifier Definitions:

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR: Exceeded ALS recommended hold time prior to sample receipt.
EHTL: Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT: Exceeded ALS recommended hold time prior to analysis.
Rec. HT: ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2356892 were received on 30-SEP-19 15:00.

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.

Friday, October 18, 2019

Rick Hawthorne
ALS Environmental
60 Northland Rd, Unit 1
Waterloo Canada, ON N2V 2B8

Re: ALS Workorder: 1910087
Project Name:
Project Number: L2356892

Dear Mr. Hawthorne:

Two water samples were received from ALS Environmental, on 10/3/2019. The samples were scheduled for the following analysis:

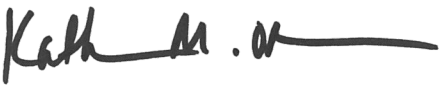
Radium-226

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,



ALS Environmental
Katie M. OBrien
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
AIHA	214884
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280

1910087

Radium-226:
The samples were prepared and analyzed according to the current revision of SOP 783.

All acceptance criteria were met.

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1910087
Client Name: ALS Environmental
Client Project Name:
Client Project Number: L2356892
Client PO Number: L2356892

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
L2356892-1	1910087-1		WATER	30-Sep-19	
L2356892-2	1910087-2		WATER	30-Sep-19	

ALS Environmental

Subcontract Request Form

1910087

Subcontract To:

ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
225 COMMERCE DRIVE
FORT COLLINS,CO 80524

NOTES: Please reference on final report and invoice: PO# *L2356892*
ALS requires QC data to be provided with your final results.

Please see enclosed 2 sample(s) in 2 Container(s)

SAMPLE NUMBER	ANALYTICAL REQUIRED	DATE SAMPLED / DUE DATE	Priority Flag
L2356892-1 MS-08		9/ 30/ 2019	E
1	Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	10/22/2019	
L2356892-2 MS-0802		9/ 30/ 2019	E
2	Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	10/22/2019	

Subcontract Info Contact: Mary-Lynn Pike (519) 886-6910
Analysis and reporting info contact: Rick Hawthorne
60 NORTHLAND ROAD, UNIT 1
WATERLOO,ON N2V 2B8
Phone: (519) 886-6910 Email: Rick.Hawthorne@alsglobal.com

Please email confirmation of receipt to: Rick.Hawthorne@alsglobal.com

Shipped By: _____ Date Shipped: _____
Received By: Emily Ayers Date Received: 10·03·19 1005
Verified By: _____ Date Verified: _____
Temperature: _____

Sample Integrity Issues: _____

ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: ALS-Waterloo Workorder No: 1910087

Project Manager: KMO Initials: Eur Date: 10-03-19

1.	Are airbills / shipping documents present and/or removable?	DROP OFF	(YES)	NO
2.	Are custody seals on **shipping** containers intact?	(NONE)	YES	NO *
3.	Are custody seals on **sample** containers intact?	(NONE)	YES	NO *
4.	Is there a COC (chain-of-custody) present?		(YES)	NO *
5.	Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)		(YES)	NO *
6.	Are short-hold samples present?		YES	(NO)
7.	Are all samples within holding times for the requested analyses?		(YES)	NO *
8.	Were all sample containers received intact? (not broken or leaking)		(YES)	NO *
9.	Is there sufficient sample for the requested analyses?		(YES)	NO *
10.	Are all samples in the proper containers for the requested analyses?		(YES)	NO *
11.	Are all aqueous samples preserved correctly, if required? (excluding volatiles)	N/A	(YES)	NO *
12.	Are all aqueous non-preserved samples pH 4-9?	(N/A)	YES	NO *
13.	Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm (1/4 inch) diameter? (i.e. size of green pea)	(N/A)	YES	NO
14.	Were the samples shipped on ice?		(YES)	NO
15.	Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: #1 (#3) #4	(RAD ONLY)	YES	NO

Cooler #:	1							
Temperature (°C):	11.8							
No. of custody seals on cooler:	0							
DOT Survey/ Acceptance Information — External µR/hr reading:	12							
Background µR/hr reading:	14							

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? **YES / NO / NA** (If no, see Form 008.)

*** Please provide details here for NO responses to gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.**

All client bottle ID's vs ALS lab ID's double-checked by: Eur

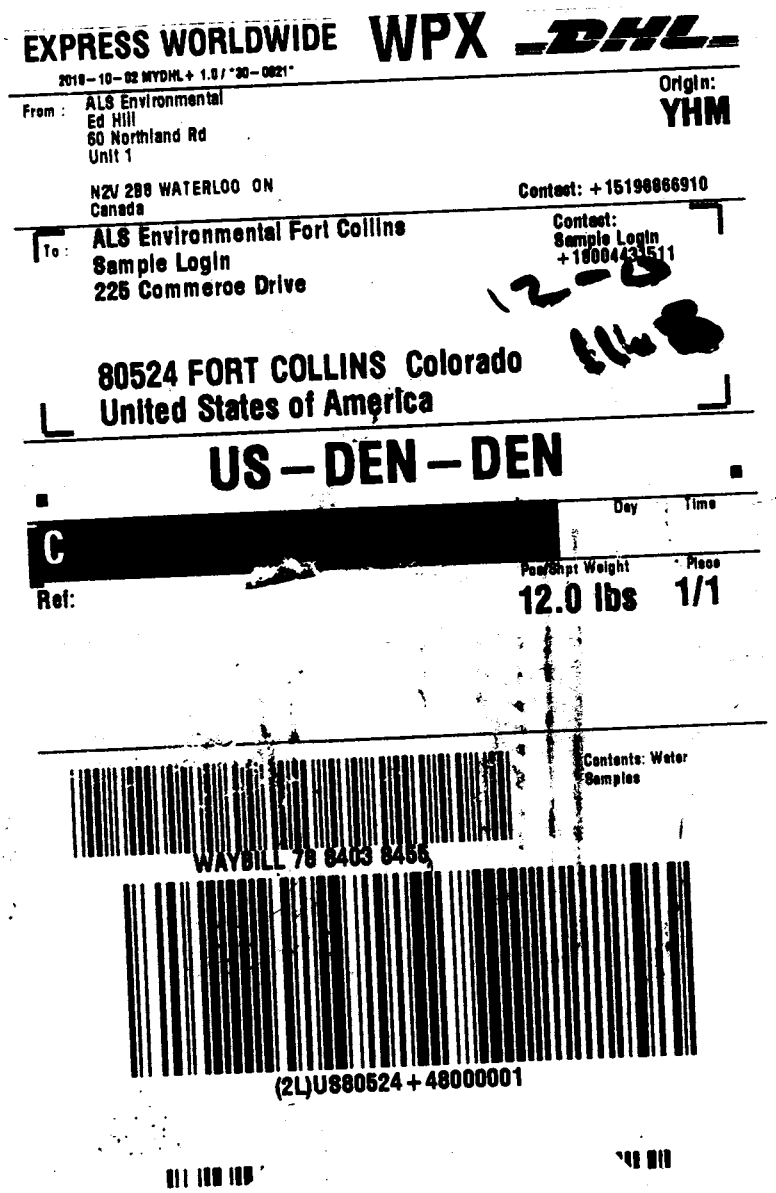
If applicable, was the client contacted? **YES / NO / NA** Contact: _____ Date/Time: _____

Project Manager Signature / Date: 10/4/19

Form 201r27.xls
(02/11/2019)

*IR Gun #1, VWR SN 170560549
*IR Gun #3, VWR SN 170647571
*IR Gun #4, Oakton, SN 2372220101-0002

1910087



EXPRESS WORLDWIDE WPX DHL

2018-10-02 MYDHL+ 1.0 / *30-0821*

From : ALS Environmental
Ed Hill
60 Northland Rd
Unit 1

N2V 2B8 WATERLOO ON
Canada

Origin:
YHM

Contact: +15198866910

To : ALS Environmental Fort Collins
Sample Login
225 Commerce Drive

Contact:
Sample Login
+18004331511

12-8

80524 FORT COLLINS Colorado
United States of America

US-DEN-DEN

C [redacted] Day Time

Ref:

Pce/Shpt Weight 12.0 lbs

Piece 1/1

Contents: Water Samples

WAYBILL 78 8403 8456

(2L)US80524+48000001

Client:	ALS Environmental	**Date:**	*18-Oct-19*
Project:	L2356892	**Work Order:**	1910087
Sample ID:	L2356892-1	**Lab ID:**	1910087-1
Legal Location:		**Matrix:**	WATER
Collection Date:	9/30/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**			Prep Date: **10/8/2019**	PrepBy: **TRW**
Ra-226	0.0047 (+/- 0.0045)	Y1,U	0.0068	BQ/l	NA	10/17/2019 14:05
Carr: BARIUM	*100*	Y1	*40-110*	*%REC*	DL = NA	10/17/2019 14:05

Client:	ALS Environmental	**Date:**	*18-Oct-19*
Project:	L2356892	**Work Order:**	1910087
Sample ID:	L2356892-2	**Lab ID:**	1910087-2
Legal Location:		**Matrix:**	WATER
Collection Date:	9/30/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**			Prep Date: **10/8/2019**	PrepBy: **TRW**
Ra-226	**0.018 (+/- 0.0082)**	Y1	**0.0078**	**BQ/l**	NA	10/17/2019 14:05
Carr: BARIUM	*100*	Y1	*40-110*	*%REC*	DL = NA	10/17/2019 14:05

Client:	ALS Environmental	**Date:**	*18-Oct-19*
Project:	L2356892	**Work Order:**	1910087
Sample ID:	L2356892-2	**Lab ID:**	1910087-2
Legal Location:		**Matrix:**	WATER
Collection Date:	9/30/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed

Explanation of Qualifiers

Radiochemistry:

- "Report Limit" is the MDC

U or ND - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

Y2 - Chemical Yield outside default limits.

W - DER is greater than Warning Limit of 1.42

* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.
# - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.
G - Sample density differs by more than 15% of LCS density.
D - DER is greater than Control Limit

M - Requested MDC not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS, Matrix Spike Recovery within control limits.

N - Matrix Spike Recovery outside control limits

NC - Not Calculated for duplicate results less than 5 times MDC

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

Inorganics:

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).

U or ND - Indicates that the compound was analyzed for but not detected.

E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.

M - Duplicate injection precision was not met.

N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.

Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.

* - Duplicate analysis (relative percent difference) not within control limits.

S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

Organics:

U or ND - Indicates that the compound was analyzed for but not detected.

B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.

E - Analyte concentration exceeds the upper level of the calibration range.

J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).

A - A tentatively identified compound is a suspected aldol-condensation product.

X - The analyte was diluted below an accurate quantitation level.

* - The spike recovery is equal to or outside the control criteria used.

+ - The relative percent difference (RPD) equals or exceeds the control criteria.

G - A pattern resembling gasoline was detected in this sample.

D - A pattern resembling diesel was detected in this sample.

M - A pattern resembling motor oil was detected in this sample.

C - A pattern resembling crude oil was detected in this sample.

4 - A pattern resembling JP-4 was detected in this sample.

5 - A pattern resembling JP-5 was detected in this sample.

H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.

L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.

Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
- gasoline
- JP-8
- diesel
- mineral spirits
- motor oil
- Stoddard solvent
- bunker C

QC BATCH REPORT

Batch ID: **RE191008-2-1** Instrument ID **Alpha Scin** Method: **Radium-226 by Radon Emanation**

LCS Sample ID: **RE191008-2** Units: **BQ/l** Analysis Date: **10/17/2019 14:40**

Client ID: Run ID: **RE191008-2A** Prep Date: **10/8/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.58 (+/- 0.393)	0.0155	1.72		91.6	67-120					P,Y1,M3
Carr: BARIUM	16500		16380		101	40-110					Y1

LCSD Sample ID: **RE191008-2** Units: **BQ/l** Analysis Date: **10/17/2019 14:40**

Client ID: Run ID: **RE191008-2A** Prep Date: **10/8/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.49 (+/- 0.373)	0.0178	1.72		86.7	67-120		1.58	0.2	2.1	P,Y1,M3
Carr: BARIUM	16500		16390		101	40-110		16500			Y1

MB Sample ID: **RE191008-2** Units: **BQ/l** Analysis Date: **10/17/2019 14:40**

Client ID: Run ID: **RE191008-2A** Prep Date: **10/8/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	0.0023 (+/- 0.0027)	0.0041									Y1,U
Carr: BARIUM	16600		16380		102	40-110					Y1

The following samples were analyzed in this batch: 1910087-1 1910087-2

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

L2356892-COFC

COC Number: 19

Report To	Contact and company name below will appear on the final report
Company:	Baffinland Iron Mines Corp.
Contact:	Wiliam Bowden and Connor Devereaux
Phone:	647-253-0596 EXT 6016
	Company address below will appear on the final report
Street:	2275 Upper Middle Rd. E., Suite #300
City/Province:	Oakville, ON
Postal Code:	L6H 0C3
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	
Contact:	

Report Fo	
Select Report Format:	☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report	☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked	
Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	bimcore@alsglobal.com
Email 2	
Email 3	

Invoice Distribution	
Select Invoice Distribution:	☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax	ap@baffinland.com
Email 2	commercial@baffinland.com

Project Information	
ALS Account # / Quote #:	23642 /Q42455
Job #:	MS-08 Eff Characterization
PO / AFE:	4500057496
LSD:	

Oil and Gas Required Fields (client use)	
AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only): L2356892 **ALS Contact:** **Sampler:** KB/AZ

se confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☐ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
4 day [P4]	☐	1 Business day [E1]	☐
3 day [P3]	☐	Same Day, Weekend or Statutory holiday [E0]	☑
2 day [P2]	☐		

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	F/P	BIM-MMER-EFF	Cyanide	Number of Containers
	MS-08	30-Sep-19	9:20	Water		E0	E0	8
	MS-0802	30-Sep-19	9:20	Water		E0	E0	8

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human drinking water use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			12.8		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released By: Kendra Button	Date: 30-Sep-19	Time: 14:00	Received by:	Date:	Time:	Received by: AP	Date: 2-Oct-19	Time: 9:15

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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 specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Baffinland Iron Mine's Corporation (Oakville)
ATTN: William Bowden/Connor Devereaux
2275 Upper Middle Rd. E.
Suite #300
Oakville ON L6H 0C3

Date Received: 01-OCT-19
Report Date: 24-OCT-19 13:49 (MT)
Version: FINAL REV. 2

Client Phone: 647-253-0596

Certificate of Analysis

Lab Work Order #: L2356925

Project P.O. #: 4500057496
Job Reference: MS-08 REFERENCE AND EXPOSURE
C of C Numbers:
Legal Site Desc:

Comments: ADDITIONAL 02-OCT-19 09:49

24-OCT-2019 With Full Package reporting

Rick Hawthorne
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2356925-1 MS-08-DS Sampled By: AZ/LM on 30-SEP-19 @ 12:50 Matrix: WATER							
Physical Tests							
Conductivity	170		3.0	umhos/cm		05-OCT-19	R4860539
Hardness (as CaCO3)	73.2	HTC	0.50	mg/L		04-OCT-19	
pH	7.94		0.10	pH units		01-OCT-19	R4851198
Total Suspended Solids	3.2		2.0	mg/L		01-OCT-19	R4851221
Total Dissolved Solids	96		20	mg/L		01-OCT-19	R4851401
Turbidity	3.38		0.10	NTU		01-OCT-19	R4851213
Anions and Nutrients							
Alkalinity, Total (as CaCO3)	72		10	mg/L		05-OCT-19	R4860539
Ammonia, Total (as N)	0.013		0.010	mg/L		07-OCT-19	R4860725
Chloride (Cl)	6.98		0.50	mg/L		04-OCT-19	R4859139
Fluoride (F)	0.025		0.020	mg/L		04-OCT-19	R4859139
Nitrate (as N)	0.074		0.020	mg/L		04-OCT-19	R4859139
Total Kjeldahl Nitrogen	<0.15		0.15	mg/L	07-OCT-19	07-OCT-19	R4860925
Phosphorus, Total	0.0073		0.0030	mg/L	04-OCT-19	07-OCT-19	R4860606
Sulfate (SO4)	6.80		0.30	mg/L		04-OCT-19	R4859139
Organic / Inorganic Carbon							
Dissolved Carbon Filtration Location	LAB					04-OCT-19	R4859597
Dissolved Organic Carbon	2.31		0.50	mg/L	04-OCT-19	07-OCT-19	R4860638
Total Organic Carbon	2.42		0.50	mg/L		07-OCT-19	R4860639
Total Metals							
Aluminum (Al)-Total	0.144		0.0050	mg/L	04-OCT-19	04-OCT-19	R4859637
Antimony (Sb)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Arsenic (As)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Barium (Ba)-Total	0.00999		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Beryllium (Be)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Boron (B)-Total	<0.010		0.010	mg/L	04-OCT-19	04-OCT-19	R4859637
Cadmium (Cd)-Total	<0.0000050		0.0000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Calcium (Ca)-Total	14.7		0.050	mg/L	04-OCT-19	04-OCT-19	R4859637
Cesium (Cs)-Total	0.000019		0.000010	mg/L	04-OCT-19	04-OCT-19	R4859637
Chromium (Cr)-Total	<0.00050		0.00050	mg/L	04-OCT-19	04-OCT-19	R4859637
Cobalt (Co)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Copper (Cu)-Total	0.0012		0.0010	mg/L	04-OCT-19	04-OCT-19	R4859637
Iron (Fe)-Total	0.140		0.010	mg/L	04-OCT-19	04-OCT-19	R4859637
Lead (Pb)-Total	0.000128		0.000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Lithium (Li)-Total	<0.0010		0.0010	mg/L	04-OCT-19	04-OCT-19	R4859637
Magnesium (Mg)-Total	8.88		0.0050	mg/L	04-OCT-19	04-OCT-19	R4859637
Manganese (Mn)-Total	0.00469		0.00050	mg/L	04-OCT-19	04-OCT-19	R4859637
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		07-OCT-19	R4860448
Molybdenum (Mo)-Total	0.000286		0.000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Nickel (Ni)-Total	0.00072		0.00050	mg/L	04-OCT-19	04-OCT-19	R4859637
Phosphorus (P)-Total	<0.050		0.050	mg/L	04-OCT-19	04-OCT-19	R4859637

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2356925-1 MS-08-DS Sampled By: AZ/LM on 30-SEP-19 @ 12:50 Matrix: WATER							
Total Metals							
Potassium (K)-Total	1.01		0.050	mg/L	04-OCT-19	04-OCT-19	R4859637
Rubidium (Rb)-Total	0.00156		0.00020	mg/L	04-OCT-19	04-OCT-19	R4859637
Selenium (Se)-Total	<0.000050		0.000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Silicon (Si)-Total	1.26		0.10	mg/L	04-OCT-19	04-OCT-19	R4859637
Silver (Ag)-Total	<0.000050		0.000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Sodium (Na)-Total	2.95		0.050	mg/L	04-OCT-19	04-OCT-19	R4859637
Strontium (Sr)-Total	0.0147		0.0010	mg/L	04-OCT-19	04-OCT-19	R4859637
Sulfur (S)-Total	2.38		0.50	mg/L	04-OCT-19	04-OCT-19	R4859637
Tellurium (Te)-Total	<0.00020		0.00020	mg/L	04-OCT-19	04-OCT-19	R4859637
Thallium (Tl)-Total	<0.000010		0.000010	mg/L	04-OCT-19	04-OCT-19	R4859637
Thorium (Th)-Total	0.00012		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Tin (Sn)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Titanium (Ti)-Total	0.00799		0.00030	mg/L	04-OCT-19	04-OCT-19	R4859637
Tungsten (W)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Uranium (U)-Total	0.00331		0.000010	mg/L	04-OCT-19	04-OCT-19	R4859637
Vanadium (V)-Total	<0.00050		0.00050	mg/L	04-OCT-19	04-OCT-19	R4859637
Zinc (Zn)-Total	<0.0030		0.0030	mg/L	04-OCT-19	04-OCT-19	R4859637
Zirconium (Zr)-Total	0.00031		0.00020	mg/L	04-OCT-19	04-OCT-19	R4859637
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					04-OCT-19	R4859193
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	04-OCT-19	07-OCT-19	R4860451
Radiological Parameters							
Ra-226	<0.0080		0.0080	Bq/L	10-OCT-19	21-OCT-19	R4851666
L2356925-2 MS-08-US Sampled By: AZ/LM on 30-SEP-19 @ 13:20 Matrix: WATER							
Physical Tests							
Conductivity	167		3.0	umhos/cm		05-OCT-19	R4860539
Hardness (as CaCO3)	72.2	HTC	0.50	mg/L		04-OCT-19	
pH	7.97		0.10	pH units		01-OCT-19	R4851198
Total Suspended Solids	2.4		2.0	mg/L		01-OCT-19	R4851221
Total Dissolved Solids	107		20	mg/L		01-OCT-19	R4851401
Turbidity	3.32		0.10	NTU		01-OCT-19	R4851213
Anions and Nutrients							
Alkalinity, Total (as CaCO3)	73		10	mg/L		05-OCT-19	R4860539
Ammonia, Total (as N)	<0.010		0.010	mg/L		07-OCT-19	R4860725
Chloride (Cl)	7.20		0.50	mg/L		04-OCT-19	R4859139
Fluoride (F)	0.027		0.020	mg/L		04-OCT-19	R4859139
Nitrate (as N)	0.074		0.020	mg/L		04-OCT-19	R4859139
Total Kjeldahl Nitrogen	<0.15		0.15	mg/L	07-OCT-19	07-OCT-19	R4860925
Phosphorus, Total	0.0084		0.0030	mg/L	04-OCT-19	07-OCT-19	R4860606
Sulfate (SO4)	4.48		0.30	mg/L		04-OCT-19	R4859139

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2356925-2 MS-08-US Sampled By: AZ/LM on 30-SEP-19 @ 13:20 Matrix: WATER							
Anions and Nutrients							
Organic / Inorganic Carbon							
Dissolved Carbon Filtration Location	LAB					04-OCT-19	R4859597
Dissolved Organic Carbon	2.24		0.50	mg/L	04-OCT-19	07-OCT-19	R4860638
Total Organic Carbon	2.47		0.50	mg/L		07-OCT-19	R4860639
Total Metals							
Aluminum (Al)-Total	0.123		0.0050	mg/L	04-OCT-19	04-OCT-19	R4859637
Antimony (Sb)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Arsenic (As)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Barium (Ba)-Total	0.0102		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Beryllium (Be)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Boron (B)-Total	<0.010		0.010	mg/L	04-OCT-19	04-OCT-19	R4859637
Cadmium (Cd)-Total	<0.0000050		0.0000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Calcium (Ca)-Total	14.7		0.050	mg/L	04-OCT-19	04-OCT-19	R4859637
Cesium (Cs)-Total	0.000019		0.000010	mg/L	04-OCT-19	04-OCT-19	R4859637
Chromium (Cr)-Total	<0.00050		0.00050	mg/L	04-OCT-19	04-OCT-19	R4859637
Cobalt (Co)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Copper (Cu)-Total	0.0011		0.0010	mg/L	04-OCT-19	04-OCT-19	R4859637
Iron (Fe)-Total	0.121		0.010	mg/L	04-OCT-19	04-OCT-19	R4859637
Lead (Pb)-Total	0.000099		0.000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Lithium (Li)-Total	<0.0010		0.0010	mg/L	04-OCT-19	04-OCT-19	R4859637
Magnesium (Mg)-Total	8.62		0.0050	mg/L	04-OCT-19	04-OCT-19	R4859637
Manganese (Mn)-Total	0.00215		0.00050	mg/L	04-OCT-19	04-OCT-19	R4859637
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		07-OCT-19	R4860448
Molybdenum (Mo)-Total	0.000289		0.000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Nickel (Ni)-Total	0.00055		0.00050	mg/L	04-OCT-19	04-OCT-19	R4859637
Phosphorus (P)-Total	<0.050		0.050	mg/L	04-OCT-19	04-OCT-19	R4859637
Potassium (K)-Total	1.02		0.050	mg/L	04-OCT-19	04-OCT-19	R4859637
Rubidium (Rb)-Total	0.00151		0.00020	mg/L	04-OCT-19	04-OCT-19	R4859637
Selenium (Se)-Total	<0.000050		0.000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Silicon (Si)-Total	1.24		0.10	mg/L	04-OCT-19	04-OCT-19	R4859637
Silver (Ag)-Total	<0.000050		0.000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Sodium (Na)-Total	3.13		0.050	mg/L	04-OCT-19	04-OCT-19	R4859637
Strontium (Sr)-Total	0.0148		0.0010	mg/L	04-OCT-19	04-OCT-19	R4859637
Sulfur (S)-Total	1.66		0.50	mg/L	04-OCT-19	04-OCT-19	R4859637
Tellurium (Te)-Total	<0.00020		0.00020	mg/L	04-OCT-19	04-OCT-19	R4859637
Thallium (Tl)-Total	<0.000010		0.000010	mg/L	04-OCT-19	04-OCT-19	R4859637
Thorium (Th)-Total	0.00013		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Tin (Sn)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Titanium (Ti)-Total	0.00718		0.00030	mg/L	04-OCT-19	04-OCT-19	R4859637
Tungsten (W)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2356925-2 MS-08-US Sampled By: AZ/LM on 30-SEP-19 @ 13:20 Matrix: WATER							
Total Metals							
Uranium (U)-Total	0.00358		0.000010	mg/L	04-OCT-19	04-OCT-19	R4859637
Vanadium (V)-Total	<0.00050		0.00050	mg/L	04-OCT-19	04-OCT-19	R4859637
Zinc (Zn)-Total	<0.0030		0.0030	mg/L	04-OCT-19	04-OCT-19	R4859637
Zirconium (Zr)-Total	0.00034		0.00020	mg/L	04-OCT-19	04-OCT-19	R4859637
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					04-OCT-19	R4859193
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	04-OCT-19	07-OCT-19	R4860451
Radiological Parameters							
Ra-226	<0.0069		0.0069	Bq/L	10-OCT-19	21-OCT-19	R4851666
L2356925-3 MS-08-US02 Sampled By: AZ/LM on 30-SEP-19 @ 13:20 Matrix: WATER							
Physical Tests							
Conductivity	<3.0		3.0	umhos/cm		05-OCT-19	R4860539
Hardness (as CaCO3)	<0.50	HTC	0.50	mg/L		04-OCT-19	
pH	6.13		0.10	pH units		01-OCT-19	R4851198
Total Suspended Solids	<2.0		2.0	mg/L		01-OCT-19	R4851221
Total Dissolved Solids	24		20	mg/L		01-OCT-19	R4851401
Turbidity	<0.10		0.10	NTU		01-OCT-19	R4851213
Anions and Nutrients							
Alkalinity, Total (as CaCO3)	<10		10	mg/L		05-OCT-19	R4860539
Ammonia, Total (as N)	<0.010		0.010	mg/L		07-OCT-19	R4860725
Chloride (Cl)	<0.50		0.50	mg/L		04-OCT-19	R4859139
Fluoride (F)	<0.020		0.020	mg/L		04-OCT-19	R4859139
Nitrate (as N)	<0.020		0.020	mg/L		04-OCT-19	R4859139
Total Kjeldahl Nitrogen	<0.15		0.15	mg/L	07-OCT-19	07-OCT-19	R4860925
Phosphorus, Total	<0.0030		0.0030	mg/L	04-OCT-19	07-OCT-19	R4860606
Sulfate (SO4)	<0.30		0.30	mg/L		04-OCT-19	R4859139
Organic / Inorganic Carbon							
Dissolved Carbon Filtration Location	LAB					04-OCT-19	R4859597
Dissolved Organic Carbon	<0.50		0.50	mg/L	04-OCT-19	07-OCT-19	R4860638
Total Organic Carbon	0.72		0.50	mg/L		07-OCT-19	R4860639
Total Metals							
Aluminum (Al)-Total	<0.0050		0.0050	mg/L	04-OCT-19	04-OCT-19	R4859637
Antimony (Sb)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Arsenic (As)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Barium (Ba)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Beryllium (Be)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Boron (B)-Total	<0.010		0.010	mg/L	04-OCT-19	04-OCT-19	R4859637
Cadmium (Cd)-Total	<0.0000050		0.0000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Calcium (Ca)-Total	<0.050		0.050	mg/L	04-OCT-19	04-OCT-19	R4859637

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2356925-3 MS-08-US02 Sampled By: AZ/LM on 30-SEP-19 @ 13:20 Matrix: WATER							
Total Metals							
Cesium (Cs)-Total	<0.000010		0.000010	mg/L	04-OCT-19	04-OCT-19	R4859637
Chromium (Cr)-Total	<0.00050		0.00050	mg/L	04-OCT-19	04-OCT-19	R4859637
Cobalt (Co)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Copper (Cu)-Total	<0.0010		0.0010	mg/L	04-OCT-19	04-OCT-19	R4859637
Iron (Fe)-Total	<0.010		0.010	mg/L	04-OCT-19	04-OCT-19	R4859637
Lead (Pb)-Total	<0.000050		0.000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Lithium (Li)-Total	<0.0010		0.0010	mg/L	04-OCT-19	04-OCT-19	R4859637
Magnesium (Mg)-Total	<0.0050		0.0050	mg/L	04-OCT-19	04-OCT-19	R4859637
Manganese (Mn)-Total	<0.00050		0.00050	mg/L	04-OCT-19	04-OCT-19	R4859637
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		07-OCT-19	R4860448
Molybdenum (Mo)-Total	<0.000050		0.000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Nickel (Ni)-Total	<0.00050		0.00050	mg/L	04-OCT-19	04-OCT-19	R4859637
Phosphorus (P)-Total	<0.050		0.050	mg/L	04-OCT-19	04-OCT-19	R4859637
Potassium (K)-Total	<0.050		0.050	mg/L	04-OCT-19	04-OCT-19	R4859637
Rubidium (Rb)-Total	<0.00020		0.00020	mg/L	04-OCT-19	04-OCT-19	R4859637
Selenium (Se)-Total	<0.000050		0.000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Silicon (Si)-Total	<0.10		0.10	mg/L	04-OCT-19	04-OCT-19	R4859637
Silver (Ag)-Total	<0.000050		0.000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Sodium (Na)-Total	<0.050		0.050	mg/L	04-OCT-19	04-OCT-19	R4859637
Strontium (Sr)-Total	<0.0010		0.0010	mg/L	04-OCT-19	04-OCT-19	R4859637
Sulfur (S)-Total	<0.50		0.50	mg/L	04-OCT-19	04-OCT-19	R4859637
Tellurium (Te)-Total	<0.00020		0.00020	mg/L	04-OCT-19	04-OCT-19	R4859637
Thallium (Tl)-Total	<0.000010		0.000010	mg/L	04-OCT-19	04-OCT-19	R4859637
Thorium (Th)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Tin (Sn)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Titanium (Ti)-Total	<0.00030		0.00030	mg/L	04-OCT-19	04-OCT-19	R4859637
Tungsten (W)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Uranium (U)-Total	<0.000010		0.000010	mg/L	04-OCT-19	04-OCT-19	R4859637
Vanadium (V)-Total	<0.00050		0.00050	mg/L	04-OCT-19	04-OCT-19	R4859637
Zinc (Zn)-Total	<0.0030		0.0030	mg/L	04-OCT-19	04-OCT-19	R4859637
Zirconium (Zr)-Total	<0.00020		0.00020	mg/L	04-OCT-19	04-OCT-19	R4859637
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					04-OCT-19	R4859193
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	04-OCT-19	07-OCT-19	R4860451
Radiological Parameters							
Ra-226	<0.0066		0.0066	Bq/L	10-OCT-19	21-OCT-19	R4851666

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

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Calcium (Ca)-Total	MS-B	L2356925-1, -2, -3
Matrix Spike	Iron (Fe)-Total	MS-B	L2356925-1, -2, -3
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2356925-1, -2, -3
Matrix Spike	Silicon (Si)-Total	MS-B	L2356925-1, -2, -3
Matrix Spike	Sodium (Na)-Total	MS-B	L2356925-1, -2, -3
Matrix Spike	Strontium (Sr)-Total	MS-B	L2356925-1, -2, -3
Matrix Spike	Uranium (U)-Total	MS-B	L2356925-1, -2, -3

Sample Parameter Qualifier key listed:

Qualifier	Description
HTC	Hardness was calculated from Total Ca and/or Mg concentrations and may be biased high (dissolved Ca/Mg results unavailable).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-WT	Water	Alkalinity, Total (as CaCO3)	EPA 310.2

This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.

CL-IC-N-WT	Water	Chloride by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

DOC-WT	Water	Dissolved Organic Carbon	APHA 5310B

Sample is filtered through a 0.45um filter, then injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic carbon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.

EC-SCREEN-WT	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

EC-WT	Water	Conductivity	APHA 2510 B

Water samples can be measured directly by immersing the conductivity cell into the sample.

F-IC-N-WT	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-WT	Water	Hardness	APHA 2340 B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-WT	Water	Dissolved Mercury in Water by CVAAS	EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

HG-T-CVAA-WT	Water	Total Mercury in Water by CVAAS	EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

MET-T-CCMS-WT	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental

Reference Information

Protection Act (July 1, 2011).

NH3-F-WT	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO3-IC-WT	Water	Nitrate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-COL-WT	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is deteremined colourimetrically after persulphate digestion of the sample.

PH-BF	Water	pH	APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

RA226-MMER-FC	Water	Ra226 by Alpha Scint, MDC=0.01 Bq/L	EPA 903.1
SO4-IC-N-WT	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-BF	Water	Total Dissolved Solids	APHA 2540C

A well-mixed sample is filtered though glass fibres filter. A known volume of the filtrate is evaporated and dried at 180 +/- 2C for 1hr.

SOLIDS-TSS-BF	Water	Suspended solids	APHA 2540 D-Gravimetric

A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104 +/- 1C for a minimum of four hours or until a constant weight is achieved.

TKN-WT	Water	Total Kjeldahl Nitrogen	APHA 4500-Norg D

This analysis is carried out using procedures adapted from APHA Method 4500-Norg "Nitrogen (Organic)". Total Kjeldahl Nitrogen is determined by sample digestion at 380 Celsius with analysis using an automated colorimetric method.

TOC-WT	Water	Total Organic Carbon	APHA 5310B

Sample is injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic cabon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.

TURBIDITY-BF	Water	Turbidity	APHA 2130 B

Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.

** 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
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA
FC	ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
BF	ALS ENVIRONMENTAL - BAFFIN ISLAND, NUNAVUT, CANADA

Chain of Custody Numbers:

Reference Information

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 weight of sample
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

Workorder: L2356925 Report Date: 24-OCT-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3

Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ALK-WT	**Water**							
Batch R4860539								
WG3183018-4 DUP		**WG3183018-3**						
Alkalinity, Total (as CaCO3)		<10	<10	RPD-NA	mg/L	N/A	20	05-OCT-19
WG3183018-2 LCS								
Alkalinity, Total (as CaCO3)			105.3		%		85-115	05-OCT-19
WG3183018-1 MB								
Alkalinity, Total (as CaCO3)			<10		mg/L		10	05-OCT-19
CL-IC-N-WT	**Water**							
Batch R4859139								
WG3181734-24 DUP		**WG3181734-23**						
Chloride (Cl)		6.98	6.98		mg/L	0.0	20	04-OCT-19
WG3181734-22 LCS								
Chloride (Cl)			102.1		%		90-110	04-OCT-19
WG3181734-21 MB								
Chloride (Cl)			<0.50		mg/L		0.5	04-OCT-19
WG3181734-25 MS		**WG3181734-23**						
Chloride (Cl)			100.1		%		75-125	04-OCT-19
DOC-WT	**Water**							
Batch R4860638								
WG3182797-3 DUP		**L2356925-1**						
Dissolved Organic Carbon		2.31	2.05		mg/L	12	20	07-OCT-19
WG3182797-2 LCS								
Dissolved Organic Carbon			107.3		%		80-120	07-OCT-19
WG3182797-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	07-OCT-19
WG3182797-4 MS		**L2356925-1**						
Dissolved Organic Carbon			102.6		%		70-130	07-OCT-19
EC-WT	**Water**							
Batch R4860539								
WG3183018-4 DUP		**WG3183018-3**						
Conductivity		<3.0	<3.0	RPD-NA	umhos/cm	N/A	10	05-OCT-19
WG3183018-2 LCS								
Conductivity			100.5		%		90-110	05-OCT-19
WG3183018-1 MB								
Conductivity			<3.0		umhos/cm		3	05-OCT-19
F-IC-N-WT	**Water**							

Quality Control Report

Workorder: L2356925 Report Date: 24-OCT-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3

Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F-IC-N-WT	**Water**							
Batch R4859139								
WG3181734-24 DUP		**WG3181734-23**						
Fluoride (F)		0.025	0.025		mg/L	0.1	20	04-OCT-19
WG3181734-22 LCS								
Fluoride (F)			103.8		%		90-110	04-OCT-19
WG3181734-21 MB								
Fluoride (F)			<0.020		mg/L		0.02	04-OCT-19
WG3181734-25 MS		**WG3181734-23**						
Fluoride (F)			101.9		%		75-125	04-OCT-19
HG-D-CVAA-WT	**Water**							
Batch R4860451								
WG3182354-3 DUP		**L2357716-1**						
Mercury (Hg)-Dissolved		<0.0000050	<0.000005C	RPD-NA	mg/L	N/A	20	07-OCT-19
WG3182354-2 LCS								
Mercury (Hg)-Dissolved			99.8		%		80-120	07-OCT-19
WG3182354-1 MB								
Mercury (Hg)-Dissolved			<0.000005C		mg/L		0.000005	07-OCT-19
WG3182354-4 MS		**L2357716-2**						
Mercury (Hg)-Dissolved			95.8		%		70-130	07-OCT-19
HG-T-CVAA-WT	**Water**							
Batch R4860448								
WG3182348-3 DUP		**L2357716-1**						
Mercury (Hg)-Total		<0.0000050	<0.000005C	RPD-NA	mg/L	N/A	20	07-OCT-19
WG3182348-2 LCS								
Mercury (Hg)-Total			98.3		%		80-120	07-OCT-19
WG3182348-1 MB								
Mercury (Hg)-Total			<0.000005C		mg/L		0.000005	07-OCT-19
WG3182348-4 MS		**L2357716-2**						
Mercury (Hg)-Total			98.8		%		70-130	07-OCT-19
MET-T-CCMS-WT	**Water**							
Batch R4859637								
WG3182336-4 DUP		**WG3182336-3**						
Aluminum (Al)-Total		0.118	0.114		mg/L	3.4	20	04-OCT-19
Antimony (Sb)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	04-OCT-19
Arsenic (As)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	04-OCT-19
Barium (Ba)-Total		0.0112	0.0109		mg/L	2.4	20	04-OCT-19
Beryllium (Be)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	04-OCT-19
Bismuth (Bi)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	04-OCT-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4859637								
WG3182336-4 DUP		**WG3182336-3**						
Boron (B)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	04-OCT-19
Cadmium (Cd)-Total		<0.0000050	<0.000005(	RPD-NA	mg/L	N/A	20	04-OCT-19
Calcium (Ca)-Total		16.5	16.5		mg/L	0.4	20	04-OCT-19
Chromium (Cr)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	04-OCT-19
Cesium (Cs)-Total		0.000014	0.000015		mg/L	4.3	20	04-OCT-19
Cobalt (Co)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	04-OCT-19
Copper (Cu)-Total		<0.0010	0.0010	RPD-NA	mg/L	N/A	20	04-OCT-19
Iron (Fe)-Total		0.117	0.115		mg/L	2.2	20	04-OCT-19
Lead (Pb)-Total		0.000077	0.000080		mg/L	4.1	20	04-OCT-19
Lithium (Li)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	04-OCT-19
Magnesium (Mg)-Total		10.2	10.1		mg/L	1.0	20	04-OCT-19
Manganese (Mn)-Total		0.00247	0.00246		mg/L	0.2	20	04-OCT-19
Molybdenum (Mo)-Total		0.000321	0.000323		mg/L	0.8	20	04-OCT-19
Nickel (Ni)-Total		0.00058	0.00057		mg/L	1.0	20	04-OCT-19
Phosphorus (P)-Total		<0.050	<0.050	RPD-NA	mg/L	N/A	20	04-OCT-19
Potassium (K)-Total		1.09	1.09		mg/L	0.1	20	04-OCT-19
Rubidium (Rb)-Total		0.00154	0.00158		mg/L	2.1	20	04-OCT-19
Selenium (Se)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	04-OCT-19
Silicon (Si)-Total		1.26	1.29		mg/L	2.6	20	04-OCT-19
Silver (Ag)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	04-OCT-19
Sodium (Na)-Total		3.41	3.39		mg/L	0.5	20	04-OCT-19
Strontium (Sr)-Total		0.0167	0.0167		mg/L	0.2	20	04-OCT-19
Sulfur (S)-Total		2.64	2.70		mg/L	2.2	25	04-OCT-19
Thallium (Tl)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	04-OCT-19
Tellurium (Te)-Total		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	04-OCT-19
Thorium (Th)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	25	04-OCT-19
Tin (Sn)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	04-OCT-19
Titanium (Ti)-Total		0.00541	0.00550		mg/L	1.5	20	04-OCT-19
Tungsten (W)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	04-OCT-19
Uranium (U)-Total		0.00415	0.00407		mg/L	2.0	20	04-OCT-19
Vanadium (V)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	04-OCT-19
Zinc (Zn)-Total		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	04-OCT-19
Zirconium (Zr)-Total		0.00026	0.00028		mg/L			04-OCT-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4859637								
WG3182336-4 DUP		**WG3182336-3**						
Zirconium (Zr)-Total		0.00026	0.00028		mg/L	5.3	20	04-OCT-19
WG3182336-2 LCS								
Aluminum (Al)-Total			106.5		%		80-120	04-OCT-19
Antimony (Sb)-Total			103.5		%		80-120	04-OCT-19
Arsenic (As)-Total			100.9		%		80-120	04-OCT-19
Barium (Ba)-Total			104.0		%		80-120	04-OCT-19
Beryllium (Be)-Total			100.9		%		80-120	04-OCT-19
Bismuth (Bi)-Total			98.0		%		80-120	04-OCT-19
Boron (B)-Total			98.7		%		80-120	04-OCT-19
Cadmium (Cd)-Total			102.5		%		80-120	04-OCT-19
Calcium (Ca)-Total			100.1		%		80-120	04-OCT-19
Chromium (Cr)-Total			102.0		%		80-120	04-OCT-19
Cesium (Cs)-Total			99.3		%		80-120	04-OCT-19
Cobalt (Co)-Total			101.5		%		80-120	04-OCT-19
Copper (Cu)-Total			101.0		%		80-120	04-OCT-19
Iron (Fe)-Total			101.2		%		80-120	04-OCT-19
Lead (Pb)-Total			100.9		%		80-120	04-OCT-19
Lithium (Li)-Total			99.9		%		80-120	04-OCT-19
Magnesium (Mg)-Total			102.4		%		80-120	04-OCT-19
Manganese (Mn)-Total			102.1		%		80-120	04-OCT-19
Molybdenum (Mo)-Total			101.4		%		80-120	04-OCT-19
Nickel (Ni)-Total			99.9		%		80-120	04-OCT-19
Phosphorus (P)-Total			106.9		%		70-130	04-OCT-19
Potassium (K)-Total			103.1		%		80-120	04-OCT-19
Rubidium (Rb)-Total			105.0		%		80-120	04-OCT-19
Selenium (Se)-Total			99.4		%		80-120	04-OCT-19
Silicon (Si)-Total			105.9		%		60-140	04-OCT-19
Silver (Ag)-Total			102.5		%		80-120	04-OCT-19
Sodium (Na)-Total			101.8		%		80-120	04-OCT-19
Strontium (Sr)-Total			102.1		%		80-120	04-OCT-19
Sulfur (S)-Total			102.9		%		80-120	04-OCT-19
Thallium (Tl)-Total			99.3		%		80-120	04-OCT-19
Tellurium (Te)-Total			100.8		%		80-120	04-OCT-19
Thorium (Th)-Total			98.0		%		70-130	04-OCT-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4859637								
WG3182336-2 LCS								
Tin (Sn)-Total			101.0		%		80-120	04-OCT-19
Titanium (Ti)-Total			98.3		%		80-120	04-OCT-19
Tungsten (W)-Total			100.5		%		80-120	04-OCT-19
Uranium (U)-Total			101.6		%		80-120	04-OCT-19
Vanadium (V)-Total			103.3		%		80-120	04-OCT-19
Zinc (Zn)-Total			99.2		%		80-120	04-OCT-19
Zirconium (Zr)-Total			101.2		%		80-120	04-OCT-19
WG3182336-1 MB								
Aluminum (Al)-Total			<0.0050		mg/L		0.005	04-OCT-19
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	04-OCT-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	04-OCT-19
Barium (Ba)-Total			<0.00010		mg/L		0.0001	04-OCT-19
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	04-OCT-19
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	04-OCT-19
Boron (B)-Total			<0.010		mg/L		0.01	04-OCT-19
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	04-OCT-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	04-OCT-19
Chromium (Cr)-Total			<0.00050		mg/L		0.0005	04-OCT-19
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	04-OCT-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	04-OCT-19
Copper (Cu)-Total			<0.0010		mg/L		0.001	04-OCT-19
Iron (Fe)-Total			<0.010		mg/L		0.01	04-OCT-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	04-OCT-19
Lithium (Li)-Total			<0.0010		mg/L		0.001	04-OCT-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	04-OCT-19
Manganese (Mn)-Total			<0.00050		mg/L		0.0005	04-OCT-19
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	04-OCT-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	04-OCT-19
Phosphorus (P)-Total			<0.050		mg/L		0.05	04-OCT-19
Potassium (K)-Total			<0.050		mg/L		0.05	04-OCT-19
Rubidium (Rb)-Total			<0.00020		mg/L		0.0002	04-OCT-19
Selenium (Se)-Total			<0.000050		mg/L		0.00005	04-OCT-19
Silicon (Si)-Total			<0.10		mg/L		0.1	04-OCT-19
Silver (Ag)-Total			<0.000050		mg/L		0.00005	04-OCT-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4859637								
WG3182336-1 MB								
Sodium (Na)-Total			<0.050		mg/L		0.05	04-OCT-19
Strontium (Sr)-Total			<0.0010		mg/L		0.001	04-OCT-19
Sulfur (S)-Total			<0.50		mg/L		0.5	04-OCT-19
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	04-OCT-19
Tellurium (Te)-Total			<0.00020		mg/L		0.0002	04-OCT-19
Thorium (Th)-Total			<0.00010		mg/L		0.0001	04-OCT-19
Tin (Sn)-Total			<0.00010		mg/L		0.0001	04-OCT-19
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	04-OCT-19
Tungsten (W)-Total			<0.00010		mg/L		0.0001	04-OCT-19
Uranium (U)-Total			<0.000010		mg/L		0.00001	04-OCT-19
Vanadium (V)-Total			<0.00050		mg/L		0.0005	04-OCT-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	04-OCT-19
Zirconium (Zr)-Total			<0.00020		mg/L		0.0002	04-OCT-19
WG3182336-5 MS		**WG3182336-6**						
Aluminum (Al)-Total			90.4		%		70-130	04-OCT-19
Antimony (Sb)-Total			98.3		%		70-130	04-OCT-19
Arsenic (As)-Total			95.7		%		70-130	04-OCT-19
Barium (Ba)-Total			91.9		%		70-130	04-OCT-19
Beryllium (Be)-Total			94.8		%		70-130	04-OCT-19
Bismuth (Bi)-Total			90.8		%		70-130	04-OCT-19
Boron (B)-Total			92.9		%		70-130	04-OCT-19
Cadmium (Cd)-Total			94.9		%		70-130	04-OCT-19
Calcium (Ca)-Total			N/A	MS-B	%		-	04-OCT-19
Chromium (Cr)-Total			96.5		%		70-130	04-OCT-19
Cesium (Cs)-Total			95.9		%		70-130	04-OCT-19
Cobalt (Co)-Total			94.9		%		70-130	04-OCT-19
Copper (Cu)-Total			93.1		%		70-130	04-OCT-19
Iron (Fe)-Total			N/A	MS-B	%		-	04-OCT-19
Lead (Pb)-Total			94.3		%		70-130	04-OCT-19
Lithium (Li)-Total			91.4		%		70-130	04-OCT-19
Magnesium (Mg)-Total			N/A	MS-B	%		-	04-OCT-19
Manganese (Mn)-Total			94.5		%		70-130	04-OCT-19
Molybdenum (Mo)-Total			96.8		%		70-130	04-OCT-19
Nickel (Ni)-Total			93.1		%		70-130	04-OCT-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4859637								
WG3182336-5 MS		**WG3182336-6**						
Phosphorus (P)-Total			104.2		%		70-130	04-OCT-19
Potassium (K)-Total			93.6		%		70-130	04-OCT-19
Rubidium (Rb)-Total			95.8		%		70-130	04-OCT-19
Selenium (Se)-Total			94.7		%		70-130	04-OCT-19
Silicon (Si)-Total			N/A	MS-B	%		-	04-OCT-19
Silver (Ag)-Total			95.9		%		70-130	04-OCT-19
Sodium (Na)-Total			N/A	MS-B	%		-	04-OCT-19
Strontium (Sr)-Total			N/A	MS-B	%		-	04-OCT-19
Sulfur (S)-Total			93.4		%		70-130	04-OCT-19
Thallium (Tl)-Total			91.6		%		70-130	04-OCT-19
Tellurium (Te)-Total			91.9		%		70-130	04-OCT-19
Thorium (Th)-Total			95.1		%		70-130	04-OCT-19
Tin (Sn)-Total			96.3		%		70-130	04-OCT-19
Titanium (Ti)-Total			94.8		%		70-130	04-OCT-19
Tungsten (W)-Total			95.7		%		70-130	04-OCT-19
Uranium (U)-Total			N/A	MS-B	%		-	04-OCT-19
Vanadium (V)-Total			97.5		%		70-130	04-OCT-19
Zinc (Zn)-Total			90.2		%		70-130	04-OCT-19
Zirconium (Zr)-Total			93.6		%		70-130	04-OCT-19
NH3-F-WT	**Water**							
Batch R4860725								
WG3183728-3 DUP		**L2357716-1**						
Ammonia, Total (as N)		<0.010	<0.010	RPD-NA	mg/L	N/A	20	07-OCT-19
WG3183728-2 LCS								
Ammonia, Total (as N)			99.9		%		85-115	07-OCT-19
WG3183728-1 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	07-OCT-19
WG3183728-4 MS		**L2357716-1**						
Ammonia, Total (as N)			104.4		%		75-125	07-OCT-19
NO3-IC-WT	**Water**							
Batch R4859139								
WG3181734-24 DUP		**WG3181734-23**						
Nitrate (as N)		0.073	0.074		mg/L	0.3	20	04-OCT-19
WG3181734-22 LCS								
Nitrate (as N)			101.5				90-110	

Quality Control Report

Workorder: L2356925 Report Date: 24-OCT-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3

Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO3-IC-WT	**Water**							
Batch R4859139								
WG3181734-22 LCS								
Nitrate (as N)			101.5		%		90-110	04-OCT-19
WG3181734-21 MB								
Nitrate (as N)			<0.020		mg/L		0.02	04-OCT-19
WG3181734-25 MS		**WG3181734-23**						
Nitrate (as N)			98.8		%		75-125	04-OCT-19
P-T-COL-WT	**Water**							
Batch R4860606								
WG3182577-3 DUP		**L2356925-1**						
Phosphorus, Total		0.0073	0.0071		mg/L	3.3	20	07-OCT-19
WG3182577-2 LCS								
Phosphorus, Total			100.1		%		80-120	07-OCT-19
WG3182577-1 MB								
Phosphorus, Total			<0.0030		mg/L		0.003	07-OCT-19
WG3182577-4 MS		**L2356925-1**						
Phosphorus, Total			89.2		%		70-130	07-OCT-19
PH-BF	**Water**							
Batch R4851198								
WG3177985-2 DUP		**L2356874-1**						
pH		7.16	7.16	J	pH units	0.00	0.2	01-OCT-19
WG3177985-1 LCS								
pH			7.01		pH units		6.9-7.1	01-OCT-19
SO4-IC-N-WT	**Water**							
Batch R4859139								
WG3181734-24 DUP		**WG3181734-23**						
Sulfate (SO4)		6.79	6.80		mg/L	0.0	20	04-OCT-19
WG3181734-22 LCS								
Sulfate (SO4)			102.6		%		90-110	04-OCT-19
WG3181734-21 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	04-OCT-19
WG3181734-25 MS		**WG3181734-23**						
Sulfate (SO4)			101.2		%		75-125	04-OCT-19
SOLIDS-TDS-BF	**Water**							
Batch R4851401								
WG3178028-3 DUP		**L2356940-1**						
Total Dissolved Solids		3130	3180		mg/L	1.7	20	01-OCT-19
WG3178028-2 LCS								

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SOLIDS-TDS-BF	**Water**							
Batch R4851401								
WG3178028-2 LCS								
Total Dissolved Solids			104.5		%		85-115	01-OCT-19
WG3178028-1 MB								
Total Dissolved Solids			<20		mg/L		20	01-OCT-19
SOLIDS-TSS-BF	**Water**							
Batch R4851221								
WG3178016-3 DUP		**L2356874-2**						
Total Suspended Solids		72.0	73.0		mg/L	1.4	25	01-OCT-19
WG3178016-2 LCS								
Total Suspended Solids			101.0		%		85-115	01-OCT-19
WG3178016-1 MB								
Total Suspended Solids			<2.0		mg/L		2	01-OCT-19
TKN-WT	**Water**							
Batch R4860925								
WG3183637-3 DUP		**L2357716-1**						
Total Kjeldahl Nitrogen		<0.15	<0.15	RPD-NA	mg/L	N/A	20	07-OCT-19
WG3183637-2 LCS								
Total Kjeldahl Nitrogen			100.3		%		75-125	07-OCT-19
WG3183637-1 MB								
Total Kjeldahl Nitrogen			<0.15		mg/L		0.15	07-OCT-19
WG3183637-4 MS		**L2357716-1**						
Total Kjeldahl Nitrogen			88.9		%		70-130	07-OCT-19
TOC-WT	**Water**							
Batch R4860639								
WG3183590-3 DUP		**L2356925-1**						
Total Organic Carbon		2.42	2.45		mg/L	1.1	20	07-OCT-19
WG3183590-2 LCS								
Total Organic Carbon			106.7		%		80-120	07-OCT-19
WG3183590-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	07-OCT-19
WG3183590-4 MS		**L2356925-1**						
Total Organic Carbon			101.6		%		70-130	07-OCT-19
TURBIDITY-BF	**Water**							
Batch R4851213								
WG3177999-3 DUP		**L2356874-1**						
Turbidity		14.2	13.9		NTU	2.1	15	01-OCT-19
WG3177999-2 LCS								

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TURBIDITY-BF	**Water**							
Batch R4851213								
WG3177999-2 LCS								
Turbidity			114.0		%		85-115	01-OCT-19
WG3177999-1 MB								
Turbidity			<0.10		NTU		0.1	01-OCT-19

Quality Control Report

Workorder: L2356925 Report Date: 24-OCT-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

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

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Quality Control Report

Workorder: L2356925 Report Date: 24-OCT-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Organic / Inorganic Carbon							
Dissolved Organic Carbon							
	1	30-SEP-19 12:50	04-OCT-19 18:00	3	4	days	EHT
	2	30-SEP-19 13:20	04-OCT-19 18:00	3	4	days	EHT
	3	30-SEP-19 13:20	04-OCT-19 18:00	3	4	days	EHT

Legend & Qualifier Definitions:

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR: Exceeded ALS recommended hold time prior to sample receipt.
EHTL: Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT: Exceeded ALS recommended hold time prior to analysis.
Rec. HT: ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2356925 were received on 01-OCT-19 06:00.

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.

Tuesday, October 22, 2019

Rick Hawthorne
ALS Environmental
60 Northland Rd, Unit 1
Waterloo Canada, ON N2V 2B8

Re: ALS Workorder: 1910177
Project Name:
Project Number: L2356925

Dear Mr. Hawthorne:

Three water samples were received from ALS Environmental, on 10/8/2019. The samples were scheduled for the following analysis:

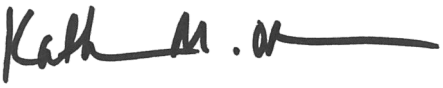
Radium-226

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,



ALS Environmental
Katie M. OBrien
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
AIHA	214884
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280

1910177

Radium-226:
The samples were prepared and analyzed according to the current revision of SOP 783.

All acceptance criteria were met.

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1910177
Client Name: ALS Environmental
Client Project Name:
Client Project Number: L2356925
Client PO Number: L2356925

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
L2356925-1	1910177-1		WATER	30-Sep-19	
L2356925-2	1910177-2		WATER	30-Sep-19	
L2356925-3	1910177-3		WATER	30-Sep-19	

ALS Environmental

L2356925

WATERLOO

1a10177

Subcontract Request Form

Subcontract To:

ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
225 COMMERCE DRIVE
FORT COLLINS,CO 80524

NOTES: Please reference on final report and invoice: PO# *L2356925*
ALS requires QC data to be provided with your final results.

Please see enclosed 3 sample(s) in 3 Container(s)

SAMPLE NUMBER	ANALYTICAL REQUIRED	DATE SAMPLED / DUE DATE	Priority Flag
L2356925-1 MS-08-DS		9/ 30/ 2019	E
1	Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	10/22/2019	
L2356925-2 MS-08-US		9/ 30/ 2019	E
2	Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	10/22/2019	
L2356925-3 MS-08-US02		9/ 30/ 2019	E
3	Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	10/22/2019	

Subcontract Info Contact: Mary-Lynn Pike (519) 886-6910
Analysis and reporting info contact: Rick Hawthorne
60 NORTHLAND ROAD, UNIT 1
WATERLOO,ON N2V 2B8
Phone: (519) 886-6910 Email: Rick.Hawthorne@alsglobal.com

Please email confirmation of receipt to: **Rick.Hawthorne@alsglobal.com**

Shipped By: _____ Date Shipped: _____

Received By: _____ Date Received: 10/8/19 12:50

Verified By: _____ Date Verified: _____

Temperature: _____

Sample Integrity Issues: _____

ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: ALS Waterloo Workorder No: 1910177

Project Manager: KMD Initials: TEM Date: 10/8/19

1.	Are airbills / shipping documents present and/or removable?	DROP OFF	YES	NO
2.	Are custody seals on **shipping** containers intact?	NONE	YES	NO *
3.	Are custody seals on **sample** containers intact?	NONE	YES	NO *
4.	Is there a COC (chain-of-custody) present?		YES	NO *
5.	Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)		YES	NO *
6.	Are short-hold samples present?		YES	NO
7.	Are all samples within holding times for the requested analyses?		YES	NO *
8.	Were all sample containers received intact? (not broken or leaking)		YES	NO *
9.	Is there sufficient sample for the requested analyses?		YES	NO *
10.	Are all samples in the proper containers for the requested analyses?		YES	NO *
11.	Are all aqueous samples preserved correctly, if required? (excluding volatiles)	N/A	YES	NO *
12.	Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm (1/4 inch) diameter? (i.e. size of green pea)	N/A	YES	NO
13.	Were the samples shipped on ice?		YES	NO
14.	Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: #1 (#3) #4	RAD ONLY	YES	NO

Cooler #:	1							
Temperature (°C):	5.7							
No. of custody seals on cooler:	0							
DOT Survey/ Acceptance Information — External µR/hr reading:	12							
Background µR/hr reading:	13							

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? YES / NO / NA (If no, see Form 008.)

*** Please provide details here for NO responses to gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.**

All client bottle ID's vs ALS lab ID's double-checked by: TEM

If applicable, was the client contacted? **YES / NO / NA** Contact: _____ Date/Time: _____

Project Manager Signature / Date: 10/9/19

Form 201r28.xls
(10/07/2019)

*IR Gun #1, VWR SN 170560549
*IR Gun #3, VWR SN 170647571
*IR Gun #4, Oakton, SN 2372220101-0002

1910177

12-0
S.A

EXPRESS WORLDWIDE **WPX** DHL

2019-10-07 DCV8 3.0.1 / *12-1403*

80524 FORT COLLINS, UNITED STATES OF AMERICA

Origin: YHM

US-DEN-DEN

C

Day Time

Date: 2019-10-07

Pce/Shpt Weight J24.2 LB

Piece 1/1

Content Description
Water Sample

WAYBILL 74 1380 5184

(2L)US80524+48000001

(J) JD01 4600 0071 2459 3321

Client:	ALS Environmental	**Date:**	*22-Oct-19*
Project:	L2356925	**Work Order:**	1910177
Sample ID:	L2356925-1	**Lab ID:**	1910177-1
Legal Location:		**Matrix:**	WATER
Collection Date:	9/30/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**		Prep Date: **10/10/2019**	PrepBy: **TRW**	
Ra-226	0.0066 (+/- 0.0056)	U	0.008	BQ/l	NA	10/21/2019 13:40
Carr: BARIUM	*96.4*		*40-110*	*%REC*	DL = NA	10/21/2019 13:40

Client:	ALS Environmental	**Date:**	*22-Oct-19*
Project:	L2356925	**Work Order:**	1910177
Sample ID:	L2356925-2	**Lab ID:**	1910177-2
Legal Location:		**Matrix:**	WATER
Collection Date:	9/30/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1		**SOP 783**			Prep Date: **10/10/2019**	PrepBy: **TRW**
Ra-226	0.0047 (+/- 0.0047)	U	0.0069	BQ/l	NA	10/21/2019 13:40
Carr: BARIUM	*94.3*		*40-110*	*%REC*	DL = NA	10/21/2019 13:40

Client:	ALS Environmental	**Date:**	*22-Oct-19*
Project:	L2356925	**Work Order:**	1910177
Sample ID:	L2356925-3	**Lab ID:**	1910177-3
Legal Location:		**Matrix:**	WATER
Collection Date:	9/30/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1			**SOP 783**		Prep Date: **10/10/2019**	PrepBy: **TRW**
Ra-226	0.00044 (+/- 0.0034)	U	0.0066	BQ/l	NA	10/21/2019 13:40
Carr: BARIUM	*97.4*		*40-110*	*%REC*	DL = NA	10/21/2019 13:40

Client:	ALS Environmental	**Date:**	*22-Oct-19*
Project:	L2356925	**Work Order:**	1910177
Sample ID:	L2356925-3	**Lab ID:**	1910177-3
Legal Location:		**Matrix:**	WATER
Collection Date:	9/30/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed

Explanation of Qualifiers

Radiochemistry:

- "Report Limit" is the MDC

U or ND - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

Y2 - Chemical Yield outside default limits.

W - DER is greater than Warning Limit of 1.42

* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.
# - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.
G - Sample density differs by more than 15% of LCS density.
D - DER is greater than Control Limit

M - Requested MDC not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS, Matrix Spike Recovery within control limits.

N - Matrix Spike Recovery outside control limits

NC - Not Calculated for duplicate results less than 5 times MDC

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

Inorganics:

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).

U or ND - Indicates that the compound was analyzed for but not detected.

E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.

M - Duplicate injection precision was not met.

N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.

Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.

* - Duplicate analysis (relative percent difference) not within control limits.

S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

Organics:

U or ND - Indicates that the compound was analyzed for but not detected.

B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.

E - Analyte concentration exceeds the upper level of the calibration range.

J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).

A - A tentatively identified compound is a suspected aldol-condensation product.

X - The analyte was diluted below an accurate quantitation level.

* - The spike recovery is equal to or outside the control criteria used.

+ - The relative percent difference (RPD) equals or exceeds the control criteria.

G - A pattern resembling gasoline was detected in this sample.

D - A pattern resembling diesel was detected in this sample.

M - A pattern resembling motor oil was detected in this sample.

C - A pattern resembling crude oil was detected in this sample.

4 - A pattern resembling JP-4 was detected in this sample.

5 - A pattern resembling JP-5 was detected in this sample.

H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.

L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.

Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
- gasoline
- JP-8
- diesel
- mineral spirits
- motor oil
- Stoddard solvent
- bunker C

QC BATCH REPORT

Batch ID: **RE191010-1-1** Instrument ID **Alpha Scin** Method: **Radium-226 by Radon Emanation**

LCS Sample ID: **RE191010-1** Units: **BQ/l** Analysis Date: **10/21/2019 14:15**

Client ID: Run ID: **RE191010-1A** Prep Date: **10/10/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.85 (+/- 0.461)	0.00675	1.72		108	67-120					P
Carr: BARIUM	16800		17940		93.7	40-110					

LCSD Sample ID: **RE191010-1** Units: **BQ/l** Analysis Date: **10/21/2019 14:15**

Client ID: Run ID: **RE191010-1A** Prep Date: **10/10/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.71 (+/- 0.427)	0.0152	1.72		99.2	67-120		1.85	0.2	2.1	P,M3
Carr: BARIUM	17300		17930		96.6	40-110		16800			

MB Sample ID: **RE191010-1** Units: **BQ/l** Analysis Date: **10/21/2019 14:15**

Client ID: Run ID: **RE191010-1A** Prep Date: **10/10/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	0.00045 (+/- 0.0030)	0.0059									U
Carr: BARIUM	17800		17930		99.1	40-110					

The following samples were analyzed in this batch: 1910177-1 1910177-2 1910177-3

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

Affix ALS barcode label here
(lab use only)

COC Number: 15 -

Report To	Contact and company name below will appear on the final report
Company:	Baffinland Iron Mines Corp.
Contact:	Wiliam Bowden and Connor Devereaux
Phone:	647-253-0596 EXT 6016
	Company address below will appear on the final report
Street:	2275 Upper Middle Rd. E., Suite #300
City/Province:	Oakville, ON
Postal Code:	L6H 0C3
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)
Quality Control (QC) Report with Report ☑ YES ☐ NO
☐ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax bimcore@alsglobal.com
Email 2
Email 3

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax ap@baffinland.com
Email 2 commercial@baffinland.com

Select Service Level Below - Please confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☐ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4] ☐ | 3 day [P3] ☐ | 2 day [P2] ☐

EMERGENCY: 1 Business day [E1] ☐ | Same Day, Weekend or Statutory holiday [E0] ☑

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm

For tests that can not be performed according to the service level selected, you will be contacted.

Project Information

ALS Account # / Quote #:	23642 /Q42455
Job #:	MS-08 Reference and Exposure
PO / AFE:	4500057496
LSD:	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only) L2356925 | **ALS Contact:** | **Sampler:** AZ/LM

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	BIM-MMER-EFF	F/P	Number of Containers
	MS-08-DS	30-Sep-19	12:50	Water	E0		7
	MS-08-US	30-Sep-19	13:20	Water	E0		7
	MS-08-US02	30-Sep-19	13:20	Water	E0		7

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human drinking water use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ | SIF Observations Yes ☐ No ☐
Ice Packs ☐ | Ice Cubes ☐ | Custody seal intact Yes ☐ No ☐
Cooling Initiated ☐

INITIAL COOLER TEMPERATURES ºC			FINAL COOLER TEMPERATURES ºC		
	7				

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Kendra Button	Release Date: 1-Oct-19	Time: 6:30	Received by:	Date:	Time:	Received by:J. Streeter	Date:OCT 1/19	Time:6:30AM

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

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 specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Baffinland Iron Mine's Corporation (Oakville)
ATTN: William Bowden/Connor Devereaux
2275 Upper Middle Rd. E.
Suite #300
Oakville ON L6H 0C3

Date Received: 01-OCT-19
Report Date: 24-OCT-19 13:52 (MT)
Version: FINAL

Client Phone: 647-253-0596

Certificate of Analysis

Lab Work Order #: L2357232

Project P.O. #: 4500057496
Job Reference: MS-08 WT TOX
C of C Numbers:
Legal Site Desc:

Comments: ADDITIONAL 02-OCT-19 09:46

Rick Hawthorne
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2357232-1 MS-08 Sampled By: KB/LM on 01-OCT-19 @ 09:15 Matrix: WATER							
Physical Tests							
Conductivity	5040		3.0	umhos/cm		03-OCT-19	R4858920
Hardness (as CaCO3)	3990		1.3	mg/L		03-OCT-19	
pH	8.79		0.10	pH units		02-OCT-19	R4853590
Total Suspended Solids	6.0		2.0	mg/L		01-OCT-19	R4853597
Total Dissolved Solids	5620		20	mg/L		02-OCT-19	R4854358
Turbidity	4.52		0.10	NTU		02-OCT-19	R4853592
Anions and Nutrients							
Acidity (as CaCO3)	2.3		2.0	mg/L		06-OCT-19	R4860194
Alkalinity, Total (as CaCO3)	39		10	mg/L		03-OCT-19	R4858920
Ammonia, Total (as N)	3.79	DLHC	0.10	mg/L		03-OCT-19	R4858766
Chloride (Cl)	17.2	DLDS	5.0	mg/L		03-OCT-19	R4858736
Fluoride (F)	<0.20	DLDS	0.20	mg/L		03-OCT-19	R4858736
Nitrate (as N)	16.7	DLDS	0.20	mg/L		03-OCT-19	R4858736
Total Kjeldahl Nitrogen	4.38		0.15	mg/L	03-OCT-19	04-OCT-19	R4859216
Phosphorus, Total	<0.0030		0.0030	mg/L	03-OCT-19	04-OCT-19	R4858789
Sulfate (SO4)	4070	DLDS	3.0	mg/L		03-OCT-19	R4858736
Cyanides							
Cyanide, Total	0.0128		0.0020	mg/L		03-OCT-19	R4857839
Organic / Inorganic Carbon							
Dissolved Carbon Filtration Location	LAB					03-OCT-19	R4858483
Dissolved Organic Carbon	3.82		0.50	mg/L	03-OCT-19	04-OCT-19	R4858934
Total Organic Carbon	4.16		0.50	mg/L		04-OCT-19	R4858932
Total Metals							
Aluminum (Al)-Total	0.082	DLHC	0.050	mg/L	03-OCT-19	03-OCT-19	R4857778
Antimony (Sb)-Total	<0.0010	DLHC	0.0010	mg/L	03-OCT-19	03-OCT-19	R4857778
Arsenic (As)-Total	<0.0010	DLHC	0.0010	mg/L	03-OCT-19	03-OCT-19	R4857778
Barium (Ba)-Total	0.0120	DLHC	0.0010	mg/L	03-OCT-19	03-OCT-19	R4857778
Beryllium (Be)-Total	<0.0010	DLHC	0.0010	mg/L	03-OCT-19	03-OCT-19	R4857778
Bismuth (Bi)-Total	<0.00050	DLHC	0.00050	mg/L	03-OCT-19	03-OCT-19	R4857778
Boron (B)-Total	<0.10	DLHC	0.10	mg/L	03-OCT-19	03-OCT-19	R4857778
Cadmium (Cd)-Total	<0.000050	DLHC	0.000050	mg/L	03-OCT-19	03-OCT-19	R4857778
Calcium (Ca)-Total	507	DLHC	0.50	mg/L	03-OCT-19	03-OCT-19	R4857778
Cesium (Cs)-Total	<0.00010	DLHC	0.00010	mg/L	03-OCT-19	03-OCT-19	R4857778
Chromium (Cr)-Total	<0.0050	DLHC	0.0050	mg/L	03-OCT-19	03-OCT-19	R4857778
Cobalt (Co)-Total	0.0050	DLHC	0.0010	mg/L	03-OCT-19	03-OCT-19	R4857778
Copper (Cu)-Total	<0.010	DLHC	0.010	mg/L	03-OCT-19	03-OCT-19	R4857778
Iron (Fe)-Total	0.42	DLHC	0.10	mg/L	03-OCT-19	03-OCT-19	R4857778
Lead (Pb)-Total	<0.00050	DLHC	0.00050	mg/L	03-OCT-19	03-OCT-19	R4857778
Lithium (Li)-Total	0.030	DLHC	0.010	mg/L	03-OCT-19	03-OCT-19	R4857778
Magnesium (Mg)-Total	664	DLHC	0.050	mg/L	03-OCT-19	03-OCT-19	R4857778
Manganese (Mn)-Total	1.12	DLHC	0.0050	mg/L	03-OCT-19	03-OCT-19	R4857778
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		04-OCT-19	R4858970

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2357232-1 MS-08 Sampled By: KB/LM on 01-OCT-19 @ 09:15 Matrix: WATER							
Total Metals							
Molybdenum (Mo)-Total	0.00141	DLHC	0.00050	mg/L	03-OCT-19	03-OCT-19	R4857778
Nickel (Ni)-Total	0.0071	DLHC	0.0050	mg/L	03-OCT-19	03-OCT-19	R4857778
Phosphorus (P)-Total	<0.50	DLHC	0.50	mg/L	03-OCT-19	03-OCT-19	R4857778
Potassium (K)-Total	6.91	DLHC	0.50	mg/L	03-OCT-19	03-OCT-19	R4857778
Rubidium (Rb)-Total	0.0082	DLHC	0.0020	mg/L	03-OCT-19	03-OCT-19	R4857778
Selenium (Se)-Total	0.00642	DLHC	0.00050	mg/L	03-OCT-19	03-OCT-19	R4857778
Silicon (Si)-Total	<1.0	DLHC	1.0	mg/L	03-OCT-19	03-OCT-19	R4857778
Silver (Ag)-Total	<0.00050	DLHC	0.00050	mg/L	03-OCT-19	03-OCT-19	R4857778
Sodium (Na)-Total	6.41	DLHC	0.50	mg/L	03-OCT-19	03-OCT-19	R4857778
Strontium (Sr)-Total	1.58	DLHC	0.010	mg/L	03-OCT-19	03-OCT-19	R4857778
Sulfur (S)-Total	1350	DLHC	5.0	mg/L	03-OCT-19	03-OCT-19	R4857778
Tellurium (Te)-Total	<0.0020	DLHC	0.0020	mg/L	03-OCT-19	03-OCT-19	R4857778
Thallium (Tl)-Total	<0.00010	DLHC	0.00010	mg/L	03-OCT-19	03-OCT-19	R4857778
Thorium (Th)-Total	<0.0010	DLHC	0.0010	mg/L	03-OCT-19	03-OCT-19	R4857778
Tin (Sn)-Total	<0.0010	DLHC	0.0010	mg/L	03-OCT-19	03-OCT-19	R4857778
Titanium (Ti)-Total	0.0037	DLHC	0.0030	mg/L	03-OCT-19	03-OCT-19	R4857778
Tungsten (W)-Total	<0.0010	DLHC	0.0010	mg/L	03-OCT-19	03-OCT-19	R4857778
Uranium (U)-Total	0.00190	DLHC	0.00010	mg/L	03-OCT-19	03-OCT-19	R4857778
Vanadium (V)-Total	<0.0050	DLHC	0.0050	mg/L	03-OCT-19	03-OCT-19	R4857778
Zinc (Zn)-Total	<0.030	DLHC	0.030	mg/L	03-OCT-19	03-OCT-19	R4857778
Zirconium (Zr)-Total	<0.0020	DLHC	0.0020	mg/L	03-OCT-19	03-OCT-19	R4857778
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					04-OCT-19	R4858748
Dissolved Metals Filtration Location	FIELD					03-OCT-19	R4857747
Aluminum (Al)-Dissolved	<0.050	DLHC	0.050	mg/L	03-OCT-19	03-OCT-19	R4857779
Antimony (Sb)-Dissolved	<0.0010	DLHC	0.0010	mg/L	03-OCT-19	03-OCT-19	R4857779
Arsenic (As)-Dissolved	<0.0010	DLHC	0.0010	mg/L	03-OCT-19	03-OCT-19	R4857779
Barium (Ba)-Dissolved	0.0117	DLHC	0.0010	mg/L	03-OCT-19	03-OCT-19	R4857779
Beryllium (Be)-Dissolved	<0.0010	DLHC	0.0010	mg/L	03-OCT-19	03-OCT-19	R4857779
Bismuth (Bi)-Dissolved	<0.00050	DLHC	0.00050	mg/L	03-OCT-19	03-OCT-19	R4857779
Boron (B)-Dissolved	<0.10	DLHC	0.10	mg/L	03-OCT-19	03-OCT-19	R4857779
Cadmium (Cd)-Dissolved	<0.000050	DLHC	0.000050	mg/L	03-OCT-19	03-OCT-19	R4857779
Calcium (Ca)-Dissolved	509	DLHC	0.50	mg/L	03-OCT-19	03-OCT-19	R4857779
Cesium (Cs)-Dissolved	<0.00010	DLHC	0.00010	mg/L	03-OCT-19	03-OCT-19	R4857779
Chromium (Cr)-Dissolved	<0.0050	DLHC	0.0050	mg/L	03-OCT-19	03-OCT-19	R4857779
Cobalt (Co)-Dissolved	0.0046	DLHC	0.0010	mg/L	03-OCT-19	03-OCT-19	R4857779
Copper (Cu)-Dissolved	0.0050	DLHC	0.0020	mg/L	03-OCT-19	03-OCT-19	R4857779
Iron (Fe)-Dissolved	<0.10	DLHC	0.10	mg/L	03-OCT-19	03-OCT-19	R4857779
Lead (Pb)-Dissolved	<0.00050	DLHC	0.00050	mg/L	03-OCT-19	03-OCT-19	R4857779
Lithium (Li)-Dissolved	0.033	DLHC	0.010	mg/L	03-OCT-19	03-OCT-19	R4857779
Magnesium (Mg)-Dissolved	661	DLHC	0.050	mg/L	03-OCT-19	03-OCT-19	R4857779

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2357232-1 MS-08 Sampled By: KB/LM on 01-OCT-19 @ 09:15 Matrix: WATER							
Dissolved Metals							
Manganese (Mn)-Dissolved	1.10	DLHC	0.0050	mg/L	03-OCT-19	03-OCT-19	R4857779
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	04-OCT-19	04-OCT-19	R4858972
Molybdenum (Mo)-Dissolved	0.00156	DLHC	0.00050	mg/L	03-OCT-19	03-OCT-19	R4857779
Nickel (Ni)-Dissolved	0.0067	DLHC	0.0050	mg/L	03-OCT-19	03-OCT-19	R4857779
Phosphorus (P)-Dissolved	<0.50	DLHC	0.50	mg/L	03-OCT-19	03-OCT-19	R4857779
Potassium (K)-Dissolved	6.97	DLHC	0.50	mg/L	03-OCT-19	03-OCT-19	R4857779
Rubidium (Rb)-Dissolved	0.0079	DLHC	0.0020	mg/L	03-OCT-19	03-OCT-19	R4857779
Selenium (Se)-Dissolved	0.00690	DLHC	0.00050	mg/L	03-OCT-19	03-OCT-19	R4857779
Silicon (Si)-Dissolved	<0.50	DLHC	0.50	mg/L	03-OCT-19	03-OCT-19	R4857779
Silver (Ag)-Dissolved	<0.00050	DLHC	0.00050	mg/L	03-OCT-19	03-OCT-19	R4857779
Sodium (Na)-Dissolved	6.41	DLHC	0.50	mg/L	03-OCT-19	03-OCT-19	R4857779
Strontium (Sr)-Dissolved	1.63	DLHC	0.010	mg/L	03-OCT-19	03-OCT-19	R4857779
Sulfur (S)-Dissolved	1370	DLHC	5.0	mg/L	03-OCT-19	03-OCT-19	R4857779
Tellurium (Te)-Dissolved	<0.0020	DLHC	0.0020	mg/L	03-OCT-19	03-OCT-19	R4857779
Thallium (Tl)-Dissolved	<0.00010	DLHC	0.00010	mg/L	03-OCT-19	03-OCT-19	R4857779
Thorium (Th)-Dissolved	<0.0010	DLHC	0.0010	mg/L	03-OCT-19	03-OCT-19	R4857779
Tin (Sn)-Dissolved	<0.0010	DLHC	0.0010	mg/L	03-OCT-19	03-OCT-19	R4857779
Titanium (Ti)-Dissolved	<0.0030	DLHC	0.0030	mg/L	03-OCT-19	03-OCT-19	R4857779
Tungsten (W)-Dissolved	<0.0010	DLHC	0.0010	mg/L	03-OCT-19	03-OCT-19	R4857779
Uranium (U)-Dissolved	0.00185	DLHC	0.00010	mg/L	03-OCT-19	03-OCT-19	R4857779
Vanadium (V)-Dissolved	<0.0050	DLHC	0.0050	mg/L	03-OCT-19	03-OCT-19	R4857779
Zinc (Zn)-Dissolved	<0.010	DLHC	0.010	mg/L	03-OCT-19	03-OCT-19	R4857779
Zirconium (Zr)-Dissolved	<0.0020	DLHC	0.0020	mg/L	03-OCT-19	03-OCT-19	R4857779
Radiological Parameters							
Ra-226	0.018		0.0035	Bq/L	08-OCT-19	17-OCT-19	R4851666

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

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L2357232-1
Matrix Spike	Lithium (Li)-Dissolved	MS-B	L2357232-1
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L2357232-1
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L2357232-1
Matrix Spike	Potassium (K)-Dissolved	MS-B	L2357232-1
Matrix Spike	Rubidium (Rb)-Dissolved	MS-B	L2357232-1
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L2357232-1
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L2357232-1
Matrix Spike	Sulfur (S)-Dissolved	MS-B	L2357232-1
Matrix Spike	Uranium (U)-Dissolved	MS-B	L2357232-1
Matrix Spike	Calcium (Ca)-Total	MS-B	L2357232-1
Matrix Spike	Iron (Fe)-Total	MS-B	L2357232-1
Matrix Spike	Lithium (Li)-Total	MS-B	L2357232-1
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2357232-1
Matrix Spike	Manganese (Mn)-Total	MS-B	L2357232-1
Matrix Spike	Potassium (K)-Total	MS-B	L2357232-1
Matrix Spike	Rubidium (Rb)-Total	MS-B	L2357232-1
Matrix Spike	Sodium (Na)-Total	MS-B	L2357232-1
Matrix Spike	Strontium (Sr)-Total	MS-B	L2357232-1
Matrix Spike	Sulfur (S)-Total	MS-B	L2357232-1
Matrix Spike	Uranium (U)-Total	MS-B	L2357232-1
Matrix Spike	Ammonia, Total (as N)	MS-B	L2357232-1
Matrix Spike	Phosphorus, Total	MS-B	L2357232-1

Sample Parameter Qualifier key listed:

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLHC	Detection Limit Raised: Dilution required due to high concentration of test analyte(s).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ACY-TITR-TB	Water	Acidity	APHA 2310 B modified

This analysis is carried out using procedures adapted from APHA Method 2310 "Acidity". Acidity is determined by potentiometric titration to a specified endpoint.

ALK-WT	Water	Alkalinity, Total (as CaCO3)	EPA 310.2

This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.

CL-IC-N-WT	Water	Chloride by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

CN-TOT-WT	Water	Cyanide, Total	ISO 14403-2

Total cyanide is determined by the combination of UV digestion and distillation. Cyanide is converted to cyanogen chloride by reacting with chloramine-T, the cyanogen chloride then reacts with a combination of barbituric acid and isonicotinic acid to form a highly colored complex.

When using this method, high levels of thiocyanate in samples can cause false positives at ~1-2% of the thiocyanate concentration. For samples with detectable cyanide analyzed by this method, ALS recommends analysis for thiocyanate to check for this potential interference

DOC-WT	Water	Dissolved Organic Carbon	APHA 5310B

Sample is filtered through a 0.45um filter, then injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic carbon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.

EC-SCREEN-WT	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Reference Information

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

EC-WT	Water	Conductivity	APHA 2510 B

Water samples can be measured directly by immersing the conductivity cell into the sample.

F-IC-N-WT	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-WT	Water	Hardness	APHA 2340 B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-WT	Water	Dissolved Mercury in Water by CVAAS	EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

HG-T-CVAA-WT	Water	Total Mercury in Water by CVAAS	EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

MET-D-CCMS-WT	Water	Dissolved Metals in Water by CRC ICPMS	APHA 3030B/6020A (mod)

Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

MET-T-CCMS-WT	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

NH3-F-WT	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO3-IC-WT	Water	Nitrate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-COL-WT	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is deteremined colourimetrically after persulphate digestion of the sample.

PH-BF	Water	pH	APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

RA226-MMER-FC	Water	Ra226 by Alpha Scint, MDC=0.01 Bq/L	EPA 903.1

SO4-IC-N-WT	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Reference Information

SOLIDS-TDS-BF	Water	Total Dissolved Solids	APHA 2540C

A well-mixed sample is filtered though glass fibres filter. A known volume of the filtrate is evaporated and dried at 180 +/- 2C for 1hr.

SOLIDS-TSS-BF	Water	Suspended solids	APHA 2540 D-Gravimetric

A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104 +/- 1C for a minimum of four hours or until a constant weight is achieved.

TKN-WT	Water	Total Kjeldahl Nitrogen	APHA 4500-Norg D

This analysis is carried out using procedures adapted from APHA Method 4500-Norg "Nitrogen (Organic)". Total Kjeldahl Nitrogen is determined by sample digestion at 380 Celsius with analysis using an automated colorimetric method.

TOC-WT	Water	Total Organic Carbon	APHA 5310B

Sample is injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic cabon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.

TURBIDITY-BF	Water	Turbidity	APHA 2130 B

Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.

** 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
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA
FC	ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
TB	ALS ENVIRONMENTAL - THUNDER BAY, ONTARIO, CANADA
BF	ALS ENVIRONMENTAL - BAFFIN ISLAND, NUNAVUT, 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 weight of sample
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

Workorder: L2357232 Report Date: 24-OCT-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ACY-TITR-TB	**Water**							
Batch R4860194								
WG3183287-8 LCS								
Acidity (as CaCO3)			94.7		%		85-115	06-OCT-19
WG3183287-7 MB								
Acidity (as CaCO3)			<2.0		mg/L		2	06-OCT-19
ALK-WT	**Water**							
Batch R4858920								
WG3181643-4 DUP		**WG3181643-3**						
Alkalinity, Total (as CaCO3)		39	39		mg/L	0.6	20	03-OCT-19
WG3181643-2 LCS								
Alkalinity, Total (as CaCO3)			104.4		%		85-115	03-OCT-19
WG3181643-1 MB								
Alkalinity, Total (as CaCO3)			<10		mg/L		10	03-OCT-19
CL-IC-N-WT	**Water**							
Batch R4858736								
WG3180434-14 DUP		**L2358193-2**						
Chloride (Cl)		1.07	1.07		mg/L	0.5	20	03-OCT-19
WG3180434-12 LCS								
Chloride (Cl)			102.0		%		90-110	03-OCT-19
WG3180434-11 MB								
Chloride (Cl)			<0.50		mg/L		0.5	03-OCT-19
WG3180434-15 MS		**L2358193-2**						
Chloride (Cl)			99.4		%		75-125	03-OCT-19
CN-TOT-WT	**Water**							
Batch R4857839								
WG3177861-3 DUP		**L2355354-9**						
Cyanide, Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	03-OCT-19
WG3177861-2 LCS								
Cyanide, Total			97.4		%		80-120	03-OCT-19
WG3177861-1 MB								
Cyanide, Total			<0.0020		mg/L		0.002	03-OCT-19
WG3177861-4 MS		**L2355354-9**						
Cyanide, Total			96.8		%		70-130	03-OCT-19
DOC-WT	**Water**							
Batch R4858934								
WG3181358-3 DUP		**L2357232-1**						
Dissolved Organic Carbon		3.82	3.99		mg/L	4.3	20	04-OCT-19
WG3181358-2 LCS								

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
DOC-WT	**Water**							
Batch R4858934								
WG3181358-2 LCS								
Dissolved Organic Carbon			105.8		%		80-120	04-OCT-19
WG3181358-1 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	04-OCT-19
WG3181358-4 MS		**L2357232-1**						
Dissolved Organic Carbon			106.2		%		70-130	04-OCT-19
EC-WT	**Water**							
Batch R4858920								
WG3181643-4 DUP		**WG3181643-3**						
Conductivity		5040	5030		umhos/cm	0.2	10	03-OCT-19
WG3181643-2 LCS								
Conductivity			101.4		%		90-110	03-OCT-19
WG3181643-1 MB								
Conductivity			<3.0		umhos/cm		3	03-OCT-19
F-IC-N-WT	**Water**							
Batch R4858736								
WG3180434-14 DUP		**L2358193-2**						
Fluoride (F)		0.042	0.043		mg/L	1.5	20	03-OCT-19
WG3180434-12 LCS								
Fluoride (F)			103.5		%		90-110	03-OCT-19
WG3180434-11 MB								
Fluoride (F)			<0.020		mg/L		0.02	03-OCT-19
WG3180434-15 MS		**L2358193-2**						
Fluoride (F)			99.8		%		75-125	03-OCT-19
HG-D-CVAA-WT	**Water**							
Batch R4858972								
WG3181846-4 DUP		**WG3181846-3**						
Mercury (Hg)-Dissolved		<0.0000050	<0.000005(	RPD-NA	mg/L	N/A	20	04-OCT-19
WG3181846-2 LCS								
Mercury (Hg)-Dissolved			109.0		%		80-120	04-OCT-19
WG3181846-1 MB								
Mercury (Hg)-Dissolved			<0.000005(		mg/L		0.000005	04-OCT-19
WG3181846-6 MS		**WG3181846-5**						
Mercury (Hg)-Dissolved			108.8		%		70-130	04-OCT-19
HG-T-CVAA-WT	**Water**							

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
HG-T-CVAA-WT	**Water**							
Batch R4858970								
WG3181845-4 DUP		**WG3181845-3**						
Mercury (Hg)-Total		<0.0000050	<0.000005C	RPD-NA	mg/L	N/A	20	04-OCT-19
WG3181845-2 LCS								
Mercury (Hg)-Total			106.0		%		80-120	04-OCT-19
WG3181845-1 MB								
Mercury (Hg)-Total			<0.000005C		mg/L		0.000005	04-OCT-19
WG3181845-6 MS		**WG3181845-5**						
Mercury (Hg)-Total			97.3		%		70-130	04-OCT-19
MET-D-CCMS-WT	**Water**							
Batch R4857779								
WG3180561-4 DUP		**WG3180561-3**						
Aluminum (Al)-Dissolved		<0.050	<0.050	RPD-NA	mg/L	N/A	20	03-OCT-19
Antimony (Sb)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	03-OCT-19
Arsenic (As)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	03-OCT-19
Barium (Ba)-Dissolved		0.0117	0.0118		mg/L	0.5	20	03-OCT-19
Beryllium (Be)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	03-OCT-19
Bismuth (Bi)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	03-OCT-19
Boron (B)-Dissolved		<0.10	<0.10	RPD-NA	mg/L	N/A	20	03-OCT-19
Cadmium (Cd)-Dissolved		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	03-OCT-19
Calcium (Ca)-Dissolved		509	495		mg/L	2.9	20	03-OCT-19
Cesium (Cs)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	03-OCT-19
Chromium (Cr)-Dissolved		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	03-OCT-19
Cobalt (Co)-Dissolved		0.0046	0.0045		mg/L	2.5	20	03-OCT-19
Copper (Cu)-Dissolved		0.0050	0.0047		mg/L	6.7	20	03-OCT-19
Iron (Fe)-Dissolved		<0.10	<0.10	RPD-NA	mg/L	N/A	20	03-OCT-19
Lead (Pb)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	03-OCT-19
Lithium (Li)-Dissolved		0.033	0.030		mg/L	9.0	20	03-OCT-19
Magnesium (Mg)-Dissolved		661	651		mg/L	1.5	20	03-OCT-19
Manganese (Mn)-Dissolved		1.10	1.09		mg/L	1.5	20	03-OCT-19
Molybdenum (Mo)-Dissolved		0.00156	0.00160		mg/L	2.6	20	03-OCT-19
Nickel (Ni)-Dissolved		0.0067	0.0066		mg/L	1.8	20	03-OCT-19
Phosphorus (P)-Dissolved		<0.50	<0.50	RPD-NA	mg/L	N/A	20	03-OCT-19
Potassium (K)-Dissolved		6.97	6.84		mg/L	1.8	20	03-OCT-19
Rubidium (Rb)-Dissolved		0.0079	0.0080		mg/L	1.8	20	03-OCT-19
Selenium (Se)-Dissolved		0.00690	0.00635		mg/L	8.3	20	03-OCT-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4857779								
WG3180561-4 DUP		**WG3180561-3**						
Silicon (Si)-Dissolved		<0.50	<0.50	RPD-NA	mg/L	N/A	20	03-OCT-19
Silver (Ag)-Dissolved		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	03-OCT-19
Sodium (Na)-Dissolved		6.41	6.30		mg/L	1.8	20	03-OCT-19
Strontium (Sr)-Dissolved		1.63	1.59		mg/L	2.7	20	03-OCT-19
Sulfur (S)-Dissolved		1370	1350		mg/L	1.8	20	03-OCT-19
Tellurium (Te)-Dissolved		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	03-OCT-19
Thallium (Tl)-Dissolved		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	03-OCT-19
Thorium (Th)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	03-OCT-19
Tin (Sn)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	03-OCT-19
Titanium (Ti)-Dissolved		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	03-OCT-19
Tungsten (W)-Dissolved		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	03-OCT-19
Uranium (U)-Dissolved		0.00185	0.00186		mg/L	0.2	20	03-OCT-19
Vanadium (V)-Dissolved		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	03-OCT-19
Zinc (Zn)-Dissolved		<0.010	<0.010	RPD-NA	mg/L	N/A	20	03-OCT-19
Zirconium (Zr)-Dissolved		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	03-OCT-19
WG3180561-2 LCS								
Aluminum (Al)-Dissolved			107.8		%		80-120	03-OCT-19
Antimony (Sb)-Dissolved			100.7		%		80-120	03-OCT-19
Arsenic (As)-Dissolved			103.2		%		80-120	03-OCT-19
Barium (Ba)-Dissolved			99.2		%		80-120	03-OCT-19
Beryllium (Be)-Dissolved			98.7		%		80-120	03-OCT-19
Bismuth (Bi)-Dissolved			98.0		%		80-120	03-OCT-19
Boron (B)-Dissolved			98.3		%		80-120	03-OCT-19
Cadmium (Cd)-Dissolved			105.7		%		80-120	03-OCT-19
Calcium (Ca)-Dissolved			99.1		%		80-120	03-OCT-19
Cesium (Cs)-Dissolved			98.3		%		80-120	03-OCT-19
Chromium (Cr)-Dissolved			105.9		%		80-120	03-OCT-19
Cobalt (Co)-Dissolved			104.1		%		80-120	03-OCT-19
Copper (Cu)-Dissolved			102.7		%		80-120	03-OCT-19
Iron (Fe)-Dissolved			100.7		%		80-120	03-OCT-19
Lead (Pb)-Dissolved			102.9		%		80-120	03-OCT-19
Lithium (Li)-Dissolved			95.7		%		80-120	03-OCT-19
Magnesium (Mg)-Dissolved			111.1		%		80-120	03-OCT-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4857779								
WG3180561-2 LCS								
Manganese (Mn)-Dissolved			104.4		%		80-120	03-OCT-19
Molybdenum (Mo)-Dissolved			96.1		%		80-120	03-OCT-19
Nickel (Ni)-Dissolved			102.6		%		80-120	03-OCT-19
Phosphorus (P)-Dissolved			108.5		%		80-120	03-OCT-19
Potassium (K)-Dissolved			100.9		%		80-120	03-OCT-19
Rubidium (Rb)-Dissolved			107.6		%		80-120	03-OCT-19
Selenium (Se)-Dissolved			103.3		%		80-120	03-OCT-19
Silicon (Si)-Dissolved			103.6		%		60-140	03-OCT-19
Silver (Ag)-Dissolved			95.6		%		80-120	03-OCT-19
Sodium (Na)-Dissolved			108.8		%		80-120	03-OCT-19
Strontium (Sr)-Dissolved			100.5		%		80-120	03-OCT-19
Sulfur (S)-Dissolved			102.6		%		80-120	03-OCT-19
Tellurium (Te)-Dissolved			95.3		%		80-120	03-OCT-19
Thallium (Tl)-Dissolved			100.1		%		80-120	03-OCT-19
Thorium (Th)-Dissolved			102.2		%		80-120	03-OCT-19
Tin (Sn)-Dissolved			105.4		%		80-120	03-OCT-19
Titanium (Ti)-Dissolved			101.7		%		80-120	03-OCT-19
Tungsten (W)-Dissolved			98.6		%		80-120	03-OCT-19
Uranium (U)-Dissolved			97.1		%		80-120	03-OCT-19
Vanadium (V)-Dissolved			106.3		%		80-120	03-OCT-19
Zinc (Zn)-Dissolved			102.3		%		80-120	03-OCT-19
Zirconium (Zr)-Dissolved			96.3		%		80-120	03-OCT-19
WG3180561-1 MB								
Aluminum (Al)-Dissolved			<0.0050		mg/L		0.005	03-OCT-19
Antimony (Sb)-Dissolved			<0.00010		mg/L		0.0001	03-OCT-19
Arsenic (As)-Dissolved			<0.00010		mg/L		0.0001	03-OCT-19
Barium (Ba)-Dissolved			<0.00010		mg/L		0.0001	03-OCT-19
Beryllium (Be)-Dissolved			<0.00010		mg/L		0.0001	03-OCT-19
Bismuth (Bi)-Dissolved			<0.000050		mg/L		0.00005	03-OCT-19
Boron (B)-Dissolved			<0.010		mg/L		0.01	03-OCT-19
Cadmium (Cd)-Dissolved			<0.000005(		mg/L		0.000005	03-OCT-19
Calcium (Ca)-Dissolved			<0.050		mg/L		0.05	03-OCT-19
Cesium (Cs)-Dissolved			<0.000010		mg/L		0.00001	03-OCT-19
Chromium (Cr)-Dissolved			<0.00050		mg/L		0.0005	03-OCT-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4857779								
WG3180561-1 MB								
Cobalt (Co)-Dissolved			<0.00010		mg/L		0.0001	03-OCT-19
Copper (Cu)-Dissolved			<0.00020		mg/L		0.0002	03-OCT-19
Iron (Fe)-Dissolved			<0.010		mg/L		0.01	03-OCT-19
Lead (Pb)-Dissolved			<0.000050		mg/L		0.00005	03-OCT-19
Lithium (Li)-Dissolved			<0.0010		mg/L		0.001	03-OCT-19
Magnesium (Mg)-Dissolved			<0.0050		mg/L		0.005	03-OCT-19
Manganese (Mn)-Dissolved			<0.00050		mg/L		0.0005	03-OCT-19
Molybdenum (Mo)-Dissolved			<0.000050		mg/L		0.00005	03-OCT-19
Nickel (Ni)-Dissolved			<0.00050		mg/L		0.0005	03-OCT-19
Phosphorus (P)-Dissolved			<0.050		mg/L		0.05	03-OCT-19
Potassium (K)-Dissolved			<0.050		mg/L		0.05	03-OCT-19
Rubidium (Rb)-Dissolved			<0.00020		mg/L		0.0002	03-OCT-19
Selenium (Se)-Dissolved			<0.000050		mg/L		0.00005	03-OCT-19
Silicon (Si)-Dissolved			<0.050		mg/L		0.05	03-OCT-19
Silver (Ag)-Dissolved			<0.000050		mg/L		0.00005	03-OCT-19
Sodium (Na)-Dissolved			<0.050		mg/L		0.05	03-OCT-19
Strontium (Sr)-Dissolved			<0.0010		mg/L		0.001	03-OCT-19
Sulfur (S)-Dissolved			<0.50		mg/L		0.5	03-OCT-19
Tellurium (Te)-Dissolved			<0.00020		mg/L		0.0002	03-OCT-19
Thallium (Tl)-Dissolved			<0.000010		mg/L		0.00001	03-OCT-19
Thorium (Th)-Dissolved			<0.00010		mg/L		0.0001	03-OCT-19
Tin (Sn)-Dissolved			<0.00010		mg/L		0.0001	03-OCT-19
Titanium (Ti)-Dissolved			<0.00030		mg/L		0.0003	03-OCT-19
Tungsten (W)-Dissolved			<0.00010		mg/L		0.0001	03-OCT-19
Uranium (U)-Dissolved			<0.000010		mg/L		0.00001	03-OCT-19
Vanadium (V)-Dissolved			<0.00050		mg/L		0.0005	03-OCT-19
Zinc (Zn)-Dissolved			<0.0010		mg/L		0.001	03-OCT-19
Zirconium (Zr)-Dissolved			<0.00020		mg/L		0.0002	03-OCT-19
WG3180561-5 MS		**WG3180561-3**						
Aluminum (Al)-Dissolved			89.9		%		70-130	03-OCT-19
Antimony (Sb)-Dissolved			92.6		%		70-130	03-OCT-19
Arsenic (As)-Dissolved			100.5		%		70-130	03-OCT-19
Beryllium (Be)-Dissolved			91.1		%		70-130	03-OCT-19
Bismuth (Bi)-Dissolved			90.3		%		70-130	03-OCT-19

Quality Control Report

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Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-D-CCMS-WT	**Water**							
Batch R4857779								
WG3180561-5 MS		**WG3180561-3**						
Cadmium (Cd)-Dissolved			89.7		%		70-130	03-OCT-19
Calcium (Ca)-Dissolved			N/A	MS-B	%		-	03-OCT-19
Cesium (Cs)-Dissolved			91.7		%		70-130	03-OCT-19
Chromium (Cr)-Dissolved			100.1		%		70-130	03-OCT-19
Iron (Fe)-Dissolved			79.7		%		70-130	03-OCT-19
Lead (Pb)-Dissolved			93.9		%		70-130	03-OCT-19
Lithium (Li)-Dissolved			N/A	MS-B	%		-	03-OCT-19
Magnesium (Mg)-Dissolved			N/A	MS-B	%		-	03-OCT-19
Manganese (Mn)-Dissolved			N/A	MS-B	%		-	03-OCT-19
Molybdenum (Mo)-Dissolved			82.1		%		70-130	03-OCT-19
Nickel (Ni)-Dissolved			72.8		%		70-130	03-OCT-19
Phosphorus (P)-Dissolved			106.7		%		70-130	03-OCT-19
Potassium (K)-Dissolved			N/A	MS-B	%		-	03-OCT-19
Rubidium (Rb)-Dissolved			N/A	MS-B	%		-	03-OCT-19
Selenium (Se)-Dissolved			89.5		%		70-130	03-OCT-19
Silver (Ag)-Dissolved			85.9		%		70-130	03-OCT-19
Sodium (Na)-Dissolved			N/A	MS-B	%		-	03-OCT-19
Strontium (Sr)-Dissolved			N/A	MS-B	%		-	03-OCT-19
Sulfur (S)-Dissolved			N/A	MS-B	%		-	03-OCT-19
Tellurium (Te)-Dissolved			86.1		%		70-130	03-OCT-19
Thallium (Tl)-Dissolved			93.4		%		70-130	03-OCT-19
Thorium (Th)-Dissolved			92.0		%		70-130	03-OCT-19
Tin (Sn)-Dissolved			96.2		%		70-130	03-OCT-19
Titanium (Ti)-Dissolved			97.2		%		70-130	03-OCT-19
Tungsten (W)-Dissolved			95.3		%		70-130	03-OCT-19
Uranium (U)-Dissolved			N/A	MS-B	%		-	03-OCT-19
Vanadium (V)-Dissolved			102.9		%		70-130	03-OCT-19
Zinc (Zn)-Dissolved			92.6		%		70-130	03-OCT-19
Zirconium (Zr)-Dissolved			91.9		%		70-130	03-OCT-19
MET-T-CCMS-WT	**Water**							
Batch R4857778								
WG3180546-4 DUP		**WG3180546-3**						
Aluminum (Al)-Total		0.082	0.096		mg/L	16	20	03-OCT-19
Antimony (Sb)-Total		<0.0010	<0.0010					

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4857778								
WG3180546-4 DUP		**WG3180546-3**						
Antimony (Sb)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	03-OCT-19
Arsenic (As)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	03-OCT-19
Barium (Ba)-Total		0.0120	0.0124		mg/L	3.9	20	03-OCT-19
Beryllium (Be)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	03-OCT-19
Bismuth (Bi)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	03-OCT-19
Boron (B)-Total		<0.10	<0.10	RPD-NA	mg/L	N/A	20	03-OCT-19
Cadmium (Cd)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	03-OCT-19
Calcium (Ca)-Total		507	514		mg/L	1.4	20	03-OCT-19
Chromium (Cr)-Total		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	03-OCT-19
Cesium (Cs)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	03-OCT-19
Cobalt (Co)-Total		0.0050	0.0056		mg/L	9.9	20	03-OCT-19
Copper (Cu)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	03-OCT-19
Iron (Fe)-Total		0.42	0.44		mg/L	4.3	20	03-OCT-19
Lead (Pb)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	03-OCT-19
Lithium (Li)-Total		0.030	0.031		mg/L	2.0	20	03-OCT-19
Magnesium (Mg)-Total		664	696		mg/L	4.7	20	03-OCT-19
Manganese (Mn)-Total		1.12	1.17		mg/L	4.6	20	03-OCT-19
Molybdenum (Mo)-Total		0.00141	0.00150		mg/L	6.0	20	03-OCT-19
Nickel (Ni)-Total		0.0071	0.0108	J	mg/L	0.0037	0.01	03-OCT-19
Phosphorus (P)-Total		<0.50	<0.50	RPD-NA	mg/L	N/A	20	03-OCT-19
Potassium (K)-Total		6.91	7.28		mg/L	5.2	20	03-OCT-19
Rubidium (Rb)-Total		0.0082	0.0089		mg/L	8.4	20	03-OCT-19
Selenium (Se)-Total		0.00642	0.00677		mg/L	5.4	20	03-OCT-19
Silicon (Si)-Total		<1.0	<1.0	RPD-NA	mg/L	N/A	20	03-OCT-19
Silver (Ag)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	03-OCT-19
Sodium (Na)-Total		6.41	6.70		mg/L	4.4	20	03-OCT-19
Strontium (Sr)-Total		1.58	1.64		mg/L	3.7	20	03-OCT-19
Sulfur (S)-Total		1350	1420		mg/L	4.8	25	03-OCT-19
Thallium (Tl)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	03-OCT-19
Tellurium (Te)-Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	03-OCT-19
Thorium (Th)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	25	03-OCT-19
Tin (Sn)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	03-OCT-19
Titanium (Ti)-Total		0.0037	0.0033		mg/L			03-OCT-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4857778								
WG3180546-4 DUP		**WG3180546-3**						
Titanium (Ti)-Total		0.0037	0.0033		mg/L	10	20	03-OCT-19
Tungsten (W)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	03-OCT-19
Uranium (U)-Total		0.00190	0.00192		mg/L	1.2	20	03-OCT-19
Vanadium (V)-Total		<0.0050	<0.0050	RPD-NA	mg/L	N/A	20	03-OCT-19
Zinc (Zn)-Total		<0.030	<0.030	RPD-NA	mg/L	N/A	20	03-OCT-19
Zirconium (Zr)-Total		<0.0020	<0.0020	RPD-NA	mg/L	N/A	20	03-OCT-19
WG3180546-2 LCS								
Aluminum (Al)-Total			103.5		%		80-120	03-OCT-19
Antimony (Sb)-Total			97.8		%		80-120	03-OCT-19
Arsenic (As)-Total			97.5		%		80-120	03-OCT-19
Barium (Ba)-Total			96.1		%		80-120	03-OCT-19
Beryllium (Be)-Total			91.3		%		80-120	03-OCT-19
Bismuth (Bi)-Total			90.9		%		80-120	03-OCT-19
Boron (B)-Total			89.6		%		80-120	03-OCT-19
Cadmium (Cd)-Total			99.9		%		80-120	03-OCT-19
Calcium (Ca)-Total			94.2		%		80-120	03-OCT-19
Chromium (Cr)-Total			98.5		%		80-120	03-OCT-19
Cesium (Cs)-Total			95.1		%		80-120	03-OCT-19
Cobalt (Co)-Total			97.4		%		80-120	03-OCT-19
Copper (Cu)-Total			96.7		%		80-120	03-OCT-19
Iron (Fe)-Total			95.0		%		80-120	03-OCT-19
Lead (Pb)-Total			95.2		%		80-120	03-OCT-19
Lithium (Li)-Total			90.5		%		80-120	03-OCT-19
Magnesium (Mg)-Total			102.0		%		80-120	03-OCT-19
Manganese (Mn)-Total			99.1		%		80-120	03-OCT-19
Molybdenum (Mo)-Total			92.0		%		80-120	03-OCT-19
Nickel (Ni)-Total			96.8		%		80-120	03-OCT-19
Phosphorus (P)-Total			98.2		%		70-130	03-OCT-19
Potassium (K)-Total			95.9		%		80-120	03-OCT-19
Rubidium (Rb)-Total			99.2		%		80-120	03-OCT-19
Selenium (Se)-Total			99.0		%		80-120	03-OCT-19
Silicon (Si)-Total			98.6		%		60-140	03-OCT-19
Silver (Ag)-Total			92.0		%		80-120	03-OCT-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4857778								
WG3180546-2 LCS								
Sodium (Na)-Total			104.1		%		80-120	03-OCT-19
Strontium (Sr)-Total			99.7		%		80-120	03-OCT-19
Sulfur (S)-Total			92.6		%		80-120	03-OCT-19
Thallium (Tl)-Total			94.8		%		80-120	03-OCT-19
Tellurium (Te)-Total			90.8		%		80-120	03-OCT-19
Thorium (Th)-Total			95.5		%		70-130	03-OCT-19
Tin (Sn)-Total			97.2		%		80-120	03-OCT-19
Titanium (Ti)-Total			96.3		%		80-120	03-OCT-19
Tungsten (W)-Total			93.2		%		80-120	03-OCT-19
Uranium (U)-Total			91.0		%		80-120	03-OCT-19
Vanadium (V)-Total			100.4		%		80-120	03-OCT-19
Zinc (Zn)-Total			94.8		%		80-120	03-OCT-19
Zirconium (Zr)-Total			91.6		%		80-120	03-OCT-19
WG3180546-1 MB								
Aluminum (Al)-Total			<0.0050		mg/L		0.005	03-OCT-19
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	03-OCT-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	03-OCT-19
Barium (Ba)-Total			<0.00010		mg/L		0.0001	03-OCT-19
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	03-OCT-19
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	03-OCT-19
Boron (B)-Total			<0.010		mg/L		0.01	03-OCT-19
Cadmium (Cd)-Total			<0.000005C		mg/L		0.000005	03-OCT-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	03-OCT-19
Chromium (Cr)-Total			<0.00050		mg/L		0.0005	03-OCT-19
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	03-OCT-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	03-OCT-19
Copper (Cu)-Total			<0.0010		mg/L		0.001	03-OCT-19
Iron (Fe)-Total			<0.010		mg/L		0.01	03-OCT-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	03-OCT-19
Lithium (Li)-Total			<0.0010		mg/L		0.001	03-OCT-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	03-OCT-19
Manganese (Mn)-Total			<0.00050		mg/L		0.0005	03-OCT-19
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	03-OCT-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	03-OCT-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4857778								
WG3180546-1 MB								
Phosphorus (P)-Total			<0.050		mg/L		0.05	03-OCT-19
Potassium (K)-Total			<0.050		mg/L		0.05	03-OCT-19
Rubidium (Rb)-Total			<0.00020		mg/L		0.0002	03-OCT-19
Selenium (Se)-Total			<0.000050		mg/L		0.00005	03-OCT-19
Silicon (Si)-Total			<0.10		mg/L		0.1	03-OCT-19
Silver (Ag)-Total			<0.000050		mg/L		0.00005	03-OCT-19
Sodium (Na)-Total			<0.050		mg/L		0.05	03-OCT-19
Strontium (Sr)-Total			<0.0010		mg/L		0.001	03-OCT-19
Sulfur (S)-Total			<0.50		mg/L		0.5	03-OCT-19
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	03-OCT-19
Tellurium (Te)-Total			<0.00020		mg/L		0.0002	03-OCT-19
Thorium (Th)-Total			<0.00010		mg/L		0.0001	03-OCT-19
Tin (Sn)-Total			<0.00010		mg/L		0.0001	03-OCT-19
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	03-OCT-19
Tungsten (W)-Total			<0.00010		mg/L		0.0001	03-OCT-19
Uranium (U)-Total			<0.000010		mg/L		0.00001	03-OCT-19
Vanadium (V)-Total			<0.00050		mg/L		0.0005	03-OCT-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	03-OCT-19
Zirconium (Zr)-Total			<0.00020		mg/L		0.0002	03-OCT-19
WG3180546-5 MS		**WG3180546-3**						
Aluminum (Al)-Total			108.9		%		70-130	03-OCT-19
Antimony (Sb)-Total			98.3		%		70-130	03-OCT-19
Arsenic (As)-Total			103.3		%		70-130	03-OCT-19
Barium (Ba)-Total			105.3		%		70-130	03-OCT-19
Beryllium (Be)-Total			94.7		%		70-130	03-OCT-19
Bismuth (Bi)-Total			93.6		%		70-130	03-OCT-19
Boron (B)-Total			90.1		%		70-130	03-OCT-19
Cadmium (Cd)-Total			99.5		%		70-130	03-OCT-19
Calcium (Ca)-Total			N/A	MS-B	%		-	03-OCT-19
Chromium (Cr)-Total			103.7		%		70-130	03-OCT-19
Cesium (Cs)-Total			97.2		%		70-130	03-OCT-19
Cobalt (Co)-Total			104.1		%		70-130	03-OCT-19
Copper (Cu)-Total			101.5		%		70-130	03-OCT-19
Iron (Fe)-Total			N/A	MS-B	%		-	03-OCT-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4857778								
WG3180546-5 MS		**WG3180546-3**						
Lead (Pb)-Total			95.4		%		70-130	03-OCT-19
Lithium (Li)-Total			N/A	MS-B	%		-	03-OCT-19
Magnesium (Mg)-Total			N/A	MS-B	%		-	03-OCT-19
Manganese (Mn)-Total			N/A	MS-B	%		-	03-OCT-19
Molybdenum (Mo)-Total			98.0		%		70-130	03-OCT-19
Nickel (Ni)-Total			101.8		%		70-130	03-OCT-19
Phosphorus (P)-Total			98.6		%		70-130	03-OCT-19
Potassium (K)-Total			N/A	MS-B	%		-	03-OCT-19
Rubidium (Rb)-Total			N/A	MS-B	%		-	03-OCT-19
Selenium (Se)-Total			106.8		%		70-130	03-OCT-19
Silicon (Si)-Total			108.3		%		70-130	03-OCT-19
Silver (Ag)-Total			90.0		%		70-130	03-OCT-19
Sodium (Na)-Total			N/A	MS-B	%		-	03-OCT-19
Strontium (Sr)-Total			N/A	MS-B	%		-	03-OCT-19
Sulfur (S)-Total			N/A	MS-B	%		-	03-OCT-19
Thallium (Tl)-Total			95.5		%		70-130	03-OCT-19
Tellurium (Te)-Total			84.7		%		70-130	03-OCT-19
Thorium (Th)-Total			90.4		%		70-130	03-OCT-19
Tin (Sn)-Total			98.7		%		70-130	03-OCT-19
Titanium (Ti)-Total			93.8		%		70-130	03-OCT-19
Tungsten (W)-Total			101.0		%		70-130	03-OCT-19
Uranium (U)-Total			N/A	MS-B	%		-	03-OCT-19
Vanadium (V)-Total			108.0		%		70-130	03-OCT-19
Zinc (Zn)-Total			100.9		%		70-130	03-OCT-19
Zirconium (Zr)-Total			87.0		%		70-130	03-OCT-19
NH3-F-WT	**Water**							
Batch R4858766								
WG3181797-15 DUP		**L2357232-1**						
Ammonia, Total (as N)		3.79	3.77		mg/L	0.4	20	03-OCT-19
WG3181797-14 LCS								
Ammonia, Total (as N)			99.5		%		85-115	03-OCT-19
WG3181797-13 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	03-OCT-19
WG3181797-16 MS		**L2357232-1**						

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NH3-F-WT	**Water**							
Batch R4858766								
WG3181797-16 MS		**L2357232-1**						
Ammonia, Total (as N)			N/A	MS-B	%		-	03-OCT-19
NO3-IC-WT	**Water**							
Batch R4858736								
WG3180434-14 DUP		**L2358193-2**						
Nitrate (as N)		<0.020	<0.020	RPD-NA	mg/L	N/A	20	03-OCT-19
WG3180434-12 LCS								
Nitrate (as N)			101.4		%		90-110	03-OCT-19
WG3180434-11 MB								
Nitrate (as N)			<0.020		mg/L		0.02	03-OCT-19
WG3180434-15 MS		**L2358193-2**						
Nitrate (as N)			96.8		%		75-125	03-OCT-19
P-T-COL-WT	**Water**							
Batch R4858789								
WG3181368-3 DUP		**L2356976-1**						
Phosphorus, Total		0.331	0.328		mg/L	0.9	20	04-OCT-19
WG3181368-2 LCS								
Phosphorus, Total			98.7		%		80-120	04-OCT-19
WG3181368-1 MB								
Phosphorus, Total			<0.0030		mg/L		0.003	04-OCT-19
WG3181368-4 MS		**L2356976-1**						
Phosphorus, Total			N/A	MS-B	%		-	04-OCT-19
PH-BF	**Water**							
Batch R4853590								
WG3178736-2 DUP		**L2356948-1**						
pH		6.82	6.83	J	pH units	0.01	0.2	02-OCT-19
WG3178736-1 LCS								
pH			7.02		pH units		6.9-7.1	02-OCT-19
SO4-IC-N-WT	**Water**							
Batch R4858736								
WG3180434-14 DUP		**L2358193-2**						
Sulfate (SO4)		12.0	12.0		mg/L	0.1	20	03-OCT-19
WG3180434-12 LCS								
Sulfate (SO4)			102.4		%		90-110	03-OCT-19
WG3180434-11 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	03-OCT-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SO4-IC-N-WT	**Water**							
Batch R4858736								
WG3180434-15 MS		**L2358193-2**						
Sulfate (SO4)			100.7		%		75-125	03-OCT-19
SOLIDS-TDS-BF	**Water**							
Batch R4854358								
WG3178747-3 DUP		**L2356948-3**						
Total Dissolved Solids		519	463		mg/L	11	20	02-OCT-19
WG3178747-2 LCS								
Total Dissolved Solids			97.5		%		85-115	02-OCT-19
WG3178747-1 MB								
Total Dissolved Solids			<20		mg/L		20	02-OCT-19
SOLIDS-TSS-BF	**Water**							
Batch R4853597								
WG3178742-3 DUP		**L2357326-1**						
Total Suspended Solids		122	124		mg/L	1.6	25	01-OCT-19
WG3178742-2 LCS								
Total Suspended Solids			98.4		%		85-115	01-OCT-19
WG3178742-1 MB								
Total Suspended Solids			<2.0		mg/L		2	01-OCT-19
TKN-WT	**Water**							
Batch R4859216								
WG3181133-3 DUP		**L2355174-4**						
Total Kjeldahl Nitrogen		0.20	0.21		mg/L	7.8	20	04-OCT-19
WG3181133-2 LCS								
Total Kjeldahl Nitrogen			107.3		%		75-125	04-OCT-19
WG3181133-1 MB								
Total Kjeldahl Nitrogen			<0.15		mg/L		0.15	04-OCT-19
WG3181133-4 MS		**L2355174-4**						
Total Kjeldahl Nitrogen			102.2		%		70-130	04-OCT-19
TOC-WT	**Water**							
Batch R4858932								
WG3181671-3 DUP		**L2357232-1**						
Total Organic Carbon		4.16	4.25		mg/L	2.1	20	04-OCT-19
WG3181671-2 LCS								
Total Organic Carbon			106.3		%		80-120	04-OCT-19
WG3181671-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	04-OCT-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TOC-WT	**Water**							
Batch R4858932								
WG3181671-4 MS		**L2357232-1**						
Total Organic Carbon			104.4		%		70-130	04-OCT-19
TURBIDITY-BF	**Water**							
Batch R4853592								
WG3178737-3 DUP		**L2357383-1**						
Turbidity		4.36	4.34		NTU	0.5	15	02-OCT-19
WG3178737-2 LCS								
Turbidity			110.0		%		85-115	02-OCT-19
WG3178737-1 MB								
Turbidity			<0.10		NTU		0.1	02-OCT-19

Quality Control Report

Workorder: L2357232 Report Date: 24-OCT-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

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

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

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.

Monday, October 21, 2019

Rick Hawthorne
ALS Environmental
60 Northland Rd, Unit 1
Waterloo Canada, ON N2V 2B8

Re: ALS Workorder: 1910111
Project Name:
Project Number: L2357232

Dear Mr. Hawthorne:

One water sample was received from ALS Environmental, on 10/4/2019. The sample was scheduled for the following analysis:

Radium-226

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,

ALS Environmental
Katie M. OBrien
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
AIHA	214884
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280

1910111

Radium-226:
The sample was prepared and analyzed according to the current revision of SOP 783.

All acceptance criteria were met.

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1910111
Client Name: ALS Environmental
Client Project Name:
Client Project Number: L2357232
Client PO Number: L2357232

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
L2357232-1	1910111-1		WATER	01-Oct-19	

1910111

L2357232

WATERLOO

ALS Environmental

Subcontract Request Form

Subcontract To:

ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
225 COMMERCE DRIVE
FORT COLLINS,CO 80524

NOTES: Please reference on final report and invoice: PO# *L2357232*
ALS requires QC data to be provided with your final results.

Please see enclosed 1 **sample(s) in** 1 **Container(s)**

SAMPLE NUMBER	ANALYTICAL REQUIRED	DATE SAMPLED / DUE DATE	Priority Flag
L2357232-1 MS-08		10/ 1/ 2019	E
(1)	Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	10/22/2019	

Subcontract Info Contact: Mary-Lynn Pike (519) 886-6910
Analysis and reporting info contact: Rick Hawthorne
60 NORTHLAND ROAD, UNIT 1
WATERLOO,ON N2V 2B8
Phone: (519) 886-6910 Email: Rick.Hawthorne@alsglobal.com

Please email confirmation of receipt to: **Rick.Hawthorne@alsglobal.com**

Shipped By: _____ Date Shipped: _____

Received By: C Trumble Date Received: 10-4-19 13:15

Verified By: _____ Date Verified: _____

Temperature: _____

Sample Integrity Issues: _____

ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: ALS-Waterloo Workorder No: 1910111

Project Manager: KO Initials: CDK Date: 10-4-19

1.	Are airbills / shipping documents present and/or removable?	DROP OFF	YES	NO
2.	Are custody seals on **shipping** containers intact?	NONE	YES	NO *
3.	Are custody seals on **sample** containers intact?	NONE	YES	NO *
4.	Is there a COC (chain-of-custody) present?		YES	NO *
5.	Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)		YES	NO *
6.	Are short-hold samples present?		YES	NO
7.	Are all samples within holding times for the requested analyses?		YES	NO *
8.	Were all sample containers received intact? (not broken or leaking)		YES	NO *
9.	Is there sufficient sample for the requested analyses?		YES	NO *
10.	Are all samples in the proper containers for the requested analyses?		YES	NO *
11.	Are all aqueous samples preserved correctly, if required? (excluding volatiles)	N/A	YES	NO *
12.	Are all aqueous non-preserved samples pH 4-9?	N/A	YES	NO *
13.	Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm (1/4 inch) diameter? (i.e. size of green pea)	N/A	YES	NO
14.	Were the samples shipped on ice?		YES	NO
15.	Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: #1 (#3) #4	RAD ONLY	YES	NO

Cooler #:	1							
Temperature (°C):	2.6							
No. of custody seals on cooler:	2							
DOT Survey/ Acceptance Information — External µR/hr reading:	12							
Background µR/hr reading:	13							

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? (YES) / NO / NA (If no, see Form 008.)

*** Please provide details here for NO responses to gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.**

All ice was melted.

All client bottle ID's vs ALS lab ID's double-checked by: EE

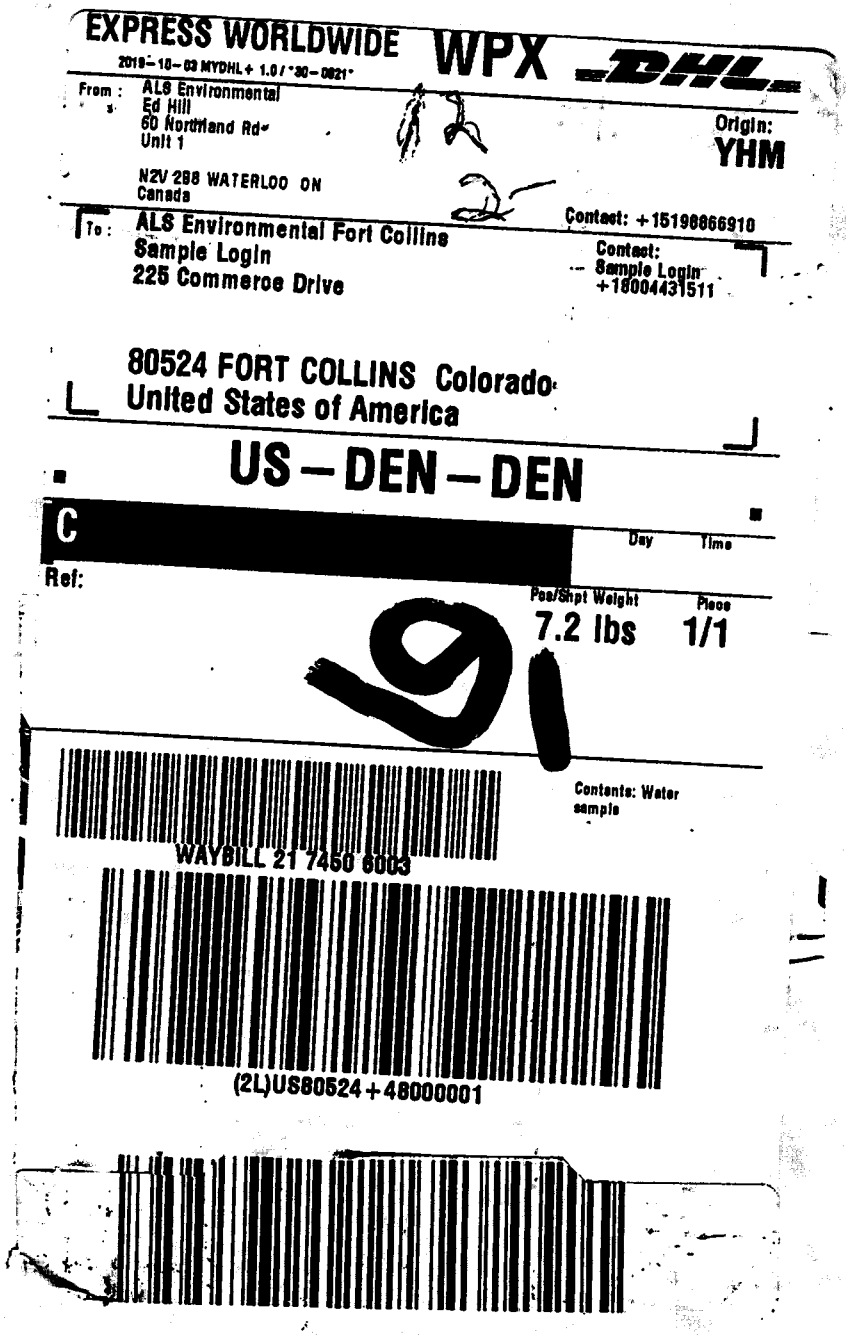
If applicable, was the client contacted? YES / NO / NA Contact: _____ Date/Time: _____

Project Manager Signature / Date: 10/7/19

Form 201r27.xls
(02/11/2019)

*IR Gun #1, VWR SN 170560549
*IR Gun #3, VWR SN 170647571
*IR Gun #4, Oakton, SN 2372220101-0002

1910111


EXPRESS WORLDWIDE
WPX
DHL
2019-10-03 MYDHL+ 1.0 / *30-0821*
From :
ALS Environmental
Ed Hill
60 Northland Rd
Unit 1
N2V 2B8 WATERLOO ON
Canada
Origin:
YHM
Contact: +15196866910
To :
ALS Environmental Fort Collins
Sample Login
225 Commerce Drive
Contact:
Sample Login
+18004431511
80524 FORT COLLINS Colorado
United States of America
US-DEN-DEN
C
Day
Time
Ref:
Pce/Shpt Weight
7.2 lbs
Piece
1/1
Contents: Water sample
WAYBILL 21 7450 6003
(2L)US80524+48000001

Client:	ALS Environmental	**Date:**	*21-Oct-19*
Project:	L2357232	**Work Order:**	1910111
Sample ID:	L2357232-1	**Lab ID:**	1910111-1
Legal Location:		**Matrix:**	WATER
Collection Date:	10/1/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1			**SOP 783**		Prep Date: **10/8/2019**	PrepBy: **TRW**
Ra-226	**0.018 (+/- 0.0075)**		**0.0035**	**BQ/l**	NA	10/17/2019 14:05
Carr: BARIUM	*99.8*		*40-110*	*%REC*	DL = NA	10/17/2019 14:05

Client:	ALS Environmental	**Date:**	*21-Oct-19*
Project:	L2357232	**Work Order:**	1910111
Sample ID:	L2357232-1	**Lab ID:**	1910111-1
Legal Location:		**Matrix:**	WATER
Collection Date:	10/1/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed

Explanation of Qualifiers

Radiochemistry:

- "Report Limit" is the MDC

U or ND - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

Y2 - Chemical Yield outside default limits.

W - DER is greater than Warning Limit of 1.42

* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.
# - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.
G - Sample density differs by more than 15% of LCS density.
D - DER is greater than Control Limit

M - Requested MDC not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS, Matrix Spike Recovery within control limits.

N - Matrix Spike Recovery outside control limits

NC - Not Calculated for duplicate results less than 5 times MDC

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

Inorganics:

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).

U or ND - Indicates that the compound was analyzed for but not detected.

E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.

M - Duplicate injection precision was not met.

N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.

Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.

* - Duplicate analysis (relative percent difference) not within control limits.

S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

Organics:

U or ND - Indicates that the compound was analyzed for but not detected.

B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.

E - Analyte concentration exceeds the upper level of the calibration range.

J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).

A - A tentatively identified compound is a suspected aldol-condensation product.

X - The analyte was diluted below an accurate quantitation level.

* - The spike recovery is equal to or outside the control criteria used.

+ - The relative percent difference (RPD) equals or exceeds the control criteria.

G - A pattern resembling gasoline was detected in this sample.

D - A pattern resembling diesel was detected in this sample.

M - A pattern resembling motor oil was detected in this sample.

C - A pattern resembling crude oil was detected in this sample.

4 - A pattern resembling JP-4 was detected in this sample.

5 - A pattern resembling JP-5 was detected in this sample.

H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.

L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.

Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
- gasoline
- JP-8
- diesel
- mineral spirits
- motor oil
- Stoddard solvent
- bunker C

QC BATCH REPORT

Batch ID: **RE191008-2-1** Instrument ID **Alpha Scin** Method: **Radium-226 by Radon Emanation**

LCS Sample ID: **RE191008-2** Units: **BQ/l** Analysis Date: **10/17/2019 14:40**

Client ID: Run ID: **RE191008-2A** Prep Date: **10/8/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.58 (+/- 0.393)	0.0155	1.72		91.6	67-120					P,Y1,M3
Carr: BARIUM	16500		16380		101	40-110					Y1

LCSD Sample ID: **RE191008-2** Units: **BQ/l** Analysis Date: **10/17/2019 14:40**

Client ID: Run ID: **RE191008-2A** Prep Date: **10/8/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.49 (+/- 0.373)	0.0178	1.72		86.7	67-120		1.58	0.2	2.1	P,Y1,M3
Carr: BARIUM	16500		16390		101	40-110		16500			Y1

MB Sample ID: **RE191008-2** Units: **BQ/l** Analysis Date: **10/17/2019 14:40**

Client ID: Run ID: **RE191008-2A** Prep Date: **10/8/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	0.0023 (+/- 0.0027)	0.0041									Y1,U
Carr: BARIUM	16600		16380		102	40-110					Y1

The following samples were analyzed in this batch: 1910111-1

AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

TOXICITY TEST REPORT

Daphnia magna
EPS 1/RM/14

Work Order : 240458
Sample Number : 60925

SAMPLE IDENTIFICATION

Company :	ALS Laboratory Group, Waterloo	Date Collected :	2019-10-01
Location :	Waterloo ON	Time Collected :	09:15
Job Number :	L2357232-1	Date Received :	2019-10-03
Substance :	L2357232-1 MS-08	Time Received :	11:00
Sampling Method :	Grab	Temperature on Receipt :	6.0 °C
Sampled By :	KB/LM	Date Tested :	2019-10-03
Sample Description :	Clear, light yellow, odourless.		

Test Method : Reference Method for Determining Acute Lethality of Effluents to *Daphnia magna* . Environment Canada EPS 1/RM/14 (Second Edition, December 2000, with February 2016 amendments).

48-HOUR TEST RESULTS

Substance	Effect	Value
Control	Mean Immobility	0.0 %
	Mean Mortality	0.0 %
100%	Mean Immobility	0.0 %
	Mean Mortality	0.0 %

The results reported relate only to the sample tested and as received.

TEST ORGANISM

Species :	*Daphnia magna*	Time to First Brood :	8.2 days
Organism Batch :	Dm19-19	Average Brood Size :	40.1 young
Culture Mortality :	1.9% (previous 7 days)		

TEST CONDITIONS

Sample Treatment :	None	Number of Replicates :	3
pH Adjustment :	None	Organisms / Replicate :	10
Pre-aeration Rate :	~30 mL/min/L	Organisms / Test Level :	30
Pre-aeration Time :	30 minutes	Organism Loading Rate :	15.0 mL/organism
Test Aeration :	None	Impaired Control Organisms :	0.0%
Hardness Adjustment :	None	Test Method Deviation(s) :	None

REFERENCE TOXICANT DATA

Toxicant :	Sodium Chloride	Historical Mean LC50 :	6.4 g/L
Date Tested :	2019-10-01	Warning Limits (± 2SD) :	5.8 - 7.1 g/L
LC50 :	6.9 g/L	Organism Batch :	Dm19-19
95% Confidence Limits :	6.4 - 7.4 g/L	Analyst(s) :	KJW, SV
Statistical Method :	Linear Regression (MLE)		

COMMENTS

All test validity criteria as specified in the test method were satisfied.

Date : 2019-10-08
yyyy-mm-dd

Approved By : *Project Manager*

Work Order : 240458
Sample Number : 60925

TEST DATA

	pH	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	Temperature (°C)	O_2 Saturation (%)*	Hardness (as $CaCO_3$)
Initial Water Chemistry (100%) :	8.7	10.4	5030	20.0	123	468 mg/L

0 HOURS

Date & Time 2019-10-03 14:45
Analyst(s) : SV/KJW (SV)

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O_2	Conductivity	Temperature	O_2 Saturation (%)*	Hardness
100	A	0	0	8.6	9.2	5040	20.0	108	468
100	B	0	0	8.6	9.2	5040	20.0	108	468
100	C	0	0	8.6	9.2	5040	20.0	108	468
Control	A	0	0	8.5	8.6	763	20.0	100	220
Control	B	0	0	8.5	8.6	763	20.0	100	220
Control	C	0	0	8.5	8.6	763	20.0	100	220

Notes:

24 HOURS

Date & Time 2019-10-04 14:45
Analyst(s) : KJW (SV)

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O_2	Conductivity	Temperature
100	A	–	0	–	–	–	20.0
100	B	–	1	–	–	–	20.0
100	C	–	0	–	–	–	20.0
Control	A	–	0	–	–	–	20.0
Control	B	–	0	–	–	–	20.0
Control	C	–	0	–	–	–	20.0

Notes: Test organisms in the 100% concentration appeared to be adhered to gas bubbles on the sides and bottom of the test chamber.

48 HOURS

Date & Time 2019-10-05 14:45
Analyst(s) : SV

Concentration (%)	Replicate	Dead	Immobile	pH	Dissolved O_2	Conductivity	Temperature
100	A	0	0	7.8	8.1	5030	20.0
100	B	0	0	7.9	8.3	5020	20.0
100	C	0	0	7.8	8.3	5020	20.0
Control	A	0	0	8.5	8.4	777	20.0
Control	B	0	0	8.5	8.4	778	20.0
Control	C	0	0	8.5	8.5	789	20.0

Notes: Test organisms in the 100% concentration appeared to be adhered to gas bubbles on the sides and bottom of the test chamber. SV

Number immobile does not include number dead.

– = not measured/not required
* adjusted for temperature and barometric pressure

Test Data Reviewed By : JL
Date : 2019-10-07

AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, ON N0B 2J0
Tel. (519) 763-4412
Fax. (519) 763-4419

TOXICITY TEST REPORT

Rainbow Trout
EPS 1/RM/13

Work Order : 240458
Sample Number : 60925

SAMPLE IDENTIFICATION

Company :	ALS Laboratory Group, Waterloo	Date Collected :	2019-10-01
Location :	Waterloo ON	Time Collected :	09:15
Job Number :	L2357232-1	Date Received :	2019-10-03
Substance :	L2357232-1 MS-08	Time Received :	11:00
Sampling Method :	Grab	Temperature on Receipt :	6.0 °C
Sampled By :	KB/LM	Date Tested :	2019-10-03
Sample Description :	Clear, light yellow, odourless.		

Test Method(s) : Reference Method for Determining Acute Lethality of Liquid Effluents to Rainbow Trout. Environment Canada, EPS 1/RM/13 (2nd Edition, December 2000, with May 2007 and February 2016 amendments).

96-HOUR TEST RESULTS

Substance	Effect	Value
Control	Mean Impairment	0.0 %
	Mean Mortality	0.0 %
100%	Mean Impairment	0.0 %
	Mean Mortality	0.0 %

The results reported relate only to the sample tested and as received.

TEST ORGANISM

Test Organism :	*Oncorhynchus mykiss*	Average Fork Length (± 2 SD) :	39.8 mm (±2.3)
Organism Batch :	T19-18	Range of Fork Lengths :	38 - 42 mm
Control Sample Size :	10	Average Wet Weight (± 2 SD) :	0.49 g (±0.12)
Cumulative stock tank mortality rate :	0.1% (previous 7 days)	Range of Wet Weights :	0.38 - 0.58 g
Control organisms showing stress :	0 (at test completion)	Organism Loading Rate :	0.2 g/L

TEST CONDITIONS

Sample Treatment :	None	Volume Tested (L) :	21
pH Adjustment :	None	Number of Replicates :	1
Test Aeration :	Yes	Organisms Per Replicate :	10
Pre-aeration/Aeration Rate :	6.5 ± 1 mL/min/L	Organisms Per Test Level :	10
Total Pre-Aeration Time :	120 minutes	Test Method Deviation(s) :	None

REFERENCE TOXICANT DATA

Toxicant :	Potassium Chloride	Date Tested :	2019-10-01
Organism Batch :	T19-18	Historical Mean LC50 :	3769 mg/L
LC50 :	3375 mg/L	Warning Limits (± 2SD) :	3141 - 4522 mg/L
95% Confidence Limits :	3021 - 3683 mg/L	Analyst(s) :	KP, ALC, AW
Statistical Method :	Linear Regression (MLE)		

COMMENTS

•All test validity criteria as specified in the test method were satisfied.

Date : 2019-10-08
yyyy-mm-dd

Approved By : *Project Manager*

Work Order : 240458
Sample Number : 60925

TEST DATA

	pH	Dissolved O_2 (mg/L)	Conductivity (µmhos/cm)	Temperature (°C)	O_2 Saturation (%)*
Initial Water Chemistry (100%) :	8.9	10.6	5085	14.0	111
After 30 min pre-aeration :	8.7	9.5	5070	14.0	101

0 HOURS

Date & Time 2019-10-03 14:30
Analyst(s) : MDH

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature	O_2 Saturation*
100%	0	0	8.6	9.3	5072	14.5	100
Control	0	0	8.2	9.3	793	15.0	98

Notes:

24 HOURS

Date & Time 2019-10-04 14:30
Analyst(s) : MDH

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	–	–	–	15.0
Control	0	0	–	–	–	15.0

Notes:

48 HOURS

Date & Time 2019-10-05 14:30
Analyst(s) : AW

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	–	–	–	15.0
Control	0	0	–	–	–	15.0

Notes:

72 HOURS

Date & Time 2019-10-06 14:30
Analyst(s) : AW

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	–	–	–	15.0
Control	0	0	–	–	–	15.0

Notes:

96 HOURS

Date & Time 2019-10-07 14:30
Analyst(s) : ALC(TL)

Concentration	Dead	Impaired	pH	Dissolved O_2	Conductivity	Temperature
100%	0	0	7.5	9.5	5087	14.5
Control	0	0	8.2	9.7	743	14.5

Notes:

"–" = not measured/not required
Number impaired does not include number dead.
* adjusted for temperature and barometric pressure

Test Data Reviewed By : JL
Date : 2019-10-07

CHAIN OF CUSTODY RECORD

AQUATOX

AquaTox Work Order No: 240458

Shipping Address: AquaTox Testing & Consulting Inc.
B-11 Nicholas Beaver Road
Puslinch, Ontario Canada N0B 2J0

Voice: (519) 763-4412 **Fax:** (519) 763-4419

P.O. Number:	4500057496
Field Sampler Name (print):	KB/LM
Signature:	
Affiliation:	Baffinland Iron Mine / ALS Environmental
Sample Storage (prior to shipping):	
Custody Relinquished by:	Kendra Button
Date/Time Shipped:	01-Oct-19/19:00

Client:	ALS Environmental c/o Baffinland Iron Mine Quote # (2019): 162705399-19
Phone:	(519) 886-6910
Fax:	(519) 886-9047
Contact:	Rick Hawthorne (ALS) / Martina Rendas (Aquatox)

Sample Identification					Analyses Requested									Sample Method and Volume		
Date Collected (yyyy-mm-dd)	Time Collected (e.g. 14:30, 24 hr clock)	Sample Name (L255732-1)	AquaTox Sample Number	Temp. on arrival	Rainbow Trout Single Concentration	Rainbow Trout LC50	*Daphnia magna* Single Concentration	*Daphnia magna* LC50	Fathead Minnow Survival & Growth	*Ceriodaphnia dubia* Survival & Reproduction	*Lemna minor* Growth	*Pseudokirchneriella subcapitata* Growth	Other (please specify below)	Grab	Composite	# of Containers and Volume (eg. 2 x 1L, 3 x 10L, etc.)
2019-10-01	09:15	MS-08	60925	6.0	✓		✓							✓		2 x 10LCarboy

For Lab Use Only

Received By: SV/CG/NG/ALC
Date: 2019-10-03
Time: 11:00
Storage Location:
Storage Temp (°C):

Please list any special requests or instructions:

Rush TAT, pH required, daily updates.
Report Distribution: bimcore@alsglobal.com, rick.hawthorne@alsglobal.com

L2357232

WATERLOO

ALS Environmental

Subcontract Request Form

Subcontract To:

AQUATOX TESTING AND CONSULTING
11B NICHOLAS BEAVER ROAD
RR3
GUELPH,ON N1H 6H9

NOTES: Please reference on final report and invoice: PO# *L2357232*
ALS requires QC data to be provided with your final results.

Please see enclosed 1 **sample(s) in** 0 **Container(s)**

SAMPLE NUMBER	ANALYTICAL REQUIRED	DATE SAMPLED / DUE DATE	Priority Flag
L2357232-1 MS-08		10/1/2019	**E**
	Special Request Aquatox (SPECIAL REQUEST2-AQT 14)	10/8/2019	
	Special Request Aquatox (SPECIAL REQUEST-AQT 14)	10/8/2019	

Subcontract Info Contact: Mary-Lynn Pike (519) 886-6910
Analysis and reporting info contact: Rick Hawthorne
60 NORTHLAND ROAD, UNIT 1
WATERLOO,ON N2V 2B8
Phone: (519) 886-6910 Email: Rick.Hawthorne@alsglobal.com

Please email confirmation of receipt to: **Rick.Hawthorne@alsglobal.com**

Shipped By: _____ Date Shipped: _____

Received By: _____ Date Received: _____

Verified By: _____ Date Verified: _____

Temperature: _____

Sample Integrity Issues: _____

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2357232-COFC

COC Number: 15 -

Page 1 of 1

Report To	Contact and company name below will appear on the final report
Company:	Baffinland Iron Mines Corp.
Contact:	Wiliam Bowden and Connor Devereaux
Phone:	647-253-0596 EXT 6016
	Company address below will appear on the final report
Street:	2275 Upper Middle Rd. E., Suite #300
City/Province:	Oakville, ON
Postal Code:	L6H 0C3
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	
Contact:	

Report Format / Distribution

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)

Quality Control (QC) Report with Report ☑ YES ☐ NO

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax bimcore@alsglobal.com

Email 2

Email 3

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax ap@baffinland.com

Email 2 commercial@baffinland.com

Project Information

ALS Account # / Quote #:	23642 /Q42455
Job #:	MS-08 WT TOX
PO / AFE:	4500057496
LSD:	
ALS Lab Work Order # (lab use only)	L2357232

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	
ALS Contact:	Sampler: KB/LM

Select Service Level: ☐ Contact your AM to confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☐ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days)		EMERGENCY	
	4 day [P4] ☐		1 Business day [E1] ☑
	3 day [P3] ☐		Same Day, Weekend or Statutory holiday [E0] ☑
	2 day [P2] ☐		

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	F/P	BIM-MMER-WT	Group 3	Number of Containers
	MS-08	1-Oct-19	9:15	Water		E0	E1	12

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human drinking water use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

1 extra gen chem included.

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☑ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			12.2		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released By: Kendra Button	Date: 01-Oct-19	Time: 13:10	Received by:	Date:	Time:	Received by:	Date: 30CT19	Time: 900

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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 specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

Baffinland Iron Mine's Corporation (Oakville)
ATTN: William Bowden/Connor Devereaux
2275 Upper Middle Rd. E.
Suite #300
Oakville ON L6H 0C3

Date Received: 01-OCT-19
Report Date: 24-OCT-19 13:53 (MT)
Version: FINAL

Client Phone: 647-253-0596

Certificate of Analysis

Lab Work Order #: L2357716

Project P.O. #: 4500057496
Job Reference: MS-08 REFERENCE AND EXPOSURE
C of C Numbers:
Legal Site Desc:

Comments: ADDITIONAL 02-OCT-19 09:37

Rick Hawthorne
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2357716-1 MS-08-DS Sampled By: KB/CD on 01-OCT-19 @ 17:30 Matrix: WATER							
Physical Tests							
Conductivity	199		3.0	umhos/cm		05-OCT-19	R4860731
Hardness (as CaCO3)	83.0	HTC	0.50	mg/L		04-OCT-19	
pH	8.08		0.10	pH units		02-OCT-19	R4853590
Total Suspended Solids	2.8		2.0	mg/L		01-OCT-19	R4853597
Total Dissolved Solids	90	DLDS	13	mg/L		06-OCT-19	R4860417
Turbidity	3.36	PEHT	0.10	NTU		05-OCT-19	R4860048
Anions and Nutrients							
Alkalinity, Total (as CaCO3)	85		10	mg/L		05-OCT-19	R4860731
Ammonia, Total (as N)	<0.010		0.010	mg/L		07-OCT-19	R4860725
Chloride (Cl)	8.20		0.50	mg/L		04-OCT-19	R4859139
Fluoride (F)	0.027		0.020	mg/L		04-OCT-19	R4859139
Nitrate (as N)	0.082		0.020	mg/L		04-OCT-19	R4859139
Total Kjeldahl Nitrogen	<0.15		0.15	mg/L	07-OCT-19	07-OCT-19	R4860925
Phosphorus, Total	0.0050		0.0030	mg/L	04-OCT-19	07-OCT-19	R4860606
Sulfate (SO4)	7.65		0.30	mg/L		04-OCT-19	R4859139
Organic / Inorganic Carbon							
Dissolved Carbon Filtration Location	LAB					04-OCT-19	R4859599
Dissolved Organic Carbon	1.60		0.50	mg/L	04-OCT-19	07-OCT-19	R4860640
Total Organic Carbon	2.19		0.50	mg/L		07-OCT-19	R4860639
Total Metals							
Aluminum (Al)-Total	0.118		0.0050	mg/L	04-OCT-19	04-OCT-19	R4859637
Antimony (Sb)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Arsenic (As)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Barium (Ba)-Total	0.0112		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Beryllium (Be)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Boron (B)-Total	<0.010		0.010	mg/L	04-OCT-19	04-OCT-19	R4859637
Cadmium (Cd)-Total	<0.0000050		0.0000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Calcium (Ca)-Total	16.5		0.050	mg/L	04-OCT-19	04-OCT-19	R4859637
Cesium (Cs)-Total	0.000014		0.000010	mg/L	04-OCT-19	04-OCT-19	R4859637
Chromium (Cr)-Total	<0.00050		0.00050	mg/L	04-OCT-19	04-OCT-19	R4859637
Cobalt (Co)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Copper (Cu)-Total	<0.0010		0.0010	mg/L	04-OCT-19	04-OCT-19	R4859637
Iron (Fe)-Total	0.117		0.010	mg/L	04-OCT-19	04-OCT-19	R4859637
Lead (Pb)-Total	0.000077		0.000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Lithium (Li)-Total	<0.0010		0.0010	mg/L	04-OCT-19	04-OCT-19	R4859637
Magnesium (Mg)-Total	10.2		0.0050	mg/L	04-OCT-19	04-OCT-19	R4859637
Manganese (Mn)-Total	0.00247		0.00050	mg/L	04-OCT-19	04-OCT-19	R4859637
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		07-OCT-19	R4860448
Molybdenum (Mo)-Total	0.000321		0.000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Nickel (Ni)-Total	0.00058		0.00050	mg/L	04-OCT-19	04-OCT-19	R4859637
Phosphorus (P)-Total	<0.050		0.050	mg/L	04-OCT-19	04-OCT-19	R4859637

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2357716-1 MS-08-DS Sampled By: KB/CD on 01-OCT-19 @ 17:30 Matrix: WATER							
Total Metals							
Potassium (K)-Total	1.09		0.050	mg/L	04-OCT-19	04-OCT-19	R4859637
Rubidium (Rb)-Total	0.00154		0.00020	mg/L	04-OCT-19	04-OCT-19	R4859637
Selenium (Se)-Total	<0.000050		0.000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Silicon (Si)-Total	1.26		0.10	mg/L	04-OCT-19	04-OCT-19	R4859637
Silver (Ag)-Total	<0.000050		0.000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Sodium (Na)-Total	3.41		0.050	mg/L	04-OCT-19	04-OCT-19	R4859637
Strontium (Sr)-Total	0.0167		0.0010	mg/L	04-OCT-19	04-OCT-19	R4859637
Sulfur (S)-Total	2.64		0.50	mg/L	04-OCT-19	04-OCT-19	R4859637
Tellurium (Te)-Total	<0.00020		0.00020	mg/L	04-OCT-19	04-OCT-19	R4859637
Thallium (Tl)-Total	<0.000010		0.000010	mg/L	04-OCT-19	04-OCT-19	R4859637
Thorium (Th)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Tin (Sn)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Titanium (Ti)-Total	0.00541		0.00030	mg/L	04-OCT-19	04-OCT-19	R4859637
Tungsten (W)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Uranium (U)-Total	0.00415		0.000010	mg/L	04-OCT-19	04-OCT-19	R4859637
Vanadium (V)-Total	<0.00050		0.00050	mg/L	04-OCT-19	04-OCT-19	R4859637
Zinc (Zn)-Total	<0.0030		0.0030	mg/L	04-OCT-19	04-OCT-19	R4859637
Zirconium (Zr)-Total	0.00026		0.00020	mg/L	04-OCT-19	04-OCT-19	R4859637
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					04-OCT-19	R4859193
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	04-OCT-19	07-OCT-19	R4860451
Radiological Parameters							
Ra-226	0.0094		0.0046	Bq/L	10-OCT-19	21-OCT-19	R4851666
L2357716-2 MS-08-US Sampled By: KB/CD on 01-OCT-19 @ 18:00 Matrix: WATER							
Physical Tests							
Conductivity	192		3.0	umhos/cm		05-OCT-19	R4860731
Hardness (as CaCO3)	81.1	HTC	0.50	mg/L		04-OCT-19	
pH	8.08		0.10	pH units		02-OCT-19	R4853590
Total Suspended Solids	2.0		2.0	mg/L		01-OCT-19	R4853597
Total Dissolved Solids	85	DLDS	13	mg/L		06-OCT-19	R4860417
Turbidity	1.88	PEHT	0.10	NTU		05-OCT-19	R4860048
Anions and Nutrients							
Alkalinity, Total (as CaCO3)	85		10	mg/L		05-OCT-19	R4860731
Ammonia, Total (as N)	<0.010		0.010	mg/L		07-OCT-19	R4860725
Chloride (Cl)	8.41		0.50	mg/L		04-OCT-19	R4859139
Fluoride (F)	0.030		0.020	mg/L		04-OCT-19	R4859139
Nitrate (as N)	0.074		0.020	mg/L		04-OCT-19	R4859139
Total Kjeldahl Nitrogen	<0.15		0.15	mg/L	07-OCT-19	07-OCT-19	R4860925
Phosphorus, Total	0.0042		0.0030	mg/L	04-OCT-19	07-OCT-19	R4860606
Sulfate (SO4)	5.26		0.30	mg/L		04-OCT-19	R4859139

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2357716-2 MS-08-US Sampled By: KB/CD on 01-OCT-19 @ 18:00 Matrix: WATER							
Anions and Nutrients							
Organic / Inorganic Carbon							
Dissolved Carbon Filtration Location	LAB					04-OCT-19	R4859599
Dissolved Organic Carbon	1.68		0.50	mg/L	04-OCT-19	07-OCT-19	R4860640
Total Organic Carbon	2.22		0.50	mg/L		07-OCT-19	R4860639
Total Metals							
Aluminum (Al)-Total	0.0844		0.0050	mg/L	04-OCT-19	04-OCT-19	R4859637
Antimony (Sb)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Arsenic (As)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Barium (Ba)-Total	0.0111		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Beryllium (Be)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Bismuth (Bi)-Total	<0.000050		0.000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Boron (B)-Total	<0.010		0.010	mg/L	04-OCT-19	04-OCT-19	R4859637
Cadmium (Cd)-Total	<0.0000050		0.0000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Calcium (Ca)-Total	16.6		0.050	mg/L	04-OCT-19	04-OCT-19	R4859637
Cesium (Cs)-Total	0.000011		0.000010	mg/L	04-OCT-19	04-OCT-19	R4859637
Chromium (Cr)-Total	<0.00050		0.00050	mg/L	04-OCT-19	04-OCT-19	R4859637
Cobalt (Co)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Copper (Cu)-Total	0.0010		0.0010	mg/L	04-OCT-19	04-OCT-19	R4859637
Iron (Fe)-Total	0.066		0.010	mg/L	04-OCT-19	04-OCT-19	R4859637
Lead (Pb)-Total	0.000062		0.000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Lithium (Li)-Total	<0.0010		0.0010	mg/L	04-OCT-19	04-OCT-19	R4859637
Magnesium (Mg)-Total	9.63		0.0050	mg/L	04-OCT-19	04-OCT-19	R4859637
Manganese (Mn)-Total	0.00121		0.00050	mg/L	04-OCT-19	04-OCT-19	R4859637
Mercury (Hg)-Total	<0.0000050		0.0000050	mg/L		07-OCT-19	R4860448
Molybdenum (Mo)-Total	0.000364		0.000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Nickel (Ni)-Total	<0.00050		0.00050	mg/L	04-OCT-19	04-OCT-19	R4859637
Phosphorus (P)-Total	<0.050		0.050	mg/L	04-OCT-19	04-OCT-19	R4859637
Potassium (K)-Total	1.10		0.050	mg/L	04-OCT-19	04-OCT-19	R4859637
Rubidium (Rb)-Total	0.00161		0.00020	mg/L	04-OCT-19	04-OCT-19	R4859637
Selenium (Se)-Total	<0.000050		0.000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Silicon (Si)-Total	1.31		0.10	mg/L	04-OCT-19	04-OCT-19	R4859637
Silver (Ag)-Total	<0.000050		0.000050	mg/L	04-OCT-19	04-OCT-19	R4859637
Sodium (Na)-Total	3.68		0.050	mg/L	04-OCT-19	04-OCT-19	R4859637
Strontium (Sr)-Total	0.0170		0.0010	mg/L	04-OCT-19	04-OCT-19	R4859637
Sulfur (S)-Total	1.92		0.50	mg/L	04-OCT-19	04-OCT-19	R4859637
Tellurium (Te)-Total	<0.00020		0.00020	mg/L	04-OCT-19	04-OCT-19	R4859637
Thallium (Tl)-Total	<0.000010		0.000010	mg/L	04-OCT-19	04-OCT-19	R4859637
Thorium (Th)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Tin (Sn)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637
Titanium (Ti)-Total	0.00375		0.00030	mg/L	04-OCT-19	04-OCT-19	R4859637
Tungsten (W)-Total	<0.00010		0.00010	mg/L	04-OCT-19	04-OCT-19	R4859637

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample Details/Parameters	Result	Qualifier*	D.L.	Units	Extracted	Analyzed	Batch
L2357716-2 MS-08-US Sampled By: KB/CD on 01-OCT-19 @ 18:00 Matrix: WATER							
Total Metals							
Uranium (U)-Total	0.00450		0.000010	mg/L	04-OCT-19	04-OCT-19	R4859637
Vanadium (V)-Total	<0.00050		0.00050	mg/L	04-OCT-19	04-OCT-19	R4859637
Zinc (Zn)-Total	<0.0030		0.0030	mg/L	04-OCT-19	04-OCT-19	R4859637
Zirconium (Zr)-Total	0.00026		0.00020	mg/L	04-OCT-19	04-OCT-19	R4859637
Dissolved Metals							
Dissolved Mercury Filtration Location	FIELD					04-OCT-19	R4859193
Mercury (Hg)-Dissolved	<0.0000050		0.0000050	mg/L	04-OCT-19	07-OCT-19	R4860451
Radiological Parameters							
Ra-226	0.0081		0.0059	Bq/L	10-OCT-19	21-OCT-19	R4851666

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

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Calcium (Ca)-Total	MS-B	L2357716-1, -2
Matrix Spike	Iron (Fe)-Total	MS-B	L2357716-1, -2
Matrix Spike	Magnesium (Mg)-Total	MS-B	L2357716-1, -2
Matrix Spike	Silicon (Si)-Total	MS-B	L2357716-1, -2
Matrix Spike	Sodium (Na)-Total	MS-B	L2357716-1, -2
Matrix Spike	Strontium (Sr)-Total	MS-B	L2357716-1, -2
Matrix Spike	Uranium (U)-Total	MS-B	L2357716-1, -2

Sample Parameter Qualifier key listed:

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
HTC	Hardness was calculated from Total Ca and/or Mg concentrations and may be biased high (dissolved Ca/Mg results unavailable).
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
PEHT	Parameter Exceeded Recommended Holding Time Prior to Analysis

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-WT	Water	Alkalinity, Total (as CaCO3)	EPA 310.2

This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.

CL-IC-N-WT	Water	Chloride by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

DOC-WT	Water	Dissolved Organic Carbon	APHA 5310B

Sample is filtered through a 0.45um filter, then injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic carbon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.

EC-SCREEN-WT	Water	Conductivity Screen (Internal Use Only)	APHA 2510

Qualitative analysis of conductivity where required during preparation of other tests - e.g. TDS, metals, etc.

EC-WT	Water	Conductivity	APHA 2510 B

Water samples can be measured directly by immersing the conductivity cell into the sample.

F-IC-N-WT	Water	Fluoride in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

HARDNESS-CALC-WT	Water	Hardness	APHA 2340 B

Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.

HG-D-CVAA-WT	Water	Dissolved Mercury in Water by CVAAS	EPA 1631E (mod)

Water samples are filtered (0.45 um), preserved with hydrochloric acid, then undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

HG-T-CVAA-WT	Water	Total Mercury in Water by CVAAS	EPA 1631E (mod)

Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS.

MET-T-CCMS-WT	Water	Total Metals in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Water samples are digested with nitric and hydrochloric acids, and analyzed by CRC ICPMS.

Reference Information

Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analysis conducted in accordance with the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act (July 1, 2011).

NH3-F-WT	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

NO3-IC-WT	Water	Nitrate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

P-T-COL-WT	Water	Total P in Water by Colour	APHA 4500-P PHOSPHORUS

This analysis is carried out using procedures adapted from APHA Method 4500-P "Phosphorus". Total Phosphorus is deteremined colourimetrically after persulphate digestion of the sample.

PH-BF	Water	pH	APHA 4500 H-Electrode

Water samples are analyzed directly by a calibrated pH meter.

RA226-MMER-FC	Water	Ra226 by Alpha Scint, MDC=0.01 Bq/L	EPA 903.1
SO4-IC-N-WT	Water	Sulfate in Water by IC	EPA 300.1 (mod)

Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

SOLIDS-TDS-WT	Water	Total Dissolved Solids	APHA 2540C

This analysis is carried out using procedures adapted from APHA Method 2540 "Solids". Solids are determined gravimetrically. Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, TDS is determined by evaporating the filtrate to dryness at 180 degrees celsius.

SOLIDS-TSS-BF	Water	Suspended solids	APHA 2540 D-Gravimetric

A well-mixed sample is filtered through a weighed standard glass fibre filter and the residue retained is dried in an oven at 104 +/- 1C for a minimum of four hours or until a constant weight is achieved.

TKN-WT	Water	Total Kjeldahl Nitrogen	APHA 4500-Norg D

This analysis is carried out using procedures adapted from APHA Method 4500-Norg "Nitrogen (Organic)". Total Kjeldahl Nitrogen is determined by sample digestion at 380 Celsius with analysis using an automated colorimetric method.

TOC-WT	Water	Total Organic Carbon	APHA 5310B

Sample is injected into a heated reaction chamber which is packed with an oxidative catalyst. The water is vaporized and the organic cabon is oxidized to carbon dioxide. The carbon dioxide is transported in a carrier gas and is measured by a non-dispersive infrared detector.

TURBIDITY-WT	Water	Turbidity	APHA 2130 B

Sample result is based on a comparison of the intensity of the light scattered by the sample under defined conditions with the intensity of light scattered by a standard reference suspension under the same conditions. Sample readings are obtained from a Nephelometer.

** 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
WT	ALS ENVIRONMENTAL - WATERLOO, ONTARIO, CANADA
FC	ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
BF	ALS ENVIRONMENTAL - BAFFIN ISLAND, NUNAVUT, CANADA

Chain of Custody Numbers:

Reference Information

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 weight of sample
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

Workorder: L2357716 Report Date: 24-OCT-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
ALK-WT	**Water**							
Batch R4860731								
WG3183025-4 DUP		**WG3183025-3**						
Alkalinity, Total (as CaCO3)		85	85		mg/L	0.4	20	05-OCT-19
WG3183025-2 LCS								
Alkalinity, Total (as CaCO3)			106.0		%		85-115	05-OCT-19
WG3183025-1 MB								
Alkalinity, Total (as CaCO3)			<10		mg/L		10	05-OCT-19
CL-IC-N-WT	**Water**							
Batch R4859139								
WG3181734-24 DUP		**WG3181734-23**						
Chloride (Cl)		6.98	6.98		mg/L	0.0	20	04-OCT-19
WG3181734-22 LCS								
Chloride (Cl)			102.1		%		90-110	04-OCT-19
WG3181734-21 MB								
Chloride (Cl)			<0.50		mg/L		0.5	04-OCT-19
WG3181734-25 MS		**WG3181734-23**						
Chloride (Cl)			100.1		%		75-125	04-OCT-19
DOC-WT	**Water**							
Batch R4860640								
WG3182798-7 DUP		**L2356948-1**						
Dissolved Organic Carbon		14.2	14.8		mg/L	4.0	20	07-OCT-19
WG3182798-6 LCS								
Dissolved Organic Carbon			96.4		%		80-120	07-OCT-19
WG3182798-5 MB								
Dissolved Organic Carbon			<0.50		mg/L		0.5	07-OCT-19
WG3182798-8 MS		**L2356948-1**						
Dissolved Organic Carbon			93.6		%		70-130	07-OCT-19
EC-WT	**Water**							
Batch R4860731								
WG3183025-4 DUP		**WG3183025-3**						
Conductivity		199	196		umhos/cm	1.4	10	05-OCT-19
WG3183025-2 LCS								
Conductivity			100.4		%		90-110	05-OCT-19
WG3183025-1 MB								
Conductivity			<3.0		umhos/cm		3	05-OCT-19
F-IC-N-WT	**Water**							

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
F-IC-N-WT	**Water**							
Batch R4859139								
WG3181734-24 DUP		**WG3181734-23**						
Fluoride (F)		0.025	0.025		mg/L	0.1	20	04-OCT-19
WG3181734-22 LCS								
Fluoride (F)			103.8		%		90-110	04-OCT-19
WG3181734-21 MB								
Fluoride (F)			<0.020		mg/L		0.02	04-OCT-19
WG3181734-25 MS		**WG3181734-23**						
Fluoride (F)			101.9		%		75-125	04-OCT-19
HG-D-CVAA-WT	**Water**							
Batch R4860451								
WG3182354-3 DUP		**L2357716-1**						
Mercury (Hg)-Dissolved		<0.0000050	<0.000005C	RPD-NA	mg/L	N/A	20	07-OCT-19
WG3182354-2 LCS								
Mercury (Hg)-Dissolved			99.8		%		80-120	07-OCT-19
WG3182354-1 MB								
Mercury (Hg)-Dissolved			<0.000005C		mg/L		0.000005	07-OCT-19
WG3182354-4 MS		**L2357716-2**						
Mercury (Hg)-Dissolved			95.8		%		70-130	07-OCT-19
HG-T-CVAA-WT	**Water**							
Batch R4860448								
WG3182348-3 DUP		**L2357716-1**						
Mercury (Hg)-Total		<0.0000050	<0.000005C	RPD-NA	mg/L	N/A	20	07-OCT-19
WG3182348-2 LCS								
Mercury (Hg)-Total			98.3		%		80-120	07-OCT-19
WG3182348-1 MB								
Mercury (Hg)-Total			<0.000005C		mg/L		0.000005	07-OCT-19
WG3182348-4 MS		**L2357716-2**						
Mercury (Hg)-Total			98.8		%		70-130	07-OCT-19
MET-T-CCMS-WT	**Water**							
Batch R4859637								
WG3182336-4 DUP		**WG3182336-3**						
Aluminum (Al)-Total		0.118	0.114		mg/L	3.4	20	04-OCT-19
Antimony (Sb)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	04-OCT-19
Arsenic (As)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	04-OCT-19
Barium (Ba)-Total		0.0112	0.0109		mg/L	2.4	20	04-OCT-19
Beryllium (Be)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	04-OCT-19
Bismuth (Bi)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	04-OCT-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4859637								
WG3182336-4 DUP		**WG3182336-3**						
Boron (B)-Total		<0.010	<0.010	RPD-NA	mg/L	N/A	20	04-OCT-19
Cadmium (Cd)-Total		<0.0000050	<0.000005(	RPD-NA	mg/L	N/A	20	04-OCT-19
Calcium (Ca)-Total		16.5	16.5		mg/L	0.4	20	04-OCT-19
Chromium (Cr)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	04-OCT-19
Cesium (Cs)-Total		0.000014	0.000015		mg/L	4.3	20	04-OCT-19
Cobalt (Co)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	04-OCT-19
Copper (Cu)-Total		<0.0010	0.0010	RPD-NA	mg/L	N/A	20	04-OCT-19
Iron (Fe)-Total		0.117	0.115		mg/L	2.2	20	04-OCT-19
Lead (Pb)-Total		0.000077	0.000080		mg/L	4.1	20	04-OCT-19
Lithium (Li)-Total		<0.0010	<0.0010	RPD-NA	mg/L	N/A	20	04-OCT-19
Magnesium (Mg)-Total		10.2	10.1		mg/L	1.0	20	04-OCT-19
Manganese (Mn)-Total		0.00247	0.00246		mg/L	0.2	20	04-OCT-19
Molybdenum (Mo)-Total		0.000321	0.000323		mg/L	0.8	20	04-OCT-19
Nickel (Ni)-Total		0.00058	0.00057		mg/L	1.0	20	04-OCT-19
Phosphorus (P)-Total		<0.050	<0.050	RPD-NA	mg/L	N/A	20	04-OCT-19
Potassium (K)-Total		1.09	1.09		mg/L	0.1	20	04-OCT-19
Rubidium (Rb)-Total		0.00154	0.00158		mg/L	2.1	20	04-OCT-19
Selenium (Se)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	04-OCT-19
Silicon (Si)-Total		1.26	1.29		mg/L	2.6	20	04-OCT-19
Silver (Ag)-Total		<0.000050	<0.000050	RPD-NA	mg/L	N/A	20	04-OCT-19
Sodium (Na)-Total		3.41	3.39		mg/L	0.5	20	04-OCT-19
Strontium (Sr)-Total		0.0167	0.0167		mg/L	0.2	20	04-OCT-19
Sulfur (S)-Total		2.64	2.70		mg/L	2.2	25	04-OCT-19
Thallium (Tl)-Total		<0.000010	<0.000010	RPD-NA	mg/L	N/A	20	04-OCT-19
Tellurium (Te)-Total		<0.00020	<0.00020	RPD-NA	mg/L	N/A	20	04-OCT-19
Thorium (Th)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	25	04-OCT-19
Tin (Sn)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	04-OCT-19
Titanium (Ti)-Total		0.00541	0.00550		mg/L	1.5	20	04-OCT-19
Tungsten (W)-Total		<0.00010	<0.00010	RPD-NA	mg/L	N/A	20	04-OCT-19
Uranium (U)-Total		0.00415	0.00407		mg/L	2.0	20	04-OCT-19
Vanadium (V)-Total		<0.00050	<0.00050	RPD-NA	mg/L	N/A	20	04-OCT-19
Zinc (Zn)-Total		<0.0030	<0.0030	RPD-NA	mg/L	N/A	20	04-OCT-19
Zirconium (Zr)-Total		0.00026	0.00028		mg/L			04-OCT-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4859637								
WG3182336-4 DUP		**WG3182336-3**						
Zirconium (Zr)-Total		0.00026	0.00028		mg/L	5.3	20	04-OCT-19
WG3182336-2 LCS								
Aluminum (Al)-Total			106.5		%		80-120	04-OCT-19
Antimony (Sb)-Total			103.5		%		80-120	04-OCT-19
Arsenic (As)-Total			100.9		%		80-120	04-OCT-19
Barium (Ba)-Total			104.0		%		80-120	04-OCT-19
Beryllium (Be)-Total			100.9		%		80-120	04-OCT-19
Bismuth (Bi)-Total			98.0		%		80-120	04-OCT-19
Boron (B)-Total			98.7		%		80-120	04-OCT-19
Cadmium (Cd)-Total			102.5		%		80-120	04-OCT-19
Calcium (Ca)-Total			100.1		%		80-120	04-OCT-19
Chromium (Cr)-Total			102.0		%		80-120	04-OCT-19
Cesium (Cs)-Total			99.3		%		80-120	04-OCT-19
Cobalt (Co)-Total			101.5		%		80-120	04-OCT-19
Copper (Cu)-Total			101.0		%		80-120	04-OCT-19
Iron (Fe)-Total			101.2		%		80-120	04-OCT-19
Lead (Pb)-Total			100.9		%		80-120	04-OCT-19
Lithium (Li)-Total			99.9		%		80-120	04-OCT-19
Magnesium (Mg)-Total			102.4		%		80-120	04-OCT-19
Manganese (Mn)-Total			102.1		%		80-120	04-OCT-19
Molybdenum (Mo)-Total			101.4		%		80-120	04-OCT-19
Nickel (Ni)-Total			99.9		%		80-120	04-OCT-19
Phosphorus (P)-Total			106.9		%		70-130	04-OCT-19
Potassium (K)-Total			103.1		%		80-120	04-OCT-19
Rubidium (Rb)-Total			105.0		%		80-120	04-OCT-19
Selenium (Se)-Total			99.4		%		80-120	04-OCT-19
Silicon (Si)-Total			105.9		%		60-140	04-OCT-19
Silver (Ag)-Total			102.5		%		80-120	04-OCT-19
Sodium (Na)-Total			101.8		%		80-120	04-OCT-19
Strontium (Sr)-Total			102.1		%		80-120	04-OCT-19
Sulfur (S)-Total			102.9		%		80-120	04-OCT-19
Thallium (Tl)-Total			99.3		%		80-120	04-OCT-19
Tellurium (Te)-Total			100.8		%		80-120	04-OCT-19
Thorium (Th)-Total			98.0		%		70-130	04-OCT-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4859637								
WG3182336-2 LCS								
Tin (Sn)-Total			101.0		%		80-120	04-OCT-19
Titanium (Ti)-Total			98.3		%		80-120	04-OCT-19
Tungsten (W)-Total			100.5		%		80-120	04-OCT-19
Uranium (U)-Total			101.6		%		80-120	04-OCT-19
Vanadium (V)-Total			103.3		%		80-120	04-OCT-19
Zinc (Zn)-Total			99.2		%		80-120	04-OCT-19
Zirconium (Zr)-Total			101.2		%		80-120	04-OCT-19
WG3182336-1 MB								
Aluminum (Al)-Total			<0.0050		mg/L		0.005	04-OCT-19
Antimony (Sb)-Total			<0.00010		mg/L		0.0001	04-OCT-19
Arsenic (As)-Total			<0.00010		mg/L		0.0001	04-OCT-19
Barium (Ba)-Total			<0.00010		mg/L		0.0001	04-OCT-19
Beryllium (Be)-Total			<0.00010		mg/L		0.0001	04-OCT-19
Bismuth (Bi)-Total			<0.000050		mg/L		0.00005	04-OCT-19
Boron (B)-Total			<0.010		mg/L		0.01	04-OCT-19
Cadmium (Cd)-Total			<0.000005(		mg/L		0.000005	04-OCT-19
Calcium (Ca)-Total			<0.050		mg/L		0.05	04-OCT-19
Chromium (Cr)-Total			<0.00050		mg/L		0.0005	04-OCT-19
Cesium (Cs)-Total			<0.000010		mg/L		0.00001	04-OCT-19
Cobalt (Co)-Total			<0.00010		mg/L		0.0001	04-OCT-19
Copper (Cu)-Total			<0.0010		mg/L		0.001	04-OCT-19
Iron (Fe)-Total			<0.010		mg/L		0.01	04-OCT-19
Lead (Pb)-Total			<0.000050		mg/L		0.00005	04-OCT-19
Lithium (Li)-Total			<0.0010		mg/L		0.001	04-OCT-19
Magnesium (Mg)-Total			<0.0050		mg/L		0.005	04-OCT-19
Manganese (Mn)-Total			<0.00050		mg/L		0.0005	04-OCT-19
Molybdenum (Mo)-Total			<0.000050		mg/L		0.00005	04-OCT-19
Nickel (Ni)-Total			<0.00050		mg/L		0.0005	04-OCT-19
Phosphorus (P)-Total			<0.050		mg/L		0.05	04-OCT-19
Potassium (K)-Total			<0.050		mg/L		0.05	04-OCT-19
Rubidium (Rb)-Total			<0.00020		mg/L		0.0002	04-OCT-19
Selenium (Se)-Total			<0.000050		mg/L		0.00005	04-OCT-19
Silicon (Si)-Total			<0.10		mg/L		0.1	04-OCT-19
Silver (Ag)-Total			<0.000050		mg/L		0.00005	04-OCT-19

Quality Control Report

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Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4859637								
WG3182336-1 MB								
Sodium (Na)-Total			<0.050		mg/L		0.05	04-OCT-19
Strontium (Sr)-Total			<0.0010		mg/L		0.001	04-OCT-19
Sulfur (S)-Total			<0.50		mg/L		0.5	04-OCT-19
Thallium (Tl)-Total			<0.000010		mg/L		0.00001	04-OCT-19
Tellurium (Te)-Total			<0.00020		mg/L		0.0002	04-OCT-19
Thorium (Th)-Total			<0.00010		mg/L		0.0001	04-OCT-19
Tin (Sn)-Total			<0.00010		mg/L		0.0001	04-OCT-19
Titanium (Ti)-Total			<0.00030		mg/L		0.0003	04-OCT-19
Tungsten (W)-Total			<0.00010		mg/L		0.0001	04-OCT-19
Uranium (U)-Total			<0.000010		mg/L		0.00001	04-OCT-19
Vanadium (V)-Total			<0.00050		mg/L		0.0005	04-OCT-19
Zinc (Zn)-Total			<0.0030		mg/L		0.003	04-OCT-19
Zirconium (Zr)-Total			<0.00020		mg/L		0.0002	04-OCT-19
WG3182336-5 MS		**WG3182336-6**						
Aluminum (Al)-Total			90.4		%		70-130	04-OCT-19
Antimony (Sb)-Total			98.3		%		70-130	04-OCT-19
Arsenic (As)-Total			95.7		%		70-130	04-OCT-19
Barium (Ba)-Total			91.9		%		70-130	04-OCT-19
Beryllium (Be)-Total			94.8		%		70-130	04-OCT-19
Bismuth (Bi)-Total			90.8		%		70-130	04-OCT-19
Boron (B)-Total			92.9		%		70-130	04-OCT-19
Cadmium (Cd)-Total			94.9		%		70-130	04-OCT-19
Calcium (Ca)-Total			N/A	MS-B	%		-	04-OCT-19
Chromium (Cr)-Total			96.5		%		70-130	04-OCT-19
Cesium (Cs)-Total			95.9		%		70-130	04-OCT-19
Cobalt (Co)-Total			94.9		%		70-130	04-OCT-19
Copper (Cu)-Total			93.1		%		70-130	04-OCT-19
Iron (Fe)-Total			N/A	MS-B	%		-	04-OCT-19
Lead (Pb)-Total			94.3		%		70-130	04-OCT-19
Lithium (Li)-Total			91.4		%		70-130	04-OCT-19
Magnesium (Mg)-Total			N/A	MS-B	%		-	04-OCT-19
Manganese (Mn)-Total			94.5		%		70-130	04-OCT-19
Molybdenum (Mo)-Total			96.8		%		70-130	04-OCT-19
Nickel (Ni)-Total			93.1		%		70-130	04-OCT-19

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
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Oakville ON L6H 0C3
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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
MET-T-CCMS-WT	**Water**							
Batch R4859637								
WG3182336-5 MS		**WG3182336-6**						
Phosphorus (P)-Total			104.2		%		70-130	04-OCT-19
Potassium (K)-Total			93.6		%		70-130	04-OCT-19
Rubidium (Rb)-Total			95.8		%		70-130	04-OCT-19
Selenium (Se)-Total			94.7		%		70-130	04-OCT-19
Silicon (Si)-Total			N/A	MS-B	%		-	04-OCT-19
Silver (Ag)-Total			95.9		%		70-130	04-OCT-19
Sodium (Na)-Total			N/A	MS-B	%		-	04-OCT-19
Strontium (Sr)-Total			N/A	MS-B	%		-	04-OCT-19
Sulfur (S)-Total			93.4		%		70-130	04-OCT-19
Thallium (Tl)-Total			91.6		%		70-130	04-OCT-19
Tellurium (Te)-Total			91.9		%		70-130	04-OCT-19
Thorium (Th)-Total			95.1		%		70-130	04-OCT-19
Tin (Sn)-Total			96.3		%		70-130	04-OCT-19
Titanium (Ti)-Total			94.8		%		70-130	04-OCT-19
Tungsten (W)-Total			95.7		%		70-130	04-OCT-19
Uranium (U)-Total			N/A	MS-B	%		-	04-OCT-19
Vanadium (V)-Total			97.5		%		70-130	04-OCT-19
Zinc (Zn)-Total			90.2		%		70-130	04-OCT-19
Zirconium (Zr)-Total			93.6		%		70-130	04-OCT-19
NH3-F-WT	**Water**							
Batch R4860725								
WG3183728-3 DUP		**L2357716-1**						
Ammonia, Total (as N)		<0.010	<0.010	RPD-NA	mg/L	N/A	20	07-OCT-19
WG3183728-2 LCS								
Ammonia, Total (as N)			99.9		%		85-115	07-OCT-19
WG3183728-1 MB								
Ammonia, Total (as N)			<0.010		mg/L		0.01	07-OCT-19
WG3183728-4 MS		**L2357716-1**						
Ammonia, Total (as N)			104.4		%		75-125	07-OCT-19
NO3-IC-WT	**Water**							
Batch R4859139								
WG3181734-24 DUP		**WG3181734-23**						
Nitrate (as N)		0.073	0.074		mg/L	0.3	20	04-OCT-19
WG3181734-22 LCS								
Nitrate (as N)			101.5				90-110	

Quality Control Report

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
NO3-IC-WT	**Water**							
Batch R4859139								
WG3181734-22 LCS								
Nitrate (as N)			101.5		%		90-110	04-OCT-19
WG3181734-21 MB								
Nitrate (as N)			<0.020		mg/L		0.02	04-OCT-19
WG3181734-25 MS		**WG3181734-23**						
Nitrate (as N)			98.8		%		75-125	04-OCT-19
P-T-COL-WT	**Water**							
Batch R4860606								
WG3182577-3 DUP		**L2356925-1**						
Phosphorus, Total		0.0073	0.0071		mg/L	3.3	20	07-OCT-19
WG3182577-2 LCS								
Phosphorus, Total			100.1		%		80-120	07-OCT-19
WG3182577-1 MB								
Phosphorus, Total			<0.0030		mg/L		0.003	07-OCT-19
WG3182577-4 MS		**L2356925-1**						
Phosphorus, Total			89.2		%		70-130	07-OCT-19
PH-BF	**Water**							
Batch R4853590								
WG3178736-2 DUP		**L2356948-1**						
pH		6.82	6.83	J	pH units	0.01	0.2	02-OCT-19
WG3178736-1 LCS								
pH			7.02		pH units		6.9-7.1	02-OCT-19
SO4-IC-N-WT	**Water**							
Batch R4859139								
WG3181734-24 DUP		**WG3181734-23**						
Sulfate (SO4)		6.79	6.80		mg/L	0.0	20	04-OCT-19
WG3181734-22 LCS								
Sulfate (SO4)			102.6		%		90-110	04-OCT-19
WG3181734-21 MB								
Sulfate (SO4)			<0.30		mg/L		0.3	04-OCT-19
WG3181734-25 MS		**WG3181734-23**						
Sulfate (SO4)			101.2		%		75-125	04-OCT-19
SOLIDS-TDS-WT	**Water**							
Batch R4860417								
WG3183481-3 DUP		**L2357716-1**						
Total Dissolved Solids		90	78		mg/L	14	20	06-OCT-19
WG3183481-2 LCS								

Quality Control Report

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Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
SOLIDS-TDS-WT	**Water**							
Batch R4860417								
WG3183481-2 LCS								
Total Dissolved Solids			95.3		%		85-115	06-OCT-19
WG3183481-1 MB								
Total Dissolved Solids			<10		mg/L		10	06-OCT-19
SOLIDS-TSS-BF	**Water**							
Batch R4853597								
WG3178742-3 DUP		**L2357326-1**						
Total Suspended Solids		122	124		mg/L	1.6	25	01-OCT-19
WG3178742-2 LCS								
Total Suspended Solids			98.4		%		85-115	01-OCT-19
WG3178742-1 MB								
Total Suspended Solids			<2.0		mg/L		2	01-OCT-19
TKN-WT	**Water**							
Batch R4860925								
WG3183637-3 DUP		**L2357716-1**						
Total Kjeldahl Nitrogen		<0.15	<0.15	RPD-NA	mg/L	N/A	20	07-OCT-19
WG3183637-2 LCS								
Total Kjeldahl Nitrogen			100.3		%		75-125	07-OCT-19
WG3183637-1 MB								
Total Kjeldahl Nitrogen			<0.15		mg/L		0.15	07-OCT-19
WG3183637-4 MS		**L2357716-1**						
Total Kjeldahl Nitrogen			88.9		%		70-130	07-OCT-19
TOC-WT	**Water**							
Batch R4860639								
WG3183590-3 DUP		**L2356925-1**						
Total Organic Carbon		2.42	2.45		mg/L	1.1	20	07-OCT-19
WG3183590-2 LCS								
Total Organic Carbon			106.7		%		80-120	07-OCT-19
WG3183590-1 MB								
Total Organic Carbon			<0.50		mg/L		0.5	07-OCT-19
WG3183590-4 MS		**L2356925-1**						
Total Organic Carbon			101.6		%		70-130	07-OCT-19
TURBIDITY-WT	**Water**							
Batch R4860048								
WG3183230-3 DUP		**L2358825-1**						
Turbidity		207	216		NTU	4.3	15	05-OCT-19
WG3183230-2 LCS								

Quality Control Report

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Test	Matrix	Reference	Result	Qualifier	Units	RPD	Limit	Analyzed
TURBIDITY-WT	**Water**							
Batch R4860048								
WG3183230-2 LCS								
Turbidity			102.0		%		85-115	05-OCT-19
WG3183230-1 MB								
Turbidity			<0.10		NTU		0.1	05-OCT-19

Quality Control Report

Workorder: L2357716 Report Date: 24-OCT-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

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

Sample Parameter Qualifier Definitions:

Qualifier	Description
J	Duplicate results and limits are expressed in terms of absolute difference.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RPD-NA	Relative Percent Difference Not Available due to result(s) being less than detection limit.

Quality Control Report

Workorder: L2357716 Report Date: 24-OCT-19

Client: Baffinland Iron Mine's Corporation (Oakville)
2275 Upper Middle Rd. E. Suite #300
Oakville ON L6H 0C3
Contact: William Bowden/Connor Devereaux

Hold Time Exceedances:

ALS Product Description	Sample ID	Sampling Date	Date Processed	Rec. HT	Actual HT	Units	Qualifier
Physical Tests							
Turbidity							
	1	01-OCT-19 17:30	05-OCT-19 00:00	48	78	hours	EHT
	2	01-OCT-19 18:00	05-OCT-19 00:00	48	78	hours	EHT

Legend & Qualifier Definitions:

EHTR-FM:	Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended.
EHTR:	Exceeded ALS recommended hold time prior to sample receipt.
EHTL:	Exceeded ALS recommended hold time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT:	Exceeded ALS recommended hold time prior to analysis.
Rec. HT:	ALS recommended hold time (see units).

Notes*:
Where actual sampling date is not provided to ALS, the date (& time) of receipt is used for calculation purposes.
Where actual sampling time is not provided to ALS, the earlier of 12 noon on the sampling date or the time (& date) of receipt is used for calculation purposes. Samples for L2357716 were received on 01-OCT-19 20:20.

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.

Tuesday, October 22, 2019

Rick Hawthorne
ALS Environmental
60 Northland Rd, Unit 1
Waterloo Canada, ON N2V 2B8

Re: ALS Workorder: 1910179
Project Name:
Project Number: L2357716

Dear Mr. Hawthorne:

Two water samples were received from ALS Environmental, on 10/8/2019. The samples were scheduled for the following analysis:

Radium-226

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,

ALS Environmental
Katie M. OBrien
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
AIHA	214884
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280

1910179

Radium-226:
The samples were prepared and analyzed according to the current revision of SOP 783.

All acceptance criteria were met.

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1910179
Client Name: ALS Environmental
Client Project Name:
Client Project Number: L2357716
Client PO Number: L2357716

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
L2357716-1	1910179-1		WATER	01-Oct-19	
L2357716-2	1910179-2		WATER	01-Oct-19	

ALS Environmental

L2357716

WATERLOO

1 2 1 0 7 9 -

Subcontract Request Form

Subcontract To:

ALS ENVIRONMENTAL - FORT COLLINS, COLORADO, USA
225 COMMERCE DRIVE
FORT COLLINS,CO 80524

NOTES: Please reference on final report and invoice: PO# *L2357716*
ALS requires QC data to be provided with your final results.

Please see enclosed 2 sample(s) in 2 Container(s)

SAMPLE NUMBER	ANALYTICAL REQUIRED	DATE SAMPLED / DUE DATE	Priority Flag
L2357716-1 MS-08-DS		10/ 1/ 2019	
	Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	10/22/2019	
L2357716-2 MS-08-US		10/ 1/ 2019	
	Ra226 by Alpha Scint, MDC=0.01 Bq/L (RA226-MMER-FC 1)	10/22/2019	

Subcontract Info Contact: Mary-Lynn Pike (519) 886-6910
Analysis and reporting info contact: Rick Hawthorne
60 NORTHLAND ROAD, UNIT 1
WATERLOO,ON N2V 2B8
Phone: (519) 886-6910 Email: Rick.Hawthorne@alsglobal.com

Please email confirmation of receipt to: Rick.Hawthorne@alsglobal.com

Shipped By: _____ Date Shipped: _____

Received By: _____ Date Received: 10/3/19 12:00

Verified By: _____ Date Verified: _____

Temperature: _____

Sample Integrity Issues: _____

ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: ALS Waterloo Workorder No: L2401779

Project Manager: KMD Initials: TEM Date: 10/3/19

1.	Are airbills / shipping documents present and/or removable?	DROP OFF	YES	NO
2.	Are custody seals on **shipping** containers intact?	NONE	YES	NO *
3.	Are custody seals on **sample** containers intact?	NONE	YES	NO *
4.	Is there a COC (chain-of-custody) present?		YES	NO *
5.	Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)		YES	NO *
6.	Are short-hold samples present?		YES	NO
7.	Are all samples within holding times for the requested analyses?		YES	NO *
8.	Were all sample containers received intact? (not broken or leaking)		YES	NO *
9.	Is there sufficient sample for the requested analyses?		YES	NO *
10.	Are all samples in the proper containers for the requested analyses?		YES	NO *
11.	Are all aqueous samples preserved correctly, if required? (excluding volatiles)	N/A	YES	NO *
12.	Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm (1/4 inch) diameter? (i.e. size of green pea)	N/A	YES	NO
13.	Were the samples shipped on ice?		YES	NO
14.	Were cooler temperatures measured at 0.1-6.0°C? IR gun used*: #1 #3 #4	RAD ONLY	YES	NO

Cooler #:	1							
Temperature (°C):	5.7							
No. of custody seals on cooler:	0							
DOT Survey/ Acceptance Information — External µR/hr reading:	12							
Background µR/hr reading:	13							

Were external µR/hr readings ≤ two times background and within DOT acceptance criteria? YES / NO / NA (If no, see Form 008.)

*** Please provide details here for NO responses to gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.**

All client bottle ID's vs ALS lab ID's double-checked by: TEM

If applicable, was the client contacted? YES / NO / NA Contact: _____ Date/Time: _____

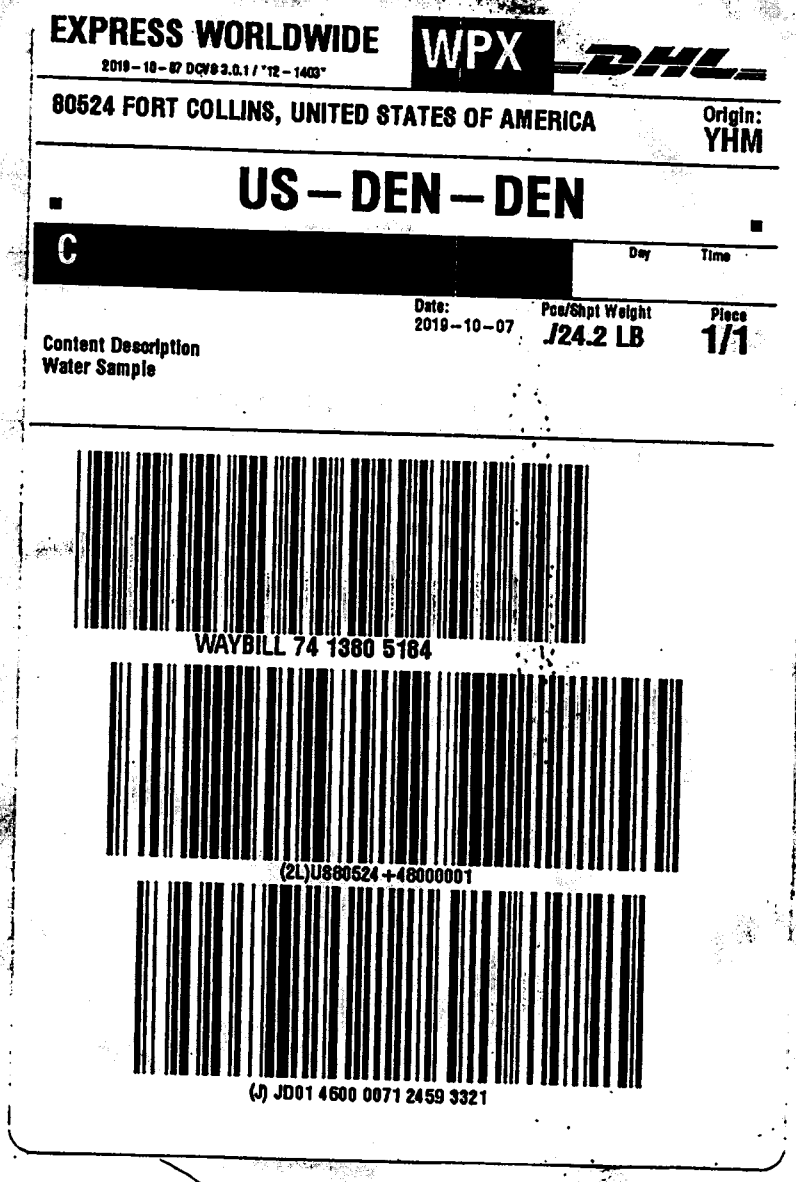
Project Manager Signature / Date: 10/9/19

Form 201r28.xls
(10/07/2019)

*IR Gun #1, VWR SN 170560549
*IR Gun #3, VWR SN 170647571
*IR Gun #4, Oakton, SN 2372220101-0002

1910179

12-0
S. A



EXPRESS WORLDWIDE

2019-10-07 DCV8 2.0.1 / "12-1403"

WPX

DHL

80524 FORT COLLINS, UNITED STATES OF AMERICA

Origin: YHM

US – DEN – DEN

C

Day Time

Date: 2019-10-07

Pce/Shpt Weight 24.2 LB

Piece 1/1

Content Description
Water Sample

WAYBILL 74 1380 5184

(2L)US80524+48000001

(J) JD01 4600 0071 2459 3321

Client:	ALS Environmental	**Date:**	*22-Oct-19*
Project:	L2357716	**Work Order:**	1910179
Sample ID:	L2357716-1	**Lab ID:**	1910179-1
Legal Location:		**Matrix:**	WATER
Collection Date:	10/1/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1			**SOP 783**		Prep Date: **10/10/2019**	PrepBy: **TRW**
Ra-226	**0.0094 (+/- 0.0053)**		**0.0046**	**BQ/l**	NA	10/21/2019 13:40
Carr: BARIUM	*89.1*		*40-110*	*%REC*	DL = NA	10/21/2019 13:40

Client:	ALS Environmental	**Date:**	*22-Oct-19*
Project:	L2357716	**Work Order:**	1910179
Sample ID:	L2357716-2	**Lab ID:**	1910179-2
Legal Location:		**Matrix:**	WATER
Collection Date:	10/1/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Radium-226 by Radon Emanation - Method 903.1			**SOP 783**		Prep Date: **10/10/2019**	PrepBy: **TRW**
Ra-226	**0.0081 (+/- 0.0051)**		**0.0059**	**BQ/l**	NA	10/21/2019 13:40
Carr: BARIUM	*94*		*40-110*	*%REC*	DL = NA	10/21/2019 13:40

Client:	ALS Environmental	**Date:**	*22-Oct-19*
Project:	L2357716	**Work Order:**	1910179
Sample ID:	L2357716-2	**Lab ID:**	1910179-2
Legal Location:		**Matrix:**	WATER
Collection Date:	10/1/2019	**Percent Moisture:**	

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed

Explanation of Qualifiers

Radiochemistry:

- "Report Limit" is the MDC

U or ND - Result is less than the sample specific MDC.

Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.

Y2 - Chemical Yield outside default limits.

W - DER is greater than Warning Limit of 1.42

* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.
# - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.
G - Sample density differs by more than 15% of LCS density.
D - DER is greater than Control Limit

M - Requested MDC not met.

M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.

L - LCS Recovery below lower control limit.

H - LCS Recovery above upper control limit.

P - LCS, Matrix Spike Recovery within control limits.

N - Matrix Spike Recovery outside control limits

NC - Not Calculated for duplicate results less than 5 times MDC

B - Analyte concentration greater than MDC.

B3 - Analyte concentration greater than MDC but less than Requested MDC.

Inorganics:

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).

U or ND - Indicates that the compound was analyzed for but not detected.

E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.

M - Duplicate injection precision was not met.

N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.

Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.

* - Duplicate analysis (relative percent difference) not within control limits.

S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

Organics:

U or ND - Indicates that the compound was analyzed for but not detected.

B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.

E - Analyte concentration exceeds the upper level of the calibration range.

J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).

A - A tentatively identified compound is a suspected aldol-condensation product.

X - The analyte was diluted below an accurate quantitation level.

* - The spike recovery is equal to or outside the control criteria used.

+ - The relative percent difference (RPD) equals or exceeds the control criteria.

G - A pattern resembling gasoline was detected in this sample.

D - A pattern resembling diesel was detected in this sample.

M - A pattern resembling motor oil was detected in this sample.

C - A pattern resembling crude oil was detected in this sample.

4 - A pattern resembling JP-4 was detected in this sample.

5 - A pattern resembling JP-5 was detected in this sample.

H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.

L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.

Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
- gasoline
- JP-8
- diesel
- mineral spirits
- motor oil
- Stoddard solvent
- bunker C

QC BATCH REPORT

Batch ID: **RE191010-1-1** Instrument ID **Alpha Scin** Method: **Radium-226 by Radon Emanation**

LCS Sample ID: **RE191010-1** Units: **BQ/l** Analysis Date: **10/21/2019 14:15**

Client ID: Run ID: **RE191010-1A** Prep Date: **10/10/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.85 (+/- 0.461)	0.00675	1.72		108	67-120					P
Carr: BARIUM	16800		17940		93.7	40-110					

LCSD Sample ID: **RE191010-1** Units: **BQ/l** Analysis Date: **10/21/2019 14:15**

Client ID: Run ID: **RE191010-1A** Prep Date: **10/10/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	1.71 (+/- 0.427)	0.0152	1.72		99.2	67-120		1.85	0.2	2.1	P,M3
Carr: BARIUM	17300		17930		96.6	40-110		16800			

MB Sample ID: **RE191010-1** Units: **BQ/l** Analysis Date: **10/21/2019 14:15**

Client ID: Run ID: **RE191010-1A** Prep Date: **10/10/2019** DF: **NA**

Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	DER Ref	DER	DER Limit	Qual
Ra-226	0.00045 (+/- 0.0030)	0.0059									U
Carr: BARIUM	17800		17930		99.1	40-110					

The following samples were analyzed in this batch: 1910179-1 1910179-2

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L2357716-COFC

COC Number: 15 -

Report To	Contact and company name below will appear on the final report
Company:	Baffinland Iron Mines Corp.
Contact:	Wiliam Bowden and Connor Devereaux
Phone:	647-253-0596 EXT 6016
	Company address below will appear on the final report
Street:	2275 Upper Middle Rd. E., Suite #300
City/Province:	Oakville, ON
Postal Code:	L6H 0C3
Invoice To	Same as Report To ☑ YES ☐ NO
	Copy of Invoice with Report ☐ YES ☑ NO
Company:	
Contact:	

Report Format

Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)

Quality Control (QC) Report with Report ☑ YES ☐ NO

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax bimcore@alsglobal.com

Email 2

Email 3

Invoice Distribution

Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax ap@baffinland.com

Email 2 commercial@baffinland.com

Project Information

ALS Account # / Quote #:	23642 /Q42455
Job #:	MS-08 Reference and Exposure
PO / AFE:	4500057496
LSD:	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (lab use only) L2357716

ALS Contact: **Sampler:** KB/CD

Confirm all E&P TATs with your AM - surcharges will apply

Regular [R] ☐ Standard TAT if received by 3 pm - business days - no surcharges apply

PRIORITY (Business Days): 4 day [P4] ☐ | 3 day [P3] ☐ | 2 day [P2] ☐

EMERGENCY: 1 Business day [E1] ☐ | Same Day, Weekend or Statutory holiday [E0] ☑

Date and Time Required for all E&P TATs:

For tests that can not be performed according to the service level selected, you will be contacted.

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	BIM-MMER-EFF	F/P	Number of Containers
	MS-08-DS	1-Oct-19	17:30	Water	E0		7
	MS-08-US	1-Oct-19	18:00	Water	E0		7

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☑ NO

Are samples for human drinking water use? ☐ YES ☑ NO

Special Instructions / Specify Criteria to add on report by clicking on the drop-down list below (electronic COC only)

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen ☐ SIF Observations Yes ☐ No ☐

Ice Packs ☐ Ice Cubes ☐ Custody seal intact Yes ☐ No ☐

Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
			9.5		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Kendra Button	Release Date: 1-Oct-19	Time: 19:00	Received by: Marc Guindon	Date: oct.1/2019	Time: 7:30pm	Received by:	Date: 4-Oct 19	Time: 11:00

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

OCTOBER 2015 FRONT

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 specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

APPENDIX F

METAL AND DIAMOND MINING EFFLUENT REGULATIONS EMERGENCY RESPONSE PLAN

Baffinland Iron Mines Corporation

METAL AND DIAMOND MINING EFFLUENT REGULATIONS EMERGENCY RESPONSE PLAN

BAF-PH1-830-P16-0047

Rev 2

Prepared By: Connor Devereaux
Department: Environment
Title: Environmental Superintendent
Date: February 27, 2019

Signature:

Approved By: Gerald Rogers
Department: Operations
Title: General Manager
Date: February 27, 2019

Signature:

DOCUMENT REVISION RECORD

Issue Date MM/DD/YY	Revision	Prepared By	Approved By	Issue Purpose
01/15/18	0	BW	WB	Use
01/30/18	1	BW	GR	Use
02/27/19	2	CD	GR	Use

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

1 PURPOSE

In accordance with Part 3, Section 30 of the Metal and Diamond Mining Effluent Regulations (MDMER), Baffinland Iron Mines Corporation (Baffinland) has prepared an MDMER Emergency Response Plan.

Revisions to this plan shall be completed based on future modifications to the work scope, emergency and spill response procedures, and the associated approvals. Updates to this Plan shall be completed in accordance with: the terms and conditions of Metal and Diamond Mining Effluent Regulations, Baffinland's water licenses, QIA Commercial Lease (Q13C301; issued September 6, 2013), the amended Project Certificate No. 005 [issued May 28, 2014 by the Nunavut Impact Review Board (NIRB)] and any subsequent requirements that may be issued.

2 SCOPE

Baffinland's Emergency Response Plan (ERP) (BAF-PH10840-P16-0002 r2) identifies potential environmental, health, and safety emergencies that could arise during the construction and operation phases of the Mary River Project. The ERP establishes the framework for responding to these situations, and applies to all facets of the Mary River Project. It defines requisite organizational roles and responsibilities for project personnel, internal and external contact information, training, resources, and reporting requirements. All Baffinland employees and project contractors are required to comply with the ERP.

Baffinland has two ponds subject to the MDMER, both located at the Mine Site. Baffinland identifies the Waste Rock Facility (WRF) Pond as 'MS-08' and the Crusher Facility (CF) Pond as 'MS-06' for MDMER reporting purposes. Both the WRF Pond (MS-08) and the CF Pond (MS-06) are subject to Metal and Diamond Mining Effluent Regulations (MDMER; Appendix B).

The WRF at the Mine Site is located approximately one kilometre east of the Deposit 1 mine (Appendix A), and is the storage location for the mine area's waste rock and overburden. Seepage and runoff from the WRF is intercepted by the drainage diversion ditches and directed downstream into the WRF Pond. Water from the WRF Pond is pumped into the Water Treatment Plant (WTP) for pH adjustment, and subsequently discharged into a Geotube adjacent to the WTP for solids removal via filtering and settling (as per the Waste Pond Water Treatment Plant Operations BAF-PH1-340-PRO-048). The MDMER regulated Final Discharge Point (FDP) for MS-08 is a sampling port located after the discharge pump (Appendix A). Following the FDP, effluent passes through approximately 475 metres (m) of layflat hose and is discharged to the tundra of the approved receiving environment, the Mary River watershed.

The WTP consists of physical-chemical treatment for pH adjustment, chemical precipitation and removal of solids by physical barrier. The water treatment processes include coagulation, pH adjustment and precipitation, flocculation and filtration. Water from the WRF pond is pumped to the first reactor tank

and mixed by an aeration system. Lime and coagulant (ferric sulfate) solutions are added and pH adjusted to a desired value to assist the precipitation of heavy metals. The intent of coagulation is to neutralize the electric charge on colloidal particles, and assist with precipitation of heavy metals. The coagulated water then enters a second reactor tank to provide additional mixing and retention time for reactions to occur. The pH adjusted water then flows to the third reactor in which polymer is added for flocculation. Flocculation creates flocs to assist with the separation of solids and liquids in subsequent stages. The overflow from the third reactor tank is pumped to the geotube to facilitate the removal of solids via a membrane. The filtered final effluent from the geotubes is then collected in the sump and discharged via layflat hose to the receiving environment if internal effluent water quality is in compliance with the applicable discharge criteria. Effluent that does not comply with the applicable discharge criteria is recirculated to the WRF pond for further treatment.

The treatment system has a 280 m3/hr treatment capacity consisting of two 140 m3/hr treatment trains. For each train, the water flow rate and pH in Reactor tanks 1 and 2 is continuously monitored. Ferric sulfate and polymer is added based on flow rate, while the lime dosage is based on pH in the reactor tank 1. The chemical dose rate is adjusted by the plant operator in the PLC to meet the targets. Monitoring of the treated effluent at various stages of the treatment system is conducted to monitor the treatment system's performance. Effluent discharge volumes are monitored and recorded during periods of discharge through the use of a Krohne Enviromag 6" Magnetic Flow Meter. The frequency and volume of effluent discharges from the WTP is dictated by the pond's capacity, weather, air logistics, sample holding times and treatment requirements. As such, effluent is discharged intermittently on an as-needed basis from approximately late-June to early September. Consequently, the implementation of MDMER effluent and water quality monitoring is restricted to periods of effluent discharge rather than throughout the year due to Project constraints.

The CF is located approximately four kilometres from the WRF (Appendix A). The CF at the Mine Site consists of a pad that houses three (3) crusher spreads as well as associated run-of-mine, lump and fines ore stockpiles. The CF Pond, which collects storm water runoff diverted with drainage diversion ditches around the CF, is located east of the CF. Water from the CF Pond is treated for solids removal via pond-based settling. The MDMER regulated FDP is a sampling port located after the discharge pump to the North of the CF Pond, and before the connection to the sewage effluent pipeline (Appendix A). Following the FDP, effluent from the pond is pumped to the approved Mary River outfall discharge location located approximately 1.3 km southeast of the pond using the Mine Site's treated sewage effluent pipeline, originating at the Mine Site sewage treatment plant. The frequency and volume of effluent discharges from the CF pond is also dictated by the pond's capacity, weather, air logistics, sample holding times and settling requirements. As such, effluent is discharged intermittently on an as-needed basis from approximately late-June to early September. Consequently, the implementation of MDMER effluent and

water quality monitoring is restricted to periods of effluent discharge rather than throughout the year due to Project constraints.

This MDMER Emergency Response Plan provides a guide for preventing and controlling the release of water outside of the normal course of events for the WRF Pond and CF Pond operations. This Plan has been prepared in accordance with MDMER (Fisheries Act. 2002-2018), and is to be used in conjunction with Baffinland's Emergency Response Plan (BAF-PH1-830-P16-0007) and the Spill Contingency Plan (BAF-PH1-830-P16-0036). Copies of these Plans can be obtained from:

Baffinland Iron Mines Corporation
2275 Upper Middle Road East, Suite 300
Oakville, ON L6H 0C3
Tel: (416) 364-8820
Fax: (416) 364-0193

TABLE 2-1 EXTERNAL CONTACT LIST FOR NOTIFICATION OF A RELEASE

Department of Environment - Environmental Protection Division PO Box 1000 Station 200 Iqaluit, Nunavut X0A 0H0 Tel : (877) 212-6638, (867) 975-6000 Fax : (867) 975-6099	**Environment Climate Change Canada** Enforcement Officer 933 Mivvik Street, Suite 301-Qiliaut Building P.O. Box 1870 Iqaluit, Nunavut X0A 0H0 Tel:(867)-975-4644 Cell: (867)-222-1925 Fax: (867)-975-4594
Qikiqtani Inuit Association Igluvut Building, 2nd Floor PO Box 1340 Iqaluit, Nunavut X0A 0H0 Tel : (867) 975-8400, 1-800-667-2742 Fax : (867) 979-3238	**Indigenous and Northern Affairs Canada** Field Operations Division PO Box 2200 Iqaluit, Nunavut X0A 0H0 Tel : (867) 975-4295 (Field Operations Manager) Cell: (867) 222-8458 Fax : (867) 975-6445
Crown-Indigenous Relations and Northern Affairs Canada – Water Resources Division Building 918, PO BOX 100 Iqaluit, Nunavut X0A 0H0 Tel : (867) 975-4517 (Water Resources Manager) Fax (867) 975-4560	**Mittimatalik Hunters and Trappers Organization** PO Box 189 Pond Inlet, Nunavut X0A 0S0 Tel : (867) 899-8856 Fax : (867) 899-8095
Nunavut Impact Review Board 29 Mitik Street PO Box 1360 Cambridge Bay, Nunavut X0B 0C0 Tel : 1-866-233-3033 Fax : (867) 983-2594, (867) 983-2574	**Nunavut Water Board** PO Box 119 Gjoa Haven, Nunavut X0B 1J) Tel : (867) 360-6338 Fax : (867) 360-6369

Hamlet of Pond Inlet PO Box 180 Pond Inlet, Nunavut X0A 0S0 Tel : (867) 899-8934, (867) 899-8935 Fax : (867) 899-8940	**Department of Fisheries and Oceans** Central and Arctic Region 520 Exmouth Street Sarnia, Ontario N7T 8B1 Tel : (519) 383-1813, 1-866-290-3731 Fax : (519) 464-5128

Baffinland requires all site personnel to be trained on the specific spill response initiation and reporting procedures. Reference Table B: Internal Distribution List for the Emergency Response Plan in the ERP (BAF-PH1-840-P16-0002) for key internal contact information if a spill is discovered. All site personnel must comply with the following procedure upon initiation of a spill response involving a regulated substance:

1. Immediately warn other personnel working near the spill area.
2. Evacuate the area if the health and safety of personnel is threatened.
3. In the absence of danger, and before the spill response team arrives at the scene, take any safe and reasonable measure to stop, contain, and identify the nature of the spill.
4. Notify the Environment and Health and Safety department and the department who owns the facility, who will initiate further spill response operations.

Upon initiation of spill response, as directed by the Head of Health, Safety and Environment or designate, the following procedure shall be completed by the spill response team:

Source Control – If safe to do so, reduce or stop the flow of product. This may be accomplished with simple actions such as: turning off a pump; closing a valve; sealing a punctured liner with readily available materials; raising a leaking or discharging hose to stop flow; or transferring product from a leaking container (if required activate Baffinland's Emergency Response Plan BAF-PH1-840-P16-0002).

Contain and Control the Free Product – If safe to do so, prevent or minimize the spread of the spilled product. Accumulate/concentrate spilled product in an area to facilitate recovery. Barriers positioned down-gradient of the spill will slow or stop flow of liquid. Barriers can consist of absorbent booms and pads, dykes, berms, fences, and/or trenches (dug in the ground, snow or ice).

Protection – Evaluate the risk of the impacted area to the surrounding environment. Protect sensitive ecosystems (i.e. fish-bearing streams) and/or natural resources that are at risk by isolating the area and/or diverting the spilled material to a less sensitive area. Protection/isolation may be achieved through the use of the above mentioned barriers.

Spill Clean-up – Recover and dispose of as much product as possible.

Report the Spill – Record information about the spill such as: date and time of occurrence; location and approximate size; type and amount of discharge product; photographic records; actions already taken to stop and contain the spill; ambient conditions; and any perceived threat to humans or the environment. Reports shall be completed as per Baffinland's Incident Investigation Form (BAF-PH1-810-FOR-0005).

2.1 CROSS-REFERENCE OF MDMER REGULATIONS, 30 (1) TO 30(2), TO THIS MDMER EMERGENCY RESPONSE PLAN

MDMER Reference	Description	Emergency Response Plan Reference
30(1)	The owner or operator of a mine shall prepare an emergency response plan that describes the measures to be taken in respect of a deleterious substance within the meaning of subsection 34(1) of the Act to prevent any deposit out of the normal course of events of such a substance or to mitigate the effects of such a deposit.	Entirety of Document
30 (2)(a)	The identification of any deposit out of the normal course of events that can reasonably be expected to occur at the mine and that can reasonably be expected to result in damage or danger to fish habitat or fish or the use by man of fish, and the identification of the damage or danger;	Pages 12 to 16
30 (2)(b)	a description of the measures to be used to prevent, prepare for and respond to a deposit identified under paragraph (a);	Pages 12 to 17
30 (2)(c)	a list of the individuals who are to implement the plan in the event of a deposit out of the normal course of events, and a description of their roles and responsibilities;	Pages 9 to 10
30 (2)(d)	the identification of the emergency response training required for each of the individuals listed under paragraph (c);	Pages 17 to 20
30 (2)(e)	a list of the emergency response equipment included as part of the plan, and the equipment's location; and	Appendix D
30 (2)(f)	alerting and notification procedures including the measures to be taken to notify members of the public who may be adversely affected by a deposit identified under Section 30 paragraph 2(a).	Table 2-1

3 RESPONSIBILITIES

In the event of an emergency associated with the WRF Pond or CF Pond it will be necessary for multiple departments to work in conjunction with each other. The following outlines the specific responsibilities of those departments.

3.1 GENERAL MANAGER

The General Manager (GM) is responsible for ensuring that each departmental Manager/Superintendent understands the contents of the plan and follows its requirements. The GM is responsible for ensuring that departments contact the appropriate external authorities as per this Plan and the Baffinland Emergency Response Plan (BAF-PH1-840-P16-0002).

3.2 MINE OPERATIONS

3.2.1 MINE OPERATIONS MANAGER

The Mine Operations Manager or designate is responsible for implementing the Plan within their department and area of operation. They must ensure that their personnel understand the contents of this Plan and follow its requirements. They are responsible for implementing an inspection program to ensure that the Plan is being fully implemented and to apply corrective actions in the event of identified non-compliances, non-conformances, and/or issues of concern.

3.2.1.1 MINE OPERATIONS SUPERVISOR

The Mine Operations Supervisor is responsible for the following:

- The health and safety of all persons while managing and directing activities associated with the working around the WRF Pond.
- Ensuring all workers and operators are trained and understand this Plan.
- Assist in approved discharging activities.
- Inspections of the WRF and WRF Pond for movement, settlement, or liner damage.
- Inspection of the drainage ditches.

3.2.1.2 MINE OPERATIONS OPERATORS

The Mine Operations Operators have the following responsibilities:

- Report all spills and/ or non-compliances to their supervisor.
- Follow procedures outlined in Waste Pond Water Treatment Plant Operations BAF-PH1-340-PRO-048.
- Understand and follow detailed instructions when assisting with discharging and working around the WRF Pond.
- Ensuring the WRF Pond access road is kept clear of snow during winter months.

3.2.1.3 WRF WTP OPERATORS

The WRF WTP Operators have the following responsibilities:

- Report all spills and/ or non-compliances to their supervisor.
- Follow procedures outlined in Waste Pond Water Treatment Plant Operations BAF-PH1-340-PRO-048.
- Understand and follow detailed instructions when assisting with discharging and working around the WRF Pond.
- Ensure the internal plant process parameters and field effluent parameters are recorded in the log book daily

3.3 CRUSHER OPERATIONS

3.3.1 CRUSHER OPERATIONS MANAGER

The Crusher Operations Manager or designate is responsible for implementing the Plan within their department and area of operation. They must ensure that their personnel understand the contents of the plan and follow its requirements. They are responsible for implementing an inspection program to ensure that the Plan is being fully implemented and to apply corrective actions in the event of identified non-compliances, non-conformances, and/or issues of concern.

3.3.1.1 CRUSHER OPERATIONS SUPERVISOR

The Crusher Operations Supervisor is responsible for the following:

- The health and safety of all persons while managing and directing activities associated with the working around the CF Pond.
- Ensuring all workers and operators are trained and understand this plan.
- Assist in approved discharging activities.
- Inspections of the CF area and CF Pond for movement, settlement, or liner damage.

3.3.1.2 CRUSHER OPERATIONS OPERATORS

The Crusher Operations Operators have the following responsibilities:

- Report all spills to their supervisor.
- Understand and follow detailed instructions when assisting with discharging and working around the CF Pond.
- Ensuring the CF Pond access road is kept clear of snow during winter months.

3.4 ENVIRONMENT

3.4.1 ENVIRONMENTAL SUPERINTENDENT

The Environmental Superintendent or designate is responsible for implementing the Plan within their department. They must ensure that their personnel understand the contents of the plan and follow its requirements. They are responsible for implementing an inspection program to ensure that the Plan is being fully implemented and advise on how best to evaluate, contain and remediate and/or recover a spill if one should occur associated with the CF Pond and WRF Pond. The Environmental Superintendent is also responsible for all required reporting to regulators regarding WRF Pond and CF Pond water quality, discharging, and spills (Section 6.2) (MDMER, 2018).

3.4.2 ENVIRONMENTAL COORDINATORS AND TECHNICIANS

The Environmental Coordinators and Technicians have the following responsibilities:

- Reviewing and understanding all the applicable plans and procedures.
- Contacting their immediate supervisor if uncertain about any of the tasks.
- Inspections of the CF Pond, WRF Pond, and surrounding tundra for:
    - Signs of instability (i.e. collapsing berm, settlement, erosion, cracks, seepage, movement, settlement)
    - Damage to the liner (i.e. tears)
    - Ditches unobstructed and functioning as per design
- Monitoring and sampling of the Final Discharge Point (FDP) during discharge of the CF Pond and WRF Pond as per BIM Environment's Water Sampling and Flow Measurement SOP and Working Near Water Containment Facilities SOP.
- Respond to spills that are associated with the CF Pond and WRF Pond in conjunction with the Emergency Response Team and the Department responsible for the facility.

4 DEFINITIONS

4.1 SPILL

A spill in this ERP is defined as the uncontrolled release of a deleterious substance from its containment into a receiving environment. A deleterious substance is defined as any acutely lethal effluent or any substance that does not meet the criteria in Table 6-2. Under MDMER (2018), Schedule 4 outlines the discharge limits for substances that must be prevented from depositing into the receiving environment. Such releases are potentially hazardous to humans, vegetation, water resources, and aquatic and terrestrial wildlife, both directly and through food web interaction. The severity of impact varies depending on several factors, including: the type and quantity of spilled material; the location of the spill; and the time of year. MDMER discharge limits are used as the standards for risk analysis of CF Pond and

WRF Pond releases to the environment. As a result, additional levels of spill response have been developed for spills that exceed these MDMER limits. Additional products with the potential for release include hydrocarbon fuels, anti-freeze, or lubricants from machinery.

4.2 SPILL PREVENTION

Spill prevention is an effective means of maintaining the safety of site personnel and the environment. Spills are less likely to occur when adhering to the criteria listed below. Inspections of the CF Pond and WRF Pond are conducted by the Mine Operations, Crusher Operations, and the Environmental Department when it is safe to do so. The conditions of the surrounding environment and current understood risk will determine the frequency of inspections, such as: freshet melt; heavy rain events; increasing reservoir levels (with limited freeboard space); and/or changing water quality conditions

4.3 FINAL DISCHARGE POINT

The Final Discharge Point (FDP) is the "identifiable discharge point of a mine beyond which the operator of the mine no longer exercises control over the quality of the effluent" (MDMER, 2018). Baffinland has two designated FDPs, one at the WRF Pond and one at the CF Pond where Baffinland has identified that they no longer exercise control over the effluent of the respective pond.

4.4 ACUTE LETHALITY

Baffinland's effluent is determined to be acutely lethal if "the effluent at 100% concentration kills more than 50% of the rainbow trout subjected to it for a period of 96 hours, when tested in accordance with the acute lethality test set out in section 14.1" (MDMER, 2018). This acute lethality test is conducted with effluent from the WRF Pond and CF Pond on a monthly basis.

4.5 DELETERIOUS SUBSTANCES

Deleterious substances under the MDMER consist of the following:

- Arsenic;
- Copper;
- Cyanide;
- Lead;
- Nickel;
- Zinc;
- Suspended solids; and
- Radium 226.

5 LEVELS OF EMERGENCY SPILL RESPONSE

To effectively manage emergency responses, Baffinland has adopted a tiered emergency classification scheme (Figure 5-1). Each level of emergency, based on its severity, require varying degrees of response, effort, and support. Each level has distinct effects on normal business operations, as well as requirements for investigation and reporting. The ERP details each level of emergency; levels of classification specific to spill response are as follows:

Level 1 (Low) – Minor accidental release of a deleterious substance with:

- No threat to public safety; and/or
- Negligible environmental impact to receiving environment.

Level 2 (Medium) – Major accidental release of a deleterious substance with:

- Some threat to public safety; and/or
- Potential Moderate environmental impact to receiving environment

Level 3 (High) – Uncontrolled hazard which:

- Jeopardizes project personnel safety: and/or
- Potential significant environmental impacts to receiving environment

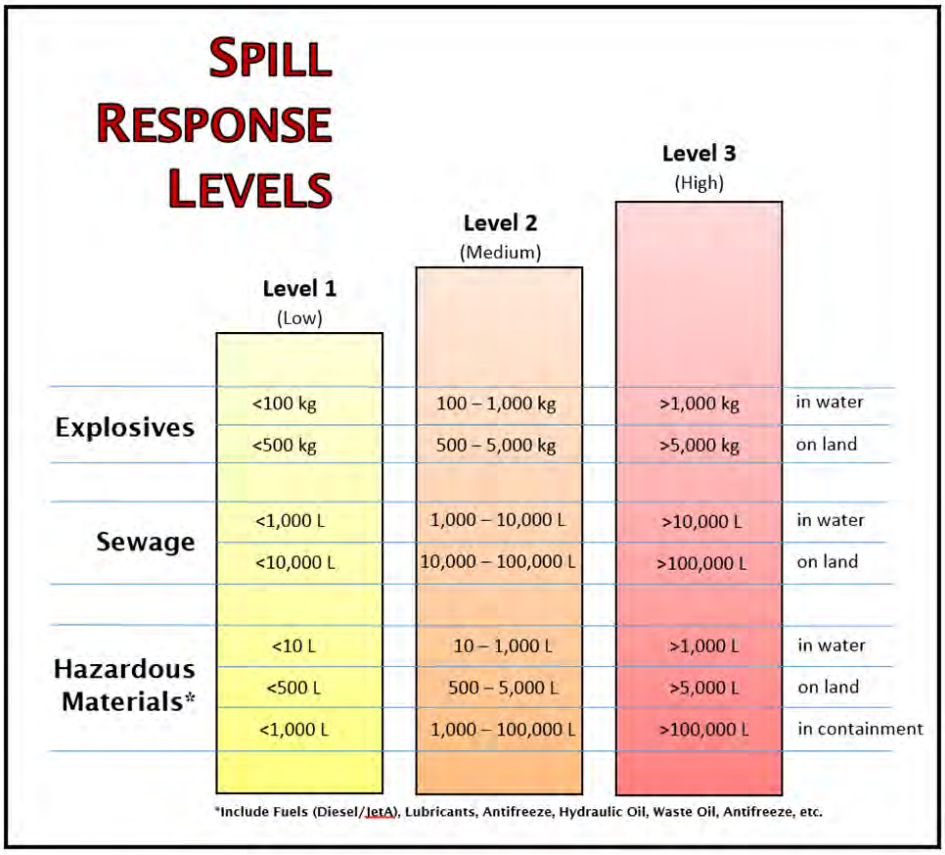


FIGURE 5-1 EMERGENCY SPILL RESPONSE LEVELS

6 PROTOCOL

6.1 EMERGENCY SPILL RESPONSE PROCEDURES

6.1.1 WATERFOWL LANDING IN PONDS

Migratory birds use the Mary River project area during open-water season in their migration routes. The presence of open water in the WRF and CF Pond mimics the natural habitat of some of these birds. This creates the risk of migratory birds landing in the WRF or CF Pond. During occasions when the WRF Pond and CF Pond contain non-compliant water (i.e. low pH), that water poses a hazard to migratory birds if they were to land in the ponds. Harming migratory birds is prohibited under the Migratory Birds Convention Act (1994).

Prevention techniques must be employed to prevent birds from landing in the ponds. These deterrent techniques may include human/ predatory bird effigies or acoustic devices. If birds do land in the ponds, all reasonable efforts must be focused on deterring and removing birds from area. If birds are impacted by any hydrocarbons, dish detergent will be used to clean the birds. In addition, a Wildlife biologist will be consulted further in an event of contamination of birds.

6.1.2 SPILLS ON LAND

The main control techniques for spills on land are the use of barriers such as dykes, trenches, booms and fences. Such barriers slow the progression of the spill and also serve as containment to facilitate spill recovery. They should be placed down gradient from the source of the spill, and as close as possible to the source. Depending on the volume spilled, the site of the spill, as well as available material, a dyke may be built with soil, booms, lumber, snow, etc. Construct dykes in such a way as to accumulate a thick layer of free product in a single area (V shaped or U-shaped). Trenches are useful in the presence of permeable soil and when the spilled product is potentially migrating below the ground surface to facilitate spill recovery and/ or containment.

6.1.3 BERM INTEGRITY FAILURE

Runoff collected in the CF Pond and WRF Pond can be released into the receiving environment if the integrity of the pond's berm structure(s) is compromised. Factors that can compromise berm integrity include: construction activities; rainfall; berm design; frost heaving; and poor management. If signs of berm failure are noticed during an inspection, Operations, Environment and Health and Safety must be contacted immediately.

In the event of failure of a CF/ WRF Pond berm, a Code 1 should be called immediately, dependent upon the extent. The Emergency Response Team will deploy the emergency spill truck and personnel to help set up pumps, manage water, and help stop/prevent further uncontrolled release of water into the receiving environment. Operations will provide personnel and equipment necessary to seal or hold the

breach. Departmental Managers and Superintendents of Operations and Environment will provide direction following such an occurrence.

6.1.4 DRAINAGE DITCH INTEGRITY FAILURE

In the event of high flows during freshet and heavy rainfalls, the capacity of the drainage diversion ditches that collect runoff from the WRF and CF may be compromised. There is the potential for the water levels in the diversion ditches to rise over the ditch berm height, resulting in an uncontrolled overflow into the receiving environment. A potential result of high water levels in a ditch, even if the ditch berm walls aren't breached, is the seepage of the ditch water through the permeable berms into the surrounding environment (further discussed in Section 6.1.5).

In such an event, immediate corrective actions must aim to ensure all water in the ditches reports to the pond. Controlled pumping from the ditches into the pond may alleviate the volume of water required to be contained by the ditches, and emergency dykes/ berms can be constructed to increase the capacity of the ditch berm. Any water that overflows and does not report to the pond must be sampled with a full suite of water samples.

Preventative efforts must include daily inspections of the drainage diversion ditches at both the WRF and CF. These inspections must include any culvert crossings to ensure water can flow unimpeded through them. Personnel must notify their supervisors of impending overflow situations to enable an effective emergency response.

6.1.5 EMERGENCY SPILLWAY

In the event that runoff inflows to the CF Pond and WRF Pond exceed the rate that can be intentionally discharged, for a prolonged period of time, pond water levels may reach an elevation that results in water being released to the receiving environment via the pond's engineered emergency spillway. In such an event, the first mitigation measure that will be implemented to prevent such occurrence will involve performing an emergency controlled discharge. The plan to conduct an emergency controlled discharge will be formulated by the Operations and Environmental Managers/Superintendents. If the controlled emergency discharge does not lower the level of water contained in the pond(s), the emergency spillway will be used, as designed, to release volumes of water that exceeds the capacity of the pond and prevent the failure of the pond's berm structures. In such an occurrence, close monitoring of the pond and spillway is required to assess any erosional degradation of the pond, spillway and surrounding tundra. Monitoring to be conducted in the event that the emergency spillway is used will include inspecting pond infrastructure and adjacent tundra area for cracks, slumping, movement and/or sinkholes. As the level of control is significantly less utilising the emergency spillway, a controlled emergency discharge is the first and preferred measure to be undertaken. If signs of instability or erosional degradation are noticed during a spillway discharge, the Mine Operations, Crushing and Environmental Superintendents should be notified immediately.

In the event of a controlled emergency or spillway discharge, a full suite sample set (BIM-MMER-WT) group and acute toxicity sample (Group 3) will be collected to determine the quality of the water being discharged to the receiving environment. Volumes of water released during such an event will be measured using a flowmeter or suitable estimation method (i.e. flowrate extrapolation) and recorded.

6.1.6 SEEPAGE

The potential exists that excessive precipitation and runoff at the WRF or CF could saturate the underlying substrate and result in the release of seepage outside of the containment areas via active-layer groundwater flow that does not report to the ponds. This groundwater flow could not be captured by the keyed in pond liner and therefore flow through the substrate to the surrounding environment. Another potential effect of excessive precipitation and runoff is high water levels in the drainage diversion ditches, allowing water to seep through permeable berm walls into the surrounding environment.

Close monitoring of the areas surrounding the WRF and CF will be conducted during the open water season. Inspections will look to identify newly formed wet areas, flowing water, and/or areas of pooling. If suspected seepage is observed, the Operations and Environmental Superintendents will be notified immediately. If seepage is confirmed, all reasonable and safe emergency containment methods must be implemented to capture the seepage and/or minimize the extent of seepage migration. For example, an emergency containment ditch and sumps may be utilized to capture observed seepage. This seepage must be pumped back into the pond, and any seepage that can't be contained will be sampled with a full suite sample set to determine potential impacts on the receiving environment.

6.1.7 SPILLS INTO CONTAINMENT FACILITY

If hazardous products (i.e. hydrocarbons, etc.) are released into the CF Pond and WRF Pond, spill response should be initiated as outlined in Section 2 of this Plan. To determine the best method for spill clean-up/ recovery, the Environmental Superintendent or their designate should be consulted. Responses to a spill in a pond can include various containment and recovery techniques, including skimming and booming, in concert with water treatment. Mechanical recovery equipment (i.e., skimmers and oil/water separators) will be utilized, as required.

6.1.8 SPILLS AT THE WRF WATER TREATMENT PLANT

The water from the WRF Pond is treated in the WTP in a three step process involving the injection of chemical into temporary storage tanks, and a final step of filtration in the Geotube. Further protocols on plant operation and management can be found in Appendix F Waste Rock Pile Water Treatment Plant Operations (BAF-PH1-340-PRO-048). The water is first treated in the temporary storage tanks using iron precipitation, hydroxide precipitation and flocculation, with pH readings monitored to indicate when the pH has reached desired values. With a desired pH value, the water is discharged from the WTP into the Geotube for further treatment of suspended solids. The water from the Geotube sump can be discharged

either back into the WRF Pond if deemed non-compliant after settling, or out into the receiving environment if compliant (refer to section 6.3.1 and 6.3.2 for guidance on this decision).

Chemicals used during the treatment of the WRF Pond water include ferric sulphate, lime and polymer. Additionally, there is fuel and other hydrocarbon products present at the plant for heating and power purposes. These hazardous products would necessitate spill response if released into the environment. Figure 5-1 should be consulted to determine the level of Emergency Spill Response.

6.2 REPORTING REQUIREMENTS IN THE EVENT OF A SPILL

In the event of a spill of deleterious substances from one of WRF or CF ponds, the spill report submitted by the Environmental Superintendent to applicable regulators (Table 6-1) must contain the following information:

- "The name, description and concentration of the deleterious substance deposited;
- The estimated quantity of the spill and how this estimate was achieved;
- The day on which, and hour at which, the deposit occurred;
- The quantity of the deleterious substance that was deposited at a place other than through a final discharge point and the identification of that place, including the location by latitude and longitude and, if applicable, the civic address;
- The quantity of the deleterious substance that was deposited through a final discharge point and the identification of that discharge point;
- The name of the receiving body of water, if there is a name, and the location by latitude and longitude where the deleterious substance entered the receiving body of water;
- The results of the acute lethality tests conducted under subsection 31.1(1) or a statement indicating that acute lethality tests were not conducted but that notification was given under subsection 31.1(2);
- The circumstances of the deposit, the measures that were taken to mitigate the effects of the deposit and, if the emergency response plan was implemented, details concerning its implementation; and
- The measures that were taken, or that are intended to be taken, to prevent any similar occurrence of an unauthorized deposit." (MDMER, 2018)

TABLE 6-1 CONTACT LIST FOR MDMER NOTIFICATION OF A RELEASE

Name	Location	Phone Number	Purpose
Environmental Superintendent and Head of Health, Safety, Environment & Security	Mary River Mine site	416-364-8820 x6016	All spills, leaks and releases of hazardous materials will be reported to the Environment Department immediately and documented by submitting the necessary documentation within 4 hours of the spill.
Environment and Climate Change Canada	933 Mivvik Street, Suite 301-Qiliaut Building P.O. Box 1870 Iqaluit, Nunavut X0A 0H0	Tel: (867)-975-4644 Cell: (867)-222-1925 Fax: (867)-975-4594	Any release of a deleterious substance or acute toxicity failure will trigger notification.
Crown Indigenous Relations and Northern Affairs Canada	Water Resources Officer, P.O. Box 100, Iqaluit, NU X0A 0H0	1-867-975-4550	Spills greater than 100 liters require notification to the regulators within 24 hours of the spill.
NT-NU 24-hr Spill Report Line	Iqaluit, NU	1-867-920-8130	Spills greater than 100 liters or deposit of a deleterious substance as outlined in MDMER Section 34 require notification to the spill line and documentation submitted within 24 hours of the spill.

6.3 ENSURING NO ACCIDENTAL DISCHARGE OF NON-COMPLIANT WATER

6.3.1 PROCEDURE FOR DISCHARGING CONTAINMENT PONDS

All personnel must adhere to the following procedure when planning to discharge a containment pond. If personnel are unsure of a task at any time, the work must cease, and the worker must contact their supervisor.

1. Prior to sampling, the YSI calibration much be checked and the results of this check recorded in the log book.
2. Obtain full-suite pre-discharge samples from pond if discharge is not immediately required to avoid overflow.
3. If pre-discharge sample results are compliant, notify applicable regulators of planned discharge. The sampling date for the monthly acute toxicity sample must be selected and recorded not less than 30 days in advance of collecting the acute toxicity sample.
4. Obtain approval from the Environmental Superintendent or Manager to begin discharging.
5. Prior to pumping, record totalizer values on the flow meter, as well as the time of pump start-up, in the appropriate log book. This is the standard requirement before any pumping occurs.

Note: Baffinland is required to report the total volume of effluent discharged daily and monthly from containment ponds as per the Water License and MDMER.

6. Effluent sampling frequency must adhere to MDMER and Water License Criteria utilizing accredited laboratory analysis, with accompanying field parameters, while discharging.
   a. All discharge samples must be taken from the particular pond's FDP.
   b. YSI readings must accompany all samples, and the BIM assigned YSI equipment number recorded in the field log.
   c. All Acute Toxicity samples must be collected with a BIM-MMER-WT sample set.
7. The containment pond must be inspected daily while discharging.
8. Ensure the appropriate field log is completed daily while discharging. There is one designated field book for each pond, and all notes must be recorded in this.
9. After sample collection, the following actions must be completed as soon as possible:
   a. Photographs of discharge activities and scans of field notes must be documented and the discharge log updated.
   b. Samples are to be stored in the lab refrigerator, or in a cooler with ice.

6.3.2 ENSURING NO DISCHARGE OF NON-COMPLIANT WATER

Water discharged to the receiving environment from containment ponds must adhere to MDMER and Baffinland's Water License discharge limits (Table 6-2). Historically, the WRF Pond has contained low pH (acidic) water as result of impacted runoff from the Waste Rock Stockpile. In cases where water contained in the WRF Pond or CF Pond is determined to be non-compliant with applicable discharge limits, water contained in the pond(s) must be treated as per Baffinland's Waste Rock Management Plan (BAF-PH1-830-P16-0029) and Waste Pond Water Treatment Plant Operations (BAF-PH1-340-PRO-048) to ensure compliance with the applicable discharge limits.

It is the responsibility of both the supervisor and the worker to discontinue discharging the ponds, and to notify their supervisor immediately, for any of the following reasons. A re-evaluation of the water quality is required prior to further discharge.

Reasons to discontinue discharging:

1. If external lab results for MS-06 (CF Pond) or MS-08 (WRF Pond) effluent are received that exceed the maximum concentrations listed in the 'BIM Internal Limits' column in Table 6-2. These limits are a threshold of conservatism to ensure regulated discharge limits are not exceeded (Table 6-2).

TABLE 6-2 BIM STANDARDS FOR EFFLUENT QUALITY DISCHARGE LIMITS FOR MS-06 AND MS-08

Parameter	Maximum Authorized Monthly Mean Concentration, as per MDMER	Maximum Concentration In A Grab Sample, as per BIM Internal Limits
Total Arsenic	0.50 mg/L	0.40 mg/L
Total Copper	0.30 mg/L	0.24 mg/L
Total Lead	0.20 mg/L	0.16 mg/L
Total Nickel	0.50 mg/L	0.40 mg/L
Total Zinc	0.50 mg/L	0.40 mg/L
TSS	15.0 mg/L	15.0 mg/L
Cyanide	1.00 mg/L	
Radium 226	0.37 Bq/L	
pH	Between 6.0 and 9.5	Between 6.5 and 9.0
Toxicity	Not acutely toxic (<50% mortality)	

2. If field pH measurements (i.e. YSI) fall outside the range/limits outlined in the 'BIM Internal Limits' column of Tables 6-2. These field readings are real-time measurements that characterize the water quality of effluent being discharged at that instance. As such, if measured field parameters fall outside of the 'BIM Internal Limits' outlined in Table 6-2, the discharge of effluent to the receiving environment must cease and the worker's supervisor notified.
3. Pumping must stop for at least 12 hours following heavy precipitation or wind events to allow for the pond water to stabilize, any suspended sediments to settle and be re-sampled, unless advised otherwise by the Environmental Superintendent.

If non-compliant water is accidently discharged to the receiving environment, Operations and Environment Departments will work collaboratively to mitigate, evaluate and document possible effects. In the case of the accidental release of non-compliant water, pumping of effluent to the receiving environment must seize immediately and the Head of Health, Safety, Environment and Security, Mine Manager and the Environmental Superintendent must to be notified immediately. In the event of a release of non-compliant water to the receiving environment, all notes, photographs, pumping/discharge times, and water quality data must be compiled for the investigation and the scene of the incident shut down until further instruction.

In the occurrence of an acute toxicity test determining the effluent to be acutely lethal, Baffinland will cease discharge immediately. The inspector will be notified of this non-compliance without delay. Water quality data collected when the acute toxicity sample was collected will be reviewed, and an additional BIM-MMER-WT sample set will be collected with the discharge pump set in recirculation mode. Additionally, reference and exposure area samples will be collected to monitor any impacts on the receiving environment. Reference area sample site for both ponds is MS-08-US, and the exposure area sample site is MS-08-DS for the WRF Pond, and MS-06-DS for the CF Pond. This is outlined in Section 15 of the MDMER. If discharge is not ceased increased frequency of acute lethality testing will occur as per

Section 15 of the MDMER. In most cases the pond will be recirculated until water quality is confirmed to be compliant before discharge to the receiving environment occurs.

6.4 TRAINING FOR SPILL RESPONSE

Emergency spill responses often occur in conjunction with other emergency responses (i.e. an overturned fuel tanker on the Tote Road); to facilitate an efficient response to an emergency, personnel trained to respond to health and safety emergencies shall also be trained in spill response. Baffinland's ERT Coordinator, with support from the Environmental Superintendents, will identify training and resource requirements for personnel involved with emergency spill responses. Emergency spill response training required by this Plan shall be reviewed in conjunction with Baffinland's ERP. Emergency and spill response training shall be updated throughout the lifecycle of Project to ensure the following requirements are fulfilled:

- The requirements of NWT/Nunavut Mines Health and Safety Regulations are met or exceeded.
- Emergency responders can competently operate the equipment employed for spills and other emergencies.
- Emergency responders will undertake practices, drills, and full scale exercises, for responding to emergencies that are plausible on site.

6.4.1 DRILLS AND EXERCISES

While drills and exercises can be used for training purposes, their primary function for this Plan is to provide the means of testing the adequacy of the Plan's provisions and the level of readiness of response personnel. The Emergency Response Trainer and Environmental Superintendents are responsible for coordinating the development of and assisting in conducting drills and exercises annually. The following section outlines the types of drills and exercises that can be practiced:

6.4.1.1 TABLE TOP EXERCISES

Table top exercises involve presenting a simulated emergency situation to key emergency response personnel in informal settings to elicit constructive discussions as the participants examine and resolve problems based on this Plan. These exercises shall be performed during ERT training sessions conducted throughout the year.

6.4.1.2 FUNCTIONAL DRILLS

Functional drills are practical exercises designed to evaluate the capability of personnel to perform a specific function (i.e. communications, first aid, and spill response). Deficiencies and competencies identified during functional drills are documented as per Section 30(4) of MDMER, and used as effective development tools in the preparation of response procedures required for full-scale exercises.

6.4.1.3 FULL-SCALE EXERCISES

Full scale exercises are intended to evaluate the operational capability of Baffinland's emergency response and preparedness. Full-scale exercises require sufficient notice to allow for the preparation of effective emergency response procedures and to identify and correct deficiencies in advance. Examples of mock full scale exercises at Baffinland include: non-compliant water discharge, berm breach, controlled discharge, seepage observed, and migratory waterfowl landing in ponds. Deficiencies and competencies identified during full scale exercises are documented as per Section 30(4) of MDMER, and used as effective development tools in the preparation of response procedures required for full-scale exercises.

7 REFERENCES AND RECORDS

Baffinland, (2014). EPP: BAF-PH1-840-P16-0002 Emergency Response Plan.

Baffinland, (2014). BAF-PH1-830-P16-0008 Environmental Protection Plan.

Baffinland, BAF-PH1-810-FOR-0005 Incident Investigation Form.

Golder, (2018). Interim Waste Rock Management Plan.

Baffinland, (2017). BAF-PH1-830-P16-0036 Spill Contingency Plan.

Baffinland, (2018). BAF-PH1-340-PRO-048 Waste Pond Water Treatment Plant Operations.

Environment and Climate Change Canada, (2018).

Fisheries Act, (1985). (R.S.C., 1985, c. F-14).

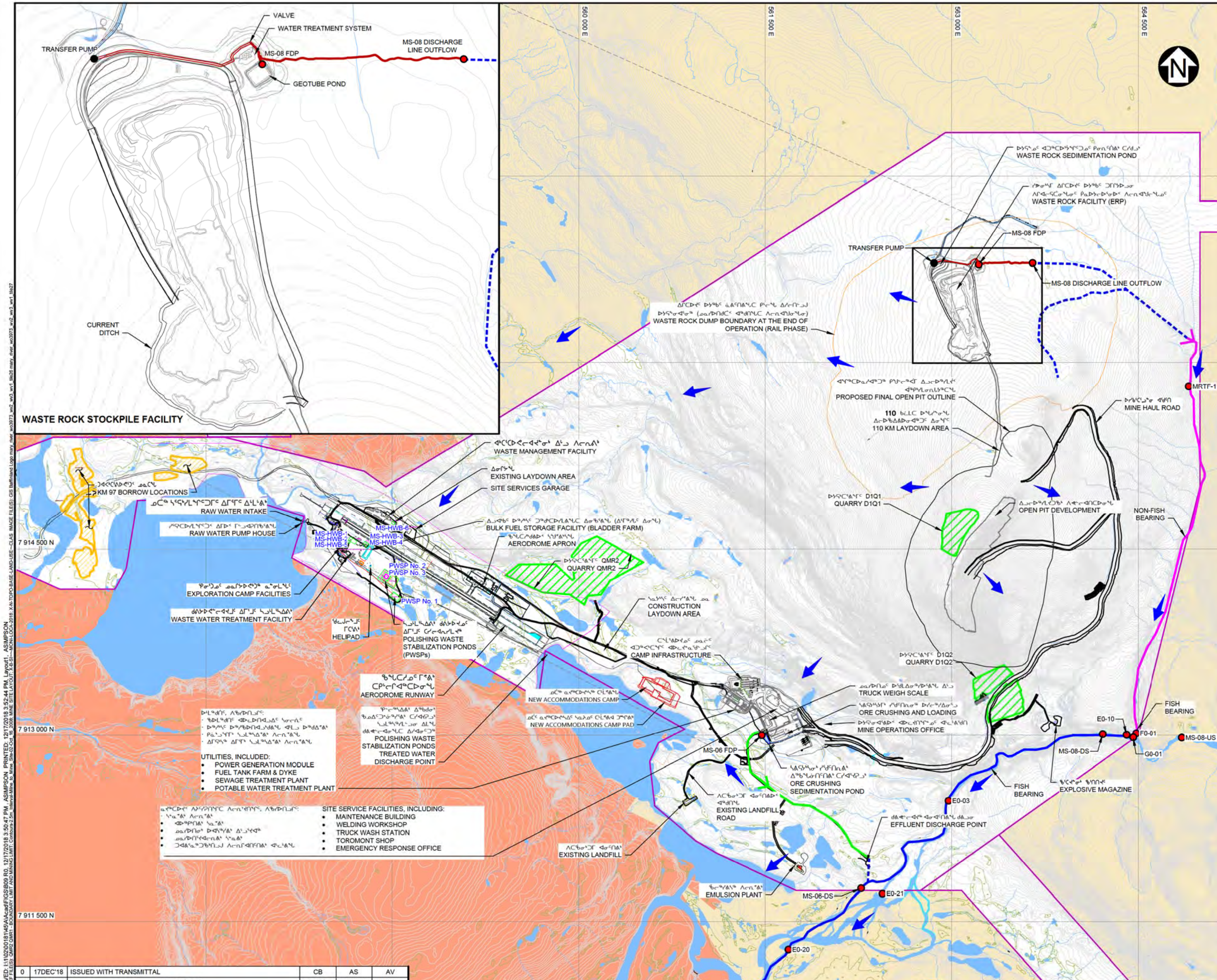
Metal and Diamond Mining Effluent Regulations. (SOR/2002-222).

Migratory Birds Convention Act, (1994). (S.C. 1994, c. 22).

Nunavut Water Board (2013): Water License NO: 2AM–MRY1325 Type “A”.

APPENDICES

APPENDIX A
SITE LAYOUT AND WATER LICENCE/ MDMER MONITORING LOCATIONS



WASTE ROCK STOCKPILE FACILITY
VALVE
WATER TREATMENT SYSTEM
TRANSFER PUMP
MS-08 FDP
MS-08 DISCHARGE LINE OUTFLOW
GEOTUBE POND
CURRENT DITCH
WASTE ROCK SEDIMENTATION POND
WASTE ROCK FACILITY (ERP)
WASTE ROCK DUMP BOUNDARY AT THE END OF OPERATION (RAIL PHASE)
PROPOSED FINAL OPEN PIT OUTLINE
110 KM LAYDOWN AREA
MINE HAUL ROAD
QUARRY D1Q1
OPEN PIT DEVELOPMENT
NON-FISH BEARING
MRTF-1
QUARRY D1Q2
FISH BEARING
E0-10
F0-01
G0-01
MS-08-US
MS-08-DS
EXPLOSIVE MAGAZINE
E0-03
E0-20
E0-21
MS-06-DS
MS-06 FDP
EFFLUENT DISCHARGE POINT
ORE CRUSHING SEDIMENTATION POND
EXISTING LANDFILL ROAD
EXISTING LANDFILL
EMULSION PLANT
TRUCK WEIGH SCALE
ORE CRUSHING AND LOADING
MINE OPERATIONS OFFICE
CAMP INFRASTRUCTURE
CONSTRUCTION LAYDOWN AREA
NEW ACCOMMODATIONS CAMP
NEW ACCOMMODATIONS CAMP PAD
WASTE MANAGEMENT FACILITY
EXISTING LAYDOWN AREA
SITE SERVICES GARAGE
BULK FUEL STORAGE FACILITY (BLADDER FARM)
AERODROME APRON
QUARRY QMR2
KM 97 BORROW LOCATIONS
RAW WATER INTAKE
RAW WATER PUMP HOUSE
MS-HWB-1
MS-HWB-2
MS-HWB-3
MS-HWB-4
MS-HWB-5
MS-HWB-6
PWSP No. 1
PWSP No. 2
PWSP No. 3
EXPLORATION CAMP FACILITIES
WASTE WATER TREATMENT FACILITY
HELIPAD
POLISHING WASTE STABILIZATION PONDS (PWSPs)
AERODROME RUNWAY
POLISHING WASTE STABILIZATION PONDS TREATED WATER DISCHARGE POINT
UTILITIES, INCLUDED:
POWER GENERATION MODULE
FUEL TANK FARM & DYKE
SEWAGE TREATMENT PLANT
POTABLE WATER TREATMENT PLANT
SITE SERVICE FACILITIES, INCLUDING:
MAINTENANCE BUILDING
WELDING WORKSHOP
TRUCK WASH STATION
TOROMONT SHOP
EMERGENCY RESPONSE OFFICE
560 000 E
561 500 E
563 000 E
564 500 E
7 914 500 N
7 913 000 N
7 911 500 N
N

LEGEND:

- INUIT OWNED LAND - SURFACE ONLY EXCLUDING MINERALS
- INUIT OWNED LAND - SURFACE AND SUBSURFACE INCLUDING MINERALS
- WATER
- BORROW AREAS (2013 UNDER Q10C3001)
- QUARRY AREA (EXISTING UNDER Q13C301)
- RIVER/STREAM/DRAINAGE
- ROAD
- QIA SURFACE COMMERCIAL LEASE BOUNDARY
- LAY FLAT HOSE
- FISH BEARING WATER
- NON-FISH BEARING WATER
- HDPE PIPE
- OVERLAND SURFACE WATER FLOW
- WATER QUALITY MONITORING LOCATION
- PUMP
- DRAINAGE DIRECTION

NOTES:

1. COORDINATE GRID IS UTM NAD83 ZONE 17N.
2. TOPOGRAPHY PROVIDED BY EAGLE MAPPING (2005).
3. PLAN BASED ON INFORMATION PROVIDED BY HATCH, DATED (JAN 13, 2015).
4. CONTOUR INTERVAL IS 2.5 METRES.

SCALE A 300 150 0 500 1000 1500 m

Baffinland

MARY RIVER PROJECT

MINE SITE LAYOUT AND MDMER / WATER LICENCE MONITORING LOCATIONS

Knight Piésold CONSULTING

P/A NO.	REF NO.
NB102-181/45	NB18-00875

FIGURE 1 REV 0

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED
0	17DEC'18	ISSUED WITH TRANSMITTAL	CB	AS	AV

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APPENDIX B
METAL AND DIAMOND MINING EFFLUENT REGULATIONS

CANADA

CONSOLIDATION

CODIFICATION

Metal and Diamond Mining Effluent Regulations

Règlement sur les effluents des mines de métaux et des mines de diamants

SOR/2002-222

DORS/2002-222

Current to July 5, 2018

Last amended on June 1, 2018

À jour au 5 juillet 2018

Dernière modification le 1 juin 2018

Published by the Minister of Justice at the following address:
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OFFICIAL STATUS OF CONSOLIDATIONS

Subsections 31(1) and (3) of the *Legislation Revision and Consolidation Act*, in force on June 1, 2009, provide as follows:

Published consolidation is evidence
31 (1) Every copy of a consolidated statute or consolidated regulation published by the Minister under this Act in either print or electronic form is evidence of that statute or regulation and of its contents and every copy purporting to be published by the Minister is deemed to be so published, unless the contrary is shown.

...

Inconsistencies in regulations
(3) In the event of an inconsistency between a consolidated regulation published by the Minister under this Act and the original regulation or a subsequent amendment as registered by the Clerk of the Privy Council under the *Statutory Instruments Act*, the original regulation or amendment prevails to the extent of the inconsistency.

NOTE

This consolidation is current to July 5, 2018. The last amendments came into force on June 1, 2018. Any amendments that were not in force as of July 5, 2018 are set out at the end of this document under the heading "Amendments Not in Force".

CARACTÈRE OFFICIEL DES CODIFICATIONS

Les paragraphes 31(1) et (3) de la *Loi sur la révision et la codification des textes législatifs*, en vigueur le 1er juin 2009, prévoient ce qui suit :

Codifications comme élément de preuve
31 (1) Tout exemplaire d'une loi codifiée ou d'un règlement codifié, publié par le ministre en vertu de la présente loi sur support papier ou sur support électronique, fait foi de cette loi ou de ce règlement et de son contenu. Tout exemplaire donné comme publié par le ministre est réputé avoir été ainsi publié, sauf preuve contraire.

[...]

Incompatibilité — règlements
(3) Les dispositions du règlement d'origine avec ses modifications subséquentes enregistrées par le greffier du Conseil privé en vertu de la *Loi sur les textes réglementaires* l'emportent sur les dispositions incompatibles du règlement codifié publié par le ministre en vertu de la présente loi.

NOTE

Cette codification est à jour au 5 juillet 2018. Les dernières modifications sont entrées en vigueur le 1 juin 2018. Toutes modifications qui n'étaient pas en vigueur au 5 juillet 2018 sont énoncées à la fin de ce document sous le titre « Modifications non en vigueur ».

TABLE OF PROVISIONS

Metal and Diamond Mining Effluent Regulations

TABLE ANALYTIQUE

Règlement sur les effluents des mines de métaux et des mines de diamants

Registration
SOR/2002-222 June 6, 2002

FISHERIES ACT

Metal and Diamond Mining Effluent Regulations

P.C. 2002-987 June 6, 2002

Her Excellency the Governor General in Council, on the recommendation of the Minister of Fisheries and Oceans, pursuant to subsections 34(2), 36(5) and 38(9) of the *Fisheries Act*, hereby makes the annexed *Metal Mining Effluent Regulations*.

Enregistrement
DORS/2002-222 Le 6 juin 2002

LOI SUR LES PÊCHES

Règlement sur les effluents des mines de métaux et des mines de diamants

C.P. 2002-987 Le 6 juin 2002

Sur recommandation du ministre des Pêches et des Océans et en vertu des paragraphes 34(2), 36(5) et 38(9) de la *Loi sur les pêches*, Son Excellence la Gouverneure générale en conseil prend le *Règlement sur les effluents des mines de métaux*, ci-après.

Metal and Diamond Mining Effluent Regulations

Règlement sur les effluents des mines de métaux et des mines de diamants

PART 1

General

Interpretation

1 (1) The following definitions apply in these Regulations.

Act means the *Fisheries Act*. (*Loi*)

acute lethality test [Repealed, SOR/2018-99, s. 2]

acutely lethal, in respect of an effluent, means that the effluent at 100% concentration kills

(a) more than 50% of the rainbow trout subjected to it for a period of 96 hours, when tested in accordance with the acute lethality test set out in section 14.1; or

(b) more than 50% of the threespine stickleback subjected to it for a period of 96 hours, when tested in accordance with the acute lethality test set out in section 14.2. (*létalité aiguë*)

acutely lethal effluent [Repealed, SOR/2018-99, s. 2]

authorization officer [Repealed, SOR/2018-99, s. 2]

commercial operation, in respect of a mine, means an average rate of production equal to or greater than 10% of the design-rated capacity of the mine over a period of 90 consecutive days. (*exploitation commerciale*)

composite sample means

(a) a quantity of effluent consisting of not less than three equal volumes or three volumes proportionate to flow that have been collected at approximately equal time intervals over a sampling period of not less than seven hours and not more than 24 hours; or

(b) a quantity of effluent collected continuously at a constant rate or at a rate proportionate to the rate of flow of the effluent over a sampling period of not less than seven hours and not more than 24 hours. (*échantillon composite*)

PARTIE I

Dispositions générales

Définitions et interprétation

1 (1) Les définitions qui suivent s'appliquent au présent règlement.

agent d'autorisation [Abrogée, DORS/2018-99, art. 2]

autorisation transitoire [Abrogée, DORS/2018-99, art. 2]

chantier [Abrogée, DORS/2018-99, art. 2]

concentration moyenne mensuelle La valeur moyenne des concentrations mesurées dans les échantillons composites ou instantanés prélevés de chaque point de rejet final chaque mois où il y a rejet de substances nocives. (*monthly mean concentration*)

dépôt de résidus miniers [Abrogée, DORS/2006-239, art. 1]

eau de drainage superficiel [Abrogée, DORS/2018-99, art. 2]

échantillon composite

a) Soit le volume d'effluent composé d'au moins trois parties égales ou de trois parties proportionnelles au débit, prélevées à intervalles sensiblement égaux, pendant une période d'échantillonnage d'au moins sept heures et d'au plus vingt-quatre heures;

b) soit le volume d'effluent prélevé de façon continue à un débit constant ou à un débit proportionnel à celui de l'effluent, pendant une période d'échantillonnage d'au moins sept heures et d'au plus vingt-quatre heures. (*composite sample*)

échantillon instantané [Abrogée, DORS/2018-99, art. 2]

effluent S'entend, selon le cas :

a) de l'effluent de bassins de traitement, de l'effluent d'eau de mine, de l'effluent des dépôts de résidus miniers, de l'effluent d'installations de préparation du

Daphnia magna monitoring test [Repealed, SOR/2018-99, s. 2]

deleterious substance [Repealed, SOR/2018-99, s. 2]

diamond mine means any work or undertaking that is designed or is used, or has been used, in connection with a mining or milling activity to produce a diamond or an ore from which a diamond may be produced. It includes any cleared or disturbed area that is adjacent to such a work or undertaking. (*mine de diamants*)

effluent means any of the following:

(a) hydrometallurgical facility effluent, milling facility effluent, mine water effluent, tailings impoundment area effluent, treatment pond effluent or treatment facility effluent other than effluent from a sewage treatment facility; or

(b) any seepage or surface runoff containing any deleterious substance that flows over, through or out of the site of a mine. (*effluent*)

final discharge point, in respect of an effluent, means an identifiable discharge point of a mine beyond which the operator of the mine no longer exercises control over the quality of the effluent. (*point de rejet final*)

grab sample [Repealed, SOR/2018-99, s. 2]

hydrometallurgical facility effluent means effluent from the acidic leaching, solution concentration and recovery of metals by means of aqueous chemical methods, tailings slurries, and all other effluents deposited from a hydrometallurgical facility. (*effluent d'installations d'hydrométallurgie*)

hydrometallurgy means the production of a metal by means of aqueous chemical methods for acidic leaching, solution concentration and recovery of metals from metal-bearing minerals other than metal-bearing minerals that have been thermally pre-treated or blended with metal-bearing minerals that have been thermally pre-treated. (*hydrométallurgie*)

metal mine means any work or undertaking that is designed or is used, or has been used, in connection with a mining, milling or hydrometallurgical activity to produce a metal or a metal concentrate or an ore from which a metal or a metal concentrate may be produced, as well as any cleared or disturbed area that is adjacent to such a work or undertaking. It includes any work or undertaking, such as a smelter, pelletizing plant, sintering plant, refinery or acid plant, if its effluent is combined with the effluent from a mining, milling or hydrometallurgical minerai, de l'effluent d'installations d'hydrométallurgie ou de l'effluent d'installations de traitement à l'exclusion de l'effluent d'installations de traitement d'eaux résiduaires;

b) des eaux d'exfiltration et des eaux de ruissellement qui contiennent une substance nocive et qui coulent sur le site d'une mine ou en proviennent. (*effluent*)

effluent à létalité aiguë [Abrogée, DORS/2018-99, art. 2]

effluent d'eau de mine Dans le cadre d'activités minières, l'eau pompée d'ouvrages souterrains, de compartiments d'extraction par solution ou de mines à ciel ouvert ou l'eau s'écoulant de ceux-ci. (*mine water effluent*)

effluent d'installations de préparation du minerai Boues de stériles, effluent des lixiviats de terrils, effluent de l'extraction par solution et tout autre effluent rejeté à partir d'une installation de préparation du minerai. (*milling facility effluent*)

effluent d'installations de traitement Eau des bassins de polissage, des bassins de traitement, des bassins de décantation, des stations de traitement de l'eau et de toute installation de traitement des effluents miniers. (*treatment facility effluent*)

effluent d'installations d'hydrométallurgie Effluent rejeté à partir d'une installation d'hydrométallurgie, notamment effluent de lixiviation acide, de concentration de solution et de récupération de métal par procédés chimiques aqueux et boues de résidus miniers. (*hydrometallurgical facility effluent*)

essai de détermination de la létalité aiguë [Abrogée, DORS/2018-99, art. 2]

essai de suivi avec bioessais sur la Daphnia magna [Abrogée, DORS/2018-99, art. 2]

exploitant Personne qui exploite une mine, qui en a le contrôle ou la garde, ou qui en est responsable. (*operator*)

exploitation commerciale Le taux de production moyen d'une mine qui, au cours d'une période de quatre-vingt-dix jours consécutifs, est égal ou supérieur à 10 % de la capacité nominale de la mine. (*commercial operation*)

exploitation des placers Exploitation minière où le minerai ou les métaux sont extraits de sédiments de cours

activity whose purpose is to produce a metal or a metal concentrate or an ore from which a metal or a metal concentrate may be produced. (*mine de métaux*)

milling means any of the following activities for the purpose of producing a diamond, metal or metal concentrate:

(a) the crushing or grinding of ore or kimberlite;

(b) the processing of uranium ore or uranium enriched solution; or

(c) the processing of tailings. (*préparation du minerai*)

milling facility effluent means tailing slurries, heap leaching effluent, solution mining effluent and all other effluent deposited from a milling facility. (*effluent d'installations de préparation du minerai*)

mine [Repealed, SOR/2018-99, s. 2]

mine under development [Repealed, SOR/2018-99, s. 2]

mine water effluent means, in respect of mining activities, water that is pumped from or flows out of any underground works, solution chambers or open pits. (*effluent d'eau de mine*)

monthly mean concentration means the average value of the concentrations measured in all composite or grab samples collected from each final discharge point during each month when a deleterious substance is deposited. (*concentration moyenne mensuelle*)

new mine [Repealed, SOR/2018-99, s. 2]

operations area [Repealed, SOR/2018-99, s. 2]

operator means any person who operates, has control or custody of or is in charge of a mine. (*exploitant*)

placer mining means a mining operation that extracts minerals or metals from stream sediments by gravity or magnetic separation. (*exploitation des placers*)

recognized closed mine [Repealed, SOR/2018-99, s. 2]

Reference Method EPS 1/RM/10 means *Biological Test Method: Reference Method for Determining Acute Lethality Using Threespine Stickleback*, published in December 2017 by the Department of the Environment, as amended from time to time. (*méthode de référence SPE 1/RM/10*)

d'eau par gravité ou par séparation magnétique. (*placer mining*)

hydrométallurgie La production d'un métal par des procédés chimiques aqueux de lixiviation acide, concentration de solution et récupération de métal à partir de minéraux métallifères n'ayant pas subi de prétraitement thermique ou n'ayant pas été mélangés à des minéraux métallifères qui ont subi un prétraitement thermique. (*hydrometallurgy*)

létalité aiguë S'agissant d'un effluent à l'état non dilué, la capacité de provoquer, selon le cas, la mort de :

a) plus de 50 % des truites arc-en-ciel qui y sont exposées pendant une période de quatre-vingt-seize heures au cours de l'essai de détermination de la létalité aiguë visé à l'article 14.1;

b) plus de 50 % des épinoches à trois épines qui y sont exposés pendant une période de quatre-vingt-seize heures au cours de l'essai de détermination de la létalité aiguë visé à l'article 14.2. (*acutely lethal*)

Loi La *Loi sur les pêches*. (*Act*)

matières en suspension Toutes matières solides présentes dans un effluent et retenues sur un papier-filtre dont les pores mesurent 1,5 micron lorsque l'effluent est soumis à un essai conforme aux exigences analytiques prévues au tableau 1 de l'annexe 3. (*suspended solids*)

méthode de référence SPE 1/RM/10 La publication intitulée *Méthode d'essai biologique : méthode de référence pour la détermination de la létalité aiguë à l'aide de l'épinoche à trois épines*, publiée en décembre 2017 par le ministère de l'Environnement, avec ses modifications successives. (*Reference Method EPS 1/RM/10*)

méthode de référence SPE 1/RM/13 La publication intitulée *Méthode d'essai biologique : méthode de référence pour la détermination de la létalité aiguë d'effluents chez la truite arc-en-ciel* (Méthode de référence SPE 1/RM/13), publiée en juillet 1990 par le ministère de l'Environnement, dans sa version modifiée en décembre 2000 et avec ses modifications successives. (*Reference Method EPS 1/RM/13*)

méthode de référence SPE 1/RM/14 La publication intitulée *Méthode d'essai biologique : méthode de référence pour la détermination de la létalité aiguë d'effluents chez Daphnia magna* (Méthode de référence SPE 1/RM/14), publiée en juillet 1990 par le ministère de l'Environnement, dans sa version modifiée en décembre 2000 et avec ses modifications successives. (*Reference Method EPS 1/RM/14*)

Reference Method EPS 1/RM/13 means *Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Rainbow Trout* (Reference Method EPS 1/RM/13), July 1990, published by the Department of the Environment, as amended in December 2000, and as may be further amended from time to time. (*méthode de référence SPE 1/RM/13*)

Reference Method EPS 1/RM/14 means *Biological Test Method: Reference Method for Determining Acute Lethality of Effluents to Daphnia magna* (Reference Method EPS 1/RM/14), July 1990, published by the Department of the Environment, as amended in December 2000, and as may be further amended from time to time. (*méthode de référence SPE 1/RM/14*)

reopened mine [Repealed, SOR/2018-99, s. 2]

surface drainage [Repealed, SOR/2018-99, s. 2]

suspended solids means any solid matter contained in an effluent that is retained on a 1.5 micron pore filter paper when the effluent is tested in compliance with the analytical requirements set out in Table 1 of Schedule 3. (*matières en suspension*)

tailings impoundment area [Repealed, SOR/2006-239, s. 1]

total suspended solids [Repealed, SOR/2018-99, s. 2]

transitional authorization [Repealed, SOR/2018-99, s. 2]

treatment facility effluent means water from a polishing pond, treatment pond, settling pond or water treatment plant or from any mine effluent treatment facility. (*effluent d'installations de traitement*)

mine [Abrogée, DORS/2018-99, art. 2]

mine de diamants Ouvrage ou entreprise qui est conçu ou qui est ou a été utilisé dans le cadre d'activités d'extraction ou de préparation du minerai visant à produire un diamant ou un minerai à partir duquel un diamant peut être produit ainsi que toute zone déboisée ou perturbée qui y est adjacente. (*diamond mine*)

mine de métaux Ouvrage ou entreprise qui est conçu ou qui est ou a été utilisé dans le cadre d'activités d'extraction, d'hydrométallurgie ou de préparation du minerai visant à produire un métal, un concentré de métal ou un minerai à partir duquel un métal ou un concentré de métal peut être produit ainsi que toute zone déboisée ou perturbée qui y est adjacente. La présente définition comprend tout ouvrage ou entreprise, telles les fonderies, usines de bouletage, usines de frittage, affineries et usines d'acide, dont l'effluent est combiné aux effluents provenant d'activités d'extraction, d'hydrométallurgie ou de préparation du minerai visant à produire un métal, un concentré de métal ou un minerai à partir duquel un métal ou un concentré de métal peut être produit. (*metal mine*)

mine en développement [Abrogée, DORS/2018-99, art. 2]

mine fermée reconnue [Abrogée, DORS/2018-99, art. 2]

mine remise en exploitation [Abrogée, DORS/2018-99, art. 2]

nouvelle mine [Abrogée, DORS/2018-99, art. 2]

point de rejet final Le point de rejet de l'effluent d'une mine qui est repérable et au-delà duquel l'exploitant de la mine n'agit plus quant à la qualité de l'effluent. (*final discharge point*)

préparation du minerai S'entend des activités ci-après effectuées en vue de la production d'un diamant, d'un métal ou d'un concentré de métal :

a) le concassage ou le broyage d'un minerai ou de kimberlite;

b) le traitement du minerai d'uranium ou de solutions uranifères;

c) le traitement de résidus miniers. (*milling*)

rejet Est assimilée au rejet l'immersion au sens du paragraphe 34(1) de la Loi. (*French version only*)

substance nocive [Abrogée, DORS/2018-99, art. 2]

(2) [Repealed, SOR/2018-99, s. 2]

SOR/2006-239, s. 1; SOR/2009-156, s. 1; SOR/2012-22, s. 1; SOR/2018-99, s. 2.

Application

2 (1) These Regulations apply in respect of the following mines:

(a) metal mines that, at any time on or after June 6, 2002,

(i) exceed an effluent flow rate of 50 m^3 per day, based on the effluent deposited from all the final discharge points of the mine, and

(ii) deposit a deleterious substance in any water or place referred to in subsection 36(3) of the Act; and

(b) diamond mines that, at any time on or after June 1, 2018,

(i) exceed an effluent flow rate of 50 m^3 per day, based on the effluent deposited from all the final discharge points of the mine, and

(ii) deposit a deleterious substance in any water or place referred to in subsection 36(3) of the Act.

(2) However, these Regulations do not apply in respect of

(a) placer mining;

(b) a metal mine that stopped commercial operation before June 6, 2002, unless it returns to commercial operation on or after that date; and

(c) a diamond mine that stopped commercial operation before June 1, 2018, unless it returns to commercial operation on or after that date.

(3) Despite subsection (1), sections 4 to 31 do not apply in respect of a mine that is a recognized closed mine under subsection 32(2) unless it returns to commercial operation, in which case it ceases to be a recognized closed mine.

SOR/2012-22, s. 2; SOR/2018-99, s. 3.

total des solides en suspension [Abrogée, DORS/2018-99, art. 2]

(2) [Abrogé, DORS/2018-99, art. 2]

DORS/2006-239, art. 1; DORS/2009-156, art. 1; DORS/2012-22, art. 1; DORS/2018-99, art. 2.

Champ d'application

2 (1) Le présent règlement s'applique à l'égard des mines suivantes :

a) les mines de métaux qui, à un moment quelconque, le 6 juin 2002 ou après cette date :

(i) d'une part, ont un débit d'effluent supérieur à 50 m^3 par jour, déterminé d'après les rejets d'effluent à partir de tous leurs points de rejet final,

(ii) d'autre part, rejettent une substance nocive dans les eaux ou les lieux visés au paragraphe 36(3) de la Loi;

b) les mines de diamants qui, à un moment quelconque, le 1er juin 2018 ou après cette date :

(i) d'une part, ont un débit d'effluent supérieur à 50 m^3 par jour, déterminé d'après les rejets d'effluent à partir de tous leurs points de rejet final,

(ii) d'autre part, rejettent une substance nocive dans les eaux ou les lieux visés au paragraphe 36(3) de la Loi.

(2) Toutefois, le présent règlement ne s'applique pas à l'égard :

a) des exploitations des placers;

b) des mines de métaux dont l'exploitation commerciale a pris fin avant le 6 juin 2002, à moins que l'exploitation commerciale ne reprenne le 6 juin 2002 ou après cette date;

c) des mines de diamants dont l'exploitation commerciale a pris fin avant le 1er juin 2018, à moins que l'exploitation commerciale ne reprenne le 1er juin 2018 ou après cette date.

(3) Malgré le paragraphe (1), les articles 4 à 31 ne s'appliquent pas à l'égard d'une mine qui est une mine fermée reconnue en application du paragraphe 32(2), à moins que l'exploitation commerciale ne reprenne, auquel cas elle cesse d'être une mine fermée reconnue.

DORS/2012-22, art. 2; DORS/2018-99, art. 3.

Prescribed Deleterious Substances

3 For the purpose of the definition *deleterious substance* in subsection 34(1) of the Act, the following substances or classes of substances are prescribed as deleterious substances:

(a) arsenic;

(b) copper;

(c) cyanide;

(d) lead;

(e) nickel;

(f) zinc;

(g) suspended solids; and

(h) radium 226.

SOR/2018-99, s. 3.

Substances nocives désignées

3 Pour l'application de la définition de *substance nocive* au paragraphe 34(1) de la Loi, sont désignées comme substances nocives et les substances ou les catégories de substance suivantes :

a) l'arsenic;

b) le cuivre;

c) le cyanure;

d) le plomb;

e) le nickel;

f) le zinc;

g) les matières en suspension;

h) le radium 226.

DORS/2018-99, art. 3.

Authority to Deposit in Water or Place Referred to in Subsection 36(3) of Act

4 (1) For the purposes of paragraph 36(4)(b) of the Act, the owner or operator of a mine is authorized to deposit, or to permit the deposit of, an effluent containing any deleterious substance that is prescribed in section 3 in any water or place referred to in subsection 36(3) of the Act if

(a) the concentration of the deleterious substance in the effluent does not exceed the maximum authorized concentrations that are set out in columns 2, 3 and 4 of Schedule 4;

(b) the pH of the effluent is equal to or greater than 6.0 but is not greater than 9.5; and

(c) the effluent is not acutely lethal.

(2) The authority in subsection (1) is conditional on the owner or operator complying with sections 6 to 27.

SOR/2018-99, s. 3.

Rejet autorisé dans les eaux ou lieux visés au paragraphe 36(3) de la Loi

4 (1) Pour l'application de l'alinéa 36(4)b) de la Loi, le propriétaire ou l'exploitant d'une mine est autorisé à rejeter ou à permettre que soit rejeté un effluent contenant l'une ou l'autre des substances nocives désignées à l'article 3 dans les eaux ou les lieux visés au paragraphe 36(3) de la Loi, si les conditions suivantes sont réunies :

a) la concentration de la substance nocive dans l'effluent ne dépasse pas les concentrations maximales permises qui sont établies aux colonnes 2, 3 et 4 de l'annexe 4;

b) le pH de l'effluent est égal ou supérieur à 6,0 mais ne dépasse pas 9,5;

c) l'effluent ne présente pas de létalité aiguë.

(2) Le propriétaire ou l'exploitant d'une mine ne peut se prévaloir de l'autorisation que lui confère le paragraphe (1) que s'il respecte les conditions prévues aux articles 6 à 27.

DORS/2018-99, art. 3.

Authority to Deposit in Tailings Impoundment Areas

5 (1) Despite section 4, the owner or operator of a mine may deposit or permit the deposit of waste rock, acutely

Autorisation de rejeter dans un dépôt de résidus miniers

5 (1) Malgré l'article 4, le propriétaire ou l'exploitant d'une mine peut rejeter — ou permettre que soient

lethal effluent or effluent of any pH and containing any concentration of a deleterious substance that is prescribed in section 3 into a tailings impoundment area that is either

(a) a water or place set out in Schedule 2; or

(b) a disposal area that is confined by anthropogenic or natural structures or by both, other than a disposal area that is, or is part of, a natural water body that is frequented by fish.

(2) The authority in subsection (1) is conditional on the owner or operator complying with sections 7 to 28.

(3) For the purposes of this section, any acutely lethal effluent is prescribed as a deleterious substance.

SOR/2006-239, s. 2; SOR/2018-99, s. 5.

rejetés — des stériles, un effluent à létalité aiguë ou tout autre effluent, quel que soit le pH de l'effluent ou sa concentration en substances nocives désignées à l'article 3, dans l'un ou l'autre des dépôts de résidus miniers suivants :

a) les eaux et lieux mentionnés à l'annexe 2;

b) toute aire de décharge circonscrite par une formation naturelle ou un ouvrage artificiel, ou les deux, à l'exclusion d'une aire de décharge qui est un plan d'eau naturel où vivent des poissons ou qui en fait partie.

(2) Le propriétaire ou l'exploitant d'une mine ne peut se prévaloir de l'autorisation que lui confère le paragraphe (1) que s'il respecte les conditions prévues aux articles 7 à 28.

(3) Pour l'application du présent article, tout effluent à létalité aiguë est désigné comme une substance nocive.

DORS/2006-239, art. 2; DORS/2018-99, art. 5.

PART 2

Conditions Governing Authority to Deposit

DIVISION 1

General

Prohibition on Diluting Effluent

6 The owner or operator of a mine shall not combine effluent with water or any other effluent for the purpose of diluting effluent before it is deposited.

Environmental Effects Monitoring

7 (1) The owner or operator of a mine shall conduct environmental effects monitoring studies in accordance with the requirements and within the periods set out in Schedule 5.

(2) The studies shall be conducted using documented and validated methods, and their results interpreted and reported on in accordance with generally accepted standards of good scientific practice at the time that the studies are conducted.

PARTIE 2

Conditions régissant l'autorisation de rejeter

SECTION 1

Dispositions générales

Interdiction de diluer

6 Il est interdit au propriétaire ou à l'exploitant d'une mine de combiner un effluent avec de l'eau ou avec tout autre effluent dans le but de le diluer avant son rejet.

Études de suivi des effets sur l'environnement

7 (1) Le propriétaire ou l'exploitant d'une mine effectue des études de suivi des effets sur l'environnement selon les exigences et dans les délais prévus à l'annexe 5.

(2) Il effectue les études selon des méthodes éprouvées et validées et évalue et présente leurs résultats conformément aux normes généralement reconnues régissant les bonnes pratiques scientifiques au moment de l'étude.

(3) The owner or operator shall record the results of the studies and submit to the Minister of the Environment, in accordance with the requirements set out in Schedule 5, the reports and information required by that Schedule.

SOR/2006-239, s. 3; SOR/2018-99, s. 6.

Identifying Information

8 (1) The owner or operator of a mine shall submit in writing to the Minister of the Environment the information referred to in subsection (2) not later than 60 days after the day on which any of the following occur:

(a) the mine becomes subject to these Regulations;

(b) ownership of the mine is transferred; and

(c) the mine returns to commercial operation after it has become a recognized closed mine.

(2) The information that shall be submitted is

(a) the name and address of both the owner and the operator of the mine;

(b) the name and address of any parent company of the owner and the operator; and

(c) the design-rated capacity of the mine, expressed as tonnes per year, and a description and rationale of how the design-rated capacity was determined.

(3) The owner or operator shall submit in writing to the Minister of the Environment any change in the information not later than 60 days after the change occurs.

SOR/2018-99, ss. 7, 36.

Final Discharge Points

9 The owner or operator of a mine shall identify each final discharge point and submit in writing to the Minister of the Environment, not later than 60 days after the day on which the mine becomes subject to these Regulations, the following information:

(a) plans, specifications and a general description of each final discharge point together with its location by latitude and longitude;

(b) a description of how each final discharge point is designed and maintained in respect of the deposit of deleterious substances; and

(3) Il enregistre les résultats des études et présente au ministre de l'Environnement, selon les exigences prévues à l'annexe 5, les rapports et les renseignements visés à cette annexe.

DORS/2006-239, art. 3; DORS/2018-99, art. 6.

Renseignements d'identification

8 (1) Le propriétaire ou l'exploitant d'une mine présente par écrit au ministre de l'Environnement les renseignements mentionnés au paragraphe (2) :

a) dans les soixante jours suivant la date à laquelle la mine devient assujettie au présent règlement;

b) dans les soixante jours suivant le transfert de la propriété de la mine;

c) s'agissant d'une mine fermée reconnue, dans les soixante jours suivant la date à laquelle l'exploitation commerciale reprend.

(2) Les renseignements à présenter sont :

a) les nom et adresse du propriétaire et de l'exploitant;

b) les nom et adresse de toute société mère du propriétaire et de l'exploitant;

c) la capacité nominale de la mine, exprimée en tonne par année, ainsi qu'une description et une explication de la façon dont elle a été établie.

(3) Le propriétaire ou l'exploitant présente par écrit au ministre de l'Environnement des précisions sur tout changement des renseignements dans les soixante jours suivant le changement.

DORS/2018-99, art. 7 et 36.

Points de rejet final

9 Le propriétaire ou l'exploitant d'une mine détermine chaque point de rejet final et fournit par écrit au ministre de l'Environnement, dans les soixante jours suivant la date à laquelle la mine devient assujettie au présent règlement, les renseignements suivants :

a) les plans, les spécifications et une description générale de chaque point de rejet final, ainsi que la latitude et la longitude de son emplacement;

b) la façon dont chacun des points de rejet final est conçu et entretenu en ce qui a trait au rejet de substances nocives;

(c) the name of the receiving body of water, if there is a name.

SOR/2006-239, s. 4; SOR/2018-99, ss. 8, 36.

c) le nom du milieu aquatique récepteur, si ce nom existe.

DORS/2006-239, art. 4; DORS/2018-99, art. 8 et 36.

10 (1) The owner or operator of a mine shall submit in writing to the Minister of the Environment the information required by section 9, for

(a) any final discharge point that is identified by an inspector, and that was not identified as required by section 9, within 30 days after the discharge point is identified; and

(b) each new final discharge point, at least 60 days before depositing effluent from that new final discharge point.

10 (1) Le propriétaire ou l'exploitant d'une mine présente par écrit au ministre de l'Environnement les renseignements visés à l'article 9 relativement à :

a) tous les points de rejet final que désigne l'inspecteur et qui n'ont pas été déterminés en application de l'article 9, dans les trente jours suivant leur désignation;

b) tout nouveau point de rejet final, au moins soixante jours avant qu'un effluent en soit rejeté.

(2) The owner or operator shall submit in writing to the Minister of the Environment the information on any proposed change to a final discharge point at least 60 days before the change is to be made.

SOR/2018-99, s. 36.

(2) Il présente par écrit au ministre de l'Environnement des précisions sur toute modification proposée d'un point de rejet final au moins soixante jours avant que la modification soit apportée.

DORS/2018-99, art. 36.

Monitoring Equipment Information

11 The owner or operator of a mine shall keep records relating to effluent monitoring equipment that contain

(a) a description of the equipment and, if applicable, the manufacturer's specifications and the year and model number of the equipment; and

(b) the results of the calibration tests of the equipment.

Renseignements sur l'équipement de surveillance

11 Le propriétaire ou l'exploitant d'une mine tient un registre concernant l'équipement de surveillance des effluents et y consigne :

a) la description de l'équipement et, le cas échéant, les spécifications du fabricant ainsi que l'année et le numéro du modèle de l'équipement;

b) les résultats des essais d'étalonnage de l'équipement.

DIVISION 2

Effluent Monitoring Conditions

Deleterious Substance and pH Testing

12 (1) The owner or operator of a mine shall, not less than once per week and at least 24 hours apart, collect from each final discharge point a grab sample or composite sample of effluent and record the pH of the sample at the time of its collection and record, without delay after collecting the sample, the concentrations of the deleterious substances prescribed in section 3.

SECTION 2

Conditions portant sur le suivi de l'effluent

Essais concernant le pH et les substances nocives

12 (1) Au moins une fois par semaine et à au moins vingt-quatre heures d'intervalle, le propriétaire ou l'exploitant d'une mine prélève, à partir de chaque point de rejet final, un échantillon instantané ou un échantillon composite d'effluent dont il enregistre le pH au moment du prélèvement ainsi que, sans délai après celui-ci, les concentrations des substances nocives désignées à l'article 3.

(2) Testing conducted under subsection (1) shall comply with the analytical requirements set out in Table 1 of Schedule 3 and shall be done in accordance with generally accepted standards of good scientific practice at the time of the sampling using documented and validated methods.

(3) Despite subsection (1), the owner or operator of a mine is not required to collect samples for the purpose of recording the concentrations of cyanide if cyanide has never been used as a process reagent at the mine.

SOR/2006-239, s. 5; SOR/2018-99, s. 9.

13 (1) The owner or operator of a mine may reduce the frequency of conducting tests relating to the concentrations of arsenic, copper, cyanide, lead, nickel or zinc at a final discharge point to not less than once in each calendar quarter, each test being conducted at least one month apart, if that substance's monthly mean concentration at that final discharge point is less than 10% of the value set out in column 2 of Schedule 4 for 12 consecutive months.

(2) The owner or operator of a mine, other than an uranium mine, may reduce the frequency of conducting tests relating to the concentration of radium 226 at a final discharge point to not less than once in each calendar quarter, each test being conducted at least one month apart, if the concentration of radium 226 at that final discharge point is less than 0.037 Bq/L for 10 consecutive weeks.

(3) The owner or operator of a mine shall increase the frequency of conducting tests relating to the concentration of a deleterious substance at a final discharge point to the frequency prescribed in section 12

(a) in the case of a deleterious substance mentioned in subsection (1), if that substance's monthly mean concentration at that final discharge point is equal to or greater than 10% of the value set out in column 2 of Schedule 4; and

(b) in the case of radium 226, if the concentration of radium 226 at that final discharge point is equal to or greater than 0.037 Bq/L.

(4) The owner or operator of a mine shall increase the frequency of conducting tests relating to the concentration of a deleterious substance at all final discharge points to the frequency prescribed in section 12 for all the substances mentioned in subsections (1) and (2) if the owner or operator

(a) fails to perform a test required under those subsections in accordance with the prescribed frequency; or

(2) Les essais effectués en application du paragraphe (1) doivent satisfaire aux exigences analytiques prévues au tableau 1 de l'annexe 3 et doivent être effectués conformément aux normes généralement reconnues régissant les bonnes pratiques scientifiques au moment de l'échantillonnage et selon des méthodes éprouvées et validées.

(3) Malgré le paragraphe (1), le propriétaire ou l'exploitant d'une mine n'a pas à prélever d'échantillon afin d'enregistrer la concentration de cyanure si cette substance n'a jamais été utilisée comme réactif de procédé à la mine.

DORS/2006-239, art. 5; DORS/2018-99, art. 9.

13 (1) Le propriétaire ou l'exploitant d'une mine peut, à un point de rejet final, réduire la fréquence des essais concernant la concentration d'arsenic, de cuivre, de cyanure, de plomb, de nickel ou de zinc à au moins une fois par trimestre civil, chaque essai étant effectué à au moins un mois d'intervalle, si la concentration moyenne mensuelle de la substance à ce point de rejet final est inférieure à 10 % de la valeur établie à la colonne 2 de l'annexe 4 pendant douze mois consécutifs.

(2) Le propriétaire ou l'exploitant d'une mine autre qu'une mine d'uranium peut, à un point de rejet final, réduire la fréquence des essais concernant la concentration de radium 226 à au moins une fois par trimestre civil, chaque essai étant effectué à au moins un mois d'intervalle, si la concentration à ce point de rejet final est inférieure à 0,037 Bq/L pendant dix semaines consécutives.

(3) Le propriétaire ou l'exploitant d'une mine porte la fréquence des essais concernant la concentration des substances nocives ci-après à celle prévue à l'article 12, à un point de rejet final, si :

a) dans le cas d'une substance nocive énumérée au paragraphe (1), la concentration moyenne mensuelle de cette substance, à ce point de rejet final, est égale ou supérieure à 10 % de la valeur établie à la colonne 2 de l'annexe 4;

b) dans le cas du radium 226, la concentration de cette substance, à ce point de rejet final, est égale ou supérieure à 0,037 Bq/L.

(4) Le propriétaire ou l'exploitant d'une mine porte la fréquence des essais concernant la concentration des substances nocives énumérées aux paragraphes (1) et (2) à celle prévue à l'article 12, à tous les points de rejet final, s'il omet :

a) soit d'effectuer les essais visés à ces paragraphes selon la fréquence requise;

(b) fails to submit a report required under subsection 21(1) or section 22 within the prescribed time.

(5) If the owner or operator of a mine changes the location of a final discharge point, the owner or operator shall increase the frequency of conducting tests relating to the concentration of a deleterious substance at that final discharge point to the frequency prescribed in section 12 for all the deleterious substances mentioned in subsections (1) and (2).

(6) The owner or operator of a mine who reduces the frequency of conducting tests under subsection (1) or (2) shall

(a) notify the Minister of the Environment, in writing, at least 30 days in advance, of that fact;

(b) select and record the sampling dates not less than 30 days in advance of collecting the samples of effluent; and

(c) collect the sample on the selected day except if, owing to unforeseen circumstances, they cannot sample on that day, in which case, they shall do so as soon as practicable after that day.

SOR/2006-239, s. 6; SOR/2018-99, s. 9.

Acute Lethality Testing

General

14 (1) Subject to section 15, the owner or operator of a mine shall collect, once a month, a grab sample of effluent from each final discharge point and determine whether the effluent is acutely lethal by conducting acute lethality tests on aliquots of each effluent sample in accordance with sections 14.1 and 14.2.

(2) For the purposes of subsection (1), the owner or operator of a mine

(a) shall select and record the sampling date not less than 30 days in advance of collecting the grab sample;

(b) shall collect the sample on the selected day except if, owing to unforeseen circumstances, they cannot sample on that day, in which case, they shall do so as soon as practicable after that day; and

(c) shall collect the grab samples not less than 15 days apart.

b) soit de présenter le rapport visé au paragraphe 21(1) ou à l'article 22 dans les délais prescrits.

(5) Si un point de rejet final est déplacé, le propriétaire ou l'exploitant d'une mine porte la fréquence des essais concernant la concentration des substances nocives, à ce point de rejet final, à celle prévue à l'article 12 pour toutes les substances nocives énumérées aux paragraphes (1) et (2).

(6) Le propriétaire ou l'exploitant d'une mine qui réduit la fréquence des essais en vertu des paragraphes (1) ou (2) prend les mesures suivantes :

a) il avise par écrit le ministre de l'Environnement de la réduction de la fréquence des essais, au moins trente jours avant celle-ci;

b) il choisit et enregistre, au moins trente jours à l'avance, la date de l'échantillonnage;

c) il prélève l'échantillon ce jour-là ou, si des circonstances imprévues l'en empêchent, le plus tôt possible après ce jour.

DORS/2006-239, art. 6; DORS/2018-99, art. 9.

Essai de détermination de la létalité aiguë

Généralités

14 (1) Sous réserve de l'article 15, le propriétaire ou l'exploitant d'une mine prélève une fois par mois un échantillon instantané d'effluent à chaque point de rejet final et détermine si cet effluent présente une létalité aiguë en effectuant des essais de détermination de la létalité aiguë sur des portions aliquotes de chaque échantillon conformément aux articles 14.1 et 14.2.

(2) Pour l'application du paragraphe (1), le propriétaire ou l'exploitant d'une mine :

a) choisit et enregistre, au moins trente jours à l'avance, la date de l'échantillonnage;

b) prélève l'échantillon ce jour-là ou, si des circonstances imprévues l'en empêchent, le plus tôt possible après ce jour;

c) prélève les échantillons instantanés à au moins quinze jours d'intervalle.

(3) When collecting a grab sample of effluent for the purposes of subsection (1), the owner or operator of a mine shall collect a sufficient volume of effluent to enable the owner or operator to comply with paragraph 15(1)(a).

SOR/2006-239, s. 7; SOR/2011-92, s. 4; SOR/2012-22, s. 3; SOR/2018-99, s. 10.

(3) Lors du prélèvement des échantillons instantanés en application du paragraphe (1), le propriétaire ou l'exploitant d'une mine prélève un volume d'effluent suffisant pour lui permettre de se conformer à l'alinéa 15(1)a).

DORS/2006-239, art. 7; DORS/2011-92, art. 4; DORS/2012-22, art. 3; DORS/2018-99, art. 10.

Acute Lethality Test — Rainbow Trout

14.1 Unless the salinity value of the effluent is equal to or greater than ten parts per thousand and the effluent is deposited into marine waters, the owner or operator of a mine shall determine whether the effluent is acutely lethal by conducting an acute lethality test in accordance with the procedures set out in section 5 or 6 of Reference Method EPS 1/RM/13.

SOR/2018-99, s. 10.

Essai de détermination de la létalité aiguë — Truite arc-en-ciel

14.1 Sauf dans le cas où la salinité de l'effluent est égale ou supérieure à dix parties par millier et que l'effluent est rejeté dans l'eau de mer, le propriétaire ou l'exploitant d'une mine détermine si l'effluent présente une létalité aiguë en effectuant un essai de détermination de la létalité aiguë conformément aux modes opératoires prévus aux sections 5 ou 6 de la méthode de référence SPE 1/RM/13.

DORS/2018-99, art. 10.

Acute Lethality Test — Threespine Stickleback

14.2 If the salinity value of the effluent is equal to or greater than ten parts per thousand and the effluent is deposited into marine waters, the owner or operator of a mine shall determine whether the effluent is acutely lethal by conducting an acute lethality test in accordance with the procedures set out in section 5 or 6 of Reference Method EPS 1/RM/10.

SOR/2018-99, s. 10.

Essai de détermination de la létalité aiguë — Épinoche à trois épines

14.2 Si la salinité de l'effluent est égale ou supérieure à dix parties par millier et que l'effluent est rejeté dans l'eau de mer, le propriétaire ou l'exploitant d'une mine détermine si l'effluent présente une létalité aiguë en effectuant un essai de détermination de la létalité aiguë conformément aux modes opératoires prévus aux sections 5 ou 6 de la méthode de référence SPE 1/RM/10.

DORS/2018-99, art. 10.

Increased Frequency of Acute Lethality Testing

15 (1) If an effluent sample is determined to be acutely lethal by an acute lethality test, the owner or operator of a mine shall

(a) without delay, conduct the effluent characterization set out in subsection 4(1) of Schedule 5 on the aliquot of each grab sample collected under subsection 14(1) and record the concentrations of the deleterious substances prescribed in section 3;

(b) collect, from the final discharge point from which the effluent sample that was determined to be acutely lethal was collected, a grab sample twice a month and, without delay after collecting the sample, conduct the acute lethality test that determined the effluent sample to be acutely lethal on each grab sample in accordance with the procedure set out in section 6 of the applicable reference method and, if the sample is determined to be acutely lethal, then conduct the effluent characterization set out in subsection 4(1) of

Fréquence accrue des essais de détermination de la létalité aiguë

15 (1) S'il est établi qu'un échantillon d'effluent présente une létalité aiguë après un essai de détermination de la létalité aiguë, le propriétaire ou l'exploitant d'une mine :

a) sans délai, effectue la caractérisation de l'effluent conformément au paragraphe 4(1) de l'annexe 5 sur une portion aliquote de chaque échantillon instantané prélevé en application du paragraphe 14(1) et enregistre les concentrations des substances nocives désignées à l'article 3;

b) deux fois par mois, prélève un échantillon instantané à partir du point de rejet final d'où l'échantillon d'effluent qui présente une létalité aiguë a été prélevé et effectue sans délai après le prélèvement, sur chacun de ces échantillons, selon le mode opératoire prévu à la section 6 de la méthode de référence, l'essai de détermination de la létalité aiguë à partir duquel la létalité aiguë de l'échantillon a été établie. S'il est ainsi établi que l'échantillon présente une létalité aiguë, le

Schedule 5 and record the concentrations of the deleterious substances prescribed in section 3; and

(c) collect the grab samples not less than seven days apart.

(2) The owner or operator may resume sampling and testing at the frequency prescribed in section 14 if the effluent is determined not to be acutely lethal in three consecutive tests conducted under paragraph (1)(b).

SOR/2006-239, s. 8; SOR/2018-99, s. 12.

Reduced Frequency of Acute Lethality Testing

16 (1) The owner or operator of a mine may reduce the frequency of conducting an acute lethality test at a final discharge point to once in each calendar quarter if the effluent from that final discharge point is determined not to be acutely lethal by that acute lethality test for 12 consecutive months.

(2) For the purpose of determining whether that effluent is acutely lethal for the 12-month period referred to in subsection (1), the owner or operator of a mine shall use the results of the acute lethality tests conducted under subsection 14(1).

(3) The owner or operator of a mine shall notify the Minister of the Environment in writing at least 30 days before the reduction of the frequency of acute lethality testing.

(4) The owner or operator who reduces the frequency of conducting acute lethality testing under subsection (1) shall

(a) select and record the sampling date not less than 30 days in advance of collecting the grab samples; and

(b) collect the grab samples not less than 45 days apart.

(5) If a grab sample is determined to be acutely lethal by an acute lethality test when the owner or operator of a mine is testing at the frequency prescribed in subsection (1), the owner or operator shall increase the frequency of conducting that test to the frequency prescribed in section 15 and conduct that test in accordance with that section.

(6) If the location of a final discharge point is changed, the owner or operator of a mine shall, at that final discharge point, increase the frequency of conducting all the acute lethality tests to the frequency prescribed in

propriétaire ou l'exploitant d'une mine effectue la caractérisation de l'effluent conformément au paragraphe 4(1) de l'annexe 5 et enregistre les concentrations des substances nocives désignées à l'article 3;

c) prélève les échantillons instantanés à au moins sept jours d'intervalle.

(2) Il peut recommencer à effectuer l'échantillonnage et les essais à la fréquence fixée à l'article 14 si l'effluent ne présente pas de létalité aiguë dans trois essais consécutifs effectués selon l'alinéa (1)b).

DORS/2006-239, art. 8; DORS/2018-99, art. 12.

Fréquence réduite des essais de détermination de la létalité aiguë

16 (1) Le propriétaire ou l'exploitant d'une mine peut réduire à une fois par trimestre civil la fréquence d'un essai de détermination de la létalité aiguë à un point de rejet final si, pendant douze mois consécutifs, l'effluent à ce point de rejet final ne présente pas de létalité aiguë selon cet essai.

(2) Pour établir si l'effluent présente une létalité aiguë pendant la période de douze mois visée au paragraphe (1), le propriétaire ou l'exploitant d'une mine se fonde sur les résultats obtenus aux termes du paragraphe 14(1).

(3) Le propriétaire ou l'exploitant d'une mine avise par écrit le ministre de l'Environnement de la réduction de la fréquence des essais au moins trente jours avant celle-ci.

(4) Le propriétaire ou l'exploitant qui réduit la fréquence des essais en application du paragraphe (1) prend les mesures suivantes :

a) il choisit et enregistre, au moins trente jours à l'avance, la date de l'échantillonnage;

b) il prélève les échantillons instantanés à au moins quarante-cinq jours d'intervalle.

(5) S'il est établi qu'un échantillon instantané d'effluent présente une létalité aiguë selon un essai de détermination de la létalité aiguë alors que cet essai est effectué à la fréquence prévue au paragraphe (1), le propriétaire ou l'exploitant d'une mine porte la fréquence de cet essai à celle prévue à l'article 15 et effectue cet essai conformément à cet article.

(6) Si l'emplacement d'un point de rejet final est déplacé, le propriétaire ou l'exploitant d'une mine porte la fréquence de tous les essais de détermination de la létalité aiguë à ce point de rejet final à celle prévue au

subsection 14(1) and conduct those tests in accordance with that subsection.

SOR/2012-22, s. 4; SOR/2018-99, s. 14.

paragraphe 14(1) et effectue ces essais conformément à ce paragraphe.

DORS/2012-22, art. 4; DORS/2018-99, art. 14.

Daphnia magna Monitoring Tests

17 (1) Unless the salinity value of the effluent is equal to or greater than four parts per thousand and the effluent is deposited into marine waters, the owner or operator of a mine shall conduct *Daphnia magna* monitoring tests in accordance with the procedure set out in section 5 or 6 of Reference Method EPS 1/RM/14 at the same time that the acute lethality tests are conducted under section 14, 15 or 16 of these Regulations.

(2) The owner or operator shall conduct *Daphnia magna* monitoring tests on the aliquots of each effluent sample collected for the acute lethality tests.

SOR/2018-99, s. 15.

Essai de suivi avec bioessais sur la *Daphnia magna*

17 (1) Sauf dans le cas où la salinité de l'effluent est égale ou supérieure à quatre parties par millier et que l'effluent est rejeté dans l'eau de mer, le propriétaire ou l'exploitant d'une mine qui fait des essais de détermination de la létalité aiguë en application des articles 14, 15 ou 16 effectue au même moment des essais de suivi avec bioessais sur la *Daphnia magna* selon les modes opératoires prévus aux sections 5 ou 6 de la méthode de référence SPE 1/RM/14.

(2) Il effectue chaque essai de suivi sur des portions aliquotes de chaque échantillon d'effluent prélevé pour les essais de détermination de la létalité aiguë.

DORS/2018-99, art. 15.

Obligation to Record All Test Results

18 The owner or operator of a mine shall record without delay the data referred to in section 9.1 of Reference Method EPS 1/RM/10, section 8.1 of Reference Method EPS 1/RM/13 and section 8.1 of Reference Method EPS 1/RM/14 for all acute lethality tests and *Daphnia magna* monitoring tests that are conducted to monitor deposits from final discharge points.

SOR/2018-99, s. 16.

Enregistrement des renseignements

18 Le propriétaire ou l'exploitant d'une mine enregistre sans délai les données visées à la section 9.1 de la méthode de référence SPE 1/RM/10, à la section 8.1 de la méthode de référence SPE 1/RM/13 et à la section 8.1 de la méthode de référence SPE 1/RM/14 pour tous les essais de détermination de la létalité aiguë et tous les essais de suivi avec bioessais sur la *Daphnia magna* effectués dans le cadre du suivi des rejets provenant de points de rejet final.

DORS/2018-99, art. 16.

Volume of Effluent

19 (1) The owner or operator of a mine shall record, in cubic metres, the total monthly volume of effluent deposited from each final discharge point for each month during which there was a deposit.

(2) The total monthly volume of effluent deposited shall be either

(a) determined on the basis of the average of the flow rates, expressed in cubic metres per day, measured and calculated as follows:

(i) by measuring the flow rate at the same time as samples are collected under section 12,

(ii) by calculating the average monthly flow rate by adding the flow rate measurements taken during

Volume d'effluent

19 (1) Le propriétaire ou l'exploitant d'une mine enregistre, en mètres cubes, le volume mensuel total d'effluent rejeté à partir de chaque point de rejet final, pour chaque mois au cours duquel un effluent a été rejeté.

(2) Le volume mensuel total d'effluent rejeté est :

a) soit fondé sur la moyenne des débits, exprimée en mètres cubes par jour, auquel cas il est déterminé de la façon suivante :

(i) le débit est mesuré au moment où les échantillons sont prélevés en application de l'article 12,

the month and dividing the total by the number of times the flow rate was measured, and

(iii) by multiplying the average monthly flow rate by the number of days during the month that effluent was deposited; or

(b) determined by using a monitoring system that provides a continuous measure of the volume of effluent deposited.

(3) The owner or operator shall

(a) measure the flow rate or volume of effluent deposited by using a monitoring system that is accurate to within 15% of measured flow rate or volume; and

(b) maintain and calibrate the monitoring system at least once in each year and record the results, as well as the date on which and the manner in which the requirement to maintain and calibrate has been met.

SOR/2006-239, s. 9; SOR/2012-22, s. 5; SOR/2018-99, s. 17.

Calculation of Monthly Mean Concentration and Loading

19.1 (1) With respect to the deleterious substances that are contained in the effluent deposited from each final discharge point, the owner or operator of a mine shall, for each month during which there is a deposit and during which samples are collected, record the monthly mean concentration

(a) in mg/L for deleterious substances referred to in paragraphs 3(a) to (g); and

(b) in Bq/L for a deleterious substance referred to in paragraph 3(h).

(2) If the analytical result from any test conducted under section 12 or 13 is less than the method detection limit used for that test, the test result shall be considered to be equal to one half of the detection limit used for the purpose of calculating the monthly mean concentration.

SOR/2006-239, s. 9; SOR/2018-99, s. 18.

20 (1) With respect to the deleterious substances that are contained in the effluent deposited from each final discharge point, the owner or operator of a mine shall, for each month and for each calendar quarter during which there was a deposit and during which a sample is collected, record the loading

(ii) la moyenne mensuelle des débits est calculée par la division du total des mesures de débit enregistrées au cours du mois par le nombre de mesures prises,

(iii) la moyenne mensuelle des débits est multipliée par le nombre de jours où l'effluent a été rejeté;

b) soit déterminé à l'aide d'un système de surveillance à mesure continue.

(3) Le propriétaire ou l'exploitant mesure le volume ou le débit d'effluent rejeté en tenant compte des exigences suivantes :

a) il utilise à cette fin un système de surveillance donnant des mesures exactes à 15 % près;

b) il entretient et étalonne le système de surveillance au moins une fois par année et enregistre les résultats, la date à laquelle il s'est conformé à cette exigence ainsi que la manière dont il s'y est pris.

DORS/2006-239, art. 9; DORS/2012-22, art. 5; DORS/2018-99, art. 17.

Calcul de la concentration moyenne mensuelle et de la charge

19.1 (1) À l'égard des substances nocives désignées à l'article 3 se trouvant dans l'effluent rejeté à partir de chaque point de rejet final, le propriétaire ou l'exploitant d'une mine enregistre, pour chaque mois au cours duquel un effluent est rejeté et des prélèvements sont effectués :

a) la concentration moyenne mensuelle en mg/L des substances nocives énumérées aux alinéas 3a) à g);

b) la concentration moyenne mensuelle en Bq/L de la substance nocive figurant à l'alinéa 3h).

(2) Si le résultat analytique de tout essai effectué en application des articles 12 ou 13 est inférieur à la limite de détection de la méthode utilisée pour l'essai, il est considéré comme égal à la moitié de la limite de détection de la méthode utilisée pour le calcul de la concentration moyenne mensuelle.

DORS/2006-239, art. 9; DORS/2018-99, art. 18.

20 (1) À l'égard des substances nocives désignées à l'article 3 se trouvant dans l'effluent rejeté à partir de chaque point de rejet final, le propriétaire ou l'exploitant d'une mine enregistre, pour chaque mois et pour chaque trimestre civil au cours duquel un effluent a été rejeté et des prélèvements ont été effectués :

(a) in kg for deleterious substances referred to in paragraphs 3(a) to (g); and

(b) in MBq for a deleterious substance referred to in paragraph 3(h).

(2) The owner or operator shall determine the loading for each month using the following formula:

ML = C × V / 1,000

where

ML is the loading for a month;

C is the monthly mean concentration of the deleterious substance, recorded under section 19.1; and

V is the total monthly volume of effluent deposited from each final discharge point, recorded under section 19.

(3) The owner or operator shall determine the loading for each calendar quarter using the following formula:

QL = C × V / 1,000

where

QL is the loading for a calendar quarter;

C is the mean of the monthly mean concentrations of the deleterious substance for that calendar quarter, recorded under section 19.1; and

V is the total volume of effluent deposited from each final discharge point during that calendar quarter, based on the sum of the total monthly volumes of effluent deposited from each final discharge point, recorded under section 19.

SOR/2006-239, s. 9; SOR/2018-99, s. 19.

Reporting Monitoring Results

21 (1) The owner or operator of a mine shall submit to the Minister of the Environment an effluent monitoring report for all tests and monitoring conducted during each calendar quarter not later than 45 days after the end of the quarter.

(2) Subject to subsection (3), the effluent monitoring report shall include

(a) the data referred to in section 9.1 of Reference Method EPS 1/RM/10, section 8.1 of Reference Method EPS 1/RM/13 and section 8.1 of Reference Method EPS 1/RM/14 as required by section 18;

(b) the concentration and monthly mean concentration of each deleterious substance prescribed in section 3 that is contained in the effluent samples

a) la charge en kg des substances nocives énumérées aux alinéas 3a) à g);

b) la charge en MBq de la substance nocive figurant l'alinéa 3h).

(2) Il détermine la charge pour chaque mois civil selon la formule suivante :

CM = C × V / 1 000

où :

CM représente la charge pour un mois;

C la concentration moyenne mensuelle de la substance nocive enregistrée en application de l'article 19.1;

V le volume total d'effluent rejeté à partir de chaque point de rejet final au cours du mois et enregistré en application de l'article 19.

(3) Il détermine la charge pour le trimestre civil selon la formule suivante :

CT = C × V / 1 000

où :

CT représente la charge pour un trimestre;

C la moyenne des concentrations moyennes mensuelles de la substance nocive enregistrées au cours du trimestre en application de l'article 19.1;

V le volume total d'effluent rejeté à partir de chaque point de rejet final au cours du trimestre, fondé sur la somme des volumes mensuels d'effluent rejeté à partir de chaque point de rejet final et enregistrés en application de l'article 19.

DORS/2006-239, art. 9; DORS/2018-99, art. 19.

Rapports sur les résultats de suivi

21 (1) Le propriétaire ou l'exploitant d'une mine présente au ministre de l'Environnement un rapport sur le suivi de l'effluent pour tout essai ou mesure de suivi effectué au cours de chaque trimestre civil, dans les quarante-cinq jours suivant la fin du trimestre.

(2) Sous réserve du paragraphe (3), le rapport comporte ce qui suit :

a) les données visées à la section 9.1 de la méthode de référence SPE 1/RM/10, à la section 8.1 de la méthode de référence SPE 1/RM/13 et à la section 8.1 de la méthode de référence SPE 1/RM/14, qu'exige l'article 18;

b) la concentration et la concentration moyenne mensuelle des substances nocives désignées à l'article 3 se trouvant dans les échantillons d'effluent prélevés en

collected under subsection 12(1) and the concentrations of such deleterious substances contained in the effluent samples collected under subsection 13(1) or (2);

(c) the pH of the effluent samples as required by subsection 12(1);

(d) whether a composite or grab sample collection method was used for each effluent sample as required by subsection 12(1);

(d.1) for each month of the calendar quarter, the number of days that effluent was deposited;

(e) the total volume of effluent deposited during each month of the reporting quarter as recorded under section 19;

(f) the mass loading of the deleterious substances prescribed in section 3 as recorded under section 20; and

(g) the results of the effluent characterization conducted under paragraph 15(1)(a).

(3) If no effluent is deposited in a calendar quarter, the report shall only include a statement to that effect.

SOR/2006-239, s. 10; SOR/2018-99, ss. 20, 36.

22 The owner or operator of a mine shall submit to the Minister of the Environment, not later than March 31 in each year, a report in the form set out in Schedule 6, that shall include the following:

(a) the identifying information set out in Part 1 of that Schedule;

(b) the effluent monitoring results for the previous calendar year, including

(i) test results respecting each final discharge point, and

(ii) the results of acute lethality tests; and

(c) the following information regarding non-compliance:

(i) if the results of any effluent monitoring tests indicate that the maximum authorized concentrations set out in Schedule 4 were exceeded or that the pH of the effluent is less than 6.0 or greater than 9.5, the causes of that non-compliance and the remedial measures that are planned or that have been implemented, and

application du paragraphe 12(1) de même que la concentration de ces substances nocives dans les échantillons d'effluent prélevés au titre des paragraphes 13(1) ou (2);

c) le pH des échantillons, exigé par le paragraphe 12(1);

d) pour chaque échantillon d'effluent prélevé en application du paragraphe 12(1), s'il s'agit d'un échantillon composite ou instantané;

d.1) pour chaque mois du trimestre civil, le nombre de jours où il y a eu rejet d'effluent;

e) le volume total d'effluent rejeté pour chaque mois du trimestre, enregistré en application de l'article 19;

f) la charge des substances nocives désignées à l'article 3 enregistrée en application de l'article 20;

g) les résultats des essais de caractérisation de l'effluent effectués conformément à l'alinéa 15(1)a).

(3) Si au cours d'un trimestre civil aucun effluent n'a été rejeté, le rapport ne comporte qu'une mention à cet effet.

DORS/2006-239, art. 10; DORS/2018-99, art. 20 et 36.

22 Le propriétaire ou l'exploitant d'une mine présente au ministre de l'Environnement, au plus tard le 31 mars de chaque année, un rapport en la forme prévue à l'annexe 6 et comportant les renseignements suivants :

a) les renseignements identificatoires prévus à la partie 1 de cette annexe;

b) les résultats du suivi de l'effluent pour l'année civile précédente dont :

(i) les résultats des essais à chacun des points de rejet final,

(ii) les résultats des essais de détermination de la létalité aiguë;

c) les renseignements suivants sur la non-conformité :

(i) si les résultats des essais de suivi de l'effluent montrent que les concentrations maximales permises prévues à l'annexe 4 ont été dépassées ou que le pH de l'effluent est inférieur à 6,0 ou supérieur à 9,5, les causes ainsi que les mesures correctives projetées ou mises en œuvre,

(ii) if the results of any acute lethality tests indicate that an effluent sample was determined to be acutely lethal, the remedial measures that are planned or that have been implemented.

SOR/2006-239, s. 11; SOR/2018-99, s. 21.

23 Any report or information referred to in sections 7, 21 and 22 shall be submitted electronically in the format provided by the Department of the Environment, but the report or information shall be submitted in writing if

(a) no such format has been provided; or

(b) it is, owing to circumstances beyond the control of either the owner or the operator, impracticable to submit the report or information electronically in the format provided.

SOR/2006-239, s. 11; SOR/2018-99, s. 22.

24 (1) The owner or operator of a mine shall notify an inspector without delay if the results of the effluent monitoring tests conducted under section 12 or 13, subsection 14(1) or section 15 or 16 indicate that

(a) the limits set out in Schedule 4 are being or have been exceeded;

(b) the pH of the effluent is less than 6.0 or greater than 9.5; or

(c) an effluent is acutely lethal.

(2) The owner or operator shall provide a written report of the test results to the inspector within 30 days after the tests have been completed.

(3) [Repealed, SOR/2018-99, s. 23]

SOR/2006-239, s. 12; SOR/2018-99, s. 23.

Relief

25 (1) Any time period specified for collecting samples of effluent referred to in this Division may be extended if

(a) unforeseen circumstances cause safety concerns or access problems and render the collection of samples of effluent impracticable; and

(b) the owner or operator of a mine notifies an inspector, without delay, of the circumstances and indicates when they expect to be able to collect the samples.

(ii) si les résultats des essais de détermination de la létalité aiguë démontrent qu'un échantillon d'effluent présente une létalité aiguë, les mesures correctives projetées ou mises en œuvre.

DORS/2006-239, art. 11; DORS/2018-99, art. 21.

23 Les rapports et renseignements visés aux articles 7, 21 et 22 sont présentés sous forme électronique selon le modèle fourni par le ministère de l'Environnement. Ils sont toutefois présentés par écrit dans l'un ou l'autre des cas suivants :

a) aucun modèle n'est fourni;

b) il est pratiquement impossible, pour des raisons indépendantes de la volonté du propriétaire ou de l'exploitant, selon le cas, de les présenter sous forme électronique selon le modèle fourni.

DORS/2006-239, art. 11; DORS/2018-99, art. 22.

24 (1) Le propriétaire ou l'exploitant d'une mine avise sans délai l'inspecteur si les résultats des essais de suivi de l'effluent effectués au titre des articles 12 ou 13, du paragraphe 14(1) ou des articles 15 ou 16 montrent que :

a) les limites prévues à l'annexe 4 sont ou ont été dépassées;

b) le pH de l'effluent est inférieur à 6,0 ou supérieur à 9,5;

c) l'effluent est un effluent à létalité aiguë.

(2) Il présente à l'inspecteur un rapport écrit des résultats des essais dans les trente jours suivant la fin de ceux-ci.

(3) [Abrogé, DORS/2018-99, art. 23]

DORS/2006-239, art. 12; DORS/2018-99, art. 23.

Dispense

25 (1) Les délais prévus dans la présente section à l'égard du prélèvement des échantillons d'effluent peuvent être prorogés si les conditions suivantes sont réunies :

a) des circonstances imprévues provoquent des problèmes de sécurité ou d'accessibilité et rendent le prélèvement d'échantillons d'effluent pratiquement impossible;

b) le propriétaire ou l'exploitant d'une mine a avisé l'inspecteur sans délai des circonstances et lui a indiqué le moment où il croit pouvoir procéder au prélèvement des échantillons.

(2) The owner or operator shall collect the samples of effluent without delay when the circumstances permit.

SOR/2006-239, s. 13.

(2) Le propriétaire ou l'exploitant prélève les échantillons d'effluent sans délai dès que les circonstances le permettent.

DORS/2006-239, art. 13.

DIVISION 3

Notice, Records and Other Documents

End of Commercial Operation Notice

26 (1) The owner or operator of a mine shall notify the Minister of the Environment in writing of the day on which the mine has stopped commercial operation not later than 90 days after the end of commercial operation.

(2) The owner or operator shall notify the Minister of the Environment in writing without delay if the mine returns to commercial operation.

SOR/2018-99, s. 36.

Records, Books of Account or Other Documents

27 The owner or operator of a mine shall keep all records, books of account or other documents required by these Regulations at the mine for a period of not less than five years, beginning on the day on which they are made, including

(a) records relating to all final discharge points, including any changes to those records;

(b) records relating to effluent monitoring equipment, including the calibration of that equipment;

(c) records relating to the data referred to in section 9.1 of Reference Method EPS 1/RM/10, section 8.1 of Reference Method EPS 1/RM/13 and section 8.1 of Reference Method EPS 1/RM/14;

(d) compensation plans;

(e) emergency response plans, including each update to the plan;

(f) reports on any unauthorized deposits;

(g) reports or other documents prepared and data collected for the purposes of environmental effects monitoring studies; and

SECTION 3

Avis, registres et autres documents

Avis de la fin de l'exploitation commerciale

26 (1) Le propriétaire ou l'exploitant d'une mine avise le ministre de l'Environnement par écrit de la date où l'exploitation commerciale de la mine a cessé, dans les quatre-vingt-dix jours suivant la cessation.

(2) Il avise le ministre de l'Environnement, par écrit et sans délai, de la reprise de l'exploitation commerciale.

DORS/2018-99, art. 36.

Registres, livres comptables ou autres documents

27 Le propriétaire ou l'exploitant d'une mine conserve à la mine, pendant au moins cinq ans à compter de leur établissement, tous les registres, livres comptables ou autres documents exigés par le présent règlement, soit, notamment :

a) les registres concernant les points de rejet final et tout changement à ces registres;

b) les registres concernant les équipements de surveillance des effluents, y compris les registres de calibration de ces équipements;

c) les registres concernant les données visées à la section 9.1 de la méthode de référence SPE 1/RM/10, à la section 8.1 de la méthode de référence SPE 1/RM/13 et à la section 8.1 de la méthode de référence SPE 1/RM/14;

d) les plans compensatoires;

e) les plans d'intervention d'urgence et chacune de leurs mises à jour;

f) tout rapport sur le rejet non autorisé;

(h) records and reports of measurements with respect to the pH, temperature and concentration of any deleterious substance prescribed in section 3.

SOR/2018-99, s. 24.

g) tous les rapports ou autres documents préparés et toutes les données recueillies pour une étude de suivi des effets sur l'environnement;

h) registres et rapports concernant toutes les mesures de pH, de la température et des concentrations des substances nocives énumérées à l'article 3.

DORS/2018-99, art. 24.

DIVISION 4

Tailings Impoundment Areas

Compensation Plan

27.1 (1) The owner or operator of a mine shall, before depositing a deleterious substance into a tailings impoundment area that is set out in Schedule 2, submit to the Minister of the Environment a compensation plan that includes the information described in subsection (2) and obtain that Minister's approval of the plan.

(2) The purpose of the compensation plan is to offset the loss of fish habitat resulting from the deposit of any deleterious substance into the tailings impoundment area. It shall contain the following information:

(a) a description of the location of the tailings impoundment area and of fish habitat that will be affected by the deposit;

(b) a quantitative impact assessment of the deposit on fish habitat;

(c) a description of the measures to be taken to offset the loss of fish habitat;

(d) a description of the measures to be taken during the planning and implementation of the compensation plan to mitigate any potential adverse effects on fish habitat that could result from the plan's implementation;

(e) a description of the measures to be taken to monitor the plan's implementation;

(f) a description of the measures to be taken to verify the extent to which the plan's purpose has been achieved;

(g) the time required to implement the plan that allows for the achievement of the plan's purpose within a reasonable time; and

(h) an estimate of the cost of implementing each element of the plan.

SECTION 4

Dépôts de résidus miniers

Plan compensatoire

27.1 (1) Avant de rejeter des substances nocives dans tout dépôt de résidus miniers qui figure à l'annexe 2, le propriétaire ou l'exploitant d'une mine présente au ministre de l'Environnement un plan compensatoire qui comporte les renseignements énumérés au paragraphe (2) et obtient son approbation.

(2) Le plan compensatoire a pour objectif de contrebalancer la perte d'habitat du poisson consécutive au rejet de substances nocives dans le dépôt de résidus miniers. Il comporte les renseignements suivants :

a) une description de l'emplacement du dépôt de résidus miniers et de l'habitat du poisson qui sera affecté par le rejet;

b) l'analyse quantitative de l'incidence du rejet sur l'habitat du poisson;

c) une description des mesures visant à contrebalancer la perte d'habitat du poisson;

d) une description des mesures envisagées durant la planification et la mise en œuvre du plan pour atténuer les effets défavorables sur l'habitat du poisson qui pourraient résulter de cette mise en œuvre;

e) une description des mesures de surveillance de la mise en œuvre du plan;

f) une description des mécanismes permettant de mesurer l'atteinte de l'objectif du plan;

g) le délai de la mise en œuvre du plan qui permet l'atteinte de son objectif dans un délai raisonnable;

h) l'estimation du coût de mise en œuvre de chacun des éléments du plan.

(3) The owner or operator of a mine shall submit with the compensation plan an irrevocable letter of credit to cover the plan's implementation costs, which letter of credit shall be payable upon demand on the declining balance of the implementation costs.

(4) The Minister of the Environment shall approve the compensation plan if it meets the requirements of subsection (2) and the owner or operator of a mine has complied with subsection (3).

(5) The owner or operator of a mine shall ensure that the compensation plan approved by the Minister of the Environment is implemented and, if the compensation plan's purpose is not being achieved, the owner or operator shall inform the Minister of the Environment.

(6) If the compensation plan's purpose is not being achieved, the owner or operator of a mine shall, as soon as practicable in the circumstances, identify and implement all necessary remedial measures to ensure that the purpose is achieved.

SOR/2006-239, s. 14; SOR/2018-99, s. 24.

(3) Le propriétaire ou l'exploitant d'une mine présente, avec le plan compensatoire, une lettre de crédit irrévocable couvrant les coûts de mise en œuvre du plan et payable sur demande à l'égard du coût des éléments du plan qui n'ont pas été mis en œuvre.

(4) Le ministre de l'Environnement approuve le plan compensatoire si celui-ci satisfait aux exigences visées au paragraphe (2) et si le propriétaire ou l'exploitant de la mine s'est conformé au paragraphe (3).

(5) Le propriétaire ou l'exploitant d'une mine veille à ce que le plan compensatoire qui a été approuvé par le ministre de l'Environnement soit mis en œuvre et informe ce dernier si l'objectif du plan n'a pas été atteint.

(6) Si l'objectif du plan compensatoire n'est pas atteint, le propriétaire ou l'exploitant d'une mine prend les mesures correctives nécessaires le plus tôt possible, eu égard aux circonstances.

DORS/2006-239, art. 14; DORS/2018-99, art. 24.

Deposits from Tailings Impoundment Areas

28 (1) The owner or operator of a mine shall deposit effluent from a tailings impoundment area only through a final discharge point that is monitored and reported on in accordance with the requirements of these Regulations.

(2) The owner or operator of a mine shall comply with section 6 and the conditions prescribed in paragraphs 4(1)(a) to (c) for all effluent that exits a tailing impoundment area.

Rejets à partir de dépôts de résidus miniers

28 (1) Le propriétaire ou l'exploitant d'une mine ne rejette l'effluent provenant d'un dépôt de résidus miniers qu'à un point de rejet final faisant l'objet d'un suivi et de rapports conformément aux exigences du présent règlement.

(2) Il remplit les conditions prévues aux alinéas 4(1)a) à c) et se conforme à l'article 6 lorsqu'il rejette un tel effluent.

PART 3

Unauthorized Deposits

29 [Repealed, SOR/2018-99, s. 25]

Emergency Response Plan

30 (1) The owner or operator of a mine shall prepare an emergency response plan that describes the measures to be taken in respect of a deleterious substance within the meaning of subsection 34(1) of the Act to prevent any unauthorized deposit of such a substance or to mitigate the effects of such a deposit.

PARTIE 3

Rejets non autorisés

29 [Abrogé, DORS/2018-99, art. 25]

Plan d'intervention d'urgence

30 (1) Le propriétaire ou l'exploitant d'une mine dresse un plan d'intervention d'urgence qui énonce, à l'égard d'une substance nocive au sens du paragraphe 34(1) de la Loi, les mesures à prendre pour prévenir tout rejet non autorisé d'une telle substance ou pour en atténuer les effets.

(2) The emergency response plan shall include the following elements:

(a) the identification of any unauthorized deposit that can reasonably be expected to occur at the mine and that can reasonably be expected to result in damage or danger to fish habitat or fish or the use by man of fish, and the identification of the damage or danger;

(b) a description of the measures to be used to prevent, prepare for, respond to and recover from a deposit identified under paragraph (a);

(c) a list of the individuals who are to implement the plan in the event of an unauthorized deposit, and a description of their roles and responsibilities;

(d) the identification of the emergency response training required for each of the individuals listed under paragraph (c);

(e) a list of the emergency response equipment included as part of the plan, and the equipment's location; and

(f) alerting and notification procedures including the measures to be taken to notify members of the public who may be adversely affected by a deposit identified under paragraph (a).

(3) The owner or operator shall complete the emergency response plan and have it available for inspection no later than 60 days after the mine becomes subject to this section.

(4) The owner or operator shall update and test the emergency response plan at least once each year to ensure that the plan continues to meet the requirements of subsection (2).

(4.1) The owner or operator of a mine shall, each time the emergency response plan is tested, record the following information and keep the record for at least five years:

(a) a summary of the test;

(b) the test results; and

(c) any modifications that are made to the plan as a consequence of the test.

(4.2) The owner or operator of a mine shall ensure that a copy of the most recent version of the emergency response plan is kept at the mine in a location that is readily available to the individuals who are responsible for implementing the plan.

(2) Le plan d'intervention d'urgence comporte en outre les éléments suivants :

a) la mention de tout rejet non autorisé qui pourrait se produire à la mine et entraîner des dommages ou des risques réels de dommages pour le poisson ou son habitat ou pour l'utilisation par l'homme du poisson, ainsi que l'identification de ces risques ou dommages;

b) le détail des mesures de prévention, de préparation, d'intervention et de réparation applicable à l'égard du rejet non autorisé mentionné au titre de l'alinéa a);

c) la liste des personnes chargées de mettre à exécution le plan en cas de rejet non autorisé ainsi qu'une description de leurs rôles et responsabilités;

d) la mention de la formation en intervention d'urgence exigée des personnes visées à l'alinéa c);

e) la liste de l'équipement d'intervention d'urgence prévu dans le plan et l'emplacement de cet équipement;

f) les procédures d'alerte et de notification, notamment les mesures prévues pour avertir les membres du public auxquels le rejet irrégulier mentionné au titre de l'alinéa a) pourrait causer un préjudice.

(3) Le propriétaire ou l'exploitant termine le plan d'intervention d'urgence, lequel doit être disponible pour inspection, dans les soixante jours suivant la date à laquelle la mine devient assujettie au présent article.

(4) Il tient à jour et met à l'essai le plan d'intervention d'urgence au moins une fois par année afin de veiller à ce que celui-ci satisfasse aux exigences du paragraphe (2).

(4.1) Chaque fois que le plan d'intervention est mis à l'essai, le propriétaire ou l'exploitant d'une mine consigne dans un registre les renseignements ci-après qu'il conserve pendant au moins cinq ans :

a) un résumé de l'essai;

b) les résultats de cet essai;

c) les modifications apportées au plan à la suite de cet essai.

(4.2) Il veille à ce qu'une copie du plan d'intervention d'urgence à jour soit conservée à la mine, à un endroit facilement accessible aux personnes chargées de mettre à exécution le plan.

(5) If a mine has not been subject to the requirements of this section for more than one year, a new emergency response plan shall be prepared and completed no later than 60 days after the day on which the mine again becomes subject to this section.

SOR/2006-239, s. 16; SOR/2012-22, s. 6(F); SOR/2018-99, s. 26.

Reporting

31 A report required by subsection 38(7) of the Act in respect of the unauthorized deposit of a deleterious substance shall contain the following information:

(a) the name, description and concentration of the deleterious substance deposited;

(b) the estimated quantity of the deposit and how the estimate was achieved;

(c) the day on which, and hour at which, the deposit occurred;

(d) the quantity of the deleterious substance that was deposited at a place other than through a final discharge point and the identification of that place, including the location by latitude and longitude and, if applicable, the civic address;

(e) the quantity of the deleterious substance that was deposited through a final discharge point and the identification of that discharge point;

(f) the name of the receiving body of water, if there is a name, and the location by latitude and longitude where the deleterious substance entered the receiving body of water;

(g) the results of the acute lethality tests conducted under subsection 31.1(1) or a statement indicating that acute lethality tests were not conducted but that notification was given under subsection 31.1(2);

(h) the circumstances of the deposit, the measures that were taken to mitigate the effects of the deposit and, if the emergency response plan was implemented, details concerning its implementation; and

(i) the measures that were taken, or that are intended to be taken, to prevent any similar occurrence of an unauthorized deposit.

SOR/2006-239, s. 17; SOR/2011-92, s. 6; SOR/2018-99, s. 27.

(5) Si la mine n'a pas été assujettie au présent article pendant plus d'un an, un nouveau plan d'intervention d'urgence est dressé — et doit être terminé — dans les soixante jours suivant la date à laquelle elle le redevient.

DORS/2006-239, art. 16; DORS/2012-22, art. 6(F); DORS/2018-99, art. 26.

Rapport

31 Le rapport exigé au paragraphe 38(7) de la Loi, à l'égard du rejet non autorisé d'une substance nocive, comporte les renseignements suivants :

a) le nom, la description et la concentration de la substance nocive rejetée;

b) la quantité estimative du rejet ainsi que la méthode d'estimation utilisée;

c) la date et l'heure du rejet;

d) la quantité de la substance nocive qui a été rejetée à partir d'un lieu autre qu'un point de rejet final et la mention de ce lieu ainsi que sa latitude et sa longitude et, le cas échéant, l'adresse municipale;

e) la quantité de la substance nocive qui a été rejetée à partir d'un point de rejet final, et la mention de celui-ci;

f) le nom du milieu aquatique récepteur, si ce nom existe, et la latitude et la longitude du point de pénétration de la substance nocive dans le milieu aquatique;

g) les résultats des essais de détermination de la létalité aiguë effectués en application du paragraphe 31.1(1) ou une attestation indiquant qu'aucun essai de détermination de la létalité aiguë n'a été effectué mais que l'avis visé au paragraphe 31.1(2) a été donné;

h) les circonstances du rejet, les mesures d'atténuation prises et, le cas échéant, le détail de l'exécution du plan d'intervention d'urgence;

i) les mesures prises ou planifiées afin d'éviter d'autres rejets semblables à l'avenir.

DORS/2006-239, art. 17; DORS/2011-92, art. 6; DORS/2018-99, art. 27.

Acute Lethality Testing

31.1 (1) If an unauthorized deposit of a deleterious substance occurs, the owner or operator of a mine shall, without delay, collect a grab sample of effluent at the place where the deposit occurred and determine whether the effluent is acutely lethal by conducting tests on aliquots of each effluent sample in accordance with sections 14.1 and 14.2.

(2) Despite subsection (1), the owner or operator of a mine is not required to conduct those tests if they notify an inspector, without delay, that the deposit is an acutely lethal effluent.

SOR/2018-99, s. 27.

Essai de détermination de la létalité aiguë

31.1 (1) En cas de rejet non autorisé d'une substance nocive, le propriétaire ou l'exploitant d'une mine prélève sans délai un échantillon instantané d'effluent sur les lieux du rejet non autorisé et détermine si cet effluent présente une létalité aiguë en effectuant des essais conformément aux articles 14.1 et 14.2 sur des portions aliquotes de chaque échantillon d'effluent prélevé.

(2) Malgré le paragraphe (1), le propriétaire ou l'exploitant d'une mine n'est pas tenu d'effectuer les essais s'il avise sans délai l'inspecteur que le rejet est un effluent à létalité aiguë.

DORS/2018-99, art. 27.

PART 4

Recognized Closed Mines

Requirements

32 (1) An owner or operator who intends to close a mine shall

(a) provide written notice of that intention to the Minister of the Environment;

(b) maintain the mine's rate of production at less than 10% of its design-rated capacity for a continuous period of three years starting on the day on which the written notice is received by the Minister of the Environment; and

(c) conduct a biological monitoring study during the three-year period referred to in paragraph (b) in accordance with Division 3 of Part 2 of Schedule 5.

(2) If the owner or operator has complied with all of the requirements set out in paragraphs (1)(a) to (c), the mine becomes a recognized closed mine after the expiry of the three-year period referred to in subsection (1).

(3) The owner or operator shall notify the Minister of the Environment in writing at least 60 days before reopening the recognized closed mine.

(4) The owner or operator referred to in this section shall keep at any place in Canada all records, books of account or other documents required by these Regulations for a period of not less than five years beginning on the day

PARTIE 4

Mines fermées reconnues

Exigences

32 (1) Le propriétaire ou l'exploitant qui souhaite fermer sa mine :

a) en avise le ministre de l'Environnement par écrit;

b) maintient le taux de production de la mine à moins de 10 % de sa capacité nominale durant une période continue de trois ans commençant à la date à laquelle le ministre de l'Environnement reçoit l'avis;

c) effectue, durant la période prévue à l'alinéa b), une étude de suivi biologique conformément à la section 3 de la partie 2 de l'annexe 5.

(2) La mine devient une mine fermée reconnue à l'expiration de la période de trois ans prévue au paragraphe (1) si le propriétaire ou l'exploitant s'est conformé aux exigences visées aux alinéas (1)a) à c).

(3) Le propriétaire ou l'exploitant avise par écrit le ministre de l'Environnement de la réouverture de la mine fermée reconnue au moins soixante jours avant la réouverture.

(4) Le propriétaire ou l'exploitant visé par le présent article conserve n'importe où au Canada tous les registres, livres comptables ou autres documents exigés par le présent règlement pendant au moins cinq ans à compter de

they are made, and shall notify the Minister of the Environment in writing of their location.

SOR/2006-239, s. 18; SOR/2018-99, ss. 28, 36.

leur établissement et avise le ministre de l'Environnement par écrit du lieu où ils se trouvent.

DORS/2006-239, art. 18; DORS/2018-99, art. 28 et 36.

Identifying Information

33 (1) The owner or operator of a recognized closed mine shall submit in writing to the Minister of the Environment the information referred to in subsection (2) not later than 60 days after the day on which

(a) the recognized closed mine becomes subject to these Regulations; or

(b) ownership of the recognized closed mine is transferred.

(2) The information that shall be submitted is the name and address of

(a) both the owner and the operator of the recognized closed mine; and

(b) any parent company of the owner or the operator.

(3) The owner or operator shall notify the Minister of the Environment of any change in the information not later than 60 days after the change occurs.

SOR/2018-99, s. 36.

Renseignements d'identification

33 (1) Le propriétaire ou l'exploitant d'une mine fermée reconnue présente par écrit au ministre de l'Environnement les renseignements mentionnés au paragraphe (2) :

a) dans les soixante jours suivant la date à laquelle la mine fermée reconnue devient assujettie au présent règlement;

b) dans les soixante jours suivant le transfert de propriété de la mine fermée reconnue.

(2) Les renseignements à présenter sont :

a) les nom et adresse du propriétaire et de l'exploitant;

b) les nom et adresse de toute société mère du propriétaire ou de l'exploitant.

(3) Le propriétaire ou l'exploitant avise le ministre de l'Environnement de tout changement des renseignements dans les soixante jours suivant le changement.

DORS/2018-99, art. 36.

34 [Repealed, SOR/2018-99, s. 29]

35 [Repealed, SOR/2018-99, s. 29]

36 [Repealed, SOR/2018-99, s. 29]

37 [Repealed, SOR/2018-99, s. 29]

38 [Repealed, SOR/2018-99, s. 29]

39 [Repealed, SOR/2018-99, s. 29]

40 [Repealed, SOR/2018-99, s. 29]

41 [Repealed, SOR/2018-99, s. 29]

42 [Repealed, SOR/2018-99, s. 29]

34 [Abrogé, DORS/2018-99, art. 29]

35 [Abrogé, DORS/2018-99, art. 29]

36 [Abrogé, DORS/2018-99, art. 29]

37 [Abrogé, DORS/2018-99, art. 29]

38 [Abrogé, DORS/2018-99, art. 29]

39 [Abrogé, DORS/2018-99, art. 29]

40 [Abrogé, DORS/2018-99, art. 29]

41 [Abrogé, DORS/2018-99, art. 29]

42 [Abrogé, DORS/2018-99, art. 29]

SCHEDULE 1

[Repealed, SOR/2018-99, s. 30]

ANNEXE 1

[Abrogée, DORS/2018-99, art. 30]

SCHEDULE 2

(Subsections 5(1) and 27.1(1))

Tailings Impoundment Areas

Item	Column 1 Water or Place	Column 2 Description
1	Anderson Lake, Manitoba	Anderson Lake located at 54°51′ north latitude and 100°0′ west longitude near the town of Snow Lake, Manitoba. More precisely, the area bounded by **(a)** the contour of elevation around Anderson Lake at the 285-m level, and **(b)** the control dam built at the east end of Anderson Lake.
2	Garrow Lake, Nunavut	Garrow Lake located at 75°23′ north latitude and 97°48′ west longitude near the south end of Little Cornwallis Island, Nunavut.
3	South Kemess Creek, British Columbia	That part of South Kemess Creek being within the watershed of that tributary of South Kemess Creek **(a)** extending eastwards and upstream from the centre of a tailings dam constructed at 57°1′ north latitude and 126°41′ west longitude, and **(b)** below the crest of the dam at an elevation of 1515 m.
4	Albino Lake, British Columbia	Albino Lake located at 56°39.4′ north latitude and 130°29.4′ west longitude near the Eskay Creek Mine in British Columbia. More precisely, the area bounded by **(a)** the contour of elevation around Albino Lake at the 1040-m level, and **(b)** the outlet of Albino Lake.
5	Tom MacKay Lake, British Columbia	Tom MacKay Lake located at 56°39′ north latitude and 130°34′ west longitude near the Eskay Creek Mine in British Columbia. More precisely, the area bounded by **(a)** the contour of elevation around Tom MacKay Lake at the 1078-m level, and **(b)** the outlet of Tom MacKay Lake.
6	Trout Pond, Newfoundland and Labrador	Trout Pond located at 48°39′0.81882″ north latitude and 56°29′19.704984″ west longitude in west-central Newfoundland. More precisely, the area bounded by **(a)** the contour of elevation around Trout Pond at the 270 m level, and **(b)** the outlet of Trout Pond.
7	The headwater pond of a tributary to Gill's Pond Brook, Newfoundland and Labrador	The headwater pond of a tributary to Gill's Pond Brook, located at 48°38′29.599584″ north latitude and 56°30′15.560676″ west longitude in west-central Newfoundland. More precisely, the area bounded by **(a)** the contour of elevation around the pond at the 260 m level, and **(b)** the outlet of the pond.

ANNEXE 2

(paragraphes 5(1) et 27.1(1))

Dépôts de résidus miniers

Article	Colonne 1 Eaux ou lieux	Colonne 2 Description
1	Lac Anderson, Manitoba	Le lac Anderson, situé par 54°51′ de latitude N. et 100°0′ de longitude O., près de la ville de Snow Lake, au Manitoba. Plus précisément, le lieu délimité par : **a)** la courbe de niveau à 285 m autour du lac Anderson; **b)** le barrage de régulation à l'extrémité est du lac Anderson.
2	Lac Garrow, Nunavut	Le lac Garrow, situé par 75°23′ de latitude N. et 97°48′ de longitude O., près de l'extrémité sud de la petite île Cornwallis, au Nunavut.
3	Ruisseau South Kemess, Colombie-Britannique	La partie du ruisseau South Kemess située dans le bassin hydrographique du tributaire du ruisseau South Kemess : **a)** qui s'étend vers l'est et en amont du centre d'un barrage de retenue des stériles situé par 57°1′ de latitude N. et 126°41′ de longitude O.; **b)** qui se trouve en dessous de la crête du barrage, à une altitude de 1515 m.
4	Lac Albino, Colombie-Britannique	Le lac Albino, situé par 56°39,4′ de latitude N. et 130°29,4′ de longitude O., près de la mine Eskay Creek, en Colombie-Britannique. Plus précisément, la région délimitée par : **a)** la courbe de niveau à 1040 m autour du lac Albino; **b)** la décharge du lac Albino.
5	Lac Tom MacKay, Colombie-Britannique	Le lac Tom MacKay, situé par 56°39′ de latitude N. et 130°34′ de longitude O., près de la mine Eskay Creek, en Colombie-Britannique. Plus précisément, la région délimitée par : **a)** la courbe de niveau à 1078 m autour du lac Tom MacKay; **b)** la décharge du lac Tom Mackay.
6	Trout Pond, Terre-Neuve-et-Labrador	L'étang Trout Pond, situé par 48°39′0,818 82″ de latitude N. et 56°29′19,704 984″ de longitude O., dans la partie centrale ouest de Terre-Neuve et, plus précisément, la région délimitée par : **a)** la courbe de niveau à 270 m autour de l'étang Trout Pond; **b)** la décharge de l'étang Trout Pond.

Item	Column 1 Water or Place	Column 2 Description
8	The northwest arm of Second Portage Lake, Nunavut	That portion of the northwest arm of Second Portage Lake, located at 65°1′39.29″ north latitude and 96°3′43″ west longitude, approximately 80 km north of the town of Baker Lake, Nunavut. More precisely, the area bounded by **(a)** the contour of elevation around the arm at the 146 m level, and **(b)** the dam built at the southeast end of the arm.
9	Tail Lake, Nunavut	Tail Lake, located at 68°7′25.8″ north latitude and 106°33′31.2″ west longitude, approximately 125 km southwest of the town of Cambridge Bay, Nunavut. More precisely, the area bounded by **(a)** the contour of elevation around Tail Lake at the 33.5 m level, and **(b)** the dams built at the south and north ends of the lake.
10	A portion of Wabush Lake, Newfoundland and Labrador	That portion of Wabush Lake near the towns of Labrador City and Wabush in western Labrador. More precisely, the area bounded by **(a)** the southern limit, extending from 53° north latitude, 66°50′24″ west longitude to 53° north latitude, 66°52′57″ west longitude, and **(b)** the outlet of Wabush Lake, extending from 53°09′4.7″ north latitude, 66°47′3.5″ west longitude to 53°08′57.5″ north latitude, 66°47′2.9″ west longitude.
11	Flora Lake, Newfoundland and Labrador	Flora Lake located at 52°55′ north latitude, 66°49′ west longitude, near the towns of Labrador City and Wabush in western Labrador.
12	A portion of an unnamed tributary stream to Flora Lake, Newfoundland and Labrador	A portion of an unnamed tributary stream to Flora Lake, Newfoundland and Labrador. More precisely, an area extending from the mouth of the stream (52°52′9.94″ north latitude, 66°47′14.26″ west longitude) for a distance of 75 m upstream from Flora Lake.
13	A portion of an unnamed tributary stream to Flora Lake, Newfoundland and Labrador	A portion of an unnamed tributary stream to Flora Lake, Newfoundland and Labrador. More precisely, an area extending from the mouth of the stream (52°52′10.70″ north latitude, 66°47′6.49″ west longitude) for a distance of 580 m upstream from Flora Lake.
14	A portion of an unnamed tributary stream to Flora Lake, Newfoundland and Labrador	A portion of an unnamed tributary stream to Flora Lake, Newfoundland and Labrador. More precisely, an area extending from the mouth of the stream (52°52′57.45″ north latitude, 66°47′25.23″ west longitude) for a distance of 256 m upstream from Flora Lake.

Article	Colonne 1 Eaux ou lieux	Colonne 2 Description
7	L'étang d'amont d'un tributaire du ruisseau Gill, Terre-Neuve-et-Labrador	L'étang d'amont d'un tributaire du ruisseau Gill, situé par 48°38′29,599 584″ de latitude N. et 56°30′15,560 676″ de longitude O., dans la partie centrale ouest de Terre-Neuve et, plus précisément, la région délimitée par : **a)** la courbe de niveau à 260 m autour de l'étang; **b)** la décharge de l'étang.
8	Le nord-ouest du bras du lac Second Portage, Nunavut	La partie du nord-ouest du bras du lac Second Portage, située par 65°1′39,29″ de latitude N. et 96°3′43″ de longitude O., à environ 80 km au nord de la ville de Baker Lake, au Nunavut et, plus précisément, la région délimitée par : **a)** la courbe de niveau à 146 m autour du bras; **b)** la digue construite à l'extrémité sud-est du bras.
9	Lac Tail, Nunavut	Le lac Tail, situé par 68°7′25,8″ de latitude N. et 106°33′31,2″ de longitude O., à environ 125 km au sud-ouest de la ville de Cambridge Bay, au Nunavut et, plus précisément, la région délimitée par : **a)** la courbe de niveau à 33,5 m autour du lac; **b)** les digues construites aux extrémités sud et nord du lac.
10	Une partie du lac Wabush, Terre-Neuve-et-Labrador	La partie du lac Wabush, située près des villes de Labrador City et de Wabush dans la partie ouest du Labrador, et, plus précisément, la région délimitée par : **a)** la limite sud s'étendant de 53° de latitude N. et 66°50′24″ de longitude O., à 53° de latitude N. et 66°52′57″ de longitude O.; **b)** la décharge du lac Wabush, s'étendant de 53°09′4,7″ de latitude N. et 66°47′3,5″ de longitude O., à 53°08′57,5″ de latitude N. et 66°47′2,9″ de longitude O.
11	Lac Flora, Terre-Neuve-et-Labrador	Le lac Flora, situé par 52°55′ de latitude N. et 66°49′ de longitude O., près des villes de Labrador City et de Wabush dans la partie ouest du Labrador.
12	Une partie d'un ruisseau sans nom tributaire du lac Flora, Terre-Neuve-et-Labrador	La partie d'un ruisseau sans nom tributaire du lac Flora, Terre-Neuve-et-Labrador, et, plus précisément, la région s'étendant de l'embouchure du ruisseau (52°52′9,94″ de latitude N., 66°47′14,26″ de longitude O.) sur une distance de 75 m en amont du lac Flora.
13	Une partie d'un ruisseau sans nom tributaire du lac Flora, Terre-Neuve-et-Labrador	La partie d'un ruisseau sans nom tributaire du lac Flora, Terre-Neuve-et-Labrador, et, plus précisément, la région s'étendant de l'embouchure du ruisseau (52°52′10,70″ de latitude N., 66°47′6,49″ de longitude O.) sur une distance de 580 m en amont du lac Flora.

Item	Column 1 Water or Place	Column 2 Description
15	Sandy Pond, Newfoundland and Labrador	Sandy Pond, located at 47°25′33″ north latitude and 53°46′52″ west longitude, on the Avalon Peninsula, approximately 3 km east southeast of the town of Long Harbour-Mount Arlington Heights, Newfoundland and Labrador. More precisely, the area bounded by **(a)** the contour of elevation around Sandy Pond at the 137 m level, and **(b)** the dams built at the north end of Sandy Pond.
16	A portion of King Richard Creek, British Columbia	A portion of King Richard Creek, located approximately 60 km southwest of the town of Mackenzie, British Columbia. More precisely, a 3.3 km portion of the creek extending northwards and upstream from the centre of a dam constructed at 55°06′42″ north latitude and 123°59′29″ west longitude, to the centre of a dam constructed at 55°07′52″ north latitude and 124°00′50″ west longitude.
17	A portion of an unnamed tributary to Alpine Lake, British Columbia	A portion of an unnamed tributary to Alpine Lake, located approximately 60 km southwest of the town of Mackenzie, British Columbia. More precisely, a 900 m portion of the tributary extending southwards and upstream from the centre of a dam constructed at 55°08′19″ north latitude and 124°00′27″ west longitude, to the centre of a dam constructed at 55°07′59″ north latitude and 124°01′00″ west longitude.
18	A portion of an unnamed tributary to Alpine Lake, British Columbia	A portion of an unnamed tributary to Alpine Lake, located approximately 60 km southwest of the town of Mackenzie, British Columbia. More precisely, a 590 m portion of the tributary extending southwards and upstream from the centre of a dam constructed at 55°08′18″ north latitude and 124°00′41″ west longitude, to the centre of a dam constructed at 55°08′09″ north latitude and 124°01′08″ west longitude.
19	Mallard Lake, Saskatchewan	Mallard Lake, located at 56°00′32″ north latitude and 104°16′38″ west longitude, approximately 120 km northeast of the town of La Ronge, Saskatchewan. More precisely, the area bounded by **(a)** the contour of elevation around Mallard Lake at the 490 m level, and **(b)** the dam built at the south end of Mallard Lake.
20	The unnamed headwater pond of an unnamed tributary of East Creek, Ontario	An unnamed headwater pond of an unnamed tributary of East Creek, located at 50°02′17″ north latitude and 79°40′57″ west longitude, approximately 145 km northeast of the town of Cochrane, Ontario.

Article	Colonne 1 Eaux ou lieux	Colonne 2 Description
14	Une partie d'un ruisseau sans nom tributaire du lac Flora, Terre-Neuve-et-Labrador	La partie d'un ruisseau sans nom tributaire du lac Flora, Terre-Neuve-et-Labrador, et, plus précisément, la région s'étendant de l'embouchure du ruisseau (52°52′57,45″ de latitude N., 66°47′25,23″ de longitude O.) sur une distance de 256 m en amont du lac Flora.
15	Sandy Pond, Terre-Neuve-et-Labrador	L'étang Sandy Pond, situé par 47°25′33″ de latitude N. et 53°46′52″ de longitude O., dans la péninsule Avalon, à environ 3 km est-sud-est de la ville de Long Harbour-Mount Arlington Heights, Terre-Neuve-et-Labrador, et, plus précisément, la région délimitée par : **a)** la courbe de niveau à 137 m autour de l'étang Sandy Pond; **b)** les digues construites à l'extrémité nord de l'étang Sandy Pond.
16	Une partie du ruisseau King Richard, Colombie-Britannique	La partie du ruisseau King Richard située à environ 60 km au sud-ouest de la ville de Mackenzie en Colombie-Britannique, et, plus précisément, la partie du ruisseau qui s'étend sur 3,3 km vers le nord et en amont du centre du barrage situé par 55°06′42″ de latitude N. et 123°59′29″ de longitude O. jusqu'au centre du barrage situé par 55°07′52″ de latitude N. et 124°00′50″ de longitude O.
17	Une partie d'un affluent sans nom tributaire du lac Alpine, Colombie-Britannique	La partie d'un affluent sans nom tributaire du lac Alpine située à environ 60 km au sud-ouest de la ville de Mackenzie en Colombie-Britannique, et, plus précisément, la partie de l'affluent qui s'étend sur 900 m vers le sud et en amont du centre du barrage situé par 55°08′19″ de latitude N. et 124°00′27″ de longitude O. jusqu'au centre du barrage situé par 55°07′59″ de latitude N. et 124°01′00″ de longitude O.
18	Une partie d'un affluent sans nom tributaire du lac Alpine, Colombie-Britannique	La partie d'un affluent sans nom tributaire du lac Alpine située à environ 60 km au sud-ouest de la ville de Mackenzie en Colombie-Britannique, et, plus précisément, la partie de l'affluent qui s'étend sur 590 m vers le sud et en amont du centre du barrage situé par 55°08′18″ de latitude N. et 124°00′41″ de longitude O. jusqu'au centre du barrage situé par 55°08′09″ de latitude N. et 124°01′08″ de longitude O.
19	Lac Mallard, Saskatchewan	Le lac Mallard, situé par 56°00′32″ de latitude N. et 104°16′38″ de longitude O., à environ 120 km au nord-est de la ville de La Ronge en Saskatchewan et, plus précisément, la région délimitée par : **a)** la courbe de niveau à 490 m autour du lac Mallard; **b)** le barrage construit à l'extrémité sud du lac Mallard.
20	L'étang d'amont sans nom d'un tributaire sans nom du ruisseau East, Ontario	L'étang d'amont sans nom d'un tributaire sans nom du ruisseau East situé par 50°02′17″ de latitude N. et 79°40′57″ de longitude O., à environ 145 km au nord-est de la ville de Cochrane, en Ontario.

Item	Column 1 Water or Place	Column 2 Description
21	A portion of an unnamed tributary to East Creek, Ontario	A portion of an unnamed tributary to East Creek, Ontario, located approximately 145 km northeast of the town of Cochrane, Ontario. More precisely, a 2.3-km portion of the tributary extending northwards and downstream from the outlet of the unnamed headwater pond referred to in item 20, to the centre of a dam constructed at 50°02′43″ north latitude and 79°40′20″ west longitude.
22	A portion of an unnamed tributary to Linden Creek, Ontario	A portion of an unnamed tributary to Linden Creek, Ontario, located approximately 145 km northeast of the town of Cochrane, Ontario. More precisely, a 1.8-km portion of the tributary extending southwards and downstream from the northern perimeter of a waste rock disposal area at 50°00′17″ north latitude and 79°43′37″ west longitude to the southern perimeter of the waste rock disposal area at 49°59′30″ north latitude and 79°43′07″ west longitude.
23	A portion of an unnamed tributary to an unnamed lake in the Linden Creek watershed, Ontario	A portion of an unnamed tributary to an unnamed lake in the Linden Creek watershed, Ontario, located approximately 145 km northeast of the town of Cochrane, Ontario. More precisely, a 1.4-km portion of the tributary extending southwards and downstream from the headwaters of the tributary at 50°00′17″ north latitude and 79°42′39″ west longitude to the southern perimeter of a waste rock disposal area at 49°59′25″ north latitude and 79°42′27″ west longitude.
24	A portion of Trail Creek, British Columbia	A portion of Trail Creek, located approximately 20 km southeast of the community of Iskut, British Columbia. More precisely, a 0.6 km portion of the creek extending southwards and downstream from a natural barrier located at 57°42′59″ north latitude and 129°44′10″ west longitude, to the centre of a dam constructed at 57°42′43″ north latitude and 129°44′20″ west longitude.
25	Lake Hesse, Quebec	Lake Hesse, located at 52°46′21″ north latitude and 67°20′58″ west longitude, approximately 15 km west of the town of Fermont, Quebec. More precisely, the area bounded by **(a)** the contour of elevation around Lake Hesse at the 620 m level, **(b)** the dam built at the north end of Lake Hesse, and **(c)** the control dam built at the south end of Lake Hesse.

Article	Colonne 1 Eaux ou lieux	Colonne 2 Description
21	Une partie d'un tributaire sans nom du ruisseau East, Ontario	La partie d'un tributaire sans nom du ruisseau East située à environ 145 km au nord-est de la ville de Cochrane, en Ontario et, plus précisément, la partie du tributaire qui s'étend sur 2,3 km vers le nord et en aval de la décharge de l'étang d'amont sans nom visé à l'article 20 de la présente annexe, jusqu'au centre du barrage situé par 50°02′43″ de latitude N. et 79°40′20″ de longitude O.
22	Une partie d'un tributaire sans nom du ruisseau Linden, Ontario	La partie d'un tributaire sans nom du ruisseau Linden situé à environ 145 km au nord-est de la ville de Cochrane, en Ontario et, plus précisément, la partie du tributaire qui s'étend sur 1,8 km vers le sud et en aval du périmètre nord d'une aire de décharge de stériles située par 50°00′17″ de latitude N. et 79°43′37″ de longitude O., jusqu'au périmètre sud de l'aire de décharge de stériles située par 49°59′30″ de latitude N. et 79°43′07″ de longitude O.
23	Une partie d'un tributaire sans nom d'un lac sans nom du bassin hydrographique du ruisseau Linden, Ontario	La partie d'un tributaire sans nom d'un lac sans nom du bassin hydrographique du ruisseau Linden située à environ 145 km au nord-est de la ville de Cochrane, en Ontario et, plus précisément, la partie du tributaire qui s'étend sur 1,4 km vers le sud et en aval des eaux d'amont du tributaire située par 50°00′17″ de latitude N. et 79°42′39″ de longitude O., jusqu'au périmètre sud d'une aire de décharge de stériles située par 49°59′25″ de latitude N. et 79°42′27″ de longitude O.
24	Une partie du ruisseau Trail, Colombie-Britannique	Une partie du ruisseau Trail situé en Colombie-Britannique à environ 20 km au sud-est de la communauté d'Iskut et, plus précisément, la partie du ruisseau qui s'étend sur 0,6 km vers le sud et en aval de la barrière naturelle située par 57°42′59″ de latitude N. et 129°44′10″ de longitude O. jusqu'au centre du barrage situé par 57°42′43″ de latitude N. et 129°44′20″ de longitude O.
25	Le lac Hesse, Québec	Le lac Hesse, situé par 52°46′21″ de latitude N. et 67°20′58″ de longitude O., à environ 15 km à l'ouest de la ville de Fermont, au Québec, et, plus précisément, la région délimitée par : **a)** la courbe de niveau à 620 m autour du lac Hesse; **b)** le barrage construit à l'extrémité nord du lac Hesse; **c)** le barrage de régulation construit à l'extrémité sud du lac Hesse.

Item	Column 1 Water or Place	Column 2 Description
26	An unnamed lake approximately 20 km west of Fermont, Quebec and a portion of its outlet	An unnamed lake, located at 52°49′43″ north latitude and 67°22′23″ west longitude, approximately 20 km west of the town of Fermont, Quebec, and a portion of its outlet. More precisely, the area bounded by **(a)** the contour of elevation around the lake at the 660 m level, and **(b)** the outlet of the lake extending from the mouth of an outlet stream at 52°49′33″ north latitude and 67°22′18″ west longitude for a distance of 30 m downstream from that mouth.
27	A portion of an unnamed stream discharging waters from an unnamed lake, other than the one referred to in item 26, approximately 20 km west of Fermont, Quebec	A portion of an unnamed stream discharging waters from an unnamed lake, other than the one referred to in item 26, approximately 20 km west of the town of Fermont, Quebec. More precisely, the 1815 m portion of the stream that extends southwards and downstream from the point located at 52°50′02″ north latitude and 67°21′29″ west longitude to the point located at 52°49′20″ north latitude and 67°21′39″ west longitude.
28	A portion of South Teigen Creek, British Columbia	A portion of South Teigen Creek, located approximately 65 km northwest of Stewart, British Columbia. More precisely, an 8.1-km portion of the creek extending northwestwards and downstream from the point located at 56°37′53″ north latitude and 129°54′44″ west longitude to the centre of a dam located at 56°40′11.57″ north latitude and 129°58′20.92″ west longitude.
29	A portion of North Treaty Creek, British Columbia	A portion of North Treaty Creek, located approximately 65 km northwest of Stewart, British Columbia. More precisely, a 3.3-km portion of the creek extending southwards and downstream from the headwaters of the creek located at 56°37′34″ north latitude and 129°54′50″ west longitude to the centre of a dam located at 56°35′54.24″ north latitude and 129°51′25.31″ west longitude.
30	An unnamed watercourse that is a tributary to Lake Jean, located approximately 25 km southeast of Chibougamau, Quebec	The unnamed watercourse that is a tributary to Lake Jean, located approximately 25 km southeast of the town of Chibougamau, Quebec, beginning at the unnamed pond located at 49°47′58″ north latitude and 74°01′38″ west longitude and extending northwards and downstream for a distance of 6.4 km to the centre of the dam constructed at 49°49′29″ north latitude and 74°03′07″ west longitude.
31	A portion of an unnamed watercourse that is a tributary to the watercourse referred to in item 30	A portion of an unnamed watercourse beginning at that watercourse's point of confluence with the watercourse referred to in item 30, which confluence is located at 49°47′57″ north latitude and 74°03′25″ west longitude, and extending for a distance of 1 km northwards and upstream from that point.

Article	Colonne 1 Eaux ou lieux	Colonne 2 Description
26	Un lac sans nom situé à environ 20 km à l'ouest de Fermont, Québec et une partie de sa décharge	Un lac sans nom, situé par 52°49′43″ de latitude N. et 67°22′23″ de longitude O., à environ 20 km à l'ouest de la ville de Fermont, au Québec, et une partie de sa décharge, et, plus précisément, la région délimitée par : **a)** la courbe de niveau à 660 m autour du lac; **b)** la décharge du lac s'étendant de l'embouchure de l'émissaire situé par 52°49′33″ de latitude N. et 67°22′18″ de longitude O., sur une distance de 30 m en aval de son embouchure.
27	Une partie d'un ruisseau sans nom évacuant les eaux d'un lac sans nom, autre que celui mentionné à l'article 26, situé à environ 20 km à l'ouest de Fermont, Québec	Une partie d'un ruisseau sans nom évacuant les eaux d'un lac sans nom, autre que celui mentionné à l'article 26, situé à environ 20 km à l'ouest de la ville de Fermont, au Québec, et, plus précisément, la partie du ruisseau s'étendant sur une distance de 1815 m, au sud et en aval à partir du point situé par 52°50′02″ de latitude N. et 67°21′29″ de longitude O. jusqu'au point situé par 52°49′20″ de latitude N. et 67°21′39″ de longitude O.
28	Une partie du ruisseau South Teigen, Colombie-Britannique	La partie du ruisseau South Teigen située à environ 65 km au nord-ouest de Stewart, en Colombie-Britannique, et, plus précisément, la partie du ruisseau qui s'étend sur 8,1 km vers le nord-ouest et en aval d'un point situé par 56°37′53″ de latitude N. et 129°54′44″ de longitude O. jusqu'au centre d'un barrage situé par 56°40′11,57″ de latitude N. et 129°58′20,92″ de longitude O.
29	Une partie du ruisseau North Treaty, Colombie-Britannique	La partie du ruisseau North Treaty située à environ 65 km au nord-ouest de Stewart, en Colombie-Britannique, et, plus précisément, la partie du ruisseau qui s'étend sur 3,3 km vers le sud et en aval des eaux d'amont du ruisseau situé par 56°37′34″ de latitude N. et 129°54′50″ de longitude O. jusqu'au centre d'un barrage situé par 56°35′54,24″ de latitude N. et 129°51′25,31″ de longitude O.
30	Un cours d'eau sans nom tributaire du lac Jean, situé à environ 25 km au sud-est de Chibougamau, Québec	Le cours d'eau sans nom tributaire du lac Jean, situé à environ 25 km au sud-est de la ville de Chibougamau, au Québec, débutant à l'étang sans nom situé par 49°47′58″ de latitude N. et 74°01′38″ de longitude O. et s'étendant vers le nord et en aval sur une distance de 6,4 km jusqu'au centre du barrage situé par 49°49′29″ de latitude N. et 74°03′07″ de longitude O.
31	Une partie d'un cours d'eau sans nom tributaire du cours d'eau visé à l'article 30	La partie d'un cours d'eau sans nom débutant au point de confluence de celui-ci avec le cours d'eau visé à l'article 30 situé par 49°47′57″ de latitude N. et 74°03′25″ de longitude O. et s'étendant vers le nord et en amont de ce point sur une distance de 1 km.
32	Une partie d'un cours d'eau sans nom tributaire du cours d'eau visé à l'article 30	La partie du cours d'eau sans nom débutant au point situé par 49°48′06″ de latitude N. et 74°03′41″ de longitude O. et s'étendant vers le nord et en aval de ce point sur une distance de 740 m jusqu'au point de confluence avec le cours d'eau visé à l'article 30 situé par 49°48′25″ de latitude N. et 74°03′25″ de longitude O.

Item	Column 1 Water or Place	Column 2 Description
32	A portion of an unnamed watercourse that is a tributary to the watercourse referred to in item 30	A portion of an unnamed watercourse beginning at a point located at 49°48′06″ north latitude and 74°03′41″ west longitude and extending for a distance of 740 m northwards and downstream from that point to the point of confluence with the watercourse referred to in item 30, which confluence is located at 49°48′25″ north latitude and 74°03′25″ west longitude.
33	An unnamed pond east of Lake Bernadette, Quebec, and a portion of its outlet	An unnamed pond located at 49°48′43″ north latitude and 74°04′01″ west longitude and a portion of its outlet extending from the mouth of the outlet located at 49°48′47″ north latitude and 74°03′59″ west longitude for a distance of 190 m northwards and downstream from that mouth.
34	A portion of an unnamed creek (locally known as Loslo Creek), and of its unnamed tributaries, that is tributary to Pinewood River, Ontario	A portion of an unnamed creek (locally known as Loslo Creek), and of its unnamed tributaries, that is tributary to Pinewood River, located approximately 65 km northwest of the town of Fort Frances, Ontario. More precisely, the portion extending southwards and downstream from the northernmost point of the creek at 48°53′6″ north latitude and 94°2′43″ west longitude to the point located at 48°50′24″ north latitude and 94°3′36″ west longitude.
35	A portion of an unnamed creek (locally known as Marr Creek), and of its unnamed tributaries, that is tributary to Pinewood River, Ontario	A portion of an unnamed creek (locally known as Marr Creek), and of its unnamed tributaries, that is tributary to Pinewood River, located approximately 65 km northwest of the town of Fort Frances, Ontario. More precisely, the portion extending southwards and downstream from the northernmost point of the creek at 48°52′12″ north latitude and 94°1′49″ west longitude to the point located at 48°51′18″ north latitude and 94°2′25″ west longitude.
36	A portion of an unnamed creek (locally known as Marr Creek), other than the portion referred to in item 35, that is tributary to Pinewood River, Ontario	A portion of an unnamed creek (locally known as Marr Creek), other than the portion referred to in item 35, that is tributary to Pinewood River, located approximately 65 km northwest of the town of Fort Frances, Ontario. More precisely, the portion extending southwards and downstream from the point located at 48°50′52″ north latitude and 94°2′11″ west longitude, for a distance of 1.85 km, to the point located at 48°49′53″ north latitude and 94°2′24″ west longitude.
37	A portion of an unnamed stream and its unnamed tributaries located approximately 25 km northwest of the town of Amos, Quebec	A portion of an unnamed stream and its unnamed tributaries located approximately 25 km northwest of the town of Amos, Quebec. More precisely, the 4.6 km portion of the stream extending from the point located at 48°40′44.00″ north latitude and 78°29′12.68″ west longitude to the point located at 48°40′7.19″north latitude and 78°28′1.52″ west longitude and covering an area of 3.4 ha.

Article	Colonne 1 Eaux ou lieux	Colonne 2 Description
33	Un étang sans nom à l'est du lac Bernadette, Québec, et une partie de sa décharge	Un étang sans nom situé par 49°48′43″ de latitude N. et 74°04′01″ de longitude O. et une partie de sa décharge s'étendant de l'embouchure de celle-ci située par 49°48′47″ de latitude N. et 74°03′59″ de longitude O. sur une distance de 190 m vers le nord en aval de son embouchure.
34	Une partie d'un ruisseau sans nom (connu localement sous le nom de ruisseau Loslo) et de ses tributaires sans nom, qui est tributaire de la rivière Pinewood, Ontario	La partie d'un ruisseau sans nom (connu localement sous le nom de ruisseau Loslo) et de ses tributaires sans nom, qui est tributaire de la rivière Pinewood, située à environ 65 km au nord-ouest de la ville de Fort Frances, en Ontario, et, plus précisément, la partie qui s'étend vers le sud et en aval du point le plus au nord du ruisseau situé par 48°53′6″ de latitude N. et 94°2′43″ de longitude O., jusqu'au point situé par 48°50′24″ de latitude N. et 94°3′36″ de longitude O.
35	Une partie d'un ruisseau sans nom (connu localement sous le nom de ruisseau Marr) et de ses tributaires sans nom, qui est tributaire de la rivière Pinewood, Ontario	La partie d'un ruisseau sans nom (connu localement sous le nom de ruisseau Marr) et de ses tributaires sans nom, qui est tributaire de la rivière Pinewood, située à environ 65 km au nord-ouest de la ville de Fort Frances, en Ontario, et, plus précisément, la partie qui s'étend vers le sud et en aval du point le plus au nord du ruisseau situé par 48°52′12″ de latitude N. et 94°1′49″ de longitude O., jusqu'au point situé par 48°51′18″ de latitude N. et 94°2′25″ de longitude O.
36	Une partie d'un ruisseau sans nom (connu localement sous le nom de ruisseau Marr), autre que la partie mentionnée à l'article 35, qui est tributaire de la rivière Pinewood, Ontario	La partie d'un ruisseau sans nom (connu localement sous le nom de ruisseau Marr), autre que la partie mentionnée à l'article 35, qui est tributaire de la rivière Pinewood, située à environ 65 km au nord-ouest de la ville de Fort Frances, en Ontario, et, plus précisément, la partie qui s'étend vers le sud et en aval du point situé par 48°50′52″ de latitude N. et 94°2′11″ de longitude O., sur une distance de 1,85 km, jusqu'au point situé par 48°49′53″ de latitude N. et 94°2′24″ de longitude O.
37	Une partie d'un ruisseau sans nom, et ses tributaires sans nom, située à environ 25 km au nord-ouest de la ville d'Amos, Québec	La partie d'un ruisseau sans nom, et ses tributaires sans nom, située à environ 25 km au nord-ouest de la ville d'Amos, au Québec, et, plus précisément, la partie du ruisseau qui s'étend sur 4,6 km à partir du point situé par 48°40′44,00″ de latitude N. et 78°29′12,68″ de longitude O. jusqu'au point situé par 48°40′7,19″ de latitude N. et 78°28′1,52″ de longitude O. et qui couvre une superficie de 3,4 ha.
38	Une partie d'un tributaire sans nom du Petit lac du Portage, Québec	La partie d'un tributaire sans nom du Petit lac du Portage située à environ 15 km au nord-ouest de la ville de Sept-Îles, au Québec. Plus précisément, la partie qui s'étend sur 465 m vers le sud-ouest et en amont du point situé par 50°16′00,90″ de latitude N. et 66°33′42,71″ de longitude O. jusqu'au point situé par 50°16′06,00″ de latitude N. et 66°33′31,55″ de longitude O. et qui couvre une superficie de 0,233 ha.

Item	Column 1 Water or Place	Column 2 Description
38	A portion of an unnamed tributary to Petit lac du Portage, Quebec	A portion of an unnamed tributary to Petit lac du Portage located approximately 15 km northwest of the town of Sept-Îles, Quebec. More precisely, the 465 m portion of the tributary to Petit lac du Portage extending southwest and upstream from the point located at 50°16′00.90″ north latitude and 66°33′42.71″ west longitude to the point located at 50°16′06.00″ north latitude and 66°33′31.55″ west longitude and covering an area of 0.233 ha.
39	An unnamed headwater pond of ruisseau Clet and its unnamed tributaries, Quebec	An unnamed headwater pond of ruisseau Clet located at 50°15′15.82″ north latitude and 66°33′13.6″ west longitude and covering an area of 2.486 ha, approximately 15 km northwest of the town of Sept-Îles, Quebec, and **(a)** a 471 m portion of its unnamed tributary extending upstream from the point located at 50°15′18.37″ north latitude and 66°33′24.01″ west longitude to the point located at 50°15′20.27″ north latitude and 66°33′13.51″ west longitude and covering an area of 0.117 ha; and **(b)** a 76 m portion of its unnamed tributary extending upstream from the point located at 50°15′11.97″ north latitude and 66°33′22.57″ west longitude to the point located at 50°15′12.82″ north latitude and 66°33′20.66″ west longitude and covering an area of 0.033 ha.
40	A portion of ruisseau Clet and its unnamed tributaries, Quebec	A portion of ruisseau Clet, and its unnamed tributaries, located approximately 15 km northwest of the town of Sept-Îles, Quebec. More precisely, the 1897 m portion of ruisseau Clet extending southeast and downstream from the outlet of the unnamed headwater pond referred to in item 39 to the point on ruisseau Clet located at 50°15′11.26″ north latitude and 66°32′15.99″ west longitude and covering an area of 0.850 ha.
41	An unnamed watercourse that is a tributary to Rivière Hall, Quebec	An unnamed watercourse that is composed of interconnected streams and ponds and is a tributary to Rivière Hall and located approximately 15 km northwest of the town of Sept-Îles, Quebec. More precisely, the 910 m portion of the unnamed watercourse extending downstream from the point located at 50°14′52.33″ north latitude and 66°33′27.75″ west longitude to the point located at 50°14′39.67″ north latitude and 66°32′45.74″ west longitude and covering an area of 3.619 ha.

Article	Colonne 1 Eaux ou lieux	Colonne 2 Description
39	Un étang d'amont sans nom du ruisseau Clet et ses tributaires sans nom, Québec	L'étang d'amont sans nom du ruisseau Clet qui est situé par 50°15′15,82″ de latitude N. et 66°33′13,6″ de longitude O. et qui couvre une superficie de 2,486 ha, à environ 15 km au nord-ouest de la ville de Sept-Îles, au Québec, et : **a)** la partie de son tributaire sans nom qui s'étend sur 471 m en amont du point situé par 50°15′18,37″ de latitude N. et 66°33′24,01″ de longitude O. jusqu'au point situé par 50°15′20,27″ de latitude N. et 66°33′13,51″ de longitude O. et qui couvre une superficie de 0,117 ha; **b)** la partie de son tributaire sans nom qui s'étend sur 76 m en amont du point situé par 50°15′11,97″ de latitude N. et 66°33′22,57″ de longitude O. jusqu'au point situé par 50°15′12,82″ de latitude N. et 66°33′20,66″ de longitude O. et qui couvre une superficie de 0,033 ha.
40	Une partie du ruisseau Clet et ses tributaires sans nom, Québec	La partie du ruisseau Clet, et ses tributaires sans nom, située à environ 15 km au nord-ouest de la ville de Sept-Îles, au Québec, et, plus précisément, la partie du ruisseau qui s'étend sur 1 897 m vers le sud-est et en aval de la décharge de l'étang d'amont sans nom visé à l'article 39 jusqu'au point du ruisseau situé par 50°15′11,26″ de latitude N. et 66°32′15,99″ de longitude O. et qui couvre une superficie de 0,850 ha.
41	Un cours d'eau sans nom tributaire de la rivière Hall, Québec	Le cours d'eau sans nom qui est composé de ruisseaux et d'étangs interconnectés, qui est tributaire de la rivière Hall et qui est situé à environ 15 km au nord-ouest de la ville de Sept-Îles, au Québec. Plus précisément, la partie du cours d'eau sans nom qui s'étend sur 910 m en amont du point situé par 50°14′52,33″ de latitude N. et 66°33′27,75″ de longitude O. jusqu'au point situé par 50°14′39,67″ de latitude N. et 66°32′45,74″ de longitude O. et qui couvre une superficie de 3,619 ha.
42	Des parties d'un ruisseau sans nom, Québec	Les deux parties d'un ruisseau sans nom situées à environ 15 km au nord-ouest de la ville de Sept-Îles, au Québec, et, plus précisément : **a)** la partie ouest du ruisseau qui s'étend sur 253 m du point situé par 50°15′18,78″ de latitude N. et 66°29′52,43″ de longitude O. jusqu'au point situé par 50°15′13,76″ de latitude N. et 66°29′46,60″ de longitude O. et qui couvre une superficie de 0,0585 ha; **b)** la partie est du ruisseau qui s'étend sur 267 m du point situé par 50°15′19,58″ de latitude N. et 66°29′45,99″ de longitude O. jusqu'au point situé par 50°15′14,18″ de latitude N. et 66°29′45,19″ de longitude O. et qui couvre une superficie de 0,0555 ha.

Item	Column 1 Water or Place	Column 2 Description
42	Portions of an unnamed creek, Quebec	Two portions of an unnamed creek located approximately 15 km northwest of the town of Sept-Îles, Quebec. More precisely, **(a)** the west portion of the creek extending for a distance of 253 m from the point located at 50°15′18.78″ north latitude and 66°29′52.43″ west longitude to the point located at 50°15′13.76″ north latitude and 66°29′46.60″ west longitude and covering 0.0585 ha; and **(b)** the east portion of the creek extending for a distance of 267 m from the point located at 50°15′19.58″ north latitude and 66°29′45.99″ west longitude to the point located at 50°15′14.18″ north latitude and 66°29′45.19″ west longitude and covering 0.0555 ha.

SOR/2006-239, ss. 21 to 23; SOR/2008-216, s. 1; SOR/2009-27, s. 1; SOR/2009-156, s. 2; SOR/2010-250, s. 1; SOR/2011-202, s. 1; SOR/2015-45, s. 1; SOR/2016-87, s. 1; SOR/2016-196, s. 1; SOR/2017-128, s. 1; SOR/2017-129, s. 1; SOR/2017-197, s. 1; SOR/2017-272, s. 1; SOR/2018-100, s. 1.

DORS/2006-239, art. 21 à 23; DORS/2008-216, art. 1; DORS/2009-27, art. 1; DORS/2009-156, art. 2; DORS/2010-250, art. 1; DORS/2011-202, art. 1; DORS/2015-45, art. 1; DORS/2016-87, art. 1; DORS/2016-196, art. 1; DORS/2017-128, art. 1; DORS/2017-129, art. 1; DORS/2017-197, art. 1; DORS/2017-272, art. 1; DORS/2018-100, art. 1.

SCHEDULE 3

(Subsections 1(1) and 12(2) and subsection 4(2) of Schedule 5)

Analytical Requirements for Metal or Diamond Mining Effluent

TABLE 1

Item	Column 1 Deleterious Substance/pH/ temperature	Column 2 Precision[1]	Column 3 Accuracy[2]	Column 4 Method Detection Limit (MDL)
1	Arsenic	10%	100 ± 10%	0.0025 mg/L
2	Copper	10%	100 ± 10%	0.001 mg/L
3	Cyanide	10%	100 ± 10%	0.005 mg/L
4	Lead	10%	100 ± 10%	0.0005 mg/L
5	Nickel	10%	100 ± 10%	0.0125 mg/L
6	Zinc	10%	100 ± 10%	0.010 mg/L
7	Suspended Solids	15%	100 ± 15%	2.000 mg/L
8	Radium 226	10%	100 ± 10%	0.01 Bq/L
9	Total ammonia	10%	100 ± 10%	0.05 mg/L expressed as nitrogen (N)
10	pH	0.1 pH unit	0.1 pH unit	Not Applicable
11	Temperature	10%	± 0.5 °C	Not Applicable

[1] Relative standard deviation at concentrations 10 times above the MDL.

[2] Analyte recovery at concentrations above 10 times the MDL.

TABLE 2

Item	Column 1 Substances/ hardness/ alkalinity/ electrical conductivity	Column 2 Precision[1]	Column 3 Accuracy[2]	Column 4 Method Detection Limit (MDL)
1	Aluminum	10%	100 ± 10%	0.005 mg/L
2	Cadmium	10%	100 ± 10%	0.000045 mg/L
3	Chloride	10%	100 ± 10%	60 mg/L

ANNEXE 3

(paragraphes 1(1) et 12(2) et paragraphe 4(2) de l'annexe 5)

Exigences analytiques pour les effluents des mines de métaux et des mines de diamants

TABLEAU 1

Article	Colonne 1 Substance nocive/pH/ température	Colonne 2 Précision[1]	Colonne 3 Exactitude[2]	Colonne 4 Limite de détection de la méthode (LDM)
1	Arsenic	10 %	100 ± 10 %	0,0025 mg/L
2	Cuivre	10 %	100 ± 10 %	0,001 mg/L
3	Cyanure	10 %	100 ± 10 %	0,005 mg/L
4	Plomb	10 %	100 ± 10 %	0,0005 mg/L
5	Nickel	10 %	100 ± 10 %	0,0125 mg/L
6	Zinc	10 %	100 ± 10 %	0,010 mg/L
7	Matières en suspension	15 %	100 ± 15 %	2,000 mg/L
8	Radium 226	10 %	100 ± 10 %	0,01 Bq/L
9	Ammoniac total	10 %	100 ± 10 %	0,05 mg/L sous forme d'azote (N)
10	pH	0,1 unité pH	0,1 unité pH	Sans objet
11	Température	10 %	± 0,5 °C	Sans objet

[1] Écart-type relatif à des concentrations dix fois supérieures à la LDM.

[2] Récupération de l'analyte à des concentrations de plus de dix fois la LDM.

TABLEAU 2

Article	Colonne 1 Substance/ dureté/ alcalinité/ conductivité électrique	Colonne 2 Précision[1]	Colonne 3 Exactitude[2]	Colonne 4 Limite de détection de la méthode (LDM)
1	Aluminium	10 %	100 ± 10 %	0,005 mg/L
2	Cadmium	10 %	100 ± 10 %	0,000045 mg/L
3	Chlorure	10 %	100 ± 10 %	60 mg/L

Item	Column 1 Substances/ hardness/ alkalinity/ electrical conductivity	Column 2 Precision[1]	Column 3 Accuracy[2]	Column 4 Method Detection Limit (MDL)
4	Chromium	10%	100 ± 10%	0.00445 mg/L
5	Cobalt	10%	100 ± 10%	0.00125 mg/L
6	Iron	10%	100 ± 10%	0.15 mg/L
7	Manganese	10%	100 ± 10%	0.005 mg/L
8	Mercury	10%	100 ± 10%	0.00001 mg/L
9	Molybdenum	10%	100 ± 10%	0.0365 mg/L
10	Nitrate	10%	100 ± 10%	1.46835 mg/L, expressed as nitrogen (N)
11	Phosphorus	10%	100 ± 10%	0.05 mg/L
12	Selenium	10%	100 ± 10%	0.0005 mg/L
13	Sulphate	10%	100 ± 10%	0.6 mg/L
14	Thallium	10%	100 ± 10%	0.0004 mg/L
15	Uranium	10%	100 ± 10%	0.0075 mg/L
16	Total ammonia	10%	100 ± 10%	0.05 mg/L expressed as nitrogen (N)
17	Hardness	10%	100 ± 10%	1 mg/L
18	Alkalinity	10%	100 ± 10%	2 mg/L
19	Electrical Conductivity	10%	100 ± 10%	1 µS/cm

[1] Relative standard deviation at concentrations 10 times above the MDL.

[2] Analyte recovery at concentrations above 10 times the MDL.

SOR/2006-239, s. 24; SOR/2018-99, s. 31.

Article	Colonne 1 Substance/ dureté/ alcalinité/ conductivité électrique	Colonne 2 Précision[1]	Colonne 3 Exactitude[2]	Colonne 4 Limite de détection de la méthode (LDM)
4	Chrome	10 %	100 ± 10 %	0,00445 mg/L
5	Cobalt	10 %	100 ± 10 %	0,00125 mg/L
6	Fer	10 %	100 ± 10 %	0,15 mg/L
7	Manganèse	10 %	100 ± 10 %	0,005 mg/L
8	Mercure	10 %	100 ± 10 %	0,00001 mg/L
9	Molybdène	10 %	100 ± 10 %	0,0365 mg/L
10	Nitrate	10 %	100 ± 10 %	1,46835 mg/L sous forme d'azote (N)
11	Phosphore	10 %	100 ± 10 %	0,05 mg/L
12	Sélénium	10 %	100 ± 10 %	0,0005 mg/L
13	Sulfate	10 %	100 ± 10 %	0,6 mg/L
14	Thallium	10 %	100 ± 10 %	0,0004 mg/L
15	Uranium	10 %	100 ± 10 %	0,0075 mg/L
16	Ammoniac total	10 %	100 ± 10 %	0,05 mg/L sous forme d'azote (N)
17	Dureté	10 %	100 ± 10 %	1 mg/L
18	Alcalinité	10 %	100 ± 10 %	2 mg/L
19	Conductivité électrique	10 %	100 ± 10 %	1 µS/cm

[1] Écart-type relatif à des concentrations dix fois supérieures à la LDM.

[2] Récupération de l'analyte à des concentrations de plus de dix fois la LDM.

DORS/2006-239, art. 24; DORS/2018-99, art. 31.

SCHEDULE 4

(Paragraph 4(1)(a), subsection 13(1), paragraph 13(3)(a), subparagraph 22(c)(i) and paragraph 24(1)(a))

Authorized Limits of Deleterious Substances

Item	Column 1 Deleterious Substance	Column 2 Maximum Authorized Monthly Mean Concentration	Column 3 Maximum Authorized Concentration in a Composite Sample	Column 4 Maximum Authorized Concentration in a Grab Sample
1	Arsenic	0.50 mg/L	0.75 mg/L	1.00 mg/L
2	Copper	0.30 mg/L	0.45 mg/L	0.60 mg/L
3	Cyanide	1.00 mg/L	1.50 mg/L	2.00 mg/L
4	Lead	0.20 mg/L	0.30 mg/L	0.40 mg/L
5	Nickel	0.50 mg/L	0.75 mg/L	1.00 mg/L
6	Zinc	0.50 mg/L	0.75 mg/L	1.00 mg/L
7	Total Suspended Solids	15.00 mg/L	22.50 mg/L	30.00 mg/L
8	Radium 226	0.37 Bq/L	0.74 Bq/L	1.11 Bq/L

NOTE: All concentrations are total values.

SOR/2006-239, s. 25; SOR/2018-99, s. 32.

ANNEXE 4

(alinéa 4(1)a), paragraphe 13(1), alinéa 13(3)a), sous-alinéa 22c)(i) et alinéa 24(1)a))

Limites permises pour certaines substances nocives

Article	Colonne 1 Substance nocive	Colonne 2 Concentration moyenne mensuelle maximale permise	Colonne 3 Concentration maximale permise dans un échantillon composite	Colonne 4 Concentration maximale permise dans un échantillon instantané
1	Arsenic	0,50 mg/L	0,75 mg/L	1,00 mg/L
2	Cuivre	0,30 mg/L	0,45 mg/L	0,60 mg/L
3	Cyanure	1,00 mg/L	1,50 mg/L	2,00 mg/L
4	Plomb	0,20 mg/L	0,30 mg/L	0,40 mg/L
5	Nickel	0,50 mg/L	0,75 mg/L	1,00 mg/L
6	Zinc	0,50 mg/L	0,75 mg/L	1,00 mg/L
7	Total des solides en suspension	15,00 mg/L	22,50 mg/L	30,00 mg/L
8	Radium 226	0,37 Bq/L	0,74 Bq/L	1,11 Bq/L

NOTE : Toutes les concentrations sont des valeurs totales.

DORS/2006-239, art. 25; DORS/2018-99, art. 32.

SCHEDULE 5

(Subsections 7(1) and (3) and paragraphs 15(1)(a) and (b) and 32(1)(c))

Environmental Effects Monitoring Studies

Interpretation

1 (1) The following definitions apply in this Schedule.

biological monitoring study means a study referred to in section 9. (*étude de suivi biologique*)

effect on fish tissue from mercury means a concentration of total mercury that exceeds 0.5 µg/g wet weight in fish tissue that is taken in an exposure area and that is statistically different from and higher than the concentration of total mercury in fish tissue that is taken in a reference area. (*effet du mercure sur les tissus de poissons*)

effect on the benthic invertebrate community means a statistical difference between data referred to in subparagraph 12(1)(e)(ii) and paragraph 12(1)(f) from a study respecting the benthic invertebrate community conducted in

(a) an exposure area and a reference area; or

(b) sampling areas within an exposure area where there are gradually decreasing effluent concentrations. (*effet sur la communauté d'invertébrés benthiques*)

effect on the fish population means a statistical difference between data relating to the indicators referred to in subparagraph 12(1)(e)(i) from a study respecting fish population conducted in

(a) an exposure area and a reference area; or

(b) sampling areas within an exposure area where there are gradually decreasing effluent concentrations. (*effet sur la population de poissons*)

exposure area means all fish habitat and waters frequented by fish that are exposed to effluent. (*zone exposée*)

fish has the same meaning as in section 2 of the Act but does not include parts of fish, parts of shellfish, parts of crustaceans or parts of marine animals. (*poisson*)

reference area means water frequented by fish that is not exposed to effluent and that has fish habitat that, as far as practicable, is most similar to that of the exposure area. (*zone de référence*)

sampling area means the area within an exposure or reference area where representative samples are collected. (*zone d'échantillonnage*)

ANNEXE 5

(paragraphes 7(1) et (3), alinéas 15(1)a) et b) et 32(1)c))

Études de suivi des effets sur l'environnement

Définitions et interprétation

1 (1) Les définitions qui suivent s'appliquent à la présente annexe.

effet du mercure sur les tissus de poissons Concentration du mercure total dans les tissus de poissons pris dans la zone exposée, supérieure à 0,5 µg/g (poids humide), présentant une différence statistique et ayant une concentration plus élevée par rapport à la concentration du mercure total dans les tissus de poissons pris dans la zone de référence. (*effect on fish tissue from mercury*)

effet sur la communauté d'invertébrés benthiques Différence statistique entre les données visées au sous-alinéa 12(1)e)(ii) et à l'alinéa 12(1)f) d'une étude sur la communauté d'invertébrés benthiques effectuée :

a) soit dans la zone exposée et dans la zone de référence;

b) soit dans les zones d'échantillonnage de la zone exposée qui présentent un gradient décroissant de concentration d'effluent. (*effect on the benthic invertebrate community*)

effet sur la population de poissons Différence statistique entre les données portant sur les indicateurs visés au sous-alinéa 12(1)e)(i) d'une étude sur la population de poissons effectuée :

a) soit dans la zone exposée et dans la zone de référence;

b) soit dans les zones d'échantillonnage de la zone exposée qui présentent un gradient décroissant de concentration d'effluent. (*effect on the fish population*)

étude de suivi biologique Étude visée à l'article 9. (*biological monitoring study*)

poisson S'entend au sens de l'article 2 de la Loi, à l'exclusion des parties de poissons, de mollusques, de crustacés et d'animaux marins. (*fish*)

zone d'échantillonnage Partie de la zone exposée ou de la zone de référence où les échantillons représentatifs sont prélevés. (*sampling area*)

zone de référence Les eaux où vivent des poissons et où se trouve un habitat du poisson, qui ne sont pas exposées à un effluent et qui présentent, dans la mesure du possible, les caractéristiques les plus semblables à celles de la zone exposée. (*reference area*)

(2) For the purpose of this schedule, ***critical effect size***, in relation to an effect indicator set out in column 1 of the following table, means the critical effect size set out in column 2:

Item	Column 1 Effect Indicator	Column 2 Critical Effect Size
	For Fish Population	(% of reference mean)
1	Total body weight at age	± 25%
2	Gonad weight at total body weight	± 25%
3	Liver weight at total body weight	± 25%
4	Total body weight at length (condition)	± 10%
5	Age	± 25%
	For Benthic Invertebrate Community	(Standard Deviation Units)
6	Density	± 2 SD
7	Simpson's Evenness Index	± 2 SD
8	Taxa Richness	± 2 SD

2 Environmental effects monitoring studies consist of the effluent and water quality monitoring studies set out in Part 1 and the biological monitoring studies set out in Part 2.

PART 1

Effluent and Water Quality Monitoring Studies

Required Studies

3 Effluent and water quality monitoring studies consist of effluent characterization, sublethal toxicity testing and water quality monitoring.

zone exposée Les eaux où vivent des poissons et l'habitat du poisson qui sont exposés à un effluent. (*exposure area*)

(2) Pour l'application de la présente annexe, ***seuil critique d'effet*** s'entend, à l'égard d'un indicateur d'effet qui figure dans la colonne 1 du tableau ci-après, du seuil critique d'effet correspondant de la colonne 2 :

Article	Colonne 1 Indicateur d'effet	Colonne 2 Seuil critique d'effet
	Pour la population de poissons	(% par rapport à la moyenne de référence)
1	Poids corporel total selon l'âge	± 25 %
2	Poids des gonades par rapport au poids corporel total	± 25 %
3	Poids du foie par rapport au poids corporel total	± 25 %
4	Poids corporel total par rapport à la longueur (condition)	± 10 %
5	Âge	± 25 %
	Pour la communauté d'invertébrés benthiques	(multiple d'écart type)
6	Densité	± 2 ET
7	Indice de régularité de Simpson	± 2 ET
8	Richesse des taxons	± 2 ET

2 Les études de suivi des effets sur l'environnement se composent des études de suivi de l'effluent et de la qualité de l'eau prévues à la partie 1 et des études de suivi biologique prévues à la partie 2.

PARTIE 1

Études de suivi de l'effluent et de la qualité de l'eau

Composition des études

3 Les études de suivi de l'effluent et de la qualité de l'eau se composent de la caractérisation de l'effluent, des essais de toxicité sublétale et du suivi de la qualité de l'eau.

Effluent Characterization

4 (1) Effluent characterization is conducted by analyzing a sample of effluent and recording the hardness, alkalinity, electrical conductivity and temperature of the sample and the concentrations, in total values, of the following substances:

(a) aluminum;

(b) cadmium;

(c) iron;

(d) subject to subsection (4), mercury;

(e) molybdenum;

(f) selenium;

(g) nitrate (concentration in units of nitrogen);

(h) chloride;

(i) chromium;

(j) cobalt;

(k) sulphate;

(l) thallium;

(m) uranium;

(n) phosphorus (concentration in units of phosphorus);

(o) manganese; and

(p) ammonia (concentration in units of nitrogen).

(2) The analysis shall comply with the analytical requirements set out in Table 2 of Schedule 3.

(3) The effluent characterization shall be conducted once per calendar quarter on an aliquot of effluent sample collected under sections 12 and 13 of these Regulations from each final discharge point at least one month after the sample on which the previous characterization was conducted.

(4) The recording of the concentration of mercury in effluent referred to in paragraph (1)(d) may be discontinued if that concentration is less than 0.10 µg/L in 12 consecutive samples collected under subsection (3).

(5) Quality assurance and quality control measures shall be implemented that will ensure the accuracy of the effluent characterization data.

Caractérisation de l'effluent

4 (1) La caractérisation de l'effluent est effectuée par l'analyse d'un échantillon d'effluent et par l'enregistrement de sa dureté, de son alcalinité, de sa conductivité électrique, de sa température et des concentrations, exprimées en valeurs totales, des substances suivantes :

a) l'aluminium;

b) le cadmium;

c) le fer;

d) sous réserve du paragraphe (4), le mercure;

e) le molybdène;

f) le sélénium;

g) le nitrate (la concentration en unités d'azote);

h) le chlorure;

i) le chrome;

j) le cobalt;

k) le sulfate;

l) le thallium;

m) l'uranium;

n) le phosphore (la concentration en unités de phosphore);

o) le manganèse;

p) l'ammoniac (la concentration en unités d'azote).

(2) Les analyses doivent satisfaire aux exigences analytiques prévues au tableau 2 de l'annexe 3.

(3) La caractérisation de l'effluent est effectuée, une fois par trimestre civil, sur une portion aliquote de l'échantillon d'effluent prélevé à chaque point de rejet final en application des articles 12 et 13 du présent règlement au moins un mois après la caractérisation précédente.

(4) La concentration en mercure n'a plus à être enregistrée aux termes de l'alinéa (1)d) si la concentration de mercure de douze échantillons consécutifs prélevés selon le paragraphe (3) est inférieure à 0,10 µg/L.

(5) Des mesures d'assurance de la qualité et de contrôle de la qualité sont prises pour garantir l'exactitude des données visant la caractérisation de l'effluent.

Sublethal Toxicity Testing

5 (1) Sublethal toxicity testing shall, in the case of effluent deposited into fresh waters, be conducted using the following test methodologies, as amended from time to time:

(a) in the case of a fish species,

(i) *Biological Test Method: Test of Larval Growth and Survival Using Fathead Minnows* (Report EPS 1/RM/22), published by the Department of the Environment, or

(ii) *Biological Test Method: Toxicity Tests Using Early Life Stages of Salmonid Fish (Rainbow Trout)* (Reference Method EPS 1/RM/28), published by the Department of the Environment;

(b) in the case of an invertebrate species, *Biological Test Method: Test of Reproduction and Survival Using the Cladoceran Ceriodaphnia dubia* (Report EPS 1/RM/21), published by the Department of the Environment;

(c) in the case of a plant species, *Biological Test Method: Test for Measuring the Inhibition of Growth Using the Freshwater Macrophyte, Lemna minor* (Reference Method EPS 1/RM/37), published by the Department of the Environment, as it applies to the biological endpoint based on the number of fronds; and

(d) in the case of an algal species,

(i) *Biological Test Method: Growth Inhibition Test Using a Freshwater Alga* (Report EPS 1/RM/25), published by the Department of the Environment, or

(ii) *Détermination de la toxicité : inhibition de la croissance chez l'algue Pseudokirchneriella subcapitata*, (Méthode de référence MA 500 – P. sub. 1.0, rév. 3), published by the Centre d'expertise en analyse environnementale du Québec du ministère du Développement durable, de l'Environnement et de la Lutte contre les changements climatiques du Québec.

(2) Sublethal toxicity testing shall, in the case of effluent deposited into marine or estuarine waters, be conducted for fish species, invertebrate species and algal species using the following test methodologies, as amended from time to time, as applicable to each species:

(a) *Biological Test Method: Fertilization Assay Using Echinoids (Sea Urchins and Sand Dollars)* (Report EPS 1/RM/27), published by the Department of the Environment;

(b) *Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organisms* (Reference Method EPA/821/R-02/014), published by the U.S. Environmental Protection Agency; and

Essais de toxicité sublétale

5 (1) Dans le cas d'effluent rejeté dans l'eau douce, les essais de toxicité sublétale sont effectués en conformité avec les méthodes ci-après, avec leurs modifications successives :

a) dans le cas d'une espèce de poissons :

(i) soit la *Méthode d'essai biologique : essai de croissance et de survie sur des larves de tête-de-boule* (Rapport SPE 1/RM/22), publiée par le ministère de l'Environnement,

(ii) soit la *Méthode d'essai biologique : essais toxicologiques sur des salmonidés (truite arc-en-ciel) aux premiers stades de leur cycle biologique* (Méthode de référence SPE 1/RM/28), publiée par le ministère de l'Environnement;

b) dans le cas d'une espèce d'invertébré, la *Méthode d'essai biologique : essai de reproduction et de survie du cladocère Ceriodaphnia dubia* (Rapport SPE 1/RM/21), publiée par le ministère de l'Environnement;

c) dans le cas d'une espèce de plante, la *Méthode d'essai biologique : essai de mesure de l'inhibition de la croissance de la plante macroscopique dulcicole Lemna minor* (Méthode de référence SPE 1/RM/37), publiée par le ministère de l'Environnement et appliquée au paramètre biologique en fonction du nombre de thalles;

d) dans le cas d'une espèce d'algue :

(i) soit la *Méthode d'essai biologique : essai d'inhibition de la croissance d'une algue d'eau douce* (Rapport SPE 1/RM/25), publiée par le ministère de l'Environnement,

(ii) soit la méthode intitulée *Détermination de la toxicité : inhibition de la croissance chez l'algue Pseudokirchneriella subcapitata,* (Méthode de référence MA 500 – P. sub. 1.0, rév. 3), publiée par le Centre d'expertise en analyse environnementale du Québec du ministère du Développement durable, de l'Environnement et de la Lutte contre les changements climatiques du Québec.

(2) Dans le cas d'effluent rejeté dans l'eau de mer ou d'estuaire, les essais de toxicité sublétale sont effectués conformément aux méthodes ci-après, avec leurs modifications successives, à l'égard d'une espèce, selon le cas, de poisson, d'invertébré et d'algue :

a) la *Méthode d'essai biologique : essai sur la fécondation chez les échinides (oursins globuleux et oursins plats)* (Rapport SPE/1/RM/27), publiée par le ministère de l'Environnement;

b) les méthodes intitulées *Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to Marine and Estuarine Organisms* (Méthode de référence EPA/821/R-02/014), publiées par l'Environmental Protection Agency des États-Unis;

(c) *Short-term Methods for Estimating the Chronic Toxicity of Effluent and Receiving Waters to West Coast Marine and Estuarine Organisms* (Reference Method EPA/600/R-95-136), published by the U.S. Environmental Protection Agency.

(3) The sublethal toxicity tests shall be conducted on aliquots of the same effluent sample collected for effluent characterization collected from the mine's final discharge point that has potentially the most adverse environmental impact on the environment, taking into account

(a) the loading of the deleterious substances contained in the effluent as determined under subsection 20(2) of these Regulations; and

(b) the manner in which the effluent mixes within the exposure area.

6 (1) The sublethal toxicity tests shall be conducted on the species referred to in subsections 5(1) and (2) two times each calendar year for three years and each test shall be conducted on an aliquot of effluent sample collected at least one month after the collection of the sample used in the previous tests.

(2) However, if effluent is discharged for 31 consecutive days or less in a calendar year, the tests may be conducted only once in that year.

(3) After three years, the tests shall be conducted once per calendar quarter on the species referred to in subsection 5(1) or (2), as the case may be, whose results for all the tests conducted in accordance with subsections (1) and (2) — including such tests conducted in addition to the number required by those subsections — produce the lowest geometric mean, taking into account the inhibition concentration that produces a 25% effect or an effective concentration of 25%.

Water Quality Monitoring

7 (1) Water quality monitoring is conducted by

(a) collecting samples of water from

(i) the exposure area surrounding the point of entry of effluent into water from each final discharge point and from the related reference areas, and

(ii) the sampling areas that are selected under clauses 10(b)(i)(B) and 10(c)(i)(A);

(b) recording the temperature of the water and the dissolved oxygen concentration in the water in the exposure and reference areas where the samples are collected;

(c) recording the concentration of the substances set out in paragraphs 4(1)(a) to (p) and,

(i) in the case of effluent that is deposited into fresh water, recording the pH, hardness, alkalinity and electrical conductivity of the water samples,

c) les méthodes intitulées *Short-term Methods for Estimating the Chronic Toxicity of Effluents and Receiving Waters to West Coast Marine and Estuarine Organisms* (Méthode de référence EPA/600/R-95-136), publiées par l'Environmental Protection Agency des États-Unis.

(3) Les essais de toxicité sublétale sont effectués sur des portions aliquotes d'un même échantillon d'effluent prélevé pour la caractérisation de l'effluent au point de rejet final de la mine qui représente le plus grand risque de répercussions néfastes sur l'environnement, compte tenu :

a) de la charge des substances nocives se trouvant dans l'effluent, déterminée conformément au paragraphe 20(2) du présent règlement;

b) de la façon dont l'effluent se mélange dans la zone exposée.

6 (1) Les essais de toxicité sublétale sont effectués, à l'égard de chaque espèce visée aux paragraphes 5(1) et (2), à raison de deux fois par année civile pendant trois ans et chaque essai est effectué sur une portion aliquote de l'échantillon d'effluent prélevé au moins un mois après le prélèvement de l'échantillon utilisé pour les essais précédents.

(2) Toutefois, dans le cas de l'effluent rejeté pendant trente et un jours consécutifs ou moins dans une année civile, ces essais peuvent être effectués une fois pour cette année.

(3) Après trois ans, les essais sont effectués une fois par trimestre civil pour l'espèce visée au paragraphe 5(1) ou (2), selon le cas, à l'égard de laquelle les résultats de tous les essais effectués conformément aux paragraphes (1) ou (2) — y compris ceux excédant le nombre d'essais exigés par ces paragraphes — révèlent la moyenne géométrique la plus faible, compte tenu d'une concentration inhibitrice qui produit un effet de 25 % ou d'une concentration effective de 25 %.

Suivi de la qualité de l'eau

7 (1) Le suivi de la qualité de l'eau s'effectue :

a) par prélèvement d'échantillons d'eau :

(i) dans la zone exposée entourant l'endroit où l'effluent rejeté par chaque point de rejet final se mélange à l'eau, et dans les zones de référence connexes,

(ii) dans les zones d'échantillonnage choisies aux termes des divisions 10b)(i)(B) et 10c)(i)(A);

b) par enregistrement de la température de l'eau et de la concentration d'oxygène dissous dans l'eau des zones exposées et des zones de référence où les échantillons sont prélevés;

c) par enregistrement de la concentration des substances énumérées aux alinéas 4(1)a) à p) et :

(i) dans le cas où l'effluent est rejeté dans l'eau douce, par enregistrement du pH, de la dureté, de l'alcalinité et de la conductivité électrique des échantillons d'eau,

(ii) in the case of effluent that is deposited into estuarine waters, recording the pH, hardness, alkalinity, electrical conductivity and salinity of the water samples, and

(iii) in the case of effluent that is deposited into marine waters, recording the salinity of the water samples;

(d) recording the concentration of the deleterious substances prescribed in section 3 of these Regulations, but

(i) not recording the concentrations of cyanide if that substance is not used as a process reagent within the operations area, and

(ii) not recording the concentrations of radium 226 if the conditions of subsection 13(2) of these Regulations are met; and

(e) implementing quality assurance and quality control measures that will ensure the accuracy of water quality monitoring data.

(2) The water quality monitoring shall be conducted

(a) four times per calendar year and at least one month apart on the samples of water collected, while the mine is depositing effluent, from the areas referred to in subparagraph (1)(a)(i); and

(b) at the same time that the biological monitoring studies are conducted on samples of water collected in the areas referred to in subparagraph (1)(a)(ii).

Information Related to Effluent and Water Quality Monitoring Studies

8 The following information in relation to the effluent and water quality monitoring studies conducted during a calendar year under sections 4 to 7 shall be submitted to the Minister of the Environment not later than March 31 of the following year:

(a) the dates on which samples were collected for effluent characterization, sublethal toxicity testing and water quality monitoring;

(b) for each sample collected for effluent characterization, the location of the final discharge point from which samples were collected for effluent characterization;

(c) the location of the final discharge point from which samples were collected for sublethal toxicity testing and the data used in selecting the final discharge point in accordance with subsection 5(3);

(d) the latitude and longitude of sampling areas for water quality monitoring and a description that is sufficient to identify the location of the sampling areas;

(ii) dans le cas où il est rejeté dans l'eau d'estuaire, par enregistrement du pH, de la dureté, de l'alcalinité, de la conductivité électrique et de la salinité des échantillons d'eau,

(iii) dans le cas où il est rejeté dans l'eau de mer, par enregistrement de la salinité des échantillons d'eau;

d) par enregistrement de la concentration des substances nocives désignées à l'article 3 du présent règlement, sous réserve de ce qui suit :

(i) la concentration de cyanure n'est enregistrée que si cette substance est utilisée comme réactif de procédé sur le chantier,

(ii) la concentration de radium 226 n'est pas enregistrée si les conditions mentionnées au paragraphe 13(2) du présent règlement sont remplies;

e) par la prise des mesures d'assurance de la qualité et de contrôle de la qualité pour garantir l'exactitude des données visant le suivi de la qualité de l'eau.

(2) Le suivi de la qualité de l'eau est effectué :

a) quatre fois par année civile et à au moins un mois d'intervalle sur les échantillons d'eau prélevés, lorsque la mine rejette de l'effluent, dans les zones visées au sous-alinéa (1)a)(i);

b) en même temps que les études de suivi biologique, sur les échantillons d'eau prélevés dans les zones visées au sous-alinéa (1)a)(ii).

Renseignements relatifs aux études de suivi de l'effluent et de la qualité de l'eau

8 Les renseignements ci-après, relatifs aux études de suivi de l'effluent et de la qualité de l'eau effectuées au cours d'une année civile en application des articles 4 à 7, sont présentés au ministre de l'Environnement au plus tard le 31 mars de l'année suivante :

a) les dates de prélèvement des échantillons pour la caractérisation de l'effluent, les essais de toxicité sublétale et le suivi de la qualité de l'eau;

b) l'emplacement des points de rejet final où les échantillons sont prélevés pour la caractérisation de l'effluent;

c) l'emplacement du point de rejet final où les échantillons ont été prélevés pour les essais de toxicité sublétale et les données qui ont servi à le sélectionner conformément au paragraphe 5(3);

d) la latitude et la longitude des zones d'échantillonnage utilisées pour le suivi de la qualité de l'eau et une description qui permet de reconnaître l'emplacement de ces zones;

(e) the results of effluent characterization, sublethal toxicity testing and water quality monitoring;

(f) the methodologies used to conduct effluent characterization and water quality monitoring, and the related method detection limits;

(g) a description of the quality assurance and quality control measures that were implemented and the data related to the implementation of those measures; and

(h) with respect to every effluent sample collected at each final discharge point, the annual mean concentration of mercury and selenium.

e) les résultats de la caractérisation de l'effluent, des essais de toxicité sublétale et du suivi de la qualité de l'eau;

f) les méthodes utilisées pour la caractérisation de l'effluent et le suivi de la qualité de l'eau, ainsi que les limites de détection de celles-ci;

g) la description des mesures d'assurance de la qualité et de contrôle de la qualité qui ont été prises ainsi que les données associées à leur mise en œuvre;

h) à l'égard de chaque échantillon d'effluent prélevé à tout point final de rejet, les concentrations moyennes annuelles de mercure et de sélénium.

PART 2

Biological Monitoring Studies

Required Studies

9 (1) Biological monitoring studies shall include

(a) a study respecting fish population, if the highest concentration of effluent in the exposure area, during a period in which there are deposits, is greater than 1% at any location that is 250 m from a point at which the effluent enters the area from a final discharge point, unless the results of the previous two biological monitoring studies indicate

(i) for all effect indicators with no assigned critical effect size, no effect on the fish population, and

(ii) for all effect indicators with an assigned critical effect size, no effect on the fish population or an effect on the fish population the absolute value of the magnitude of which is less than the absolute value of its assigned critical effect size;

(b) a study respecting the benthic invertebrate community, if the highest concentration of effluent in the exposure area, during a period in which there are deposits, is greater than 1% at any location that is 100 m from a point at which the effluent enters the area from a final discharge point, unless the results of the previous two biological monitoring studies indicate

(i) for all effect indicators with no assigned critical effect size, no effect on the benthic invertebrate community, and

(ii) for all effect indicators with an assigned critical effect size, no effect on the benthic invertebrate community or an effect on the benthic invertebrate community the absolute value of the magnitude of which is less than the absolute value of its assigned critical effect size;

(c) a study respecting fish tissue mercury, if

PARTIE 2

Études de suivi biologique

Composition des études

9 (1) Les études de suivi biologique comportent :

a) une étude sur la population de poissons, si la concentration de l'effluent la plus élevée dans une zone exposée, lors d'une période pendant laquelle il y a des rejets, est supérieure à 1 % à tout endroit situé à 250 m du point où l'effluent entre dans la zone depuis un point de rejet final, à moins que les résultats des deux études de suivi biologique précédentes révèlent, à la fois :

(i) à l'égard des indicateurs d'effet pour lesquels il n'y a pas de seuil critique d'effet, qu'il n'y a aucun effet sur la population de poissons,

(ii) à l'égard des indicateurs d'effet pour lesquels il y a un seuil critique d'effet, qu'il n'y a aucun effet sur la population de poissons ou qu'il y a un effet sur la population de poissons, dont la valeur absolue de l'ampleur est inférieure à la valeur absolue du seuil critique d'effet;

b) une étude sur la communauté d'invertébrés benthiques, si la concentration de l'effluent la plus élevée dans une zone exposée, lors d'une période pendant laquelle il y a des rejets, est supérieure à 1 % à tout endroit situé à 100 m d'un point où l'effluent entre dans la zone depuis un point de rejet final, sauf si les résultats des deux études de suivi biologique précédentes révèlent à la fois :

(i) à l'égard des indicateurs d'effet pour lesquels il n'y a pas de seuil critique d'effet, qu'il n'y a aucun effet sur la communauté d'invertébrés benthiques,

(ii) à l'égard des indicateurs pour lesquels il y a un seuil critique d'effet, qu'il n'y a aucun effet sur la communauté d'invertébrés benthiques ou il y a un effet sur la communauté d'invertébrés benthiques, dont la valeur absolue de l'ampleur est inférieure à la valeur absolue du seuil critique d'effet;

(i) effluent characterization reveals an annual mean concentration of total mercury in the effluent that is equal to or greater than 0.10 µg/L, based on a calendar year, unless the results of the previous two biological monitoring studies indicate no effect on fish tissue from mercury, or

(ii) the method detection limit used in respect of mercury for the analysis of at least two of four effluent samples in a calendar year is equal to or greater than 0.10 µg/L;

(d) a study respecting fish tissue selenium, if

(i) effluent characterization reveals a concentration of total selenium in the effluent that is equal to or greater than 10 µg/L,

(ii) effluent characterization reveals an annual mean concentration of total selenium in the effluent that is equal to or greater than 5 µg/L, based on a calendar year, or

(iii) the method detection limit used in respect of selenium for the analysis of any effluent sample is equal to or greater than 10 µg/L, or the method detection limit used in respect of selenium for the analysis of at least two of four effluent samples in a calendar year is equal to or greater than 5 µg/L; and

(e) if the cause of any effect on the fish population, on fish tissue from mercury or on the benthic invertebrate community is not known, a study that will be used to determine the cause of the effect if

(i) the results of the previous two biological monitoring studies indicate a similar type of effect, and

(ii) for an effect indicator with an assigned critical effect size, the absolute value of the magnitude of the effect is equal to or greater than the absolute value of its critical effect size in either of those studies.

(2) If the results of the previous two biological monitoring studies are used to lift the requirement to conduct a study under any of paragraphs (1)(a), (b), (c) or (e), the earlier of those two studies shall not be used to lift a requirement to conduct a subsequent study.

(3) For the purposes of subsection (1), the concentration of effluent shall be determined or the effluent characterization shall be carried out, as the case may be,

(a) in the case of the first biological monitoring studies, beginning on the day on which the mine becomes subject

c) une étude sur le mercure dans les tissus de poissons, si :

(i) soit la caractérisation de l'effluent révèle une concentration annuelle moyenne de mercure total égale ou supérieure à 0,10 µg/L pour une année civile donnée, sauf si les résultats des deux études de suivi biologique précédentes révèlent qu'il n'y a aucun effet du mercure sur les tissus de poissons,

(ii) soit la limite de détection de la méthode utilisée, à l'égard du mercure, pour l'analyse d'au moins deux échantillons d'effluent sur quatre pour une année civile donnée est égale ou supérieure à 0,10 µg/L;

d) une étude sur le sélénium dans les tissus de poissons, si :

(i) soit la caractérisation de l'effluent révèle une concentration de sélénium total égale ou supérieure à 10 µg/L,

(ii) soit la caractérisation de l'effluent révèle une concentration annuelle moyenne de sélénium total égale ou supérieure à 5 µg/L pour une année civile donnée,

(iii) soit la limite de détection de la méthode utilisée, à l'égard du sélénium, pour l'analyse de tout échantillon d'effluent est égale ou supérieure à 10 µg/L ou la limite de détection de la méthode utilisée, à l'égard du sélénium, pour l'analyse d'au moins deux échantillons d'effluent sur quatre pour une année civile donnée est égale ou supérieure à 5 µg/L;

e) si la cause d'un effet sur la population de poissons, d'un effet du mercure sur les tissus de poissons ou d'un effet sur la communauté d'invertébrés benthiques n'est pas connue, une étude qui sera utilisée pour établir la cause de l'effet si, à la fois :

(i) les résultats des deux études de suivi biologique précédentes indiquent un type d'effet semblable,

(ii) à l'égard de tout indicateur d'effet pour lequel un seuil critique d'effet est prévu, la valeur absolue de l'ampleur de l'effet est égale ou supérieure à la valeur absolue du seuil critique d'effet, dans l'une ou l'autre de ces deux études précédentes.

(2) Si les résultats des deux études de suivi biologique précédentes sont utilisés pour lever l'obligation de présenter une étude en application des alinéas (1)a), b), c) ou e), celle qui est antérieure à l'autre ne peut être utilisée pour lever l'obligation de présenter une étude subséquente.

(3) Pour l'application du paragraphe (1), la concentration de l'effluent est déterminée — et la caractérisation de l'effluent est effectuée — selon les périodes suivantes :

a) dans le cas des premières études de suivi biologique, à partir de la date à laquelle la mine est assujettie à l'article 7 du présent règlement et jusqu'au jour qui précède la date à laquelle le premier plan d'étude doit être présenté;

to section 7 of these Regulations and ending on the day before the day on which the first study design is required to be submitted; and

(b) for any subsequent biological monitoring studies, beginning on the day on which the previous study design was required to be submitted and ending on the day before the day on which the subsequent study design is required to be submitted.

b) pour les études de suivi biologique subséquentes, à partir de la date à laquelle le plan d'étude précédent devait être présenté et jusqu'au jour qui précède la date à laquelle le plan d'étude subséquent doit être présenté.

DIVISION 1

First Biological Monitoring Studies

First Study Design

10 A first study design shall be submitted to the Minister of the Environment not later than 12 months after the day on which a mine becomes subject to section 7 of these Regulations. It shall contain

(a) a site characterization that includes

(i) a description of the manner in which the effluent mixes within each exposure area, during a period in which there are deposits, including an estimate of the concentration of effluent in the exposure area at 100 m and 250 m from every point at which the effluent enters the area from a final discharge point and — in respect of each calendar year — any supporting data, including raw data, for the estimate,

(ii) a description of the exposure and reference areas where the biological monitoring studies would be conducted — whether or not they are required — that includes information on the geological, hydrological, oceanographical, limnological, chemical and biological features of those areas,

(iii) the type of production process used by the mine and the environmental protection practices in place at the mine,

(iv) a description of any anthropogenic, natural or other factors that are not related to the effluent but that may reasonably be expected to affect the results of any biological monitoring study, whether or not it is required, and

(v) any additional information that would enable a determination as to whether studies would be conducted in accordance with generally accepted standards of good scientific practice;

(b) a description of how any required study respecting fish population, fish tissue mercury and fish tissue selenium will be conducted that includes

(i) a description of and the scientific rationale for

SECTION 1

Premières études de suivi biologique

Premier plan d'étude

10 Un premier plan d'étude est présenté au ministre de l'Environnement au plus tard douze mois après la date à laquelle la mine devient assujettie à l'article 7 du présent règlement et comporte :

a) la caractérisation du site comportant :

(i) une description de la façon dont l'effluent se mélange dans chaque zone exposée, lors d'une période pendant laquelle il y a des rejets, notamment une estimation de la concentration de l'effluent à 100 m et à 250 m de chaque point où l'effluent entre dans la zone depuis un point de rejet final ainsi que, à l'égard de toute année civile, toute donnée justificative à l'appui de l'estimation, y compris les données brutes,

(ii) une description des zones exposées et des zones de référence, si une étude de suivi biologique serait menée, qu'elle soit exigée ou non, y compris les renseignements sur les caractéristiques géologiques, hydrologiques, océanographiques, limnologiques, chimiques et biologiques de ces zones,

(iii) le type de procédé de production utilisé par la mine et les pratiques de protection de l'environnement appliquées à la mine,

(iv) les facteurs anthropiques, naturels ou autres non liés à l'effluent, mais dont on peut raisonnablement s'attendre à ce qu'ils affectent les résultats de toute étude de suivi biologique, qu'elle soit exigée ou non,

(v) tout renseignement supplémentaire qui permet de déterminer si des études seraient effectuées conformément aux normes généralement reconnues régissant les bonnes pratiques scientifiques;

b) la description du déroulement de l'étude portant sur la population de poissons, sur le mercure dans les tissus de poissons ou sur le sélénium dans les tissus de poissons, si une telle étude est exigée :

(i) les éléments ci-après, y compris les motifs scientifiques à l'appui :

(A) the fish species selected, taking into account the abundance of the species most exposed to effluent,

(B) the sampling areas selected within the exposure area and the reference area,

(C) the sampling period selected,

(D) the sample size selected, and

(E) the field and laboratory methodologies selected, and

(ii) an explanation as to how, in the case of the study respecting fish population or fish tissue mercury, the study will provide the information necessary to determine if the effluent has an effect on fish population or on fish tissue from mercury;

(c) a description of how any required study respecting the benthic invertebrate community will be conducted that includes

(i) a description of and the scientific rationale for

(A) the sampling areas selected, taking into account the benthic invertebrate diversity and the area most exposed to effluent,

(B) the sampling period selected,

(C) the sample size selected, and

(D) the field and laboratory methodologies selected, and

(ii) an explanation as to how the study will provide the information necessary to determine if the effluent has an effect on the benthic invertebrate community;

(d) the month in which the samples will be collected for each required biological monitoring study;

(e) a description of the quality assurance and quality control measures that will be implemented for each required biological monitoring study to ensure the validity of the data that is collected; and

(f) a summary of the results of any studies to determine whether the effluent was causing an effect on the fish population, fish tissue from mercury or the benthic invertebrate community and of any studies in the exposure and reference areas respecting fish tissue selenium completed before the mine becomes subject to section 7 of these Regulations and any scientific data to support the results.

(A) les espèces de poissons choisies, compte tenu de l'abondance des espèces les plus exposées à l'effluent,

(B) les zones d'échantillonnage choisies de la zone exposée et de la zone de référence,

(C) la période d'échantillonnage choisie,

(D) la taille des échantillons choisie,

(E) les méthodes choisies sur le terrain et en laboratoire,

(ii) dans le cas de l'étude sur la population de poissons ou de l'étude sur le mercure dans les tissus de poissons, la façon dont l'étude fournira les renseignements permettant de déterminer si l'effluent a un effet sur la population de poissons ou un effet du mercure sur les tissus de poissons;

c) la description du déroulement de toute étude sur la communauté d'invertébrés benthiques exigée, notamment :

(i) une description des éléments ci-après, y compris les motifs scientifiques à l'appui :

(A) les zones d'échantillonnage choisies, compte tenu de la diversité des invertébrés benthiques et de la zone la plus exposée à l'effluent,

(B) la période d'échantillonnage choisie,

(C) la taille des échantillons choisie,

(D) les méthodes choisies sur le terrain et en laboratoire,

(ii) la façon dont l'étude fournira les renseignements permettant de déterminer si l'effluent a un effet sur la communauté d'invertébrés benthiques;

d) le mois pendant lequel les échantillons seront prélevés pour toute étude de suivi biologique exigée;

e) la description des mesures d'assurance de la qualité et de contrôle de la qualité pour toute étude de suivi biologique exigée qui seront prises pour garantir la validité des données recueillies;

f) un résumé des résultats de toute étude qui indique si l'effluent produit un effet sur les populations de poissons, un effet du mercure sur les tissus de poissons ou un effet sur la communauté d'invertébrés benthiques et de toute étude sur le sélénium dans les tissus de poissons dans la zone exposée et de référence, effectuées avant la date à laquelle la mine devient assujettie à l'article 7 du présent règlement, ainsi que toutes données scientifiques justificatives.

First Biological Monitoring Studies

11 (1) Subject to subsection (2), the first biological monitoring studies shall start not earlier than six months after the day on which the first study design is submitted under section 10, and shall be conducted in accordance with that study design.

(2) If the owner or operator is unable to follow the study design due to circumstances beyond their control, the owner or operator shall inform the Minister of the Environment without delay of those circumstances and of the changes that are made to the study.

First Interpretative Report

12 (1) A first interpretative report shall be submitted to the Minister of the Environment not later than 36 months after the day on which the mine becomes subject to section 7 of these Regulations. It shall contain

(a) a description of any deviation from the study design that occurred while the biological monitoring studies were being conducted and any impact that the deviation had on the studies;

(b) the latitude and longitude of sampling areas and a description of the sampling areas sufficient to identify the location of the sampling areas;

(c) the dates and times when samples were collected;

(d) the sample sizes;

(e) the mean, median, standard deviation, standard error and minimum and maximum values in the sampling areas for

(i) in the case of the study respecting fish population, effect indicators of growth, reproduction, condition and survival that include, if practicable, the length, total body weight and age of the fish, the weight of its liver or hepatopancreas and, if the fish are sexually mature, the egg weight, fecundity and gonad weight of the fish,

(ii) in the case of the study respecting the benthic invertebrate community, effect indicators of the total benthic invertebrate density, evenness index, taxa richness and, if the study is conducted in an area where it is possible to sample sediment, total organic carbon content of sediment and particle size distribution of sediment,

(iii) in the case of the study respecting fish tissue mercury, the effect indicator of the concentration of total mercury (wet weight) in the fish tissue, and

(iv) in the case of the study respecting fish tissue selenium, the concentration — in the muscle or whole body and, if practicable, in the ovaries or eggs — of total selenium (dry weight) reported in μg/g and the percentage of the moisture content of the sample;

Premières études de suivi biologique

11 (1) Les premières études de suivi biologique débutent au plus tôt six mois après la date à laquelle le premier plan d'étude a été présenté en application de l'article 10 et sont effectuées conformément à ce plan.

(2) Toutefois, si le propriétaire ou l'exploitant est incapable de suivre le plan d'étude pour des raisons indépendantes de sa volonté, il en avise sans délai le ministre de l'Environnement et l'informe des modifications à apporter aux modalités du déroulement de l'étude.

Premier rapport d'interprétation

12 (1) Un premier rapport d'interprétation est présenté au ministre de l'Environnement au plus tard trente-six mois après la date à laquelle la mine devient assujettie à l'article 7 du présent règlement et comporte :

a) la description de tout écart par rapport au plan d'étude qui s'est produit durant les études de suivi biologique et l'incidence de ces écarts sur les études;

b) la latitude et la longitude des zones d'échantillonnage et une description qui permet de reconnaître l'emplacement de ces zones;

c) les dates et heures de prélèvement des échantillons;

d) la taille des échantillons;

e) la moyenne, la médiane, l'écart-type, l'erreur-type ainsi que les valeurs minimales et maximales dans les zones d'échantillonnage quant aux éléments suivants :

(i) dans le cas de l'étude sur la population de poissons, les indicateurs d'effet qui portent sur la croissance des poissons, leur reproduction, leur condition et leur survie qui comprennent, dans la mesure du possible, la longueur, le poids corporel total, l'âge, le poids du foie ou de l'hépatopancréas et, si les poissons ont atteint la maturité sexuelle, le poids des œufs, le taux de fécondité et le poids des gonades,

(ii) dans le cas de l'étude sur la communauté d'invertébrés benthiques, les indicateurs d'effet qui portent sur la densité totale des invertébrés benthiques, l'indice de régularité, la richesse des taxons et, si des sédiments peuvent être prélevés à l'endroit où s'effectue l'étude, la teneur en carbone organique total des sédiments et la distribution granulométrique de ceux-ci,

(iii) dans le cas de l'étude sur le mercure dans les tissus de poissons, l'indicateur d'effet portant sur la concentration de mercure total (poids humide) dans les tissus,

(iv) dans le cas de l'étude sur le sélénium dans les tissus de poissons, la concentration — dans les muscles ou le corps et, dans la mesure du possible, les ovaires ou

(f) in the case of the study respecting the benthic invertebrate community, a calculation of the similarity index effect indicator;

(g) an identification of the sex of the fish sampled and of the presence of any lesions, tumours, parasites or other abnormalities and, in the case of the study respecting fish tissue selenium, the type of fish tissue studied and the scientific rationale for the selection of that tissue;

(h) a determination as to whether there is a statistically significant difference between the sampling areas for the calculations under subparagraphs (e)(i) to (iii) and paragraph (f) taking into consideration the information identified under paragraph (g), with the statistical comparison made separately and independently for each effect indicator;

(i) a statistical analysis of the results of the calculations under subparagraphs (e)(i) to (iii) and paragraph (g) that indicates the probability of correctly detecting an effect of a pre-defined size and the degree of confidence that can be placed in the calculations;

(j) for an effect indicator referred to in paragraph (e) with an assigned critical effect size, a comparison of the magnitude of the effect — calculated in accordance with subsection (2) or (3), as the case may be — to its critical effect size;

(k) any supporting data, including raw data, for the information provided under paragraphs (e) to (j);

(l) a description of any quality assurance or quality control measures that were implemented and the data related to the implementation of those measures;

(m) based on the information referred to in paragraphs (e) to (k), the identification of

(i) any effect on the fish population,

(ii) any effect on the benthic invertebrate community, and

(iii) any effect on fish tissue from mercury;

(n) for an effect indicator with an assigned critical effect size, a statement as to whether the absolute value of the magnitude of the effect is equal to or greater than the absolute value of its critical effect size;

(o) a summary of the results of effluent characterization, sublethal toxicity testing and water quality monitoring reported under paragraph 8(e) beginning on the day on which the mine becomes subject to section 7 of these Regulations;

(p) the conclusions of the biological monitoring studies, and a description of how those conclusions will impact the study design for subsequent biological monitoring studies, taking into account

les œufs — de sélénium total (poids sec), rapportée en µg/g, et le pourcentage d'humidité de l'échantillon;

f) dans le cas de l'étude sur la communauté d'invertébrés benthiques, le calcul de l'indicateur d'effet portant sur l'indice de similitude;

g) l'identification du sexe des poissons pris et la présence de lésions, de tumeurs, de parasites et d'autres anomalies et, dans le cas de l'étude sur le sélénium dans les tissus de poissons, le type de tissu étudié ainsi que les motifs scientifiques à l'appui du choix de tissu;

h) l'établissement à savoir s'il existe une différence statistique significative entre les zones d'échantillonnage pour les calculs effectués en application des sous-alinéas e)(i) à (iii) et de l'alinéa f) et eu égard aux renseignements visés à l'alinéa g), selon une comparaison statistique séparée et indépendante pour chaque indicateur d'effet;

i) une analyse statistique des résultats des calculs effectués en application des sous-alinéas e)(i) à (iii) et de l'alinéa g) qui indique la probabilité de détection correcte d'un effet d'une ampleur prédéterminée ainsi que le degré de confiance pouvant être accordé aux calculs;

j) une comparaison de l'ampleur de l'effet — calculée conformément aux paragraphes (2) ou (3) — par rapport au seuil critique d'effet d'un indicateur d'effet visé par l'alinéa e) et pour lequel il y a un seuil critique d'effet;

k) toute donnée justificative à l'appui, y compris les données brutes, relatives aux renseignements visés aux alinéas e) à j);

l) la description des mesures d'assurance de la qualité et de contrôle de la qualité qui ont été prises ainsi que les données associées à leur mise en œuvre;

m) selon les renseignements visés aux alinéas e) à k), l'indication de tout :

(i) effet sur la population de poissons,

(ii) effet sur la communauté d'invertébrés benthiques,

(iii) effet du mercure sur les tissus de poissons;

n) à l'égard de tout indicateur d'effet, un énoncé à savoir si la valeur absolue de l'ampleur de l'effet est égale ou supérieure à la valeur absolue du seuil critique d'effet prévu pour cet indicateur d'effet;

o) un résumé des résultats de la caractérisation de l'effluent, des essais de toxicité sublétale et du suivi de la qualité de l'eau visés à l'alinéa 8e) à partir de la date où la mine devient assujettie à l'article 7 du présent règlement;

p) les conclusions des études de suivi biologique et l'incidence de ces conclusions sur le plan d'étude pour les études de suivi biologique subséquentes, compte tenu des éléments suivants :

(i) les résultats de toute étude visée à l'alinéa 10f),

(i) the results of any studies referred to in paragraph 10(f),

(ii) the presence of anthropogenic, natural or other factors that are not related to the effluent under study and that may reasonably be expected to contribute to any observed effect,

(iii) the results of the statistical analysis conducted under paragraphs (h) and (i), and

(iv) the data referred to in paragraph (l);

(q) the month in which the next biological monitoring studies will start, if any biological monitoring studies are required; and

(r) the date when the next interpretative report is required to be submitted or would be required to be submitted but for the application of subsection 16(3).

(2) For the purpose of the study respecting fish population, the magnitude of the effect for an effect indicator is to be calculated using the following formula:

(A – B)/B × 100

where

A is

(a) for the purpose of the age indicator, the mean value for the indicator in the exposure area, and

(b) for the purpose of the indicators other than age, the adjusted mean value — obtained using the analysis of covariance (ANCOVA) statistical test method — for the indicator in the exposure area; and

B is

(a) for the purpose of the age indicator, the mean value for the indicator in the reference area, and

(b) for the purpose of the indicators other than age, the adjusted mean value — obtained using the analysis of covariance (ANCOVA) statistical test method — for the indicator in the reference area.

(3) For the purposes of the study respecting the benthic invertebrate community, the magnitude of the effect for an effect indicator is to be calculated using the following formula:

(A – B)/C

where

A is the mean value for the indicator in the exposure area;

B is the mean value for the indicator in the reference area; and

C is the standard deviation for the indicator in the reference area.

(ii) la présence de facteurs anthropiques, naturels ou autres non liés à l'effluent à l'étude et dont on peut raisonnablement s'attendre à ce qu'ils contribuent à tout effet observé,

(iii) les résultats de l'analyse statistique effectuée en application des alinéas h) et i),

(iv) les données visées à l'alinéa l);

q) le mois pendant lequel les prochaines études de suivi biologique débuteront, si des études de suivi biologique sont exigées;

r) la date à laquelle le prochain rapport d'interprétation doit être présenté ou devrait être présenté si ce n'était l'application du paragraphe 16(3).

(2) Pour l'étude sur la population de poissons, l'ampleur de l'effet d'un indicateur d'effet se calcule selon la formule suivante :

(A – B)/B × 100

où :

A représente :

a) dans le cas de l'âge, la moyenne pour l'indicateur dans la zone exposée;

b) dans le cas des autres indicateurs d'effet, la moyenne ajustée — obtenue en application de la méthode statistique de l'analyse de covariance (ANCOVA) — pour l'indicateur dans la zone exposée;

B selon le cas :

a) dans le cas de l'âge, la moyenne pour l'indicateur dans la zone de référence;

b) dans le cas des autres indicateurs d'effet, la moyenne ajustée — obtenue en application de la méthode statistique de l'analyse de covariance (ANCOVA) — pour l'indicateur dans la zone de référence.

(3) Pour l'étude sur la communauté d'invertébrés benthiques, l'ampleur de l'effet d'un indicateur se calcule selon la formule suivante :

(A – B)/C

où :

A représente la moyenne pour l'indicateur dans la zone exposée;

B la moyenne pour l'indicateur dans la zone de référence;

C l'écart-type pour l'indicateur dans la zone de référence.

DIVISION 2

Subsequent Biological Monitoring Studies

Subsequent Study Designs

13 (1) Each subsequent study design shall be submitted to the Minister of the Environment

(a) at least six months before the start of the biological monitoring studies that are set out in that study design; or

(b) if no biological monitoring studies are required, not later than 12 months after the day on which the previous interpretative report was required to be submitted or would have been required to be submitted but for the application of subsection 16(3).

(2) Each subsequent study design shall include

(a) a summary of the information referred to in paragraph 10(a) and a description of any changes to that information since the submission of the most recent study design, as well as — in respect of each calendar year — any supporting data, including raw data, for the estimate referred to in subparagraph 10(a)(i), whether or not the estimate has changed;

(b) the information referred to in paragraphs 10(b) to (e);

(c) a summary of the results of any biological monitoring studies conducted after June 6, 2002;

(d) if the study referred to in paragraph 9(1)(e) is required,

(i) the month in which the study will start, and

(ii) a description of how the study will be conducted that includes any field and laboratory methodologies that will be used to determine the cause of the effect; and

(e) if the cause of an effect on the fish population, on fish tissue from mercury or on the benthic invertebrate community is known, the cause of the effect and any supporting data, including raw data.

Conduct of Subsequent Biological Monitoring Studies

14 (1) Subject to subsection (2), the subsequent biological monitoring studies shall be conducted in accordance with the study design submitted under section 13.

(2) If the owner or operator is unable to follow the study design due to circumstances beyond their control, the owner or

SECTION 2

Études de suivi biologique subséquentes

Plans d'étude subséquents

13 (1) Tout plan d'étude de suivi biologique subséquent est présenté au ministre de l'Environnement :

a) au moins six mois avant le début des études de suivi biologique visées dans ce plan d'étude;

b) si aucune étude de suivi biologique n'est exigée, au plus douze mois après la date à laquelle le rapport d'interprétation précédent devait être présenté ou aurait dû être présenté si ce n'était l'application du paragraphe 16(3).

(2) Tout plan d'étude de suivi biologique subséquent comporte :

a) un résumé des renseignements visés à l'alinéa 10a) et une description de toute modification à ces renseignements apportée depuis la présentation du dernier plan d'étude ainsi que, à l'égard de toute année civile, toute donnée justificative à l'appui de l'estimation visée au sous-alinéa 10a)(i), y compris les données brutes, que cette estimation ait changé ou non;

b) les renseignements visés aux alinéas 10b) à e);

c) un résumé des résultats de toute étude de suivi biologique effectuée depuis le 6 juin 2002;

d) si une étude visée à l'alinéa 9(1)e) est requise :

(i) le mois pendant lequel l'étude débutera,

(ii) une description de la façon dont l'étude sera effectuée, y compris toute méthode sur le terrain et en laboratoire, pour établir la cause de l'effet;

e) si la cause d'un effet sur la population de poissons, d'un effet du mercure sur les tissus de poissons ou d'un effet sur la communauté d'invertébrés benthiques est connue, la cause de l'effet ainsi que toute donnée justificative à l'appui, y compris les données brutes.

Déroulement des études de suivi biologique subséquentes

14 (1) Toute étude de suivi biologique subséquente est effectuée conformément au plan d'étude présenté en application de l'article 13.

(2) Toutefois, si le propriétaire ou l'exploitant est incapable de suivre le plan d'étude pour des raisons indépendantes de

operator shall inform the Minister of the Environment without delay of those circumstances and the changes that are made to the study.

Content of Subsequent Interpretative Reports

15 Subject to subsection 16(3), each subsequent study design shall be followed by a subsequent interpretative report that includes

(a) for a study referred to in paragraphs 9(1)(a) to (d), the information referred to in paragraphs 12(1)(a) to (n) and (p) to (r);

(b) a summary of the results of effluent characterization, sublethal toxicity testing and water quality monitoring reported under paragraph 8(e) after the day on which the previous interpretative report was required to be submitted or would have been required to be submitted but for the application of subsection 16(3); and

(c) if the study design includes the description required under paragraph 13(2)(d),

(i) the cause of the effect, if determined, and any supporting data, including raw data, or

(ii) if the cause of the effect was not determined, an explanation of why and a description of any steps that need to be taken in the next study to determine that cause.

Submission of Subsequent Interpretative Reports

16 (1) Subject to subsection (2), each subsequent interpretative report shall be submitted to the Minister of the Environment not later than 36 months after the day on which the previous interpretative report was required to be submitted or would have been required to be submitted but for the application of subsection 16(3).

(2) The interpretative report following a resumption of effluent discharge referred to in subsection 17(2) shall be submitted not later than 36 months after the day on which effluent discharge resumes.

(3) An interpretative report is not required in respect of a 36-month period if no biological monitoring studies are required in respect of that period.

Cessation of Discharge

17 (1) The owner or operator of a mine that has ceased discharging effluent for a period of at least 36 months is not required to conduct environmental effects monitoring studies so long as the period of cessation continues.

sa volonté, il en avise sans délai le ministre de l'Environnement et l'informe des modifications à apporter aux modalités du déroulement de l'étude.

Contenu des rapports d'interprétation subséquents

15 Sous réserve du paragraphe 16(3), tout plan d'étude subséquent est suivi d'un rapport d'interprétation subséquent qui comporte :

a) dans le cas des études visées aux alinéas 9(1)a) à d), les renseignements visés aux alinéas 12(1)a) à n) et p) à r);

b) un résumé des résultats de la caractérisation de l'effluent, des essais de toxicité sublétale et du suivi de la qualité de l'eau visés à l'alinéa 8e) à partir de la date à laquelle le rapport d'interprétation précédent devait être présenté ou aurait dû être présenté si ce n'était l'application du paragraphe 16(3);

c) si le plan d'étude comprend une description exigée par l'alinéa 13(2)d) :

(i) la cause de l'effet, si elle a été déterminée, ainsi que toutes données justificatives à l'appui, y compris les données brutes,

(ii) si la cause n'a pas été déterminée, les raisons de l'échec ainsi que les mesures nécessaires pour déterminer cette cause lors de la prochaine étude.

Présentation des rapports d'interprétation subséquents

16 (1) Tout rapport d'interprétation subséquent est présenté au ministre de l'Environnement au plus tard trente-six mois après la date à laquelle le rapport d'interprétation précédent devait être présenté ou aurait dû être présenté si ce n'était l'application du paragraphe 16(3).

(2) Toutefois, le rapport d'interprétation suivant la reprise du rejet d'effluents visée au paragraphe 17(2) est présenté au plus tard trente-six mois après la date de cette reprise.

(3) Aucun rapport d'interprétation n'est exigé à l'égard d'une période de trente-six mois à l'égard de laquelle aucune étude de suivi biologique n'est exigée.

Cessation du rejet d'effluent

17 (1) Le propriétaire ou l'exploitant d'une mine dont les rejets d'effluent ont cessé pour une période d'au moins trente-six mois n'a pas l'obligation de mener des études de suivi des effets sur l'environnement tant que l'absence de rejets se poursuit.

(2) The requirement to conduct environmental effects monitoring studies shall resume, as the case may be, on

(a) the day on which effluent discharge resumes; or

(b) the day on which a notice referred to in paragraph 32(1)(a) of these Regulations is received by the Minister of the Environment.

(3) The owner or operator shall notify the Minister of the Environment in writing without delay

(a) when the period of cessation begins; and

(b) when the mine resumes effluent discharge.

(4) Any biological monitoring study that began before the end of the 36-month period shall be completed and followed by an interpretative report in accordance with section 15.

(2) L'obligation de mener des études de suivi des effets sur l'environnement reprend, selon le cas :

a) à la date de reprise du rejet d'effluents;

b) à la date à laquelle l'avis visé à l'alinéa 32(1)a) du présent règlement est reçu par le ministre de l'Environnement.

(3) Le propriétaire ou l'exploitant d'une mine avise le ministre de l'Environnement par écrit sans délai :

a) au début de la période d'absence de rejet d'effluents;

b) à la reprise du rejet d'effluents.

(4) Toute étude de suivi biologique débutée avant la fin de la période de trente-six mois est complétée et suivie d'un rapport d'interprétation conformément à l'article 15.

DIVISION 3

Final Studies

General

18 (1) If an owner or operator of a mine has provided a notice referred to in paragraph 32(1)(a) of these Regulations to the Minister of the Environment, the owner or operator shall

(a) if the notice is received before biological monitoring studies have started, conduct the biological monitoring studies and submit any interpretative report that is required in respect of those studies; and

(b) if the notice is received after biological monitoring studies have started, in addition to submitting any interpretative report that is required in respect of those studies, submit a final study design in accordance with subsection (2), conduct final biological monitoring studies in accordance with section 19 and submit a final interpretative report in accordance with section 20.

(2) The final study design shall be submitted to the Minister of the Environment not later than six months after the day on which the notice referred to in paragraph 32(1)(a) of these Regulations is received. It shall include the information required under subsection 13(2).

Conduct of Final Biological Monitoring Studies

19 (1) Subject to subsection (2), the final biological monitoring studies shall be conducted in accordance with the study design submitted under subsection 18(2) not earlier than six months after the day on which the final study design has been submitted.

SECTION 3

Études finales

Généralités

18 (1) S'il a présenté au ministre de l'Environnement un avis visé à l'alinéa 32(1)a) du présent règlement, le propriétaire ou l'exploitant d'une mine :

a) dans le cas où l'avis est reçu avant le début des études de suivi biologique, effectue les études de suivi biologique et présente tout rapport d'interprétation requis à l'égard de ces études;

b) dans le cas où l'avis est reçu après le début des études de suivi biologique, en plus d'effectuer les études de suivi biologique et de présenter tout rapport d'interprétation exigé à l'égard de ces études, présente un plan d'étude final conformément au paragraphe (2), effectue une étude de suivi biologique finale conformément à l'article 19 et présente un rapport d'interprétation final conformément à l'article 20.

(2) Le plan d'étude final est présenté au ministre de l'Environnement au plus tard six mois après la date de réception de l'avis visé à l'alinéa 32(1)a) du présent règlement et comporte les renseignements exigés par le paragraphe 13(2).

Déroulement des études de suivi biologique finales

19 (1) Les études de suivi biologique finales sont effectuées conformément au plan d'étude présenté en application du paragraphe 18(2), au plus tôt six mois après la date de présentation du plan d'étude final.

(2) If the owner or operator is unable to follow the study design due to circumstances beyond their control, the owner or operator shall inform the Minister of the Environment without delay of those circumstances and the changes that are made to the study.

Content of Final Interpretative Report

20 The final interpretative report shall be submitted to the Minister of the Environment not later than three years after the day on which the notice referred to in paragraph 32(1)(a) of these Regulations is received and shall include the information referred to in paragraphs 15(a) to (c).

SOR/2006-239, ss. 26 to 33, 34(F); SOR/2012-22, ss. 10 to 17; SOR/2018-99, s. 33.

(2) Toutefois, si le propriétaire ou l'exploitant est incapable de suivre le plan d'étude pour des raisons indépendantes de sa volonté, il en avise sans délai le ministre de l'Environnement et l'informe des modifications à apporter aux modalités du déroulement de l'étude.

Contenu du rapport d'interprétation final

20 Le rapport d'interprétation final est présenté au ministre de l'Environnement au plus tard trois ans après la date de réception de l'avis visé à l'alinéa 32(1)a) du présent règlement et comporte les renseignements visés aux alinéas 15a) à c).

DORS/2006-239, art. 26 à 33 et 34(F); DORS/2012-22, art. 10 à 17; DORS/2018-99, art. 33.

SCHEDULE 6

(Section 22)

Annual Report Summarizing Effluent Monitoring Results

PART 1

Identifying Information

1 Name of the mine

2 Address of the mine

3 Name of the operator of the mine

4 Operator's telephone number and e-mail address, if any

5 Reporting period

6 Date of report

PART 2

Test Results Respecting Each Final Discharge Point

1 Complete the following table with the monthly mean concentration for the deleterious substances set out in the table for each final discharge point and identify the location of the final discharge point.

2 Any measurement not taken because there was no deposit from the final discharge point shall be identified by the letters "NDEP" (No Deposit).

3 Any measurement not taken because no measurement was required in accordance with the conditions set out in section 12 or 13 of the *Metal Mining Effluent Regulations* shall be identified by the letters "NMR" (No Measurement Required).

ANNEXE 6

(article 22)

Rapport annuel résumant les résultats du suivi de l'effluent

PARTIE 1

Renseignements identificatoires

1 Nom de la mine

2 Adresse de la mine

3 Nom de l'exploitant de la mine

4 Numéro de téléphone de l'exploitant et adresse électronique, le cas échéant

5 Période visée

6 Date du rapport

PARTIE 2

Résultats des essais à chacun des points de rejet final

1 Remplir le tableau suivant pour chaque point de rejet final, identifier son emplacement et indiquer la moyenne mensuelle de la concentration des substances nocives.

2 S'il n'y a pas eu de résultats parce qu'il n'y avait pas de rejet à partir du point de rejet final, inscrire « A.R. » (aucun rejet).

3 S'il n'y a pas eu de mesure parce que l'article 12 ou 13 du *Règlement sur le effluents des mines de métaux* n'en exigeait aucune, inscrire « A.M.E. » (aucune mesure exigée).

Location of final discharge point:												
Month	As (mg/L)	Cu (mg/L)	CN (mg/L)	Pb (mg/L)	Ni (mg/L)	Zn (mg/L)	TSS (mg/L)	Ra 226 (Bq/L)	Lowest pH	Highest pH	Effluent Volume (m^3)
Jan											
Feb											
Mar											
Apr											
May											
June											
July											
Aug											
Sept											
Oct											
Nov											
Dec											

Emplacement du point de rejet final :											
Mois	As (mg/L)	Cu (mg/L)	CN (mg/L)	Pb (mg/L)	Ni (mg/L)	Zn (mg/L)	TSS (mg/L)	Ra 226 (Bq/L)	pH le plus bas	pH le plus haut	Volume d'effluent (m^3)
Janv											
Févr.											
Mars											
Avr											
Mai											
Juin											
Juill.											
Août											
Sept											
Oct											
Nov											
Déc											

PART 3

Results of Acute Lethality Tests and *Daphnia Magna* Monitoring Tests

Location of final discharge point:			
Date Sample Collected	Results for Rainbow Trout Acute Lethality Tests (mean percentage mortality in 100% effluent test concentration)	Results for *Daphnia magna* Monitoring Tests (mean percentage mortality in 100% effluent test concentration)	Results for Threespine Stickleback Acute Lethality Tests (mean percentage mortality in 100% effluent test concentration)

PARTIE 3

Résultats des essais de détermination de la létalité aiguë et des essais de suivi avec bioessais sur la *Daphnia magna*

Emplacement du point de rejet final :			
Date du prélèvement de l'échantillon	Résultats des essais de détermination de la létalité aiguë sur la truite arc-en-ciel (pourcentage moyen de mortalité dans l'effluent non dilué)	Résultats des essais de suivi avec bioessais sur la *Daphnia magna* (pourcentage moyen de mortalité dans l'effluent non dilué)	Résultats des essais de détermination de la létalité aiguë sur l'épinoche à trois épines (pourcentage moyen de mortalité dans l'effluent non dilué)

PART 4

[Repealed, SOR/2018-99, s. 34]

SOR/2006-239, s. 35; SOR/2018-99, s. 34.

PARTIE 4

[Abrogée, DORS/2018-99, art. 34]

DORS/2006-239, art. 35; DORS/2018-99, art. 34.

SCHEDULE 6.1
[Repealed, SOR/2018-99, s. 35]

ANNEXE 6.1
[Abrogée, DORS/2018-99, art. 35]

SCHEDULE 7
[Repealed, SOR/2018-99, s. 35]

ANNEXE 7
[Abrogée, DORS/2018-99, art. 35]

SCHEDULE 8

[Repealed, SOR/2018-99, s. 35]

ANNEXE 8

[Abrogée, DORS/2018-99, art. 35]

RELATED PROVISIONS

— SOR/2018-99, s. 37

37 (1) Despite subsection 8(1) of the *Metal and Diamond Mining Effluent Regulations*, the owner or operator of a mine that is subject to those Regulations on the day on which this section comes into force shall submit in writing to the Minister of the Environment the information referred to in paragraph 8(2)(c) of those Regulations not later than 60 days after the day on which this section comes into force.

(2) During the 12-month period beginning on the day on which this section comes into force, despite subsection 16(2) of the *Metal and Diamond Mining Effluent Regulations*, the owner or operator of a diamond mine may, for the purposes of determining whether effluent is acutely lethal for the 12-month period referred to in subsection 16(1) of those Regulations, use acute lethality data that was collected during any period of 12 consecutive months before the day on which this section comes into force, if the owner or operator submits a report to the Minister of the Environment that indicates that

(a) the tests to determine acute lethality have been conducted in accordance with the procedures set out in section 5 or 6 of Reference Method EPS 1/RM/10 or section 5 or 6 of Reference Method EPS 1/RM/13;

(b) the data relates to effluent generated after the start of commercial operation by the mine; and

(c) the data was collected not more than 36 months before the day on which this section comes into force.

(3) During the 12-month period beginning on the day on which section 14.3 of the *Metal and Diamond Mining Effluent Regulations* comes into force, despite subsection 16(2) of those Regulations, the owner or operator of a metal mine or diamond mine may, for the purposes of determining whether effluent is acutely lethal for the 12-month period referred to in subsection 16(1) of those Regulations, use acute lethality data that was collected during any period of 12 consecutive months before the day on which that section 14.3 comes into force, if the owner or operator submits a report to the Minister of the Environment that indicates that

(a) the tests to determine acute lethality have been conducted in accordance with the procedures set out in section 5 or 6 of Reference Method EPS 1/RM/14;

(b) the data relates to effluent generated after the start of commercial operation by the mine; and

(c) the data was collected not more than 36 months before the day on which that section 14.3 comes into force.

DISPOSITIONS CONNEXES

— DORS/2018-99, art. 37

37 (1) Malgré le paragraphe 8(1) du *Règlement sur les effluents des mines de métaux et des mines de diamants*, le propriétaire ou l'exploitant d'une mine qui est assujettie à ce règlement, à la date d'entrée en vigueur du présent article, présente par écrit au ministre de l'Environnement les renseignements visés à l'alinéa 8(2)c) de ce règlement dans les soixante jours suivant la date d'entrée en vigueur du présent article.

(2) Pendant la période de douze mois commençant à la date d'entrée en vigueur du présent article, malgré le paragraphe 16(2) de ce règlement, le propriétaire ou l'exploitant d'une mine de diamants peut se fonder sur les données d'essai de détermination de la létalité aiguë recueillies pendant toute période de douze mois consécutifs précédant la date d'entrée en vigueur du présent article pour établir si l'effluent présente une létalité aiguë pendant la période de douze mois visée au paragraphe 16(1) de ce règlement, s'il présente au ministre de l'Environnement un rapport indiquant que :

a) les essais de détermination de la létalité aiguë ont été effectués conformément aux modes opératoires prévus aux sections 5 ou 6 de la méthode de référence SPE 1/RM/10 ou aux sections 5 ou 6 de la méthode de référence SPE 1/RM/13;

b) les données se rapportent à l'effluent émanant de la mine depuis le début de son exploitation commerciale;

c) les données ont été recueillies au cours des trente-six mois précédant la date d'entrée en vigueur du présent article.

(3) Pendant la période de douze mois commençant à la date d'entrée en vigueur de l'article 14.3 de ce règlement, malgré le paragraphe 16(2) de ce règlement, le propriétaire ou l'exploitant d'une mine de métal ou d'une mine de diamants peut se fonder sur les données d'essai de détermination de la létalité aiguë recueillies pendant toute période de douze mois consécutifs précédant la date d'entrée en vigueur de l'article 14.3 de ce règlement pour établir si l'effluent présente une létalité aiguë pendant la période de douze mois visée au paragraphe 16(1) de ce règlement, s'il présente au ministre de l'Environnement un rapport indiquant que :

a) les essais de détermination de la létalité aiguë ont été effectués conformément aux modes opératoires prévus aux sections 5 ou 6 de la méthode de référence SPE 1/RM/14;

b) les données se rapportent à l'effluent émanant de la mine depuis le début de son exploitation commerciale;

c) les données ont été recueillies au cours des trente-six mois précédant l'entrée en vigueur de l'article 14.3 de ce règlement.

— SOR/2018-99, s. 38

38 (1) Despite section 10 of Schedule 5 to the *Metal and Diamond Mining Effluent Regulations*, the first study design of a diamond mine that is subject to those Regulations on June 1, 2018 may be submitted not later than the earlier of June 1, 2021 and the day on which a document that is equivalent to a study design is required to be submitted under provincial or territorial laws.

(2) In the case of a diamond mine in respect of which the first study design is submitted under subsection (1), the period referred to in subsection 11(1) of Schedule 5 to the *Metal and Diamond Mining Effluent Regulations* does not apply.

(3) In the case of a diamond mine that is subject to the *Metal and Diamond Mining Effluent Regulations* on June 1, 2018, the results of any studies conducted before the day on which the first study design is submitted may be used for the purpose of determining which biological monitoring studies are required to be conducted under section 9 of Schedule 5 to those Regulations if those results can be used for the purpose of meeting the requirements of section 12 of that Schedule.

(4) However, only information gathered — for the purpose of meeting the requirements of provincial or territorial laws — during the three-year period before the day on which the first study design is submitted may be used to determine the concentration of effluent, mercury and selenium for the application of subsections 9(1) and (2) of Schedule 5 to the *Metal and Diamond Mining Effluent Regulations*. If that information is used, paragraph 9(3)(a) of that Schedule does not apply.

(5) If the results of studies referred to in subsection (3) and the information referred to in subsection (4) are used in accordance with those subsections, the first study design shall include, in addition to the information referred to in section 10 of Schedule 5 to the *Metal and Diamond Mining Effluent Regulations*, the information referred to in paragraph 13(2)(d) or (e), as the case may be, of that Schedule, copies of and a summary of the results of the studies and an explanation — that includes supporting information — as to how the results and information can be used for the purposes of meeting the requirements of sections 9 and 12 of that Schedule.

(6) In the case of a diamond mine that is subject to the *Metal and Diamond Mining Effluent Regulations* on June 1, 2018, the effluent and water quality monitoring studies set out in Part 1 of Schedule 5 to those Regulations shall be started on the day on which the first study design is submitted.

(7) In the case of a diamond mine that is subject to the *Metal and Diamond Mining Effluent Regulations* on June 1, 2018, the results of sublethal toxicity tests conducted — for the purpose of meeting the requirements of provincial or territorial laws — during the three-year period before the day on which the first study design is submitted may be used for the application of subsection 6(3) of Schedule 5 to those Regulations, as if three years had elapsed, if those tests meet the requirements of subsection 5(1) of that Schedule. If those results are used, subsections 6(1) and (2) of that Schedule do not apply.

— DORS/2018-99, art. 38

38 (1) Malgré l'article 10 de l'annexe 5 du *Règlement sur les effluents des mines de métaux et des mines de diamants*, le premier plan d'étude concernant une mine de diamants assujettie à ce règlement le 1er juin 2018 peut être présenté, au plus tard, le 1er juin 2021 ou, si elle est antérieure, à la date à laquelle un document équivalent à un plan d'étude doit être présenté aux termes de règles de droit provinciales ou territoriales.

(2) Dans le cas d'une mine de diamants à l'égard de laquelle le premier plan d'étude est présenté en application du paragraphe (1), la période visée au paragraphe 11(1) de cette annexe ne s'applique pas.

(3) Dans le cas d'une mine de diamants assujettie à ce règlement le 1er juin 2018, les résultats d'études effectuées avant la date à laquelle le premier plan d'étude est présenté peuvent être utilisés pour déterminer quelles études de suivi biologique doivent être effectuées en application de l'article 9 de cette annexe, à condition que ces résultats puissent être utilisés pour satisfaire aux exigences prévues à l'article 12 de cette annexe.

(4) Toutefois, seuls les renseignements recueillis — pour satisfaire aux règles de droit provinciales ou territoriales — dans les trois ans qui précèdent la date de présentation du premier plan d'étude peuvent être utilisés pour déterminer la concentration de l'effluent, de mercure et de sélénium pour l'application des paragraphes 9(1) et (2) de cette annexe. Si ces renseignements sont utilisés, l'alinéa 9(3)a) de cette annexe ne s'applique pas.

(5) Si les résultats d'études visés au paragraphe (3) et les renseignements visés au paragraphe (4) sont utilisés conformément à ces paragraphes, le premier plan d'étude comprend, en plus des renseignements visés à l'article 10 de cette annexe, les renseignements visés, selon le cas, à l'alinéa 13(2)d) ou e) de cette annexe, des copies et un résumé des résultats des études et une explication — y compris les renseignements à l'appui — quant à la manière dont les résultats et les renseignements peuvent être utilisées pour satisfaire aux exigences des articles 9 et 12 de cette annexe.

(6) Dans le cas d'une mine de diamants assujettie à ce règlement le 1er juin 2018, les études de suivi de l'effluent et de la qualité de l'eau prévues à la partie 1 de cette annexe débutent à la date de présentation du premier plan d'étude.

(7) Dans le cas d'une mine de diamants assujettie à ce règlement le 1er juin 2018, les résultats d'essais de toxicité sublétale effectués — pour satisfaire aux règles de droit provinciales ou territoriales — dans les trois ans qui précèdent la date de présentation du premier plan d'étude peuvent être utilisés pour l'application du paragraphe 6(3) de cette annexe, comme s'il s'était écoulé trois ans, si ces essais satisfont aux exigences du paragraphe 5(1) de cette annexe. Si ces résultats sont utilisés, les paragraphes 6(1) et (2) de cette annexe ne s'appliquent pas.

(8) If the results of sublethal toxicity tests are used in accordance with subsection (7), the information referred to in paragraphs 8(a), (c), (e) and (g) of Schedule 5 to the *Metal and Diamond Mining Effluent Regulations*, in relation to those tests, shall be submitted to the Minister of the Environment not later than the day on which the first study design is submitted and shall be accompanied by a summary of the results of the tests and an explanation — that includes supporting information — as to how the results can be used for the purposes of meeting the requirements of subsection 5(1) of that Schedule.

(9) In the case of a diamond mine that is subject to the *Metal and Diamond Mining Effluent Regulations* on June 1, 2018, the first interpretative report shall, despite subsection 12(1) of Schedule 5 to those Regulations, be submitted not later than 24 months after the day on which the first study design is submitted and shall contain, in addition to the information referred to in section 12 of that Schedule, the information referred to in paragraph 15(c) of that Schedule.

— SOR/2018-99, s. 39

39 In the case of a metal mine that is subject to the *Metal and Diamond Mining Effluent Regulations* on June 1, 2018,

(a) sections 4 to 8 of Schedule 5 to those Regulations apply beginning on January 1, 2019 and, until that day, the *Metal Mining Effluent Regulations*, as they read immediately before June 1, 2018, continue to apply to the matters referred to in those sections;

(b) subsections 6(1) and (2) of Schedule 5 to those Regulations do not apply and the results of sublethal toxicity tests conducted under the *Metal Mining Effluent Regulations* during the three-year period before January 1, 2019 shall be used for the application of subsection 6(3) of that Schedule, as if three years had elapsed; and

(c) biological monitoring studies started on or before June 1, 2018 shall be completed, and the corresponding interpretative report shall be submitted, in accordance with the *Metal Mining Effluent Regulations*, as they read immediately before June 1, 2018.

(8) Si les résultats d'essais de toxicité sublétale sont utilisés conformément au paragraphe (7), les renseignements relatifs à ces essais visés aux alinéas 8a), c), e) et g) de cette annexe sont présentés au ministre de l'Environnement au plus tard à la date de présentation du premier plan d'étude et ils sont accompagnés d'un résumé des résultats des essais ainsi qu'une explication — y compris les renseignements à l'appui — quant à la manière dont les résultats peuvent être utilisées pour satisfaire aux exigences du paragraphe 5(1) de cette annexe.

(9) Dans le cas d'une mine de diamants assujettie à ce règlement le 1er juin 2018, le premier rapport d'interprétation est présenté, malgré le paragraphe 12(1) de cette annexe, au plus tard vingt-quatre mois après la date de présentation du premier plan d'étude et il comprend, en plus des renseignements visés à l'article 12 de cette annexe, les renseignements visés à l'alinéa 15c) de l'annexe.

— DORS/2018-99, art. 39

39 Dans le cas d'une mine de métaux assujettie au *Règlement sur les effluents des mines de métaux et des mines de diamants* le 1er juin 2018 :

a) les articles 4 à 8 de l'annexe 5 de ce règlement s'appliquent à partir du 1er janvier 2019 et, jusqu'à cette date, les dispositions du *Règlement sur les effluents des mines de métaux*, dans leur version antérieure au 1er juin 2018, continuent de régir les matières visées par ces articles;

b) les paragraphes 6(1) et (2) de cette annexe ne s'appliquent pas et les résultats des essais de toxicité sublétale effectués au titre du *Règlement sur les effluents des mines de métaux* dans les trois années qui précèdent le 1er janvier 2019 sont utilisés pour l'application du paragraphe 6(3) de cette annexe, comme s'il s'était écoulé trois ans;

c) les études de suivi biologique débutées le 1er juin 2018 ou avant cette date sont menées à terme conformément aux dispositions du *Règlement sur les effluents des mines de métaux*, dans leur version antérieure au 1er juin 2018, et le rapport d'interprétation qui s'y rapporte est présenté selon les modalités prévues à cette version du même règlement.

AMENDMENTS NOT IN FORCE

— SOR/2018-99, s. 2(4)

2 (4) The definition *acutely lethal* in subsection 1(1) of the Regulations is amended by striking out "or" at the end of paragraph (a), by adding "or" at the end of paragraph (b) and by adding the following after paragraph (b):

(c) more than 50% of the *Daphnia magna* subjected to it for a period of 48 hours, when tested in accordance with the acute lethality test set out in section 14.3.

— SOR/2018-99, s. 2(6)

2 (6) Section 1 of the Regulations is amended by adding the following after subsection (1):

(2) Every reference in these Regulations to column 1, 2, 3 or 4 of Schedule 4 shall be read as

(a) a reference to column 1, 2, 3 or 4 of Table 1 of Schedule 4, in the case of a mine to which subparagraph 4(1)(a)(i) applies; or

(b) a reference to column 1, 2, 3 or 4 of Table 2 of Schedule 4, in the case of a mine to which subparagraph 4(1)(a)(ii) applies.

— SOR/2018-99, ss. 3(2), (3)

3 (2) Section 3 of the Regulations is amended by striking out "and" at the end of paragraph (g), by adding "and" at the end of paragraph (h) and by adding the following after paragraph (h):

(i) un-ionized ammonia.

(3) Paragraph 4(1)(a) of the Regulations is replaced by the following:

(a) the concentration of the deleterious substance in the effluent does not exceed the maximum authorized concentrations that are set out in columns 2, 3 and 4 of

(i) Table 1 of Schedule 4, in the case of a mine in respect of which these Regulations apply for the first time on or after June 1, 2021 or in the case of a recognized closed mine that returns to commercial operation on or after June 1, 2021, or

(ii) Table 2 of Schedule 4, in any other case;

— SOR/2018-99, s. 4

4 The Regulations are amended by adding the following after section 4:

MODIFICATIONS NON EN VIGUEUR

— DORS/2018-99, par. 2(4)

2 (4) La définition de *létalité aiguë*, au paragraphe 1(1) du même règlement, est modifiée par adjonction, après l'alinéa b), de ce qui suit :

c) plus de 50 % des *Daphnia magna* qui y sont exposées pendant une période de quarante-huit heures au cours de l'essai de détermination de la létalité aiguë visé à l'article 14.3.

— DORS/2018-99, par. 2(6)

2 (6) L'article 1 du même règlement est modifié par adjonction, après le paragraphe (1), de ce qui suit :

(2) Tout renvoi à la colonne 1, 2, 3 ou 4 de l'annexe 4 dans le présent règlement constitue un renvoi :

a) dans le cas d'une mine à laquelle s'applique le sous-alinéa 4(1)a)(i), à la colonne 1, 2, 3 ou 4 du tableau 1 de l'annexe 4;

b) dans le cas d'une mine à laquelle s'applique le sous-alinéa 4(1)a)(ii), à la colonne 1, 2, 3 ou 4 du tableau 2 de l'annexe 4.

— DORS/2018-99, par. 3(2) et (3)

3 (2) L'article 3 du même règlement est modifié par adjonction, après l'alinéa h), de ce qui suit :

i) l'ammoniac non ionisé.

(3) L'alinéa 4(1)a) du même règlement est remplacé par ce qui suit :

a) la concentration de la substance nocive dans l'effluent ne dépasse pas les concentrations maximales permises qui sont établies aux colonnes 2, 3 et 4 :

(i) du tableau 1 de l'annexe 4, dans le cas d'une mine à l'égard de laquelle le présent règlement s'applique pour la première fois le 1er juin 2021 ou après cette date ou d'une une mine reconnue fermée dont l'exploitation commerciale a repris le 1er juin 2021 ou après cette date,

(ii) du tableau 2 de l'annexe 4, dans tous les autres cas;

— DORS/2018-99, art. 4

4 Le même règlement est modifié par adjonction, après l'article 4, de ce qui suit :

4.1 Paragraph 4(1)(c) does not apply in the case where the effluent is determined to be acutely lethal in accordance with the procedures set out in section 5 or 6 of Reference Method EPS 1/RM/14 when the owner or operator of a mine is testing at the frequency prescribed in subsection 14(1), unless the effluent is determined to be acutely lethal in accordance with any other acute lethality test.

— SOR/2018-99, ss. 9(2) to (4)

9 (2) Subsection 12(1) of the Regulations is replaced by the following:

12 (1) The owner or operator of a mine shall, not less than once per week and at least 24 hours apart, collect from each final discharge point

(a) a grab sample or composite sample of effluent and record the pH of the sample at the time of its collection and record, without delay after collecting the sample, the concentrations of the deleterious substances prescribed in section 3 except un-ionized ammonia; and

(b) a grab sample of effluent and record the temperature and the pH of the sample at the time of its collection and record, without delay after collecting the sample, the concentrations of total ammonia expressed as nitrogen (N).

(3) Section 12 of the Regulations is amended by adding the following after subsection (3):

(4) The owner or operator of a mine shall determine and record the concentration of un-ionized ammonia, using the temperature, pH and concentration of total ammonia recorded under paragraph (1)(b), in accordance with the following formula:

$$A\ (1/(1 + 10^{pKa-pH}))$$

where

A is the concentration of total ammonia — which is the sum of un-ionized ammonia (NH_3) and ionized ammonia (NH_4^+) — expressed in mg/L as nitrogen (N);

pH is the pH of the effluent sample; and

pKa is a dissociation constant calculated in accordance with the following formula:

$$0.09018 + 2729.92/T$$

where

T is the temperature of the effluent sample in kelvin.

(4) Subsection 13(1) of the Regulations is replaced by the following:

13 (1) The owner or operator of a mine may reduce the frequency of conducting tests relating to the concentrations of arsenic, copper, cyanide, lead, nickel, zinc or un-ionized ammonia at a final discharge point to not less than once in each calendar quarter, each test being conducted at least one

4.1 L'alinéa 4(1)c) ne s'applique pas s'il est déterminé que l'effluent présente une létalité aiguë conformément aux modes opératoires visés aux sections 5 ou 6 de la méthode de référence SPE 1/RM/14, lorsque le propriétaire ou l'exploitant d'une mine effectue l'essai à la fréquence prévue au paragraphe 14(1) à moins qu'un autre essai de détermination de la létalité aiguë indique que l'effluent présente une létalité aiguë.

— DORS/2018-99, par. 9(2) à (4)

9 (2) Le paragraphe 12(1) du même règlement est remplacé par ce qui suit :

12 (1) Au moins une fois par semaine et à au moins vingt-quatre heures d'intervalle, le propriétaire ou l'exploitant d'une mine prélève, à partir de chaque point de rejet final :

a) un échantillon instantané ou un échantillon composite d'effluent dont il enregistre le pH au moment du prélèvement, ainsi que, sans délai après celui-ci, les concentrations des substances nocives désignées à l'article 3, à l'exception de l'ammoniac non ionisé;

b) un échantillon instantané d'effluent dont il enregistre la température et le pH au moment du prélèvement, ainsi que, sans délai après celui-ci, la concentration d'ammoniac total sous forme d'azote (N).

(3) L'article 12 du même règlement est modifié par adjonction, après le paragraphe (3), de ce qui suit :

(4) Le propriétaire ou l'exploitant d'une mine calcule et enregistre la concentration d'ammoniac non ionisé selon la formule ci-après, en utilisant la température, le pH et la concentration d'ammoniac total enregistré en application de l'alinéa (1)b) :

$$A\ (1/(1 + 10^{pKa-pH}))$$

où :

A représente la concentration d'ammoniac total — soit l'ammoniac non ionisé (NH_3) et l'ammoniac ionisé (NH_4^+) — exprimée en mg/L et sous forme d'azote (N);

pH le pH de l'échantillon d'effluent;

pKa la constante de dissociation calculée selon la formule suivante :

$$0,09018 + 2729,92/T$$

où :

T représente la température de l'échantillon d'effluent en kelvin.

(4) Le paragraphe 13(1) du même règlement est remplacé par ce qui suit :

13 (1) Le propriétaire ou l'exploitant d'une mine peut, à un point de rejet final, réduire la fréquence des essais concernant la concentration d'arsenic, de cuivre, de cyanure, de plomb, de nickel, de zinc ou d'ammoniac non ionisé à au moins une fois par trimestre civil, chaque essai étant effectué à au moins

month apart, if that substance's monthly mean concentration at that final discharge point is less than 10% of the value set out in column 2 of Schedule 4 for 12 consecutive months.

— SOR/2018-99, ss. 10(2), (3)

10 (2) Subsection 14(1) of the Regulations is replaced by the following:

14 (1) Subject to section 15, the owner or operator of a mine shall collect, once a month, a grab sample of effluent from each final discharge point and determine whether the effluent is acutely lethal by conducting acute lethality tests on aliquots of each effluent sample in accordance with sections 14.1 to 14.3.

(3) Subsection 14(3) of the Regulations is replaced by the following:

(3) When collecting a grab sample of effluent for the purposes of subsection (1), the owner or operator of a mine shall

(a) collect a sufficient volume of effluent to enable the owner or operator to comply with paragraph 15(1)(a); and

(b) record the temperature and the pH of each grab sample of effluent at the time of the sample's collection.

— SOR/2018-99, s. 11

11 The Regulations are amended by adding the following after section 14.2:

Acute Lethality Test — *Daphnia Magna*

14.3 Unless the salinity value of the effluent is equal to or greater than four parts per thousand and the effluent is deposited into marine waters, the owner or operator of a mine shall, in addition to conducting the acute lethality test set out in section 14.1, determine whether the effluent is acutely lethal by conducting an acute lethality test in accordance with the procedures set out in section 5 or 6 of Reference Method EPS 1/RM/14.

— SOR/2018-99, s. 12(2)

12 (2) Paragraphs 15(1)(a) and (b) of the Regulations are replaced by the following:

(a) without delay,

(i) conduct the effluent characterization set out in subsection 4(1) of Schedule 5 on the aliquot of each grab sample collected under subsection 14(1),

(ii) record the concentration of total ammonia and, using that concentration and using the temperature and pH recorded under paragraph 14(3)(b), determine the

un mois d'intervalle, si la concentration moyenne mensuelle de la substance à ce point de rejet final est inférieure à 10 % de la valeur établie à la colonne 2 de l'annexe 4 pendant douze mois consécutifs.

— DORS/2018-99, par. 10(2) et (3)

10 (2) Le paragraphe 14(1) du même règlement est remplacé par ce qui suit :

14 (1) Sous réserve de l'article 15, le propriétaire ou l'exploitant d'une mine prélève une fois par mois un échantillon instantané d'effluent à chaque point de rejet final et détermine si cet effluent présente une létalité aiguë en effectuant des essais de détermination de la létalité aiguë sur des portions aliquotes de chaque échantillon conformément aux articles 14.1 à 14.3.

(3) Le paragraphe 14(3) du même règlement est remplacé par ce qui suit :

(3) Lors du prélèvement des échantillons instantanés en application du paragraphe (1), le propriétaire ou l'exploitant d'une mine :

a) prélève un volume d'effluent suffisant pour lui permettre de se conformer à l'alinéa 15(1)a);

b) enregistre, au moment du prélèvement, la température et le pH de chaque échantillon.

— DORS/2018-99, art. 11

11 Le même règlement est modifié par adjonction, après l'article 14.2, de ce qui suit :

Essai de détermination de la létalité aiguë — *Daphnia magna*

14.3 Sauf dans le cas où la salinité de l'effluent est égale ou supérieure à quatre parties par millier et que l'effluent est rejeté dans l'eau de mer, le propriétaire ou l'exploitant d'une mine détermine si l'effluent présente une létalité aiguë en effectuant, en plus de l'essai de détermination de la létalité aiguë prévu à l'article 14.1, un essai de détermination de la létalité aiguë conformément aux modes opératoires prévus aux sections 5 ou 6 de la méthode de référence SPE 1/RM/14.

— DORS/2018-99, par. 12(2)

12 (2) Les alinéas 15(1)a) et b) du même règlement sont remplacés par ce qui suit :

a) sans délai :

(i) effectue la caractérisation de l'effluent conformément au paragraphe 4(1) de l'annexe 5 sur une portion aliquote de chaque échantillon instantané prélevé en application du paragraphe 14(1),

(ii) enregistre la concentration d'ammoniac total et, au moyen de cette concentration et de la température et du

concentration of un-ionized ammonia in accordance with the formula set out in subsection 12(4), and

(iii) record the concentrations of the deleterious substances prescribed in section 3;

(b) collect a grab sample twice a month from the final discharge point from which the effluent sample determined to be acutely lethal was collected, record the temperature and the pH of each sample at the time of its collection and, without delay, conduct the acute lethality test that determined the effluent sample to be acutely lethal on each grab sample in accordance with the procedure set out in section 6 of the applicable reference method and, if the sample is determined to be acutely lethal, without delay,

(i) conduct the effluent characterization set out in subsection 4(1) of Schedule 5 on the aliquot of each grab sample,

(ii) record the concentration of total ammonia and, using that concentration and using the temperature and pH recorded under this paragraph, determine the concentration of un-ionized ammonia in accordance with the formula set out in subsection 12(4), and

(iii) record the concentrations of the deleterious substances prescribed in section 3; and

pH enregistrés en application de l'alinéa 14(3)b), calcule la concentration d'ammoniac non ionisé selon la formule prévue au paragraphe 12(4),

(iii) enregistre les concentrations des substances nocives désignées à l'article 3;

b) deux fois par mois, prélève un échantillon instantané à partir du point de rejet final d'où l'échantillon d'effluent qui présente une létalité aiguë a été prélevé, enregistre, au moment du prélèvement, la température et le pH de chaque échantillon, et effectue sans délai après le prélèvement, sur chacun de ces échantillons, selon le mode opératoire prévu à la section 6 de la méthode de référence, l'essai de détermination de la létalité aiguë à partir duquel la létalité aiguë de l'échantillon a été établie. S'il est ainsi établi que l'échantillon présente une létalité aiguë, le propriétaire ou l'exploitant d'une mine, sans délai :

(i) effectue la caractérisation de l'effluent conformément au paragraphe 4(1) de l'annexe 5 sur une portion aliquote de chaque échantillon instantané,

(ii) enregistre la concentration d'ammoniac total et, au moyen de cette concentration et de la température et du pH enregistrés en application du présent alinéa, calcule la concentration d'ammoniac non ionisé selon la formule prévue au paragraphe 12(4),

(iii) enregistre les concentrations des substances nocives désignées à l'article 3;

— SOR/2018-99, s. 13

13 The Regulations are amended by adding the following after section 15:

15.1 Despite paragraph 15(1)(c), if an effluent sample is determined to be acutely lethal when tested using the acute lethality test set out in section 14.3, the owner or operator of a mine shall, without delay, collect the first grab sample required by paragraph 15(1)(b) and comply with the requirements of that paragraph.

— DORS/2018-99, art. 13

13 Le même règlement est modifié par adjonction, après l'article 15, de ce qui suit :

15.1 Malgré l'alinéa 15(1)c), s'il est établi qu'un échantillon d'effluent présente une létalité aiguë après l'essai de détermination de la létalité aiguë prévu à l'article 14.3, le propriétaire ou l'exploitant d'une mine prélève sans délai le premier échantillon instantané exigé par l'alinéa 15(1)b) et se conforme aux exigences de cet alinéa.

— SOR/2018-99, s. 15(2)

15 (2) Section 17 of the Regulations and the heading before it are repealed.

— DORS/2018-99, par. 15(2)

15 (2) L'article 17 du même règlement et l'intertitre le précédant sont abrogés.

— SOR/2018-99, s. 16(2)

16 (2) Section 18 of the Regulations is replaced by the following:

18 The owner or operator of a mine shall record without delay the data referred to in section 9.1 of Reference Method EPS 1/RM/10, section 8.1 of Reference Method EPS 1/RM/13 and section 8.1 of Reference Method EPS 1/RM/14 for all acute lethality tests that are conducted to monitor deposits from final discharge points.

— DORS/2018-99, par. 16(2)

16 (2) L'article 18 du même règlement est remplacé par ce qui suit :

18 Le propriétaire ou l'exploitant d'une mine enregistre sans délai les données visées à la section 9.1 de la méthode de référence SPE 1/RM/10, à la section 8.1 de la méthode de référence SPE 1/RM/13 et à la section 8.1 de la méthode de référence SPE 1/RM/14 pour tous les essais de détermination de la létalité aiguë effectués dans le cadre du suivi des rejets provenant de points de rejet final.

— SOR/2018-99, s. 18(2)

18 (2) Paragraph 19.1(1)(a) of the Regulations is replaced by the following:

(a) in mg/L for deleterious substances referred to in paragraphs 3(a) to (g) and (i); and

— SOR/2018-99, s. 19(2)

19 (2) Paragraph 20(1)(a) of the Regulations is replaced by the following:

(a) in kg for deleterious substances referred to paragraphs 3(a) to (g) and (i); and

— SOR/2018-99, s. 27(2)

27 (2) Subsection 31.1(1) of the Regulations is replaced by the following:

31.1 (1) If an unauthorized deposit of a deleterious substance occurs, the owner or operator of a mine shall, without delay, collect a grab sample of effluent at the place where the deposit occurred and determine whether the effluent is acutely lethal by conducting tests on aliquots of each effluent sample in accordance with sections 14.1 to 14.3.

— SOR/2018-99, s. 32(2)

32 (2) Schedule 4 to the Regulations is replaced by the Schedule 4 set out in Schedule 2 to these Regulations.

SCHEDULE 4

(Subsection 1(2), subparagraphs 4(1)(a)(i) and (ii), subsection 13(1), paragraph 13(3)(a), subparagraph 22(c)(i) and paragraph 24(1)(a))

Maximum Authorized Concentrations of Prescribed Deleterious Substances

TABLE 1

Item	Column 1 Deleterious Substance	Column 2 Maximum Authorized Monthly Mean Concentration	Column 3 Maximum Authorized Concentration in a Composite Sample	Column 4 Maximum Authorized Concentration in a Grab Sample
1	Arsenic	0.10 mg/L	0.15 mg/L	0.20 mg/L
2	Copper	0.10 mg/L	0.15 mg/L	0.20 mg/L
3	Cyanide	0.50 mg/L	0.75 mg/L	1.00 mg/L

— DORS/2018-99, par. 18(2)

18 (2) L'alinéa 19.1(1)a) du même règlement est remplacé par ce qui suit :

a) la concentration moyenne mensuelle en mg/L des substances nocives énumérées aux alinéas 3a) à g) et i);

— DORS/2018-99, par. 19(2)

19 (2) L'alinéa 20(1)a) du même règlement est remplacé par ce qui suit :

a) la charge en kg des substances nocives énumérées aux alinéas 3a) à g) et i);

— DORS/2018-99, par. 27(2)

27 (2) Le paragraphe 31.1(1) du même règlement est remplacé par ce qui suit :

31.1 (1) En cas de rejet non autorisé d'une substance nocive, le propriétaire ou l'exploitant d'une mine prélève sans délai un échantillon instantané d'effluent sur les lieux du rejet non autorisé et détermine si cet effluent présente une létalité aiguë en effectuant des essais conformément aux articles 14.1 à 14.3, sur des portions aliquotes de chaque échantillon d'effluent prélevé.

— DORS/2018-99, par. 32(2)

32 (2) L'annexe 4 du même règlement est remplacée par l'annexe 4 figurant à l'annexe 2 du présent règlement.

ANNEXE 4

(paragraphe 1(2), sous-alinéas 4(1)a)(i) et (ii), paragraphe 13(1), alinéa 13(3)a), sous-alinéa 22c)(i) et alinéa 24(1)a))

Concentrations maximales permises des substances nocives désignées

	Column 1	Column 2	Column 3	Column 4
Item	Deleterious Substance	Maximum Authorized Monthly Mean Concentration	Maximum Authorized Concentration in a Composite Sample	Maximum Authorized Concentration in a Grab Sample
4	Lead	0.08 mg/L	0.12 mg/L	0.16 mg/L
5	Nickel	0.25 mg/L	0.38 mg/L	0.50 mg/L
6	Zinc	0.40 mg/L	0.60 mg/L	0.80 mg/L
7	Suspended Solids	15.00 mg/L	22.50 mg/L	30.00 mg/L
8	Radium 226	0.37 Bq/L	0.74 Bq/L	1.11 Bq/L
9	Un-ionized ammonia	0.50 mg/L expressed as nitrogen (N)	Not applicable	1.00 mg/L expressed as nitrogen (N)

TABLEAU 1

	Colonne 1	Colonne 2	Colonne 3	Colonne 4
Article	Substance nocive	Concentration moyenne mensuelle maximale permise	Concentration maximale permise dans un échantillon composite	Concentration maximale permise dans un échantillon instantané
1	Arsenic	0,10 mg/L	0,15 mg/L	0,20 mg/L
2	Cuivre	0,10 mg/L	0,15 mg/L	0,20 mg/L
3	Cyanure	0,50 mg/L	0,75 mg/L	1,00 mg/L
4	Plomb	0,08 mg/L	0,12 mg/L	0,16 mg/L
5	Nickel	0,25 mg/L	0,38 mg/L	0,50 mg/L
6	Zinc	0,40 mg/L	0,60 mg/L	0,80 mg/L
7	Matières en suspension	15,00 mg/L	22,50 mg/L	30,00 mg/L
8	Radium 226	0,37 Bq/L	0,74 Bq/L	1,11 Bq/L
9	Ammoniac non ionisé	0,50 mg/L sous forme d'azote (N)	Sans objet	1,00 mg/L sous forme d'azote (N)

NOTE: The concentrations for items 1 to 8 are total values.

NOTE : Les concentrations pour les articles 1 à 8 sont des valeurs totales.

TABLE 2

	Column 1	Column 2	Column 3	Column 4
Item	Deleterious Substance	Maximum Authorized Monthly Mean Concentration	Maximum Authorized Concentration in a Composite Sample	Maximum Authorized Concentration in a Grab Sample
1	Arsenic	0.30 mg/L	0.45 mg/L	0.60 mg/L
2	Copper	0.30 mg/L	0.45 mg/L	0.60 mg/L
3	Cyanide	0.50 mg/L	0.75 mg/L	1.00 mg/L
4	Lead	0.10 mg/L	0.15 mg/L	0.20 mg/L

Item	Column 1 Deleterious Substance	Column 2 Maximum Authorized Monthly Mean Concentration	Column 3 Maximum Authorized Concentration in a Composite Sample	Column 4 Maximum Authorized Concentration in a Grab Sample
5	Nickel	0.50 mg/L	0.75 mg/L	1.00 mg/L
6	Zinc	0.50 mg/L	0.75 mg/L	1.00 mg/L
7	Suspended Solids	15.00 mg/L	22.50 mg/L	30.00 mg/L
8	Radium 226	0.37 Bq/L	0.74 Bq/L	1.11 Bq/L
9	Un-ionized ammonia	0.50 mg/L expressed as nitrogen (N)	Not applicable	1.00 mg/L expressed as nitrogen (N)

TABLEAU 2

Article	Colonne 1 Substance nocive	Colonne 2 Concentration moyenne mensuelle maximale permise	Colonne 3 Concentration maximale permise dans un échantillon composite	Colonne 4 Concentration maximale permise dans un échantillon instantané
1	Arsenic	0,30 mg/L	0,45 mg/L	0,60 mg/L
2	Cuivre	0,30 mg/L	0,45 mg/L	0,60 mg/L
3	Cyanure	0,50 mg/L	0,75 mg/L	1,00 mg/L
4	Plomb	0,10 mg/L	0,15 mg/L	0,20 mg/L
5	Nickel	0,50 mg/L	0,75 mg/L	1,00 mg/L
6	Zinc	0,50 mg/L	0,75 mg/L	1,00 mg/L
7	Matières en suspension	15,00 mg/L	22,50 mg/L	30,00 mg/L
8	Radium 226	0,37 Bq/L	0,74 Bq/L	1,11 Bq/L
9	Ammoniac non ionisé	0,50 mg/L sous forme d'azote (N)	Sans objet	1,00 mg/L sous forme d'azote (N)

NOTE: The concentrations for items 1 to 8 are total values.

NOTE : Les concentrations pour les articles 1 à 8 sont des valeurs totales.

— SOR/2018-99, ss. 33(2), (3)

33 (2) Schedule 5 to the Regulations is amended by replacing the references after the heading "Schedule 5" with the following:

(Subsections 7(1) and (3), subparagraphs 15(1)(a)(i) and (b)(i) and paragraph 32(1)(c))

(3) Subsection 4(1) of Schedule 5 to the Regulations is amended by adding "and" at the end of paragraph (n), by striking out "and" at the end of paragraph (o) and by repealing paragraph (p).

— DORS/2018-99, par. 33(2) et(3)

33 (2) Les renvois qui suivent le titre « Annexe 5 », à l'annexe 5 du même règlement, sont remplacés par ce qui suit :

(paragraphes 7(1) et (3), sous-alinéas 15(1)a)(i) et b)(i) et alinéa 32(1)c))

(3) L'alinéa 4(1)p) de l'annexe 5 du même règlement est abrogé.

— SOR/2018-99, s. 34(1)

34 (1) Part 2 of Schedule 6 to the Regulations is replaced by the following:

PART 2

Test Results Respecting Each Final Discharge Point

1 Complete the following table with the monthly mean concentration for the deleterious substances set out in the table for each final discharge point and identify the location of the final discharge point.

2 Any measurement not taken because there was no deposit from the final discharge point shall be identified by the letters "NDEP" (No Deposit).

3 Any measurement not taken because no measurement was required in accordance with the conditions set out in section 12 or 13 of these Regulations shall be identified by the letters "NMR" (No Measurement Required).

— DORS/2018-99, par. 34(1)

34 (1) La partie 2 de l'annexe 6 du même règlement est remplacée par ce qui suit :

PARTIE 2

Résultats des essais à chacun des points de rejet final

1 Remplir le tableau suivant pour chaque point de rejet final, identifier son emplacement et indiquer la moyenne mensuelle de la concentration des substances nocives.

2 S'il n'y a pas eu de résultats parce qu'il n'y avait pas de rejet à partir du point de rejet final, inscrire « A.R. » (aucun rejet).

3 S'il n'y a pas eu de mesure parce que l'article 12 ou 13 du présent règlement n'en exigeait aucune, inscrire « A.M.E. » (aucune mesure exigée).

Location of final discharge point:												
Month	As (mg/L)	Cu (mg/L)	CN (mg/L)	Pb (mg/L)	Ni (mg/L)	Zn (mg/L)	SS (mg/L)	Ra 226 (Bq/L)	Un-ionized ammonia (mg/L, expressed as Nitrogen (N))	Lowest pH	Highest pH	Effluent Volume (m^3)
Jan.												
Feb.												
Mar.												
Apr.												
May												
June												
July												
Aug.												
Sept.												
Oct.												
Nov.												
Dec.												

Emplacement du point de rejet final :												
Mois	As (mg/L)	Cu (mg/L)	CN (mg/L)	Pb (mg/L)	Ni (mg/L)	Zn (mg/L)	SS (mg/L)	Ra 226 (Bq/L)	Ammoniac non ionisé (mg/L sous forme d'azote (N))	pH le plus bas	pH le plus haut	Volume d'effluent (m^3)
Janv.												
Févr.												
Mars												
Avr.												
Mai												
Juin												
Juil.												
Août												
Sept.												
Oct.												
Nov.												
Déc.												

— SOR/2018-99, s. 34(3)

34 (3) Part 3 of Schedule 6 to the Regulations is replaced by the following:

— DORS/2018-99, par. 34(3)

34 (3) La partie 3 de l'annexe 6 du même règlement est remplacée par ce qui suit :

PART 3

Results of Acute Lethality Tests

Location of final discharge point:			
Date Sample Collected	Results for Rainbow Trout Acute Lethality Tests (mean percentage mortality in 100% effluent test concentration)	Results for *Daphnia magna* Acute Lethality Tests (mean percentage mortality in 100% effluent test concentration)	Results for Threespine Stickleback Acute Lethality Tests (mean percentage mortality in 100% effluent test concentration)

PARTIE 3

Résultats des essais de détermination de la létalité aiguë

Emplacement du point de rejet final :			
Date du prélèvement de l'échantillon	Résultats des essais de détermination de la létalité aiguë sur la truite arc-en-ciel (pourcentage moyen de mortalité dans l'effluent non dilué)	Résultats des essais de détermination de la létalité aiguë sur la *Daphnia magna* (pourcentage moyen de mortalité dans l'effluent non dilué)	Résultats des essais de détermination de la létalité aiguë sur l'épinoche à trois épines (pourcentage moyen de mortalité dans l'effluent non dilué)

APPENDIX C
EMERGENCY RESPONSE TRUCK INVENTORY

Baffinland

Rescue EMG-005

Equipment checklist **Date:** **Time:** **Inspector:**

N/A - Not Applicable

Compartment	Items		Yes	Condition	Full	Empty	Tested	Comments
Cabin		**Sat Phone**						**Check Battery level**
	1	Safety Glasses clear box						
	1	Safety glasses Darks box						
	1	Binoculars						
	1	Rolls of duck tape						
	2	Care Flare						
	1	Emergency Road kit						
	1	First Aid kit						
	1	Thermal Imaging Camera						**Change with spare battery**
	4	Eyewash						
	1	10 pound fire extinguisher						
1 Left Compartment	**7**	5 Delta Air, 2 Scott 2.2						
	17	SCBA Cylinder						
	21	SCBA face Masks (straps extended)						
	1	Piercing Nozzle with Shut Off						
	1	Red Rope (coil)						
	1	Rit Pack						
	10	Banks Pelican flashlights						
2 Left Compartment	**1**	Step Ladder						
	1	Skill Saw, 1 blade						
	1	Cable Power Puller						
	1	Saws all (reciprocating saw)						
	1	Saws all Blades (kits)						
	3	Drill Bits set						
	1	Cordless drill						
	1	Tape measure						
	1	Socket Set						9mm socket missing
	1	Wrench Set (in tool box)						
	2	Boxes of 30' socks						
	1	roll mech wire						
	1	Tool Box with assorted tools						
	1	Large Bolt Cutters						
	3	Battery Charger						
	8	Batteries Dewalt						
	2	Battery Milwakee						
	1	Charger & battery TIC						
	1	Safety Glasses (box) Assorted						
	1	Small Axe						
	1	Small Bolt Cutters						
	1	Haligan Bar						
	2	Axe						
	2	Pick Head Axe						
	1	Fire Pole						
	1	Steel Jerry can (gas)						
	1	Plastic Jerry Can (gas)						
	1	portable Fan						**Start and run for 5 min**
	1	Yellow rope (spool)						
		Miscellaneous Oils						
	2	Chop Saw Blade						
	1	Power pack for Jaws of Life						**Start and run for 5 min**
	1	Chain Saw chain						
	1	Duck Tape						
	1	Red Cordless Drill/Charger/Batteries						
3 Left Compartment	**1**	Portable Fan (electric)						
	2	Tarps						
	3	Ratchet Straps						
	1	Air Hammer						
	1	20 ton bottle jack						
	3	Hurst Tool Hose						

	1	Spreader						
	1	Cutter						
	1	Combi Tool						
	1	Ram						
	1	Gloves						
	1	Regulator Assembly						
	2	Air Hoses						
	1	32" Air bag						
	1	13" Air Bag						
	1	1/2 air impact						
	1	80 ton Air bag						
	2	Grizzly Struts						
		Assorted Cribbing						
4 Left Compartment	2	1.5 inch hose (yellow)						
	4	1.5 inch hose (red)						
	3	2.5 inch hose (white)						
	4	2.5 inch hose (red)						
	6	Mustang suits						
	1	Spanners						
	4	1.5 inch nozzle						
	1	3 inch adapter 2.5"						
	1	1.5" plastic Nozzle						
	2	10 lbs. extinguisher						
	1	6" connector pipe for portatanks						
	1	Rolligliss 550						
		Wood (cribbing)						
	1	Chainsaw						**Start and run for 5 min**
	1	Rescue Saw						**Start and run for 5 min**
	2	20lbs fire extinguisher						
5 Left Compartment	6	Exo Fit harness						
	1	Rollglis R 550						
	6	Self Inflatable Life vests						
	4	Boots (pairs) (Hip waiters)						
	3	Rescue rope (200 foot bags)						
	1	Tripod straps and pullies (bag)Top of ARFF						
	4	Climbing harness						
	3	Petzl AVAO Harness						
	1	Edge covers (bag)						
	8	Rock climbing helmet						
	1	Rescue ring						
	1	Life jackets (bag) of 4						
	9	Air horn						
	1	Kovak Ice drillkit						
	1	Bag assorted webbing straps						
	2	Mini 4:1						
	3	Bags of Caribiner						
	1	Bag Prusick						
	1	Pelican case Assorted High angle rescue gear						
	2	Assender kits						
	4	Pylons						
	2	Beam Clamps						
	1	Rope Launcher						
	2	400' rope bags						
	2	Confined space SCBA (Black case						
	5	6' lanyard						
	2	Telescopic reach pole						
1 Right Compartment	16	Orange blankets						
	1	Kendrick Extrication Device (KED)						
	8	Folding stretchers						
	1	White plastic rigid Leg splint						
	8	Safety vests						
	4	Misc. rigid splints (sets) (orange bag)						
	1	6 Bank Radio Charger (5 batterys)						
	1	Ferno Stair chair						
	2	Spider Straps						
	1	Burn kit						
	2	Neck brace						
	5	Quick connect straps (back board)						
	3	Trauma bag (red)						**Check Expiry Data (Burn Kits, Sterile water)**
	4	CID blocks (orange)						
	2	Flashlights (Box) MAG lites						
	1	Incident Command Board						

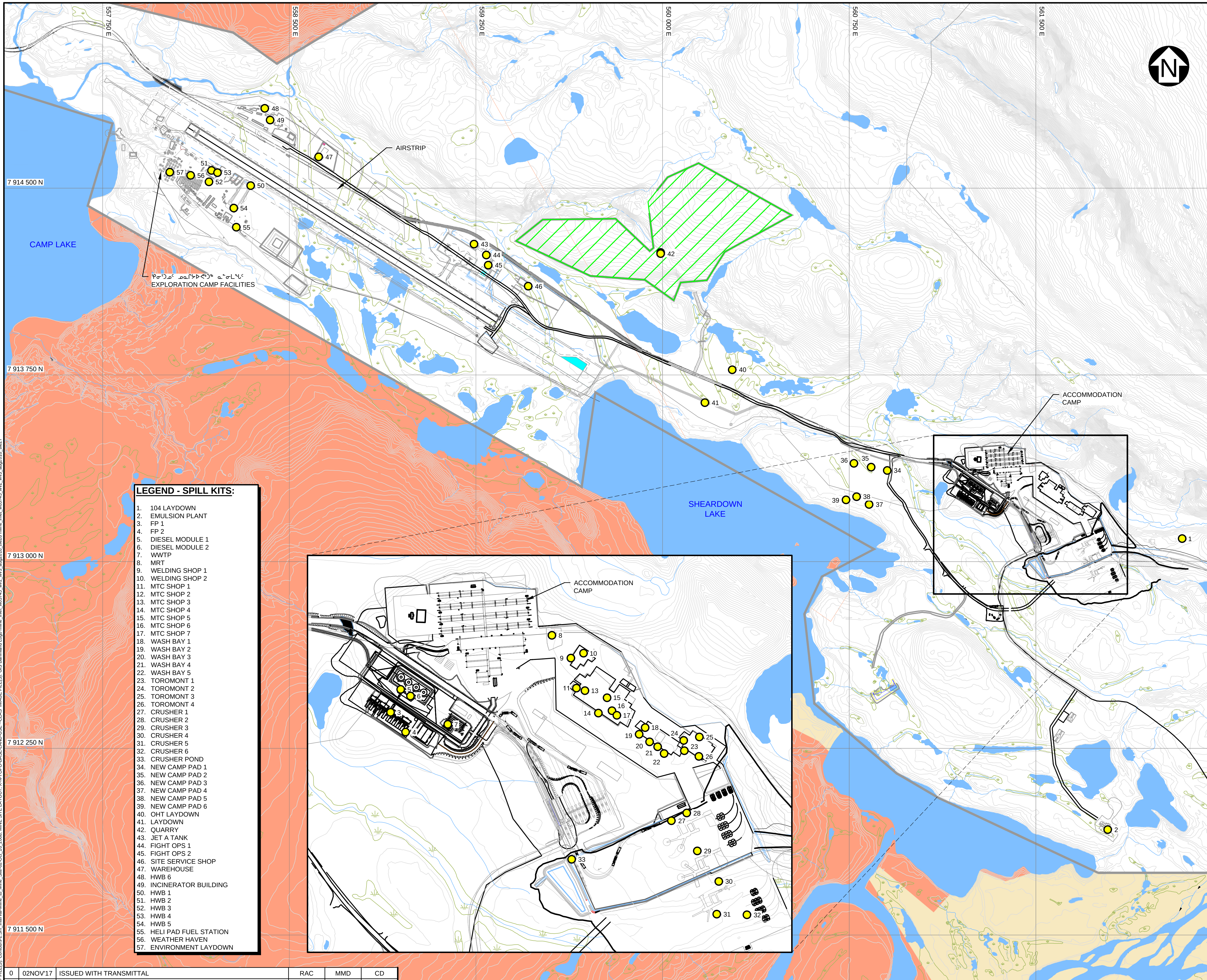
	3	Roll Caution tape						
	3	Roll Danger tape						
	1	SKED						
	1	SCBA Mask cleaning wipes						
	1	Bag stretcher cover						
	1	Nutragrain bars						
	2	Basket Stretcher kits (complete)						
2 Right Compartment	**1**	Empty Cube Totes						
	1	6" tube for portable tank						
		Diaphragm pump (Hoses)						
3 Right Compartment	**3**	Quatrex bags (white)						
	2	Lithium fire extinguisher						
	2	Magnesium fire extinguisher						
	4	Grey spill pads						
	4	12x 18 tarp						
	2	Boxes of 30' sock						
	2	Backboard						
	1	Water bottle/sleeve cups						
	9	coveralls						
	1	4 white spill pads						
4 Right Compartment	**1**	1000 VSG Bladder						
	1	5000 VSG Bladder						
	1	15000 VSG Bladder						
	5	Quatrex bags (black)						
	3	Bladder repair kits						
	1	4X4 duck pond						
	2	Box 30' spill boom						
	3	Bladder fitting kit						
5 Right Compartment	**1**	Spade						
	2	Mass Casualty Kits						**Check Expiry Data (Burn Kits, Sterile water)**
	2	Rake						
	1	Push broom						
	2	Shovel (square head)						
	2	Chicken wire (roll)						
	12	Long gloves (pair)						
	6	Extension cord						
	1	Honda GX 270 trash pump						**Start and run for 5 min**
	1	3 inch flat hose						
	3	Tyvek coveralls (box)						
	1	Funnel						
	1	Gap seal; 20 L bucket (plug agent)						
	1	Scoop						
	3	3 inch x 10 foot spill booms (box)						
	4	Cones						
	2	Dumpster liners						
	1	Box of Garbage bags						
	3	Spill pads white						
	1	Honda generator						**Start and run for 5 min**
	4	spill pads Grey						

MRT Emergency Response Truck

Right Side:

Left Side:

APPENDIX D
MINE SITE SPILL KIT INVENTORY AND LOCATIONS



557 750 E
558 500 E
559 250 E
560 000 E
560 750 E
561 500 E
7 914 500 N
7 913 750 N
7 913 000 N
7 912 250 N
7 911 500 N
AIRSTRIP
CAMP LAKE
EXPLORATION CAMP FACILITIES
SHEARDOWN LAKE
ACCOMMODATION CAMP
LEGEND - SPILL KITS:
1. 104 LAYDOWN
2. EMULSION PLANT
3. FP 1
4. FP 2
5. DIESEL MODULE 1
6. DIESEL MODULE 2
7. WWTP
8. MRT
9. WELDING SHOP 1
10. WELDING SHOP 2
11. MTC SHOP 1
12. MTC SHOP 2
13. MTC SHOP 3
14. MTC SHOP 4
15. MTC SHOP 5
16. MTC SHOP 6
17. MTC SHOP 7
18. WASH BAY 1
19. WASH BAY 2
20. WASH BAY 3
21. WASH BAY 4
22. WASH BAY 5
23. TOROMONT 1
24. TOROMONT 2
25. TOROMONT 3
26. TOROMONT 4
27. CRUSHER 1
28. CRUSHER 2
29. CRUSHER 3
30. CRUSHER 4
31. CRUSHER 5
32. CRUSHER 6
33. CRUSHER POND
34. NEW CAMP PAD 1
35. NEW CAMP PAD 2
36. NEW CAMP PAD 3
37. NEW CAMP PAD 4
38. NEW CAMP PAD 5
39. NEW CAMP PAD 6
40. OHT LAYDOWN
41. LAYDOWN
42. QUARRY
43. JET A TANK
44. FIGHT OPS 1
45. FIGHT OPS 2
46. SITE SERVICE SHOP
47. WAREHOUSE
48. HWB 6
49. INCINERATOR BUILDING
50. HWB 1
51. HWB 2
52. HWB 3
53. HWB 4
54. HWB 5
55. HELI PAD FUEL STATION
56. WEATHER HAVEN
57. ENVIRONMENT LAYDOWN

LEGEND:

- INUIT OWNED LAND - SURFACE ONLY EXCLUDING MINERALS
- INUIT OWNED LAND - SURFACE AND SUBSURFACE INCLUDING MINERALS
- WATER
- QUARRY AREA (EXISTING UNDER Q13C301)
- RIVER/STREAM/DRAINAGE
- ROAD
- QIA SURFACE COMMERCIAL LEASE BOUNDARY
- SPILL KIT LOCATION

NOTES:

1. COORDINATE GRID IS UTM NAD83 ZONE 17N.
2. TOPOGRAPHY PROVIDED BY EAGLE MAPPING (2005).
3. PLAN BASED ON INFORMATION PROVIDED BY HATCH, DATED JAN 13, 2015, AND 2017.
4. CONTOUR INTERVAL IS 2.5 METRES.

SCALE A 150 75 0 250 500 750 m

Baffinland

MARY RIVER PROJECT

MINE SITE SPILL KIT LOCATIONS

Knight Piésold CONSULTING

P/A NO.	REF NO.
NB102-181/41	NB17-00729

FIGURE 2 — REV 0

REV	DATE	DESCRIPTION	DESIGNED	DRAWN	REVIEWED
0	02NOV'17	ISSUED WITH TRANSMITTAL	RAC	MMD	CD

SAVED: I:\102\00181\41\A\Acad\FIGS\B11_r0, 11/2/2017 3:09:41 PM, MDEMERS, PRINTED: 11/2/2017 3:13:13 PM, PLAN, MDEMERS

Inventory of Typical Spill Kits	
Amount	**Description**
1	30 Gallon Drum with Lid
50	Sorbent Pads
4	Sorbent Socks
2	Sorbent Booms
1	Shaker of Safety Sorb
1	Neoprene Drain Cover
1	Disposable Bag
2 Pair	Safety Goggles
2 Pair	Nitrile Gloves

* Best efforts are made to ensure spill kits remain fully stocked at their designated locations.

APPENDIX E
NT-NU SPILL REPORT FORM

NT-NU SPILL REPORT

OIL, GASOLINE, CHEMICALS AND OTHER HAZARDOUS MATERIALS

NT-NU 24-HOUR SPILL REPORT LINE
TEL: (867) 920-8130
FAX: (867) 873-6924
EMAIL: spills@gov.nt.ca

REPORT LINE USE ONLY

A	REPORT DATE: MONTH – DAY – YEAR	REPORT TIME	☐ ORIGINAL SPILL REPORT, OR ☐ UPDATE # _____ TO THE ORIGINAL SPILL REPORT	REPORT NUMBER ____-_____
B	OCCURRENCE DATE: MONTH – DAY – YEAR	OCCURRENCE TIME		

C	LAND USE PERMIT NUMBER (IF APPLICABLE)	WATER LICENCE NUMBER (IF APPLICABLE)
D	GEOGRAPHIC PLACE NAME OR DISTANCE AND DIRECTION FROM NAMED LOCATION	REGION ☐ NWT ☐ NUNAVUT ☐ ADJACENT JURISDICTION OR OCEAN
E	LATITUDE DEGREES MINUTES SECONDS	LONGITUDE DEGREES MINUTES SECONDS

F	RESPONSIBLE PARTY OR VESSEL NAME	RESPONSIBLE PARTY ADDRESS OR OFFICE LOCATION	
G	ANY CONTRACTOR INVOLVED	CONTRACTOR ADDRESS OR OFFICE LOCATION	
H	PRODUCT SPILLED	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES	U.N. NUMBER
	SECOND PRODUCT SPILLED (IF APPLICABLE)	QUANTITY IN LITRES, KILOGRAMS OR CUBIC METRES	U.N. NUMBER
I	SPILL SOURCE	SPILL CAUSE	AREA OF CONTAMINATION IN SQUARE METRES
J	FACTORS AFFECTING SPILL OR RECOVERY	DESCRIBE ANY ASSISTANCE REQUIRED	HAZARDS TO PERSONS, PROPERTY OR ENVIRONMENT
K	ADDITIONAL INFORMATION, COMMENTS, ACTIONS PROPOSED OR TAKEN TO CONTAIN, RECOVER OR DISPOSE OF SPILLED PRODUCT AND CONTAMINATED MATERIALS		

L	REPORTED TO SPILL LINE BY	POSITION	EMPLOYER	LOCATION CALLING FROM	TELEPHONE
M	ANY ALTERNATE CONTACT	POSITION	EMPLOYER	ALTERNATE CONTACT LOCATION	ALTERNATE TELEPHONE

REPORT LINE USE ONLY

N	RECEIVED AT SPILL LINE BY	POSITION STATION OPERATOR	EMPLOYER	LOCATION CALLED YELLOWKNIFE, NT	REPORT LINE NUMBER (867) 920-8130

LEAD AGENCY ☐ EC ☐ CCG ☐ GNWT ☐ GN ☐ ILA ☐ INAC ☐ NEB ☐ TC | SIGNIFICANCE ☐ MINOR ☐ MAJOR ☐ UNKNOWN | FILE STATUS ☐ OPEN ☐ CLOSED

AGENCY	CONTACT NAME	CONTACT TIME	REMARKS
LEAD AGENCY			
FIRST SUPPORT AGENCY			
SECOND SUPPORT AGENCY			
THIRD SUPPORT AGENCY			

APPENDIX F
WASTE POND WATER TREATMENT PLANT OPERATIONS

Baffinland Iron Mines Corporation

Waste Pond Water Treatment Plant Operations

Rev 1.0

Prepared By: Chet Fong
Department: Mine Operations
Title: Senior Mining Engineer
Date: 17/08/2018
Signature:

Approved By: Simon Fleury
Department: Mine Operations
Title: Mine Manager
Date: 17/08/2018
Signature: Simon L. Fleury

DOCUMENT REVISION RECORD

Issue Date MM/DD/YY	Revision	Prepared By	Approved By	Issue Purpose
08/17/18	V1.0	CF		Initial

TABLE OF CONTENTS

1 PURPOSE

This document outlines the basic procedure to safely operate the Water Treatment Plant

2 SCOPE

This document will cover the basic operations of the plant, including start up and shut down, monitoring, treatment, and emergency protocols and procedures for at risk activities at the Water Treatment Plant.

2.1 EXEMPTIONS

This document does not include instructions related to water treatment, which can be found in the plant Operations and Maintenance Manual.

3 RESPONSIBILITES

Any visitor shall request permission to the plant operator prior to entering the work area. In the absence of an operator, permission shall be requested to the mine supervisor.

The Plant operator shall ensure that everyone working in the plant wears the requisite PPE according to the activities being performed (e.g. chemical handling).

4 PROCEDURES

The information in this section is intended as a summary of plant operations. In the case of a discrepancy between this document and the Operations and Maintenance Manual, the latter will take precedence.

For full details on design and plant operation, refer to the operator's manual. In standard operations, the WTP is intended to draw water from the Waste Dump Pond and treat the intake water in 3 steps inside the WTP structure. The water is then discharged to a Geotube Settling Pond, where a fourth treatment step of settlement will occur, before water is either discharged into the environment or, if not compliant, recirculated back to the Waste Dump Pond.

The three steps of treatment involve the injection of chemical into temporary storage tanks.

- Step 1 – Iron Precipitation
- Step 2 – Hydroxide Precipitation and pH Adjustment

- Step 3 – Flocculation
- Step 4 - Filtration

Steps 1-3 occur inside the WTP structure, with the 4th step taking place in the Geotube Settling Pond.

4.1 PLANT OPERATIONS

Plant operations consists primarily of managing flow, dosage and water levels across the pond, sump, and tanks. Flow is managed with a combination of control panel adjustments and manual valve manipulations.

The plant consists of the following components:

1. Intake Pump – pulls water from the Waste Dump Pond into the WTP
2. Onion tanks – water is stored for treatment prior to discharge. There are two trains, which can be run independently or concurrently.
3. Control panel – use to remotely manage pumps – can be set for automatic and manual operations
4. Dosing pumps – use to inject chemical into onion tanks at a fixed rate
5. Dosing tanks – mixing tanks from which chemicals (Lime, Polymer) is depleted at a configurable rate
6. Transfer pumps – used to take treated water from the plant out to the Geotube Pond
7. Geotube Pond – discharge from the plant is deposited here for particulate settlement prior to final discharge.
8. Discharge pump – used to pull treated water from the Geotube Pond to either be discharged into the environment or recirculated back to the Waste Dump Pond.
9. Blower motors – used to agitate water in onion tanks during treatment to ensure more even dispersion of chemicals.

Once the Plant is operational, the operator will commence with monitoring the measured levels of pH and suspended solids with built in instrumentations and gauges. These readings may be corroborated with manual instrumentations such as a YSI meter.

When readings indicate pH readings at the desired values, the operator shall then initiate discharging of water into the Geotube Pond. This water is allowed to percolate through the Geotube, which catches particulates as a filter. Once in the Sump, where any remaining particulates are then captured and settle into the bottom of the pond.

Water is discharged from this Geotube Pond, either directly into the environment or back into the Waste Dump Pond. The maximum flow rate for these discharging is 1200 gal/min, this limit imposed by the flowmeter installed.

At design capacity, the intake pump(s) should be able to pull water into the WTP for treatment at an equal rate to the discharge pump. The plant effectively runs continuously with dosing in-stream.

4.2 Plant Start up

The following steps should be undertaken when starting up the WTP.

1. Ensure blower motors are activated.
2. Ensure all the Valves to the Geotube Sump are open.
3. Ensure the transfer pumps are switched to automatic
4. Check that all the intake valves are open
5. Keep valves open between tanks on each train
6. Start up intake pump and adjust pressure accordingly. To do this, adjust the following:
    a. Rpm of the pump
    b. Valve openings
7. Start Ferric Sulphate Dosing system. Ensure intake is in the Ferric Sulphate barrels, and there are no leaks present. Pumps should be activated.
8. Start Lime Dosing system. Dosing pumps should be activated.
9. Start up Polymer Dosing System. Dosing pumps should be activated

Plant operations can now commence.

4.3 Plant Shut Down

Plant shut down can be undertaken when it is to be unmanned for a longer period of time (eg. More than 2 shifts) within the same system (for winter decommissioning, procedure XXX). To run a plant shut down

1. Shut all intake valves
2. Shut all Ferric Sulphate dosing equipment
3. Shut all Lime dosing equipment
4. shut all Polymer dosing equipment
5. Rinse Lime lines (reference other procedure)

Plant can now be shut down. This procedure can be utilized with the onion tanks full. This should also be done before any interruptions in power due to generator maintenance or other causes.

4.4 Discharging

Discharging be undertaken whenever the plant is running. It is most efficient to run the discharge when there is moderate to high water levels in the Geotube Sump. The intake hose for the Geotube Sump should utilize the ring to ensure that drawn water is from the top of the water surface.

Discharging requires the manual operation of the valves to discharge the water either to the environment or back to the Waste Dump Pond. Readings should also be checked and logged on the flowmeter when discharge begins using the totalizer values.

NOTE: discharge flow rate should be kept below 1200 gal/min, as flow greater than this will not be measureable.

To discharge, the following steps should be undertaken:

1. Ensure enough water to discharge. Water levels should be at least 50 centimetres from the bottom of the sump prior to beginning discharge.
2. Ensure valve on re-circulation line is closed. This will enable the water to discharge into the environment. Where re-circulation is required, close the valve on the discharge line and open the valve on the re-circulation line.
3. If discharging to the environment, check the totalizer reading on the flowmeter prior to discharge. This is not required if re-circulating.
4. On the control panel, Set discharge to "on"
5. While discharging, check discharge pH and Turbidity with sampling tap periodically. Samples can be collected and tested using YSI instrument.
6. When discharging is complete or to be disabled, go to control panel and set discharge to "off"

4.5 CHEMICAL DOSING

Chemical dosing is performed as part of the treatment process. The primary drivers for chemical dosing is:

1. Reduce the pH
2. Reduce the suspended solids

Prior to discharging water back into the environment.

As dosing quantities will vary depending on flow rate and water qualities, refer to user manual for dosing quantities.

Dosing procedures will vary slightly between the stages of treatment. The three stages that require chemical intervention are Ferric Sulphate, Lime, and Polymer.

4.5.1 FERRIC SULPHATE – LIQUID

PPE Required: long chemical resistant gloves, apron, face shield, standard PPE

- Prepare a barrel for dosing by placing the barrel into the duck pond by the ferric sulphate dosing area and removing the top seal.
- Put 2 dosing pumps into 1 barrel (1 per train)
- Switch on dosing pump on the control panel
- On the pump, check frequency and stroke length to ensure dosage is as expected.
- To change barrels, switch off on the dosing pump and change barrel

4.5.2 LIME – BAGS

PPE Required: long chemical resistant gloves, respirator, face shield, respirator, standard PPE

- Fill mixing tank with intake water.
- Check filter on accessory intake water line (dedicated line for filling lime and polymer mixing tanks)
- Open valve on AI water line (fill tank). Fill to required water levels
- Ensure mixer is operating
- Add lime to water

4.5.3 POLYMER – BAGS

PPE Required: standard PPE

- Fill mixing tank with intake water.
- Check filter on accessory intake water line (dedicated line for filling lime and polymer mixing tanks)
- Open valve on AI water line (fill tank). Fill to required water levels
- Ensure mixer is operating
- Add polymer to water

4.6 SYSTEM AUTOMATION

For instruction on System Automation, please refer to the Operations and Maintenance Manual.

4.7 TROUBLE SHOOTING

For issue identification, please refer to the checklists in the Operations and Maintenance Manual.

4.8 ACCIDENT RESPONSE

As the WTP involves the handling of a number of chemicals that may be harmful, precautions must be taken to ensure all personnel who are in the work area are informed of the hazards and the preventative and treatment measures.

4.8.1 RESPONSE EQUIPMENT AVAILABLE

The WTP is equipped with a stationary emergency shower, 2 portable emergency shower stations and eyewash stations (dual purpose), 2 fire extinguishers, and 1 stationary eyewash station.

Additionally, the WTP is equipped with spare PPE, face shields, respirators, chemical resistant gloves, hearing protection, and spill kits.

There are also patch kits for the onion tanks, hose and fitting replacements, tools, and a base station radio available at the WTP.

In the event that an incident occurs that requires emergency response, same basic steps should be immediately undertaken. The following lists some of the possible situations and a brief of the response steps.

4.8.2 SPILLS ON THE GROUND

- Retrieve spill pad kit
- use gloves to handle
- dispose in drum
- Label and dispose.

4.8.3 SPILLS ON PERSON

- Proceed to stationary emergency shower
- Notify secondary operator
- Secondary operator activates pump switch
- Pull handle and rinse for 10 mins
- If unable to proceed to stationary emergency shower, refer to “emergency response procedure”

4.8.4 LIME IN EYES

- If possible, proceed immediately to emergency eyewash station
- Activate emergency eyewash and rinse for 10 mins.
- Repeat if required
- Notify secondary operator
- If unable to proceed to emergency eyewash station, refer to “emergency response procedure”

4.8.5 LIME SPILL

- Retrieve spill pad kit
- use gloves to handle
- dispose in drum
- Label and dispose.

4.9 APPENDICIES

Appendix A – Operations and Maintenance Manual for Mary River Mine Waste Rock Pile Water Treatment Plant

APPENDIX A – OPERATIONS & MAINTENANCE MANUAL FOR MARY RIVER MINE WASTE ROCK PILE WATER TREATMENT PLANT
20180817_v02

OPERATIONS & MAINTENANCE MANUAL FOR MARY RIVER MINE WASTE ROCK PILE WATER TREATMENT PLANT 20180817_v02

Baffinland Iron Mines Corporation

Prepared by:

McCue Engineering Contractors
203-8291 92 Street
Delta, BC
V4G 0A4

Project No. 137-0001

TABLE OF CONTENTS

Page

1.0 INTRODUCTION

This documents outlines the Operations Manual for Baffinland Iron Mine Corporation's (BIM) Mary River Mine Waste Rock Pile water treatment plant (WTP).

2.0 PLANT OVERVIEW

2.1 General Process Description

The WTP employs a process of coagulation, pH adjustment, flocculation, and filtration to treat acid rock surface runoff collected in the pond at the base of the waste rock pile. The objective of the system operation is to treat water to within the parameters outlined in the Metal Mining Effluent Regulations (MMER), as specified to McCue by BIM, and summarized in Table 1.

Table 1: MMER Effluent Limits

Parameter	Unit	Maximum Authorized Monthly Mean Concentration	Maximum Authorized Concentrations in a Composite Sample	Maximum Authorized Concentration in a Grab Sample
Arsenic	mg/L	0.5	0.75	1.00
Copper	mg/L	0.3	0.45	0.60
Cyanide	NTU	1.00	1.50	2.00
Lead	mg/L	0.20	0.30	0.40
Nickel	mg/L	0.50	0.75	1.00
Zinc	mg/L	0.50	0.75	1.00
Total Suspended Solids	mg/L	15.00	22.50	30.00
Radium 226	Bq/L	0.37	0.74	1.11
pH	SU	6-9.5	6-9.5	6-9.5

The treatment steps are described in Section 2.2. Refer to drawings in Appendix A:

2.2 Brief Process Overview

2.2.1 *System Inlet*

Water is collected at an inlet storage pond (P-001) where it is held for treatment. Two diesel powered centrifugal trash pumps (PU-100A/B) are used to transfer water from the storage pond to an equipment enclosure where the WTP is housed.

At the WTP, the flow can be divided into two separate treatment trains (1 and 2), with each train having a flow meter on the inlet line to monitor flow.

Water is directed into two reactor tanks (TA-110 and TA-210) for processing.

2.2.2 *Step 1 – Iron Precipitation*

Ferric sulphate solution is injected into TA-110 and TA-210 to promote coagulation and precipitation of some heavy metals.

As of system commissioning in June 2018, ferric sulphate liquid solution (12% Fe) is used and injected directly into the process. Each process train utilizes an independent chemical pump to introduce chemical into the system.

The WTS also includes a ferric sulphate make down system, including a holding tank and mixer to allow for makeup of solution using dry ferric sulphate.

Each reactor tank includes a pH sensor to provide continuous monitoring of pH.

Each reactor tank is equipped with four air diffusers which supply air to the process and provide continuous mixing so that solids are kept suspended. Each train is supplied air by a dedicated blower.

2.2.3 *Step 2 – Hydroxide Precipitation and pH Adjustment*

Water flows by gravity from TA-110 and TA-210 to TA-120 and TA-220 respectively. Here, hydrated lime is injected into the process to increase pH and aid in further precipitation of some metals through hydroxide precipitation.

Hydrated lime solution is made manually by adding dry hydrated lime and raw influent water to a mixing tank (TA-020). A mixer is run continuously to ensure the hydrated lime slurry does not solidify.

One hydrated lime chemical pump is utilized to dose each reactor tank with chemical. Two motorized valves (MV-120 and MV-220) are used to control the flow of lime to each reactor tank. Each reactor tank includes a pH sensor to provide continuous monitoring of pH.

Each reactor tank is equipped with four air diffusers which supply air to the process and provide continuous mixing so that solids are kept suspended. Each train is supplied air by a dedicated blower.

2.2.4 *Step 3 – Flocculation*

Water flows by gravity from TA-120 and TA-220 to TA-130 and TA-230 respectively. Here, polymer is injected into the process to aid in flocculation of suspended solids prior to filtration.
Polymer solution is made manually by adding dry polymer and raw influent water to a mixing tank (TA-030). A mixer is run continuously to ensure uniformity of the polymer solution.

Two polymer chemical pumps are utilized to provide polymer dosing to each train. Polymer can be dosed directly into each reactor tank, or inline through a static mixer located directly downstream of the reactor tank.

2.2.5 *Step 4 – Filtration*

Water from TA-130 and TA-230 is pumped to a geotube pond via two diesel powered centrifugal trash pumps (PU-200A/B).

Water is directed to a manifold where it can be distributed to two geotube bags for solids filtration. Two additional geotube bags can be deployed in the pond once the currently operating geotube bags have reached capacity. These spare geotubes are currently stored in a warehouse for future use.

Filtered water leaves the geotube bags and is directed to a collection point at the North West corner of the pond. From here, water is pumped via one diesel trash pump (PU-300) to the Mary River discharge point, or recycled back to the inlet pond. A flow meter is installed on the discharge line to Mary River to allow for data logging of flow.

2.3 Major Equipment List

The WTP layout is provided in appendix A. A list of major equipment is provided in Table 2.

Table 2: Major WTP Equipment

Equipment	Description	Qty	Drawing Reference (If Available)
Pond Transfer Pump	Model: Prime Aire PA4A60-404ST Power: Diesel Driven Capacity: 140m3/hr	2	PU-100 A / PU-100 B
Inlet Flow Meter	Model: GF Signet 3-2551-P1-42	2	FT-100 / FT-200
Ferric Reaction Tank	Material: Polyurethane Size: 5.9m W x 1.5 H Capacity: 24,820 Liters	2	TA-110 / TA-210
Lime Reaction Tank	Material: Polyurethane Size: 5.9m W x 1.5 H Capacity: 24,820 Liters	2	TA-120 / TA-220
Polymer Reaction Tank	Material: Polyurethane Size: 5.9m W x 1.5 H Capacity: 24,820 Liters	2	TA-130 / TA-230
Aeration Blowers	Gast R7100A-3 Blower • 208 V / 3 HP / 60 Hz	2	BL-100A / BL-100B
pH Controller and Sensors	Model: Walchem W900 (Controller) Model: Walchem WEL-PHF-NN (Sensors)	1	pH-110/120/210/220
Motorized Ball Valve	Hayward 1” Ball Valve Model: HRSN2	2	MV-120 and MV-220
Level Transmitter	Model: Echosonic 11 LU27	2	LT-130 / LT-230
Bag Filter	Model: FTI830-2P-150-CS-BS-P13-DP Bag Size: 5 Micron	1	FIL-100
Ferric Chemical Pump	Model: Walchem EHE31E1-VC Power: 115 VAC/1hp/60Hz Capacity: 1 LPM @ 105m TDH	2	PU-010A / PU-010B
Lime Chemical Pump	Model: Flowmotion FR25-HR30HR Power: 230V/3hp/60Hz Capacity: 9.5 LPM @ 105 m TDH	1	PU-020
Polymer Chemical Pump	Model: Flowmotion FR25-HR30HR Power: 230V/3hp/60Hz Capacity: 16.5 LPM @ 105 m TDH	2	PU-030A / PU-030B
Ferric Mixing Tank	Material: Polyurethane Size: Ø 1.2m x 1.3m Height	1	TA-010
Lime Mixing Tank	Material: Polyurethane Size: Ø 1.8m x 1.7m Height	1	TA-020
Polymer Mixing Tank	Material: Polyurethane Size: Ø 1.6m x 1.6m Height	1	TA-030
Coarse Bubble Diffusers	Model: Maxair 24” SS	24	-

2.4 System Automation

The system is automated through a main control panel located in the system enclosure. The system P&ID is provided in Appendix A. Operation is outlined in Table 3.

Table 3: Control Panel Automation

Equipment ID	Equipment Description	Control Logic	PID Control Reference	Controls	Panel Indication
PU – 100 A/B	Inlet Pond Pump	Units can be controlled in Hand or in Auto. Pump will turn on in Hand in Auto or in Hand.	-	-	Pump icon will indicate run status
		Pump will turn off if high level is measured in TA-110 or TA-210	LSH-110 / LSH-210	Auto	High level alarm at panel
		Pump will turn off if high level measured in TA-130 or TA-230	LIT-130 / LIT-230	Auto - High level settable at panel	High level alarm at panel
BL-100 A/B	Blower	Units can be controlled in Hand or in Auto Blower will turn on in Auto or in Hand	-	-	Blower icon will indicate run status
		BL-100 A will turn off if low level is measured by LIT-130	LIT-130	Auto – Low level settable at panel	Low level alarm
		BL-100 B will turn off if low level is measured by LIT-230	LIT-230	Auto – Low level settable at panel	Low level alarm
pH-110	pH Sensor	Continuous monitoring of pH	-	-	Display pH on PLC
pH-210	pH Sensor	Continuous monitoring of pH	-	-	Display pH on PLC

pH-210	pH Sensor	If pH>9.5, close MV-120 - Alarm	MV-120	Auto – pH set point settable at panel	Display pH on PLC
pH-220	pH Dosage	If pH>9, close MV-220 - Alarm	MV-220	Auto – pH set point settable at panel	Display pH on PLC
PU-010A	Ferric Pump	Units can be controlled in Hand or in Auto	-	-	Pump icon will indicate run status
		If FIT-100 measures flow, PU-010A energizes.	FIT-100	Auto	Display run status on PLC
PU-010B	Ferric Pump	Units can be controlled in Hand or in Auto	-	-	Pump icon will indicate run status
		If FIT-200 measures flow, PU-010B energizes.	FIT-100	Auto	Display run status on PLC
PU-020	Lime Pump	Units can be controlled in Hand or in Auto	-	-	Pump icon will indicate run status
		Speed Control (1 train only) If pH-120> 8.5, PU-020 will reduce speed. If pH < 8, pump will increase pump speed. If pH is between 8 to 8.5, pump will maintain pump speed.	pH-110 / pH-120	Auto – pH set point adjustable at panel	Display run status on PLC
		Speed Control Disabled If flow is detected by both trains, speed control is disabled.	FIT-100 / FIT-200	Auto	Display run status on PLC
PU-030 A	Polymer Pump	Units can be controlled in Hand or in Auto	-	-	Pump icon will indicate run status

		Polymer pump energizes if PU-200 A is on	PU-200A	-	Display run status on PLC
PU-030 B	Polymer Pump	Units can be controlled in Hand or in Auto	-	-	Pump icon will indicate run status
		Polymer pump energizes if PU-200 B is on	PU-200B	-	Display run status on PLC
PU-200 A	Transfer Pump	Units can be controlled in Hand or in Auto	-	-	Pump icon will indicate run status
		If LT-130 measures < 3', PU-200A off. If LT-130 measures >3', PU-200A on.	LT-130	Auto – Set points adjustable at panel	Pump icon will indicate run status
		If LT-130 measures >4.5', PU-200A off. If LT-130<4.5', PU-200A on.	LT-130	Auto – Set points adjustable at panel	Pump icon will indicate run status
PU-200 B	Transfer Pump	Units can be controlled in Hand or in Auto	-	-	Pump icon will indicate run status
		If LT-230 measures < 3', PU-200B off. If LT-230 measures >3', PU-200B on.	LT-130	Auto – Set points adjustable at panel	Pump icon will indicate run status
		If LT-230 measures >4.5', PU-200B off. If LT-230<4.5', PU-200B on.	LT-130	Auto – Set points adjustable at panel	Pump icon will indicate run status
PU-300	Discharge Pump	Units can be controlled in Hand or in Auto	-	-	Pump icon will indicate run status
		Pump off at LSL-200	LSL-200	-	Level indicator on panel

		Pump on at LSH-200	LSH-200	-	Level indicator on panel
		High Level Alarm at LSHH-200	LSHH-200	-	High Level Alarm
MX-010 /020/030	Mixer	Units can be controlled on/off manually	-	-	-

3.0 GENERAL STARTUP PROCEDURE

3.1 After Dormancy Pre-start-up Procedures

The following steps shall be taken after extended periods of dormancy, prior to general startup of the WTP.

Task	Check
Perform a visual inspection of the system enclosure for signs of water/snow ingress.	.
Inspect hose and pipe for signs of leaks, abrasion, or other physical damage.	☐
Inspect Reactor tanks as follows: • Signs of leaks, abrasion, or other physical damage. • Tank connections for signs of strain or stress. • Make sure that valves at the inlet and outlet are opened.	☐
Inspect Blowers as follows: • Signs of abrasion, or other physical damage on all external accessories such as relief valves, gauges and filters. • Make sure that valves at the inlet and outlet are opened.	☐
Inspect Diesel Pumps as follows: • Signs of leaks, abrasion, or other physical damage. • Check for and tighten loose attaching hardware. • Make sure that valves at the inlet and outlet are opened. • Check oil levels and lubricate as necessary.	☐
Inspect Ferric Sulphate pump as follows • Signs of leaks, abrasion, or other physical damage. • Make sure that valves at the inlet and outlet are opened.	☐
Inspect Hydrated Lime pumps as follows • Signs of leaks, abrasion, or other physical damage. • Inspect condition of internal pump hose. • Make sure that valves at the inlet and outlet are opened.	☐
Inspect Polymer pump as follows: • Signs of leaks, abrasion, or other physical damage. • Inspect condition of internal pump hose. • Make sure that valves at the inlet and outlet are opened.	☐
Inspect Level Transmitter as follows: • Monitor debris and ensure the sensor is level and mounted perpendicular to water level. • Check and roughly compare measurement on the PLC with the real on the field.	☐
Inspect pH sensors as follows: • Monitor debris and deposition of scaling on the transmitter. Perform a cleaning of the sensors as necessary.	☐

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Insect Bag Filter vessel as follows: • Signs of leaks, abrasion, or other physical damage. • Inspect filter bag and replace as necessary	☐
Inspect Inlet Flow Meter as follows: • Signs of leaks, abrasion, or other physical damage. • Inspect flow sensor for scaling. Clean as necessary.	☐
Inspect Geotube Bag as follows: • Ensure inlet connection points are securely attached. • Ensure height of bag does not exceed recommended limits. If so, decommission geotube bag. • Clean geotube surface of sediment and scaling to prevent fouling using a push broom, or gentle pressure washing.	☐

3.2 Commissioning

After pre-start-up procedures are completed, the system can be energized. The following procedure reflects a high level overview of equipment checks to be performed. Detailed instructions can be found in the product specific manuals. Before any mechanical intervention, disconnect the electrical supply.

3.2.1 *Hydrated Lime Pump / Polymer Pump*

Task	Check
Ensure that all protections (cover, cover window, ventilator hood, coupling protection) are in place before operating the pump.	☐
Check the direction of rotation of the pump.	☐
Make sure that valves at the inlet and outlet are opened.	☐
Start the pump by checking its direction of rotation through the cover window.	☐
Check the flow and discharge pressure and adjust rollers if these figures don't match the pump specifications.	☐

IMPORTANT: Ensure lime pump valves remains open during operation. Should valves be left in the closed position, the process line can over pressurize, leading to a rupture of the chemical hose.

3.2.2 *Blowers*

Task	Check
Ensure impeller rotation is correct.	☐
Check filters and inspect for signs of fouling. Replace if necessary.	☐

-

Ambient temperature – Check room and discharge air temperatures. Exhaust air should not exceed 135ºC.	☐
Working pressure and vacuum values – Adjust relief valve pressure or vacuum setting, if needed.	☐
Motor current – Check that the supply current matches recommended current rating on product nameplate.	☐
Electrical overload cutout – Check that the current matches the rating on product nameplate.	☐

3.2.3 *Ferric Pump*

Task	Check
Ensure pump is energized.	☐
Make sure that valves at the inlet and outlet are opened.	☐
Start the pump manually, in order to prime and adjust dosing rates.	☐
Prime the pump. See manual for details.	☐
Adjust dosing according to inlet water flow rate. See below.	☐
Check dosing rate with calibration cylinder.	☐

3.2.4 *Motorized Valve*

Task	Check
Ensure valve is energized.	☐
Ensure valve opens/closes reliably in manual mode:	☐

3.2.5 *Diesel Pumps*

Task	Check
Check fuel level and oil levels in the engine, air compressor, pump bearings and seal housing.	☐
Consult engine operations manual before attempting to start the unit.	☐
Allow pump to prime.	☐
Adjust engine speed to desired output.	☐

3.2.6 *pH Sensors*

Task	Check
Ensure sensor is calibrated.	☐
Ensure the pH reading displayed locally at the Walchem panel is transmitted correctly to PLC.	☐

3.2.7 *Geotube*

Task	Check
Ensure surface is clean of sediment and debris.	☐
Ensure all inlet valve are open.	☐
Ensure height of geotube does not exceed manufacturer recommended limit.	☐

4.0 OPERATION

4.1 General Operating Instructions

Operation of the WTP will consist of ensuring major equipment (blowers, dosing pumps, motorized valves, level transmitters) is running correctly, and ensuring influent/effluent monitoring and sampling are conducted on schedule.

The drivers for pH adjustment and TSS treatment are operation of the Ferric Sulfate, Hydrated Lime and Polymer Pump, along with the proper performance of the aeration blowers and diffusers equipment.

The unit will run manually. During short term dormancy, the unit can be operated in a “Sleep Mode” where the system is run in a re-cycle status using two submersible pumps inside TA-130 and TA-230 to recirculate water from the end of each train to the beginning of each train. Chemical injection is disabled during dormancy, however, the lime mixer should remain on to maintain suspension of the hydrated lime slurry. Blowers will also remain on to ensure suspension of solids within the reactor tanks.

Parameters to be measured and recorded daily include temperature, pH (typical values are between 6.5 and 9), and TSS. The system must be monitored regularly to ensure pH does not drop below the low level set point or raise above the level set point.

The pH reading should be recorded daily. The pH should be cross referenced regularly with a hand held device. Should the pH differ from the hand held reading, the operator should clean the pH electrodes using a 2-5% solution of hydrochloric acid.

System data can be recorded in the spreadsheet provided in Appendix B. Regular daily monitoring of parameters such as pH, temperature, TSS, and Geotube height must be recorded to ensure proper operation.

4.2 Operating Procedure

The following section will outline the step-by-step procedures for operating the treatment system.

4.2.1 *Standard Operation*

Inlet

The inlet pond level should be checked and recorded prior to start up. Two pond pumps can be utilized to transfer raw water to the treatment system. Usage will depend on the volume of treatment required. At low pond levels, one pond pump and one process train can be utilized. At high levels, both pumps can be utilized to increase the treatment volume.

All pump discharge valves must be opened. The pumps (PU-100 A/B) shall be placed in “Hand” at the PLC. This will energize the pumps and begin transfer of water to the treatment system. The pumps will only turn on if a high level is measured by LSH-110/210 or LT-130/230.

Operators must ensure the inlet pond level is monitored, as the pumps do not include a low level shut off.

Ferric Pumps (PU-010 A/B)

Water is transferred from the inlet pond to two reactor tanks (TA-110 and TA-210) where ferric sulphate is injected. The dosage rate of the ferric pumps is determined by the inlet quality of the raw water and can range from 0 to 20 mg/l. The dosage rate is to be determined by the operator.

The dosage rate must be set manually at the pump. Once set, the pump can be set to “Auto” at the control panel. The ferric pumps, PU-010 A and PU-010 B, will energize when flow is detected by FIT-100 and FIT-200 respectively.

Before starting the pumps, all discharge valves must be opened.

Lime Pump (PU-020)

After coagulant addition, water flows by gravity to TA-120 and TA-220 where hydrated lime is injected into the process. The dosage rate of the Lime pump is determined by the inlet quality of raw water and the pH required, and can range from 0 to 300 mg/l. The dosage rate is to be determined by the operator.

In manual mode, the speed of the pump can be set at the pump VFD, located on the lime pump stand.

Pump speed will be dependent on the pH measured by pH-120, and the pH set point entered into the panel (adjustable by an operator). At a setpoint of 8.5, the pump will increase speed if pH-120 measures a pH below 8. If pH-120 measures a pH above 9, pump speed will decrease. If pH is measured between 8 to 8.5, the dosage rate will remain the same.

-

At a pH above 9.5, MV-120 and MV-220 will close.

The lime pump will operate continuously, with chemical consistently recirculated to the lime mixing tank (TA-020). This is done to ensure the lime slurry does not settle and solidify in the piping system. At the end of every shift, clean water must be flushed through the piping in order to prevent fouling. Flushing may be required more frequently depending on operational conditions.

Due to the possibility of fouling, the lime pump system must be monitored for pressure consistently.

Lime Solution Make Up

Hydrated lime solution is made manually, with the solution concentration ranging from 5-10% depending on volume of raw water to be treated. A concentration of 5% is recommended to minimize line fouling caused by the lime slurry. Higher concentrations can be made, but more frequent line flushing will be required.

The lime tank mixer is operated from the panel, and should be operated continuously to prevent the slurry from solidifying.

Polymer Pumps (PU-030 A/B)

The dosage rate of the ferric pumps is determined by the inlet quality and can range from 0 to 3 mg/l.

The dosage rate must be set manually at the pump. Once set, the pump can be set to “Auto” at the control panel. The polymer pumps, PU-020 A and PU-020 B, will energize when the transfer pumps, PU-200 A and PU-200 B are energized.

Before starting the pumps, all discharge valves must be opened.

Polymer Solution Make Up

Polymer solution is made manually, with concentration ranging from 0.1 to 0.25% depending on volume to be treated.

The polymer tank mixer is operated from the panel, and should be kept on at all times to maintain uniformity of the solution.

Blowers

The blowers are operated from the panel, and should be energized at all times when raw water is being processed in the reactor tanks.

Both blowers (BL-100A and BL-100B) can be set in “Auto” at the panel, at which point they will run continuously until the water level in TA-130 and TA-230 is measured to be less than 6”. This level is settable at the panel.

Raw Water Bag Filter

The bag filter provides filtration of water required for chemical makeup. The filter bags should be replaced periodically when differential pressure across the filter exceeds approximately 20 psi.

Geotube Bags

Water is transferred from the final reactor tanks (TA-130 and TA-230) by diesel generated trash pumps (PU-200 A and PU-200 B) to the geotube pond. The transfer pumps, PU-200A and PU-200B are operated based on the level measured by the reactor tank level transmitters, LT-130 and LT-230 respectively. These set points are adjustable at the panel.

The height of the geotube bags must be monitored regularly.

4.3 Daily Operator Checklist

The following steps outline day-to-day operational procedures for the WTS.

Standard Operation

Task	Check
Check inlet pond and record water level	☐
Check lime and polymer solutions, make up additional solution as required.	☐
Place PU-100 A (and PU-100 B if necessary) in Hand mode at the control panel.	☐
Set Ferric Sulphate pump (PU-010 A / B) dose rate and place pump in Auto at control panel. Ensure pump energizes when flow is detected by FIT-100 or FIT-200.	☐
Turn on hydrated lime pump (PU-020 A) manually. Adjust dose rate based on flow measured by inlet flow meters.	☐
Monitor hydrated lime pump pressure gauge. If pressure gauge is showing a pressure greater than 15 psi, flush line with water.	☐
Set polymer pump dose rate at panel. Set in “remote” mode. Set pump to auto at panel. Pump will turn on when PU-200A/B energize.	☐
Set Blowers (BL-100 A / BL-100B) to Hand.	☐
Once onion tanks are full, set PU-200A/B to Auto (if using both trains). Ensure downstream valves to geotube bags are open.	☐

Observe reactor tank water levels to ensure inlet and outlet flows are balanced.	☐
Observe and record height of geotube bags. Height must not exceed 6 feet.	☐
Set PU-300 to auto in the panel. Once the water in the pond reaches the operating float switch, the pump will be energized.	☐
Discharge vales must be set manually to allow for discharge to the creek, or recycle back to the inlet pond. Set valves in correct position.	☐

Daily Shutdown

Task	**Check**
Set inlet pump to Off position	
Allow reactor tanks to be pumped down to ¼ volume.	☐
Turn off chemical pumps.	☐
Flush lime line with water	☐
Keep lime mixer (Mix-020) on to ensure hydrated lime slurry remains in liquid form.	☐
If tanks are lowered, blowers can be turned off. If tanks are kept full, energize recirculation pumps.	☐
Check lime and polymer solutions, make up additional solution if required.	☐
Turn transfer pumps (PU-200 A/B) and discharge diesel pump (PU-300) off.	☐

APPENDIX A –DRAWINGS

NOTES:

PU-200A/B- Transfer Pump
PU-300- Discharge Pump
FT-300- Flow Meter
LS- Level Switch
-LSHH 200
-LSH 200
-LSL 200

Process lines
Instrumentation lines

Process based on conceptual desgin by Golder Associates

REVISION TABLE

No.	DESCRIPTION	DATE
0	Original Issue	2018/04/30
1	Record Drawing	2018/07/31

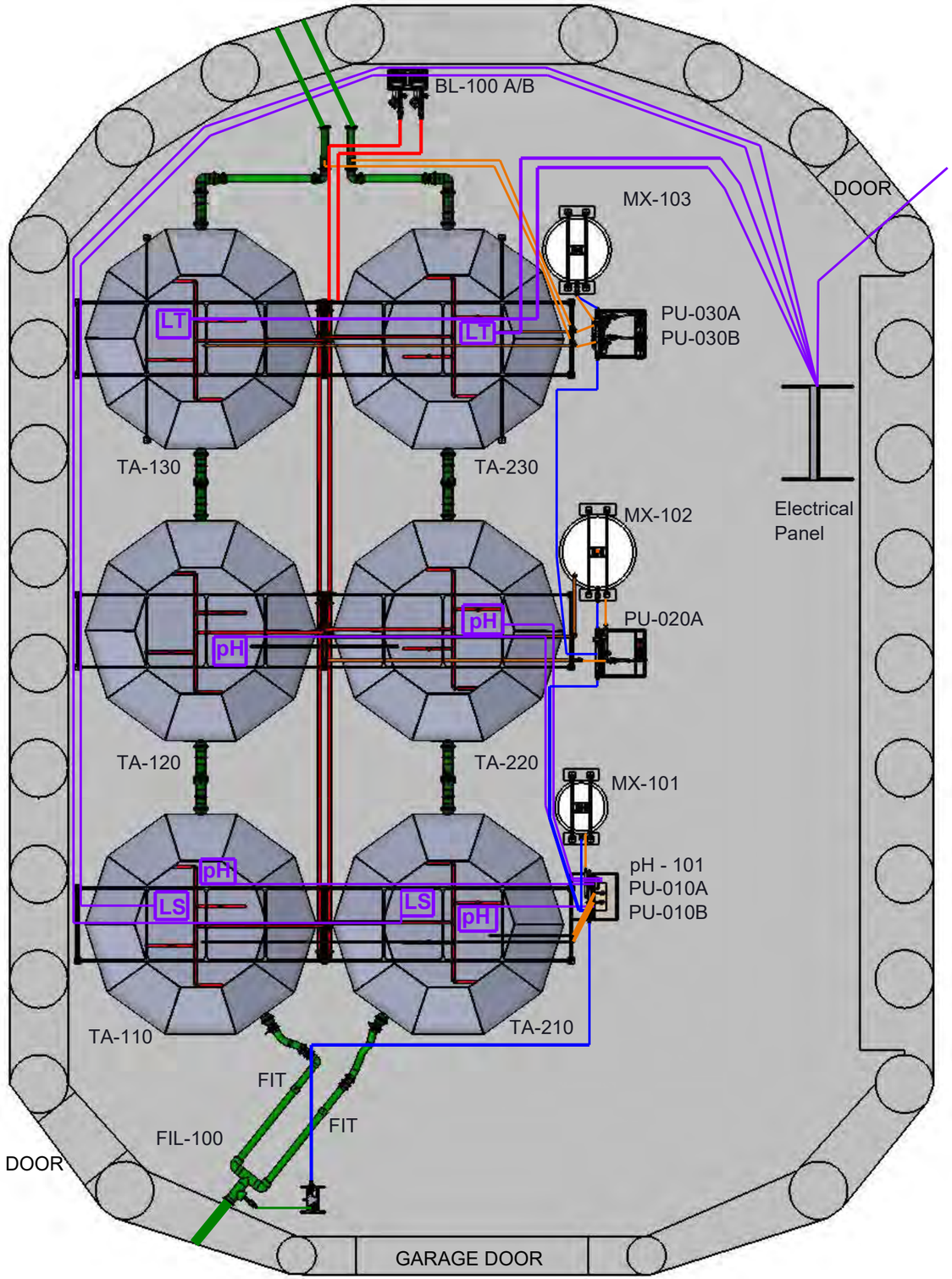
McCUE ENGINEERING CONTRACTORS

CLIENT:

BAFFINLAND IRON MINES CORPORATION

FULL SITE LAYOUT
GENERAL ARRANGEMENT DRAWING
Waste Rock Pile Water Treatment Plant

DATE: July 31, 2018	SCALE: NTS
DATA BY: R.B.	MCCUE JOB NO: 137-0001
DRAWN BY: L.S	FIG: GA-001



LEGEND

BL-100 A/B - Blower
FIL-100 - Bag Filter
MX-101 - Ferric Mixing Station
MX-102 - Lime Mixing Station
MX-103 - Polymer Mixing Station
PU-010 A/B - Ferric Pump
PU-020 - Lime Pump
PU-030 A/B - Polymer Pump
TA-110 - Ferric Process Tank (Train 1)
TA-210 - Ferric Process Tank (Train 2)
TA-120 - Lime Process Tank (Train 1)
TA-220 - Lime Process Tank (Train 2)
TA-130 - Polymer Process Tank (Train 1)
TA-230 - Polymer Process Tank (Train 2)
pH-101 - pH Controller
FIT - Flow Meter
pH - pH Sensor
LS - Level Switch
LT - Level Transmiter

Notes:

- Process Lines
- Water Make-up Lines
- Chemical Lines
- Air Lines
- Instrumentation Line

Process based on conceptual design by Golder Associates

REVISION TABLE		
No.	DESCRIPTION	DATE
0	Original Issue	2018/05/01
1	Record Drawing	2018/08/17

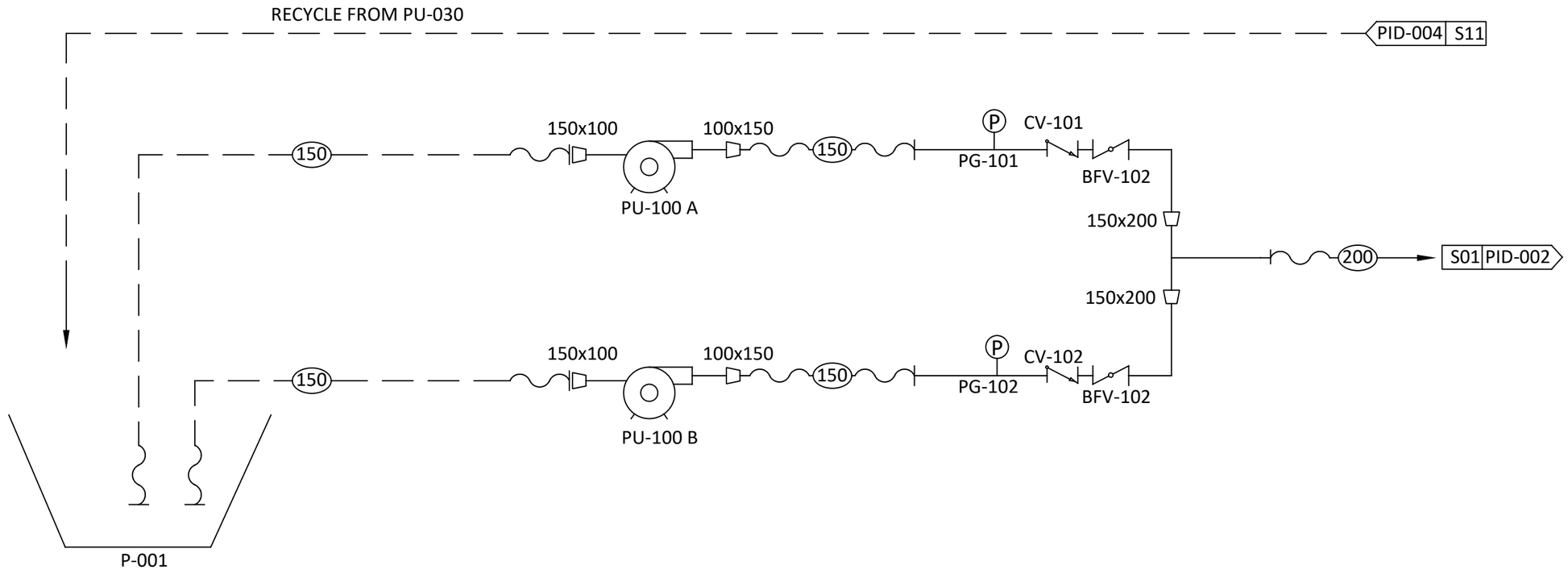
McCUE ENGINEERING CONTRATORS

CLIENT:

BAFFINLAND IRON MINES CORPORATION

BUILDING LAYOUT
GENERAL ARRANGEMENT DRAWING
Waste Rock Pile Water Treatment Plant

DATE: August 17, 2018	SCALE: AS SHOWN
DATA BY: R.B	JOB NO: 137-0001
DRAWN BY: L.S	FIG: GA-002



P-001
Inlet Storage Pond

PU-100 A/B
Pond Transfer Pump
Model: Prime Aire PA4A60-404ST
Power: Diesel Driven
Capacity: 140m³/hr

LEGEND :

- Hose
- Sch. 80 PVC Pipe
- Butterfly Valve
- Check Valve
- Reducer
- Pressure Gauge

Process based on conceptual design by Golder Associates

NO.	REVISION TABLE	DATE
0	Original Issue	April 30, 2018
1	Record Drawing	July 31, 2018

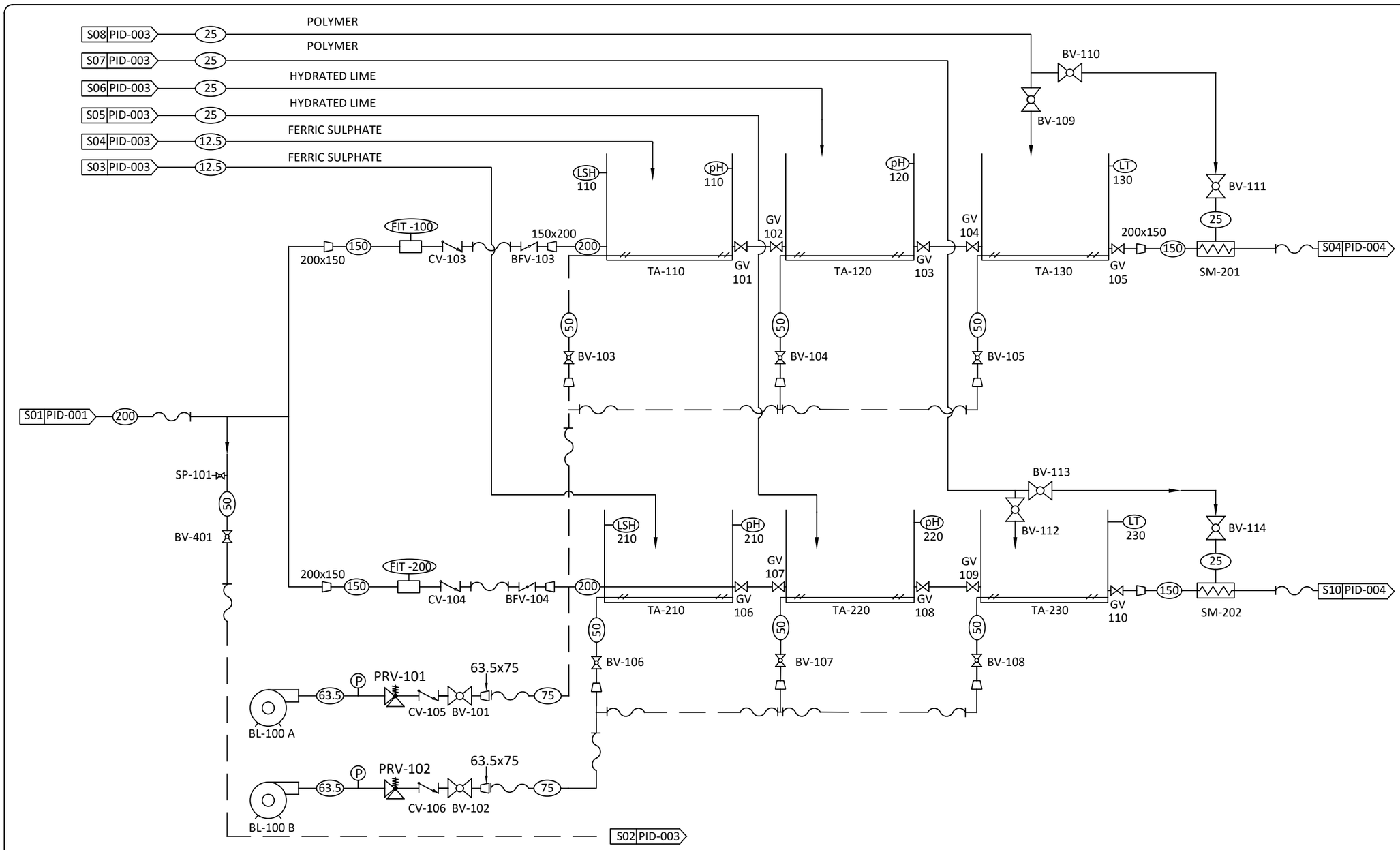
McCUE ENGINEERING CONTRACTORS

CLIENT:

BAFFINLAND IRON MINES CORPORATION

Waste Rock Water Storage Pond
PROCESS & INSTRUMENTATION DIAGRAM
Waste Rock Pile Treatment Plant

DATE: July 31, 2018	SCALE: NTS
DATA BY: R.B.	MCCUE JOB NO: 137-0001
DRAWN BY: M.T.	FIG: PID-0001



BL-100 A/B
Blower
Model: Gast R7100A-3
Power: 208V/3hp/60Hz
Capacity: 500m³/hr @ 1.9m TDH

TA-110/210
Ferric Reaction Tank
Material: Polyurethane
Size: 5.9m W x 1.5 H
Capacity: 24,820 Liters

TA-120/220
Lime Reaction Tank
Material: Polyurethane
Size: 5.9m W x 1.5 H
Capacity: 24,820 Liters

TA-130/230
Polymer Reaction Tank
Material: Polyurethane
Size: 5.9m W x 1.5 H
Capacity: 24,820 Liters

FT-100/200
Influent Flow Meter
Model: GF Signet 3-2551-P1-41

LT-130/230
Level Transmitter
Model: Echosonic 11 LU27

pH-110/120/210/220
pH Meter
Model: Walchem WEL-PHF-NN

LEGEND:

- Hose
- Sch. 80 PVC Pipe
- Butterfly Valve
- Check Valve
- Reducer
- Pressure Gauge
- Static Mixer
- Gate Valve
- Pressure Relief Valve
- Ball Valve
- Sample Port
- Flow Meter
- Level Switch
- pH Sensor
- Level Transmitter

Process based on conceptual design by Golder Associates

NO.	REVISION TABLE	DATE
0	Original Issue	April 30, 2018
1	Record Drawing	July 31, 2018

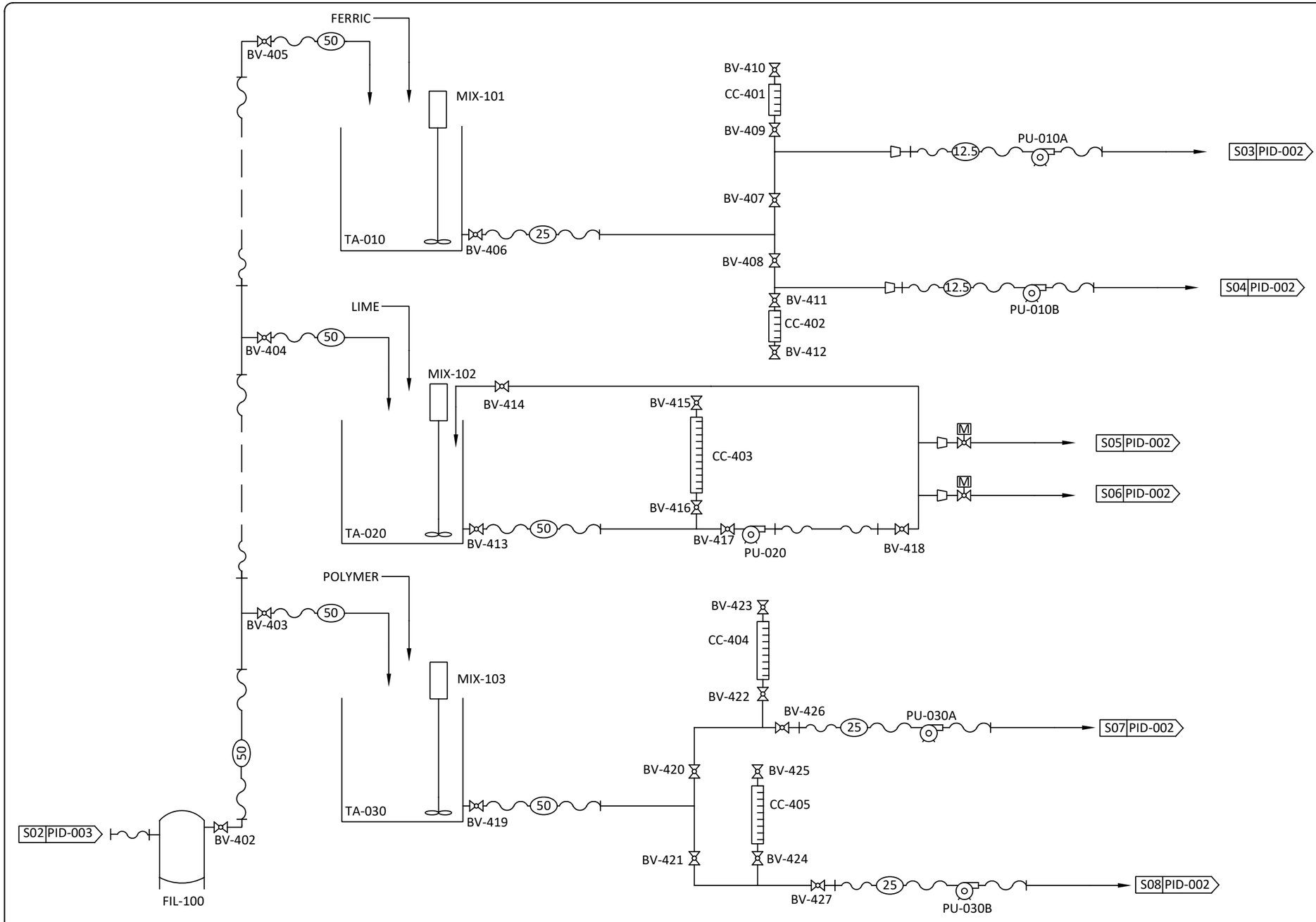
McCUE ENGINEERING CONTRACTORS

CLIENT:

BAFFINLAND IRON MINES CORPORATION

REACTION TANKS
PROCESS & INSTRUMENTATION DIAGRAM
Waste Rock Pile Water Treatment Plant

DATE: July 31, 2018	SCALE: NTS
DATA BY: R.B.	MCCUE JOB NO: 137-0001
DRAWN BY: M.T.	FIG: PID-0002



FIL-100
Bag Filter
Model: FTI 830-2P-150-CS-BS-P13-DP
Bag Size: 5 Micron

PU-010A/B
Ferric Chemical Pump
Model: Welchmen EHE31E1-VC
Power: 115 VAC/1hp/60Hz
Capacity: 21 LPM @ 106m TDH

PU-020
Lime Chemical Pump
Model: Flowmotion FR25-HR30HR
Power: 230V/3hp/60Hz
Capacity: 570 LPM @ 42m TDH

PU-030
Polymer Chemical Pump
Model: Flowmotion FR25-HR30HR
Power: 230V/3hp/60Hz
Capacity: 990 LPM @ 42m TDH

MIX-101
Ferric Mixer
Model: Dynamix DMX-5505K-1
Power: 0.5 HP, 230V/1Ph/60Hz
Shaft: 1" Diameter x 41" Long

MIX-102
Lime Mixer
Model: Dynamix DMX-5505K-2
Power: 0.5 HP, 230V/1Ph/60Hz
Shaft: 1" Diameter x 52" Long

MIX-103
Polymer Mixer
Model: Dynamix DMX-5505K-1
Power: 0.5 HP, 230V/1Ph/60Hz
Shaft: 1" Diameter x 49" Long

TA-010
Ferric Mixing Tank
Material: Polyurethane
Size: Ø 1.2m x 1.3m Height

TA-020
Lime Mixing Tank
Material: Polyurethane
Size: Ø 1.8m x 1.7m Height

TA-030
Polymer Mixing Tank
Material: Polyurethane
Size: Ø 1.6m x 1.6m Height

CC-401/402/403/404/405
Calibration Column

LEGEND:

- Hose
- Sch. 80 PVC Pipe
- Ball Valve
- Reducer
- Motorized Ball Valve

Process based on conceptual design by Golder Associates

NO.	REVISION TABLE	DATE
0	Original Issue	April 30, 2018
1	Record Drawing	July 31, 2018

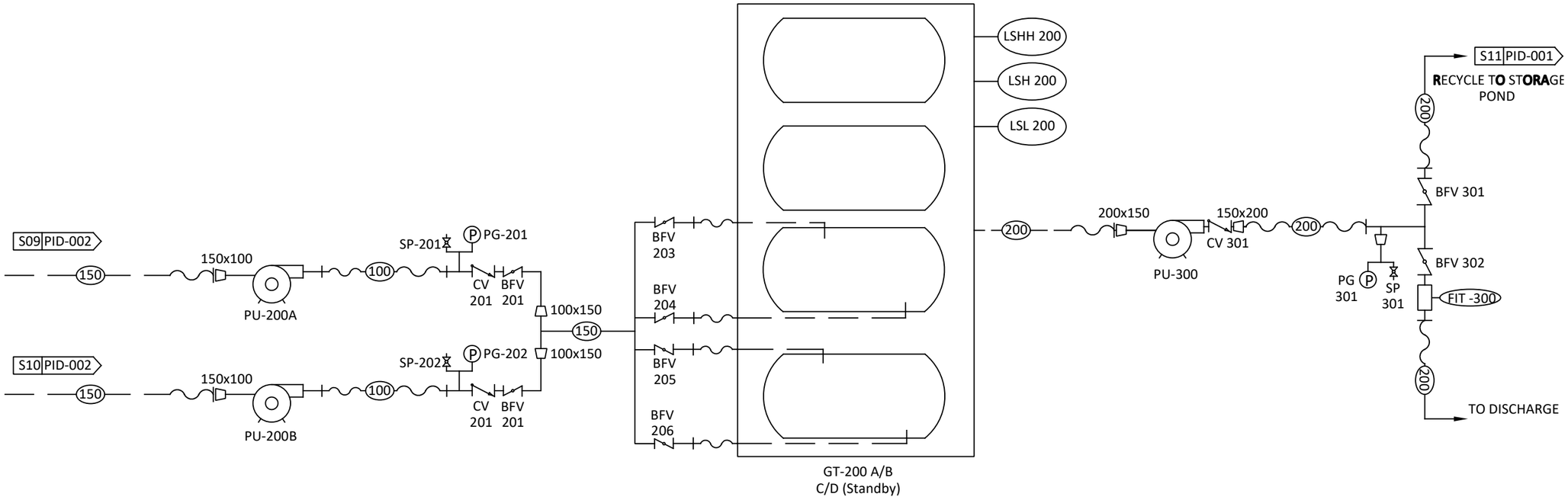
McCUE ENGINEERING CONTRACTORS

CLIENT:

BAFFINLAND IRON MINES CORPORATION

CHEMICAL MAKEUP
PROCESS & INSTRUMENTATION DIAGRAM
Waste Rock Pile Water Treatment Plant

DATE: July 31, 2018	SCALE: NTS
DATA BY: R.B.	MCCUE JOB NO: 137-0001
DRAWN BY: M.T.	FIG: PID-003



LEGEND:

- Hose
- Sch. 80 PVC Pipe
- Butterfly Valve
- Check Valve
- Reducer
- (P) Pressure Gauge
- SP Sample Port
- (LS) Level Switch

Process based on conceptual design by Golder Associates

NO.	REVISION TABLE	DATE
0	Original Issue	April 30, 2018
1	Record Drawing	July 31, 2018

McCUE ENGINEERING CONTRACTORS

CLIENT:

BAFFINLAND IRON MINES CORPORATION

GEOTUBE FIELD PROCESS & INSTRUMENTATION DIAGRAM

Waste Rock Pile Water Treatment Plant

DATE: July 31, 2018	SCALE: NTS
DATA BY: R.B.	MCCUE JOB NO: 137-0001
DRAWN BY: M.T.	FIG: PID-004

PU-200A/B
Transfer Pump
Model: Prime Aire PA4A60-404ST
Power: Diesel Driven
Capacity: 140m³/hr

GT-200 A/B/C/D
Geotube
Model: Tencare GT500
Dimensions: 60' Circumference x 100' Long

PU-300
Discharge Pump
Model: Prime Aire PA4A60-404ST
Power: Diesel Driven
Capacity: 280m³/hr

FT-300
Flow Meter
Model: Toshiba GFG32

APPENDIX B - MONITORING

Monitoring Spreadsheet

Project Name: BaffinLand Iron Mine
Waste Pile Water Treatment

Date	Time	OP	Inlet Quality			Train 1						Train 2						Discharge							
			Temp ºC	Inlet pH	Inlet TSS mg/L	FIT-100 (L/s)	pH-110	pH-120	Ferric Dosage Stroke/Speed	Lime Dosage Hz	Polymer Dosage Hz	FIT-200 (L/s)	pH-210	pH-220	Ferric Dosage Stroke/Speed	Lime Dosage Hz	Polymer Dosage Hz	FIT-300 (gpm)	FIT-300 Totalizer (gpm)	Geotube Pond pH	Geobag 1 Height (m)	Geobag 2 Height (m)	Discharge pH	Discharge Turbidity NTU	Discharge TSS (mg/L)

Observations

Chemical Availability	Week #1 Date:	Week #2 Date:	Week #3 Date:	Week #4 Date:
Ferric Sulphate				
Hydrated Lime				
Polymer				

APPENDIX G

ECCC – JULY 1, 2019 NOTIFICATION – IN PIT WATER TRANSFER

Baffinland

July 01, 2019

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RE: Notification of Controlled Transfer of In Pit Mine Water and Subsequent Discharge from Waste Rock Sedimentation Pond (MS-08); Type "A" Water License 2AM-MRY1325 – Amend. No. 1

The purpose of this notification is to inform you of Baffinland Iron Mines Corporation's (Baffinland) intention to transfer low pH water that has recently collected in a confined low elevation feature inside the Pit and working benches of the Mine to the Waste Rock Facility Containment Pond. Following treatment, this water will be discharged to the receiving environment of Mary River through the MS-08, ECCC approved, Final Discharge Point (FDP). Recent warm conditions at the Project site have resulted in runoff from the bench walls collecting in a low central point of the Mine benches. The low pH water was sampled within the confined low point giving a result of 4.07 on June 28, 2019.

At this time, the cause of this low pH water developing in Pit is under initial investigation. The fact that this is occurring in a localized area may be due to an acute source or sulfate mineral within the specific zone. Water samples have been taken to characterize chemical composition and will assist to determine the source causing the low pH. The results of the investigation will be shared once completed.

As per the Surface Water Aquatic Effects Management Plan, the impacted water is planned to be pumped by hose line to the Waste Rock Facility Containment Pond for treatment through the water treatment system located at this facility. Operations has been working diligently to set up the hose line for the transfer of the low pH Pit water. The transfer is expected to begin in the first week of July. The plan of containing and treating the water within the Waste Rock Containment Pond will effectively mitigate the potential for a release of the low pH water from the pit.

With Baffinland's water treatment facility designed to adjust and treat low-pH water to within permitted discharge levels, the treatment rate is well above the rate of the additional pumping from the Pit. The Pond will be monitored daily to ensure required freeboard levels are maintained. Standard monitoring of MS-08 effluent from the treatment system as per the Type 'A' Water Licence and MDMER will continue during the discharge operations to confirm that water quality remains in compliance with the applicable discharge criteria. As per the Water License, all discharge volumes will be quantified via totalizer or similar metering method.

Please do not hesitate to contact Baffinland should you have and questions or comments.

Regards,

Francois Gaudreau

General Manager

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