APPENDIX C
Water Quality Monitoring Report

SEM Ltd.
79 Mews Place, 2nd Floor
St. John's, NL
A1B 4N2

March 31, 2024

Nunavut Nukkiksautiit Corporation
PO Box 1228
Iqaluit, NU X0A 0H0

Attention: Mrs. Heather Shilton
Director, NNC

RE: Anuriqjuak Nukkiksautiit Project Water Quality Monitoring Report

Introduction

The Anuriqjuak Nukkiksautiit Project (the Project) is a renewable energy development in Sanikiluaq, NU, that incorporates wind turbine generation with a battery energy storage system (BESS) into the existing diesel generation plant. The Project involves the installation and subsequent operation of a single wind turbine generator of 1 megawatt (MW) capacity. An existing community trail, approximately 4.5 km long, will be upgraded to a road and extended approximately 1.0 km to facilitate access to the construction site. An above ground transmission line will be constructed in close alignment with the access road, where possible. The BESS and microgrid controller system will be constructed near the Qulliq Power Plant in the community of Sanikiluaq.

This report is written to satisfy the project-specific terms, conditions, and monitoring requirements which were issued to the Nunavut Nukkiksautiit Corporation (the Proponent) from the Nunavut Water Board (NWB) pertaining to water quality monitoring.

Monitoring and Reporting Requirements

According to the Water Licence No: 8BW-ANU2333, NNC is required to provide a summary of all information requested in the Licence and results of the Monitoring Program. This Water Quality Monitoring Report, together with the accompanying Project Environmental Management Report, contains the information requested:

- A summary, including photographic records before, during and after any relevant construction activities or Modifications and/or major maintenance work carried out on facilities under this Licence and an outline of any work anticipated for the next year.
- Documentation of monitoring activities for signs of erosion, and implementation of sediment and erosion control measures prior to the undertaking to prevent entry of sediment into any water body.

- Digital photographic record of the water crossing before, during, and after the completion of construction activities.
- GPS co-ordinates (in degrees, minutes and seconds of latitude and longitude) of the location where the watercourse crossings (culverts) are located.
- Records, during periods of flow or following a major precipitation event, of monitoring on a monthly basis, prior to, during and following construction of water crossings, immediately upstream and downstream for criteria listed under Part E, Items 6 and 7 (see Water Quality Compliance Thresholds below).
- Implement water crossings visual inspection and maintenance program prior to and during spring freshet and after heavy rainfall events to identify issues relating to watercourse crossings structural integrity and hydraulic function.
- Description of sampling, sample preservation, and analyses methods.
- Copy of accredited laboratory certificates of analysis.
- Records of additional monitoring requirements imposed by the Inspector.

A copy of the completed NWB Standard Report Form for 2023 is provided in Appendix A.

Water Quality Compliance Thresholds

Water quality compliance thresholds prescribed by the NWB presented below in Table 1 pertain to surface runoff or discharges impacted by construction activities associated with the Project, as well as to upstream and downstream of water crossings. All surface runoff or discharges impacted by construction activities associated with the Project, where flow may directly or indirectly enter water, shall not exceed the following effluent quality limits. Turbidity compliance thresholds were developed based on Canadian Council of Ministers of the Environment (CCME) Canadian Water Quality Guidelines for the Protection of Aquatic Life (CCME, 2002) and are based on short-term exposure to turbidity. These turbidity compliance thresholds are reflected in the NWB licence as well.

Table 1 Water Quality Compliance Thresholds.

Parameter		Maximum Average Concentration (mg/L)	Maximum Concentration of Any Grab Sample (mg/L)	Maximum Increase
Total Suspended Solids (TSS)		50.0	100	--
Oil and Grease		No Visible Sheen	No Visible Sheen	--
pH		Between 6.0 - 9.5	Between 6.0 - 9.5	--
Turbidity	background <= 80 NTU	--	--	8 NTU
	background > 80 NTU	--	--	10%

Monitoring Results for 2023

In response to concerns regarding Acid Rock Drainage and Metal Leaching (ARD/ML) and appropriate mitigation measures, the NNC noted in their response during the NIRB screening and during the NWB water licence review, that to their knowledge the borrow source, a local quarry operated by the Hamlet of Sanikiluaq, does not have any history of producing ARD/ML. To confirm this assumption, SEM subcontracted Ecometrix to initiate an ARD/ML investigation of the material from the Sanikiluaq quarry. A desktop study was performed based on available data in addition to a static testing program using samples collected from the quarry. Six samples were collected by a local resident, Allan Rumbolt, of the Hamlet on August 21st, 2023 under the technical instructions of Ecometrix. Samples were packaged and shipped to SGS Lakefield, ON for laboratory analysis. The study concluded that based on available information and verified by laboratory testing, the Sanikiluaq quarry represents a low risk for ARD/ML. A copy of the Ecometrix report is provided in Appendix B.

Construction personnel arrived onsite October 19, 2023. The Construction Site Manager identified culvert installation locations in the field and verified ground conditions such that road development could be adjusted accordingly. This resulted in a reduction in the number of culverts required, from three as planned down to only one. Construction took place between October 20 to October 29, 2023. On behalf of Growler Energy (Proponent Project management) Brent Sellars, Project Environmental/Wildlife Monitor, conducted monitoring activities as outlined in the Project Construction Environmental Protection Plan (EPP). Mr. Davidee Kavvik, local Sanikiluaq resident provided bear monitoring services and coordinated with the Environmental/Wildlife Monitor closely. In 2023, approximately 2.5 km of the access road subgrade was prepared, which included rough grading only. In 2024, the subgrade for the remaining 3 km will be prepared. Additional fill placement, geosynthetics placement, and final grading will be completed in 2024. Installation of the culvert has been re-scheduled to 2024 and is planned at the furthest water crossing along the access route (4.5 km).

Onsite Inspections and In-Situ Monitoring

As part of pre-construction environmental monitoring for the Project, reference and background samples were collected from seven locations as given in Table 1 and Figure 1. Reference sample points were chosen as representative points at waterbodies closest to the planned access route, and background sample points were chosen an appropriate distance upstream and downstream of the planned culvert location, as guided by the Construction Environmental Protection Plan approved by the Board.

Table 1 Water Quality Monitoring Site Names, Locations, and Sample Types.

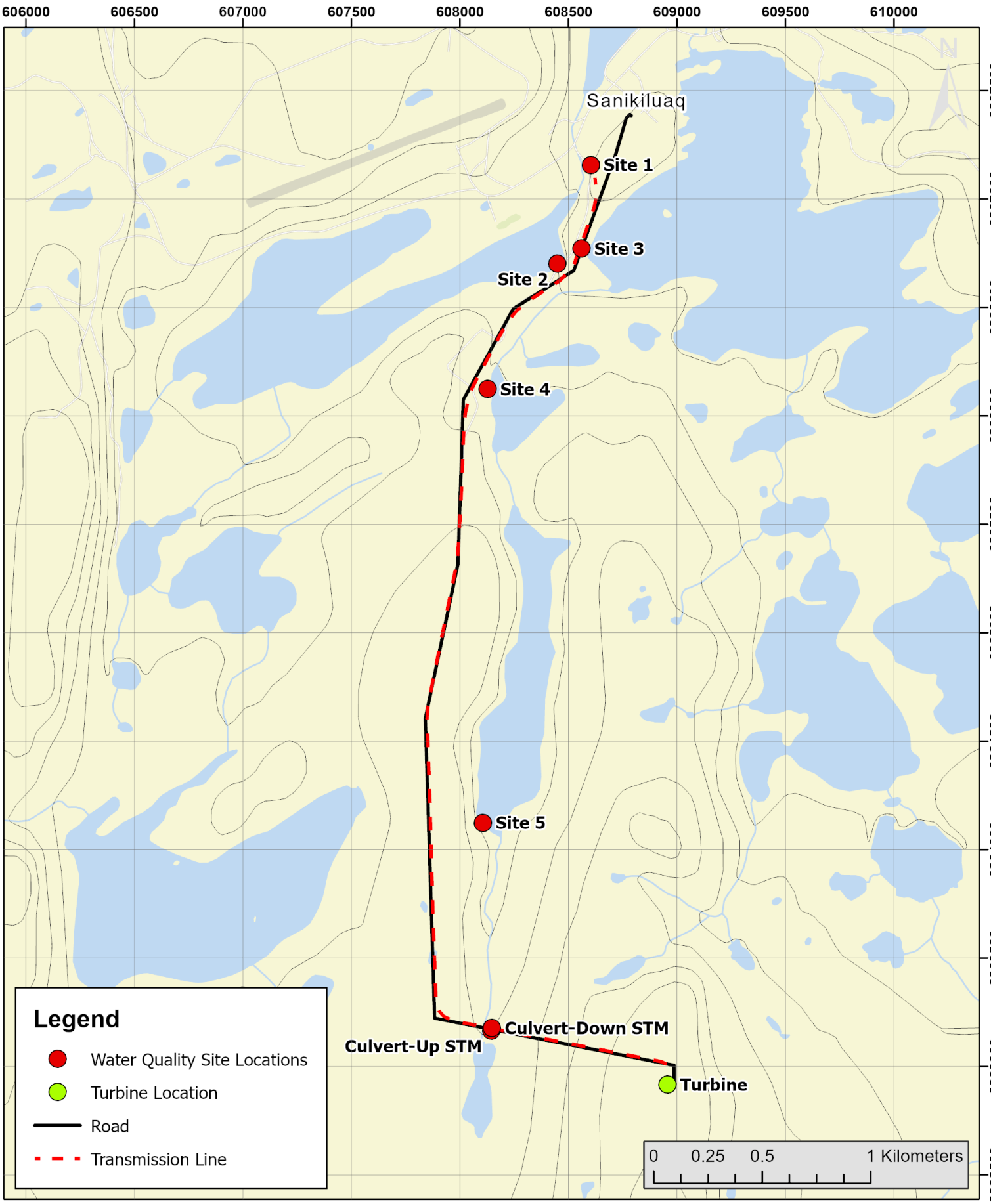
Sample Point	Location (UTM Zone 17V)		Relative Location to Project (km relative to access road)	Type
	Easting	Northing		
SITE 1	0608603	6267157	0 + 150	Reference
SITE 2	0608448	6266701	0 + 600	Reference
SITE 3	0608560	6266771	0 + 500	Reference
SITE 4	0608127	6266123	1 + 300	Reference
SITE 5	0608106	6264124	Approximately 1 km downstream from culvert at 4 + 500	Reference
CULVERT-UPSTM	0608145	6263165	Approximately 100 m upstream from culvert at 4 + 500	Upstream from Culvert (Background)
CULVERT-DOWNSTM	0608148	6263178	Approximately 100 m downstream from culvert at 4 + 500	Downstream from Culvert (Background)

No instream works occurred during the 2023 construction season, nevertheless samples were collected prior to the start of work and 30 minutes after active works stopped for the day to establish a water quality baseline and to verify erosion control measures were sufficient when working near waterbodies. *In situ* water quality samples were collected and analyzed in the field using the Apera Instruments TN400 Portable Turbidity Meter, and the Hanna Instruments HI98127 pH and Temperature Waterproof Tester. Sample handling and measurement procedures noted in the appropriate equipment instruction manuals were adhered to. Calibration of the turbidity meter was performed daily using 0 NTU and 20 NTU standard solutions (expiry April 2024). Calibration of the pH and temperature tester was performed daily using pH buffer 4.01 and 7.01 NIST traceable solutions. Copies of the Quality Certificate for both pieces of equipment indicating conformance with ISO 9001:2015/NIST are provided in Figure 2. A summary of *in situ* turbidity, pH, and temperature monitoring results is provided in Table 2.

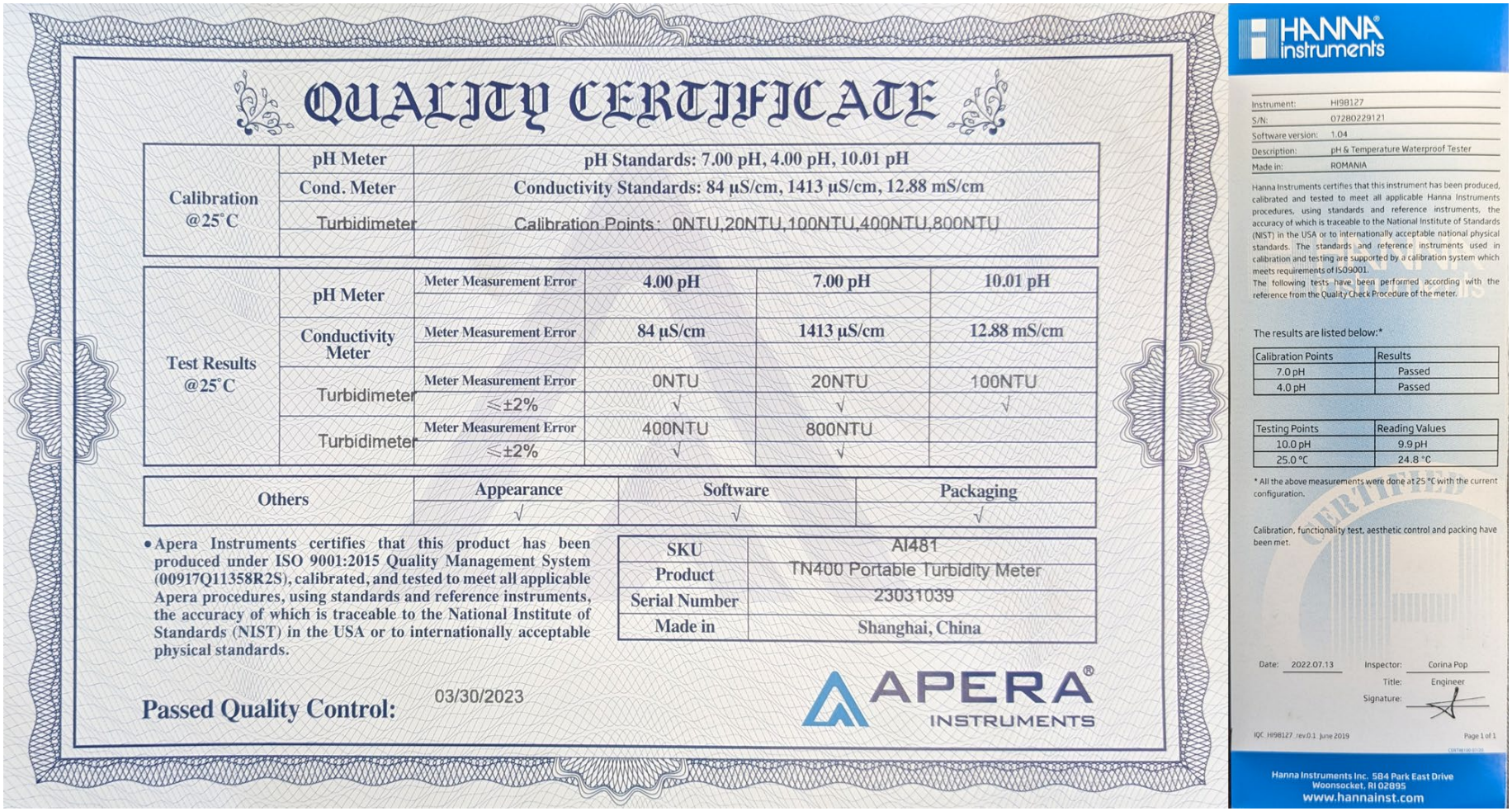
Additional samples for total suspended solids (TSS) and pH were collected and sent to Bureau Veritas for laboratory analysis in Calgary, AB. Samples were collected once at the locations indicated in Table 1 to fulfill monthly monitoring requirement prior to construction. All efforts were made to take the sample from shore using a sampling pole, instead of walking through/in the stream/waterbody. Care was taken so that the sampling container did not touch the bottom. Prior to collecting a sample, the container to be used was rinsed three times with the sample water. A fresh set of nitrile gloves were used at each site. Once collected, the samples were transferred into appropriate labelled sample bottles as provided by Bureau Veritas. Samples were stored on ice in a cooler while in the field, then transferred to a refrigerator at 4 ^{o}C until the samples were shipped. Shipping was timed to allow for analysis within the applicable holding time for TSS (i.e. 7 days). Laboratory certificates of analysis from Bureau Veritas are provided in Appendix C.

Photographs upstream and downstream of the planned culvert location were obtained on October 22, 2023, and appear in Figures 3-4.

No additional monitoring requirements were imposed by the Inspector nor the Board in 2023.



Growler Energy	Anuriqjuak Nukkiksautiit Project	AUTHOR: JC	PREPARED BY: sem
	Water Quality Monitoring Site Locations	COORDINATE SYSTEM: NAD 83 UTM Zone 17	DATE: 26/03/2024



QUALITY CERTIFICATE

Calibration @25°C	pH Meter	pH Standards: 7.00 pH, 4.00 pH, 10.01 pH
	Cond. Meter	Conductivity Standards: 84 µS/cm, 1413 µS/cm, 12.88 mS/cm
	Turbidimeter	Calibration Points: 0NTU,20NTU,100NTU,400NTU,800NTU

Test Results @25°C	pH Meter	Meter Measurement Error	4.00 pH	7.00 pH	10.01 pH
	Conductivity Meter	Meter Measurement Error	84 µS/cm	1413 µS/cm	12.88 mS/cm
	Turbidimeter	Meter Measurement Error ⩽±2%	0NTU √	20NTU √	100NTU √
	Turbidimeter	Meter Measurement Error ⩽±2%	400NTU √	800NTU √	

Others	Appearance	Software	Packaging
	√	√	√

- Apera Instruments certifies that this product has been produced under ISO 9001:2015 Quality Management System (00917Q11358R2S), calibrated, and tested to meet all applicable Apera procedures, using standards and reference instruments, the accuracy of which is traceable to the National Institute of Standards (NIST) in the USA or to internationally acceptable physical standards.

SKU	AI481
Product	TN400 Portable Turbidity Meter
Serial Number	23031039
Made in	Shanghai, China

Passed Quality Control: 03/30/2023

APERA® INSTRUMENTS

HANNA® instruments

Instrument:	HI98127
S/N:	07280229121
Software version:	1.04
Description:	pH & Temperature Waterproof Tester
Made in:	ROMANIA

Hanna Instruments certifies that this instrument has been produced, calibrated and tested to meet all applicable Hanna Instruments procedures, using standards and reference instruments, the accuracy of which is traceable to the National Institute of Standards (NIST) in the USA or to internationally acceptable national physical standards. The standards and reference instruments used in calibration and testing are supported by a calibration system which meets requirements of ISO9001.
The following tests have been performed according with the reference from the Quality Check Procedure of the meter.

The results are listed below:*

Calibration Points	Results
7.0 pH	Passed
4.0 pH	Passed

Testing Points	Reading Values
10.0 pH	9.9 pH
25.0 °C	24.8 °C

* All the above measurements were done at 25 °C with the current configuration.

Calibration, functionality test, aesthetic control and packing have been met.

Date: 2022.07.13 Inspector: Corina Pop
Title: Engineer
Signature:

IQC_HI98127 /rev.0.1 June 2019 Page 1 of 1

Hanna Instruments Inc. 584 Park East Drive
Woonsocket, RI 02895
www.hannainst.com

Figure 2 Quality Certificates Turbidity and pH Meters.

Figure 3 **Photograph Upstream of Culvert Location Prior to Construction.**

Figure 4 **Photograph Downstream of Culvert Location Prior to Construction.**

Table 2 ***In Situ*** **Water Quality Monitoring Results.**

Sample ID	Date	Time	Avg. Turbidity (NTU)	pH
SITE 1	2023-10-21	10:30	1.57	7.6
SITE 2	2023-10-21	11:25	0.52	7.8
SITE 3	2023-10-22	12:02	0.40	7.8
SITE 4	2023-10-22	11:45	0.65	7.9
SITE 5	2023-10-22	10:10	2.62	7.8
CULVERT- UPSTM	2023-10-22	9:35	1.34	8.0
CULVERT-DOWNSTM	2023-10-22	9.45	1.40	8.1
SITE 1	2023-10-23	15:35	1.14	7.8
SITE 1	2023-10-24	8:45	1.38	7.6
SITE 2	2023-10-24	8:55	0.70	7.7
SITE 4	2023-10-24	9:10	0.61	8.0
SITE 1	2023-10-24	5:20	2.01	7.5
SITE 2	2023-10-24	5:32	1.02	7.7
SITE 4	2023-10-24	5:45	0.64	7.9
SITE 1	2023-10-25	9:00	1.45	7.9
SITE 2	2023-10-25	9:00	0.99	8.0
SITE 4	2023-10-25	9:00	0.72	8.0
SITE 1	2023-10-25	6:00	1.39	7.9
SITE 2	2023-10-25	6:00	0.95	8.0
SITE 4	2023-10-25	6:00	0.72	8.0
SITE 1	2023-10-26	9:00	1.51	7.9
SITE 2	2023-10-26	9:00	1.22	7.9
SITE 4	2023-10-26	9:00	1.40	7.9
SITE 1	2023-10-26	6:00	0.95	7.9
SITE 2	2023-10-26	6:00	1.02	8.1
SITE 4	2023-10-26	6:00	2.19	8.1
SITE 1	2023-10-27	9:00	1.07	8.0
SITE 2	2023-10-27	9:00	0.96	7.9
SITE 4	2023-10-27	9:00	3.78	8.0
SITE 1	2023-10-27	6:00	1.32	8.0
SITE 2	2023-10-27	6:00	0.88	8.0
SITE 4	2023-10-27	6:00	7.57	8.0
SITE 1	2023-10-28	9:00	1.16	7.8
SITE 2	2023-10-28	9:00	0.78	8.0
SITE 4	2023-10-28	9:00	4.95	7.9
SITE 1	2023-10-28	6:00	0.79	7.9
SITE 2	2023-10-28	6:00	0.78	8.0
SITE 4	2023-10-28	6:00	7.85	8.1

Bold indicates exceedance of NWB compliance criterion

Table 3 TSS and pH Results.

Sample ID	Date	Time	TSS (mg/L)	pH
SITE 1	2023-10-21	10:30 AM	1.5	7.72
SITE 2	2023-10-21	11:25 AM	1.6	8.12
SITE 3	2023-10-22	12:02 PM	ND	8.11
SITE 4	2023-10-22	11:45 AM	ND	8.16
SITE 5	2023-10-22	10:10 AM	ND	8.25
CULVERT- UPSTM	2023-10-22	09:35 AM	1.1	8.33
CULVERT-DOWNSTM	2023-10-22	09:45 AM	ND	8.33
ND = Not Detected at a concentration equal or greater than 1.0 **Bold** indicates exceedance of NWB compliance criterion				

Water quality monitoring results are indicative of clear water with little suspended solids, typical of a natural stream during low flow conditions. It will be important to measure turbidity and TSS during higher flow conditions, outside of the construction period, to establish a more robust background and reference dataset.

Mitigation Recommendations Issued to Project Construction Team

A small section of existing ATV trail that is near a small waterbody (km 0+ 200 of access road construction section) was recommended to be adjusted further away from the waterbody. This is a small, ponded area that is not on the Project mapping (1:50,000 scale) but the larger part of it is. The Project Environmental/Wildlife Monitor expressed concern to the Site Construction Manager, and it was decided to place larger rock on the section to minimize sediment entering the waterbody due to traffic usage and rainfall. The concern was alleviated, and no other issues of concern were identified.

Conclusion

Daily visual monitoring paired with *in-situ* and laboratory sample results indicated that compliance with water quality thresholds were maintained throughout the construction period in 2023.

Regards,

Brittany Connolly, HBSc, A.Dip.
Environmental Scientist

SEM File: 199-007

Attachments:
NWB Standard Report Form
Ecometrix ARD/ML Report
Laboratory Certificates of Analysis

NWB Annual Report **Year being reported:** Select

License No: 8BW-ANU2333 **Issued Date:** August 16, 2023
Expiry Date: August 15, 2033

Project Name: Anuriqjuak Nukkiksautiit Project

Licensee: Nunavut Nukkiksautiit Corporation

Mailing Address:
5300 Qulliq Court, 2nd floor
P.O. Box 1228
Iqaluit, NU X0A 0H0

Name of Company filing Annual Report (if different from Name of Licensee please clarify relationship between the two entities, if applicable):
Sikumiut Environmental Management Limited (SEM) - Environmental Management Contractor

General Background Information on the Project (*optional):

Licence Requirements: the licensee must provide the following information in accodance with
Part B Item 1

A summary report of water use and waste disposal activities, including, but not limited to: methods of obtaining water; sewage and greywater management; drill waste management; solid and hazardous waste management.

Water Source(s): No Direct Water Use is Authorized

Water Quantity:

0	Quantity Allowable Domestic (cu.m)
0	Actual Quantity Used Domestic (cu.m)
0	Quantity Allowable Drilling (cu.m)
0	Total Quantity Used Drilling (cu.m)

Waste Management and/or Disposal

- ☐ Solid Waste Disposal
- ☐ Sewage
- ☐ Drill Waste
- ☐ Greywater
- ☐ Hazardous
- ☐ Other:

Additional Details:

A list of unauthorized discharges and a summary of follow-up actions taken.

Spill No.: n/a (as reported to the Spill Hot-line)

Date of Spill:
Date of Notification to an Inspector:
Additional Details: (impacts to water, mitigation measures, short/long term monitoring, etc)

Revisions to the Spill Contingency Plan

SCP addendum attached for Board consideration

Additional Details:

Spill Prevention and Response Plan (SPRP) updated following issue of Licence to reflect compliance thresholds. Version 1.2 Attached.

Revisions to the Abandonment and Restoration Plan

No Abandonment and Restoration (AR) Plan submitted or approved

Additional Details:

Progressive Reclamation Work Undertaken

Additional Details (i.e., work completed and future works proposed)

Results of the Monitoring Program including:

The GPS Co-ordinates (in degrees, minutes and seconds of latitude and longitude) of each location where sources of water are utilized;

Not Applicable (N/A)

Additional Details:

The GPS Co-ordinates (in degrees, minutes and seconds of latitude and longitude) of each location where wastes associated with the licence are deposited;

Not Applicable (N/A)

Additional Details:

Results of any additional sampling and/or analysis that was requested by an Inspector

No additional sampling requested by an Inspector or the Board

Additional Details: (date of request, analysis of results, data attached, etc)

See attached Water Quality Monitoring Report for sampling results requested in Part B Item 1 and Part E Item 5 of Licence.

Any other details on water use or waste disposal requested by the Board by November 1 of the year being reported.

No additional sampling requested by an Inspector or the Board

Additional Details: (Attached or provided below)

Any responses or follow-up actions on inspection/compliance reports

No inspection and/or compliance report issued by INAC

Additional Details: (Dates of Report, Follow-up by the Licensee)

Any additional comments or information for the Board to consider

Date Submitted:	March 28, 2024	
Submitted/Prepared by:	Brittany Connolly	
Contact Information:	**Tel:**	1-709-754-0499
	Fax:	
	email:	brittany.connolly@semltd.ca

Ecometrix | Environmental INTELLIGENCE

TO:	FROM:
Amy Copeland, Shelly Brown, SEM Limited	Eric Yu Nicolas Rey Jeff Martin
REF:	**DATE:**
Borrow Materials ARD/ML Study	9 November 2023

This memorandum summarizes the results of a study that examined the potential of acid rock drainage and metal leaching (ARD/ML) of borrow materials to be used for road/culvert construction. The purpose of this study was to examine the risk of ARD/ML associated with road/culvert construction as part of the Sanikiluaq High Displacement Renewable Energy Demonstration Project. This study was based on existing data provided by SEM Limited (SEMLtd) and data that is publicly available, as well as static testing data using samples collected from the quarry where the borrow materials will be sourced.

1.0 Summary

Results of the desktop study showed that there may be sulphidic minerals present in the borrow materials and therefore may pose a risk of acid generation; however, the granular material to be taken from the quarry appears to have been placed in a high energy beach marine environment, and this depositional environment is such that sulphide minerals are less likely to be preserved, reducing this risk. Results of the laboratory tests showed that the samples collected from the quarry were non-potentially acid generating (non-PAG). Solids constituent contents were not elevated in comparison to global average crustal abundances. Although some constituents had soluble concentrations higher than water quality guidelines, the exceedances were not substantial (less than 10 times water quality guidelines) and do not indicate exceedances in the receiving environment. Given the solids constituent contents are not elevated, the long-term risk associated with metal leaching is expected to be low. Overall, the geochemical characteristics of the Sanikiluaq quarry material, based on available information and laboratory testing, appear to represent a low risk of ARD/ML.

DATE: 9 November 2023

TO: Amy Copeland, Shelly Brown, SEM Limited

REF: Borrow Materials ARD/ML Study

2.0 Introduction

The Nunavut Nukkiksautiit Corporation (NNC) plans to install wind turbines and a battery energy storage system (BESS) at the municipality of Sanikiluaq, Nunavut. The installations are to be integrated with the community's electrical grid, reducing the Hamlet's reliance on diesel fuel for electricity. The scope of the installation activities include: installation and operation of one wind turbine; construction upgrades and extension of the existing trail to an access road to the project site; installation of a 4.5 km transmission line corridor; installation of a microgrid controller platform; and installation of a BESS near the power plant in Sanikiluaq.

As part of the installation undertakings, NNC would like to initiate an ARD/ML investigation for borrow materials to be used for road and culvert construction. SEMLtd is assisting NNC in this aspect.

SEMLtd, on behalf of NNC, requested that Ecometrix Incorporated (Ecometrix) provide a desktop ARD/ML study based on available data and conduct a static testing program using samples collected from the quarry where borrow materials will be sourced.

3.0 Background

It is understood that NNC plans to source unconsolidated borrow materials from a local quarry. Based on historical geology of the quarry site and from photographs and satellite images, the borrow material was deposited in historic high energy beach environments which are now raised above the current water level in James Bay by the ongoing process of glacial rebound.

Sulphide minerals, such as pyrite (FeS_2) and pyrrhotite ($Fe_{1-x}S$), are reactive minerals that can be found in the quarry area; however, the depositional environment of this quarry is less favourable for the retention of sulphide minerals, as they are relatively brittle and more susceptible to be broken into smaller fragments which would then be deposited in a lower energy marine environment. Oxidation of sulphide minerals produces sulphuric acid (as ARD) which could be an environmental concern. In addition, sulphide minerals and their weathering products could leach metals and metalloids (e.g. iron, copper, arsenic, selenium) that could be mobilized as metal leaching (ML) (GNWT, 2022).

Carbonate minerals, such as calcium carbonate ($CaCO_3$) and dolomite ($CaMg(CO_3)_2$), can neutralize acid from sulphide oxidation and reduce metal mobility. However, the extent of neutralization depends on several factors, including but not limited to: mineralogy of the rock, the balance between acid generating and neutralizing minerals, and rate of sulphide oxidation. Therefore, it is important to characterize the material through laboratory testing in order to better understand the risk associated with ARD/ML (GNWT, 2022).

This assessment includes a desktop study based on existing data that is available at this time. In addition, a static testing program was completed to verify the ARD/ML potential via quarry sampling and laboratory testing. The following section discusses the methodology of this assessment.

4.0 Methodology

4.1 Desktop Study

Sanikiluaq is located on Flaherty Island as part of the Belcher Islands. Relevant reference documents relating to the geology at Sanikiluaq and the Belcher Islands were reviewed to assess the potential for ARD/ML. Specifically, the following reference documents were reviewed:

- Dimroth, E., Baragar, D.R., Bergeron, R., and Jackson, G.D., 1970. The Filling of the Circum-Ungava Geosyncline, In Baer, A.E. (ed.), Basins and Geosynclines of the Canadian Shield, Geol. Surv. Can., Paper 70-40, p. 45-142.
- Fryer, B.J., 1972. Age Determinations in the Circum-Ungava Geosyncline and the Evolution of Precambrian Banded Iron-Formations: Can. Journ. of Earth Sci., v.9, p. 652-663.
- Hodgskiss, M. S. W., & Sperling, E. A. 2019. Stratigraphy and shale geochemistry of the Belcher Group, Belcher Islands, southern Nunavut. Summary of Activities, p. 65-78.
- Hofmann, H.J. and Jackson, G.D. 1969, Precambrian (Aphebian) microfossils from Belcher Islands, Hudson Bay; Canadian Journal of Earth Sciences, v.6, p. 1137-1144.
- Hutteri, H.P., 2011. Report on the 2011 Haig Inlet Phase 1 Drilling Program, Belcher Island Qikiqtaaaluk Region, Nunavut, Canada. Assessment Report for Canadian Orebodies.
- McKenzie Judith A., 1991. The dolomite problem: an outstanding controversy, in D. W. Müller, J. A. McKenzie, H. Weissert (eds.), Controversies in modern geology, Academic press, London.
- Ricketts, B.D. 1979. Sedimentology and stratigraphy of eastern and central Belcher Islands, Northwest Territories; Unpublished Ph.D. thesis, Carleton University, Ottawa, 314 p.
- Whal, G. H., 2012. Haig Inlet Iron Project Technical Report – Belcher Islands, Qikiqtaaluk Region, Nunavut, Canada. Prepared for Canadian Orebodies Inc. 62 p.

4.2 Quarry Sampling and Laboratory Testing

Six (6) samples were collected from the quarry by NNC personnel on August 21st, 2023. Sampling was biased towards particles with diameters of less than 2 inches in order to sample material with a greater potential to affect water quality due to the proportionately greater surface area. Samples were submitted to SGS Lakefield for laboratory testing . A suite of laboratory analyses was completed to assess the ARD/ML characteristics of the samples, including acid base accounting, solid phase elemental analysis, shake flask extraction, and moisture content analysis. The following subsections present sampling from the quarry and laboratory test methods.

4.2.1 Quarry Description and Sampling

The Sanikiluaq Quarry is located in the western region of the municipality of Sanikiluaq, Nunavut, approximately 3 km west of the Sanikiluaq Airport. The quarry has a footprint of approximately 60,000 m^2.

Figure 1: Satellite Image of the Sanikiluaq Quarry

Six (6) samples were collected from the pit area of the quarry to characterize the rock to be used as borrow material. **Figure 2** shows the general area and **Figure 3** shows the location of the samples collected. In both figures the raised beaches are visible.

Figure 2: Pit Area, Sanikiluaq Quarry

Figure 3: Sampling Locations at the Sanikiluaq Quarry

4.2.2 Laboratory Test Methods

Acid base accounting (ABA) analysis was performed to quantify the material acid potential (AP) and neutralization potential (NP).

Solid phase elemental analysis was conducted to assess the material's composition and variability of chemical constituents, and to estimate the total load of chemical constituents that could potentially be released to the environment.

Shake flask extraction (SFE) is a short-term leach test and was completed to provide insights on the constituent leachability or ML component of the ARD/ML assessment.

5.0 Results and Discussion

5.1 Regional Geology

The Belcher Islands constitute the western segment of an ancient geological formation dating back to the Paleoproterozoic era, referred to as the Circum-Superior Belt of the large igneous province of the Canadian Shield. The formation encircles the Ungava craton and encompasses other notable geological features, such as the Labrador Trough to the east and the Cape Smith Fold Belt to the north, and is truncated to the south by the Grenville Front (Dimroth et al., 1970; Fryer, 1972).

This geological sequence primarily consists of Middle Paleoproterozoic sediments, alternating between shallow and deep-water marine deposits. Interruptions in this sequence are marked by two occurrences of tholeiitic continental basalt flows. Subsequent to these sedimentary and volcanic processes, tectonic forces during the Trans-Hudsonian orogeny led to the formation of a series of NE-SW trending doubly plunging anticlines and synclines.

5.2 Local Geology

The Belcher Islands encompass a substantial and remarkably uniform succession of rock units, with a thickness ranging from 7,000 to 9,000 meters. These rock units offer a valuable record of the evolving development of the basin. The stratigraphy suggests multiple depositional phases that led to the formation of alternating layers of limestone, dolostone, and grainstone, and shales punctuated by significant tectonic events that led to the formation of a series of anticline and syncline features that shaped the Belcher islands through differential erosion. The sedimentary sequence is interrupted by two magmatic events, namely the Eskimo basaltic/gabbroic formation (~2,014 Ma), and the Flaherty basaltic intrusion (1,870 Ma). The stratigraphic column, depositional phases and associated magmatic events, are summarized in **Figure 4**. The local geology is relevant to this study as the rock in the quarry, deposited in the marine beach environment, is likely a blend of various rock types from this stratigraphy.

DATE: 9 November 2023

TO: Amy Copeland, Shelly Brown, SEM Limited

REF: Borrow Materials ARD/ML Study

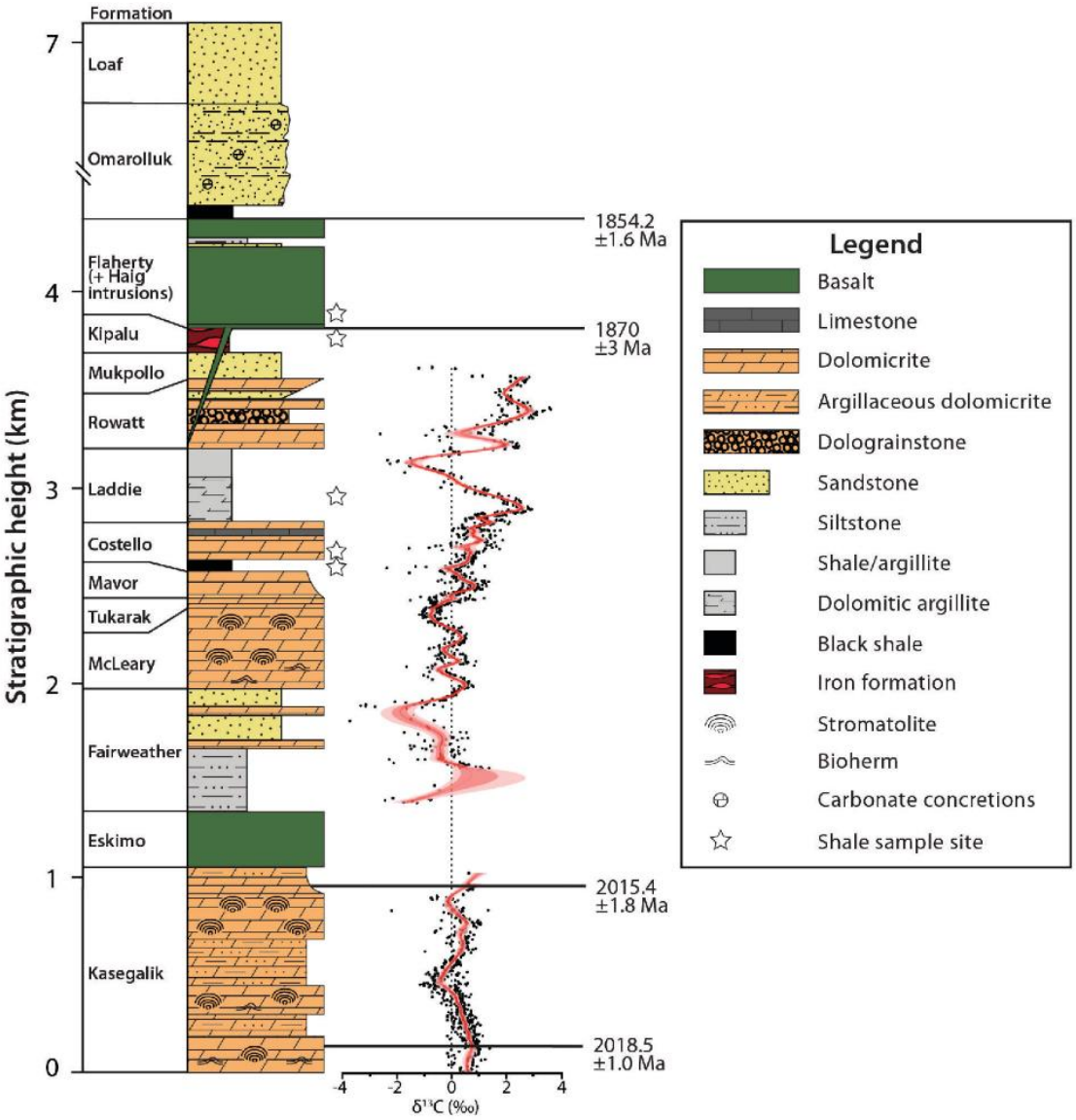


Figure 4. Schematic stratigraphic section of the Belcher Group, Belcher Islands (Hodgskiss, and Sperling, 2020)

5.3 Geological Evidence of Acid Generation, and Neutralization Potential

The Canadian Orebodies' drilling program conducted as part of the Haig Inlet Iron Project in the Belcher Islands, and targeting higher iron (Fe) grades within the Kipalu Iron Formation (1,880 Ma), identified the presence of sulphidic minerals susceptible of producing acid through oxidation. More specifically, the Kipalu Iron Formation includes a 10-50 cm thick black pyritic carbonaceous argillite layer atop a green to grey-brown argillite. It may contain 1-2% pyrite and trace pyrrhotite (Hutteri, 2011; Whal, 2012).

Shale soils such as the carbonaceous argillite layer of the Kipalu Iron-rich formation typically contain pyrites resulting from bacterial activity on organic matter in low-oxygen conditions. This process begins with bacteria producing hydrogen sulphide by breaking down proteins or decomposing sulphates, which then combines with iron to form iron sulphides, including pyrite. In sedimentary origins, pyrite is a characteristic mineral in oxygen-depleted marine environments with abundant organic matter. Such conditions are also characteristic of lower Costello where pyrite was also identified (Hodgskiss, and Sperling, 2020), and potentially the Omarolluk (1,854 Ma) formations present in the Belcher Islands sequence.

Additionally, pyrite may also be found in association with dolomite, as its primary formation was found to be concomitant with the existence of sulphate reducing bacteria also responsible for the formation of pyrite (McKenzie, 1991). Dolostone can be found extensively through the whole Belcher Islands geological sequence.

However, neutralization processes such as the dissolution of carbonates like calcite or dolomite may also mitigate the production of acid caused by the oxidation of pyrite or pyrrhotite. Limestone and dolostone are dominant lithologies of the Belcher Island stratigraphic sequence and may therefore suffice to mitigate potential acid generation.

The static tests conducted as part of this assessment were designed to establish the acid potential (AP), and neutralization potential (NP) inventories of the rock collected at the quarry and determine if they present potential for ARD.

5.4 Acid Rock Drainage Potential

Results of the ABA analysis for the samples collected from the Sanikiluaq Quarry are presented in **Table 1**. The samples are characterized by basic paste pH, with values ranging from 8.8 to 9.1. Sobek neutralization potential (Sobek-NP) values ranged from 20 to 54 kg $CaCO_3$/tonne with an average value of 32 kg $CaCO_3$/tonne. The sulphide sulphur contents were below detection limit (<0.04 %S). The resulting AP calculated using the sulphide detection limit was 1.25 kg

$CaCO_3$/tonne. Sobek-NP/AP ratios ranged from 16 to 43. As all samples had Sobek-NP/AP ratios that were greater than 2, the quarry samples were therefore considered non-potentially acid generating (non-PAG) based on the criteria provided by Price (1997 and 2009).

A more conservative estimate of the neutralization potential based on the carbonate-NP (Carb-NP) provides a range of 9 to 50 kg $CaCO_3$/tonne. The lower Carb-NP than Sobek-NP values suggest that not all of the neutralization potential is associated with the available or "effective" fraction as calcite or dolomite. The calculated Carb-NP /AP ratios were greater than 2 for all samples (7 to 40), and therefore samples are also classified as non-PAG using the more conservative Carb-NP values.

Table 1. Summary of Acid Base Accounting Results for the Sanikiluaq Quarry Samples

Parameter	Paste pH	CO_3	Total Sulphur	Sulphate Sulphur	Sulphide Sulphur	Sobek Neutralization Potential (Sobek-NP)	Carbonate NP (Carb-NP)[2]	Ratio (Carb-NP:Sobek-NP)	Acid Generation Potential (AP)[3]	Ratio (Sobek-NP:AP)	Ratio (Carb-NP:AP)
Units	-	%	% S	% S	% S	kg $CaCO_3$/ t	kg $CaCO_3$/ t	-	kg $CaCO_3$ /t	-	-
Sample #1 Stock pile	9.0	3.0	0.014	< 0.04	< 0.04	54	50	0.9	1.3	43	40
Sample #2 Stock pile 2	8.8	0.9	0.010	< 0.04	< 0.04	20	16	0.8	1.3	16	12
Sample #3 Stock pile 3	9.1	1.2	0.013	< 0.04	< 0.04	29	20	0.7	1.3	23	16
Sample #4 Stock pile 4	8.9	1.0	0.013	< 0.04	< 0.04	24	17	0.7	1.3	19	14
Sample #5 Hill side	8.8	0.6	0.011	< 0.04	< 0.04	37	9	0.2	1.3	30	7
Sample #6 Stock pile / hill side	8.9	1.6	0.009	< 0.04	< 0.04	29	26	0.9	1.3	23	21
Average	8.9	1.4	0.012	< 0.04	< 0.04	32	23	0.7	1.3	26	18
Minimum	8.8	0.6	0.009	< 0.04	< 0.04	20	9	0.2	1.3	16	7
Maximum	9.1	3.0	0.014	< 0.04	< 0.04	54	50	0.9	1.3	43	40

Notes:

1. Samples from the Sanikiluaq Quarry and analyzed by SGS Canada Inc. using the modified Sobek method (Price, 1997)
2. Carbonate NP (Carb-NP) values were calculated as Carb-NP (kg $CaCO_3$/t) = $\%CO_3$ * (100.09/60.008) * 10
3. AP values were calculated from the sulphide-sulphur content; AP = % Sulphide Sulphur x 31.25
4. Results below detection were treated as at detection limit for calculations
5. Highlighted values indicate that a sample has an NPR ≤ 1, while bolded font indicates a sample has an 1 ≤ NPR ≤ 2

5.5 Constituent Contents in the Solids

Although no regulatory criteria exist for constituent contents in quarry rocks, values can be compared to average crustal abundances, as recommended by Price (1997 and 2009). Materials with high leachability would generally be expected to have elevated contents of constituents in comparison to the average crustal abundances according to Faure (1998). Therefore, for screening purposes, results of the bulk analysis were compared to 10 times the average crustal abundances to identify constituents that may require additional investigation or scrutiny.

The contents of all constituents in the quarry rock samples were found to be below the screening value of ten times the average crustal abundance, as summarized in **Table 2**.

Table 2: Summary of Constituent Contents in the Sanikiluaq Quarry Samples

Parameter	Unit	10X Crustal Abundance	Sample #1 Stock pile	Sample #2 Stock pile 2	Sample #3 Stock pile 3	Sample #4 Stock pile 4	Sample #5 Hill side	Sample #6 Stock pile / hill side	Average	Min	Max
Silver	µg/g	0.8	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
Arsenic	µg/g	21	12	6.4	6.6	7.4	5.5	6.4	7.4	5.5	12
Aluminum	µg/g	820000	22000	22000	22000	22000	19000	20000	21167	19000	22000
Barium	µg/g	3400	24	24	25	23	23	29	25	23	29
Beryllium	µg/g	19	0.69	0.77	0.8	0.73	0.64	0.7	0.7	0.6	0.8
Bismuth	µg/g	0.25	0.11	0.12	0.11	0.15	0.1	0.11	0.12	0.10	0.15
Calcium	µg/g	500000	22000	9300	11000	12000	8400	11000	12283	8400	22000
Cadmium	µg/g	1.5	0.08	0.09	0.08	0.1	0.06	0.08	0.08	0.06	0.10
Cobalt	µg/g	300	16	16	17	17	14	15	16	14	17
Chromium	µg/g	1400	140	140	130	140	120	130	133	120	140
Copper	µg/g	680	30	32	35	42	24	29	32	24	42
Iron	µg/g	630000	40000	41000	42000	41000	40000	43000	41167	40000	43000
Potassium	µg/g	150000	1200	1300	1400	1200	1400	1200	1283	1200	1400
Lithium	µg/g	170	35	35	37	36	32	31	34	31	37
Magnesium	µg/g	290000	15000	15000	16000	14000	13000	15000	14667	13000	16000
Manganese	µg/g	11000	700	530	520	630	470	1400	708	470	1400
Molybdenum	µg/g	11	0.5	0.4	0.4	0.4	0.4	0.5	0.4	0.4	0.5

Parameter	Unit	10X Crustal Abundance	Sample #1 Stock pile	Sample #2 Stock pile 2	Sample #3 Stock pile 3	Sample #4 Stock pile 4	Sample #5 Hill side	Sample #6 Stock pile / hill side	Average	Min	Max
Nickel	µg/g	900	43	45	46	45	39	42	43	39	46
Lead	µg/g	100	11	9.2	10	12	8.4	8.6	10	8.4	12
Antimony	µg/g	2	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6	< 6
Selenium	µg/g	0.5	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.1	0.2
Tin	µg/g	22	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Strontium	µg/g	3600	46	32	29	34	26	29	33	26	46
Titanium	µg/g	66000	1700	1800	2000	2000	1900	2000	1900	1700	2000
Thallium	µg/g	5.3	0.05	0.05	0.05	0.04	0.05	0.05	0.05	0.04	0.05
Uranium	µg/g	18	1.7	1.6	1.7	1.7	1.5	1.6	1.6	1.5	1.7
Vanadium	µg/g	1900	66	65	68	70	58	63	65	58	70
Yttrium	µg/g	290	11	12	13	13	12	12	12	11	13
Zinc	µg/g	790	72	76	75	82	63	68	73	63	82

Notes:

1. Grey highlighted values indicate that the value is above ten times the crustal abundance.

5.6 Soluble Constituents

Shake flask extraction (SFE) tests were utilized to assess the soluble weathering products released potentially as a result of sulphide oxidation including dissolution of surface coatings or soluble minerals, such as carbonates and salts. The results of the shake flask tests are provided in **Table 3**. Measured shake flask concentrations were screened against Canadian Council of Ministers of the Environment (CCME), Metal and Diamond Mining Effluent Regulations (MDMER), Ontario Provincial Water Quality Objectives (PWQO) guidelines, as well as limits provided in the water license issued to NNC by the Nunavut Water Board (NWB). This is a comparative exercise and is not meant to indicate a likely exceedance in the receiving environment. Where multiple guidelines exist, or if the guideline is variable (e.g., hardness-dependent), the most conservative guideline (i.e., the lowest concentration) was used for screening purposes.

The SFE results indicate that the leachate pH values were near-neutral to basic, ranging from 7.9 to 8.5. Alkalinity was detected in all samples, with concentrations ranging from 28 to 57 mg $CaCO_3$/L. Concentrations of sulphate were below detection for all samples. These results suggest that there was minimal sulphide oxidation exhibited by these samples, and thus minimal to nil acid generation potential consistent with results in **Section 5.4**.

Leachate concentrations of aluminum, arsenic, cadmium, copper, and iron were above the water quality guidelines for at least one sample. The exceedances were generally within one magnitude (10X) of the guidelines for all samples. It should be noted that the exceedances are not meant to indicate a likely exceedance in the receiving environment, as mixing of leachate with water in the environment could reduce their concentrations (i.e., by dilution). Results were consistent with low solid constituent contents (**Table 2**; less than 10X the average crustal abundance), and thus the long-term risk associated with metal leaching is expected to be low.

Table 3: Summary of Soluble Constituents in the Sanikiluaq Quarry Samples

Parameter	Unit	CCME	MDMER	PWQO/ IPWQO	NWB	Most Conservative Guideline	Bag #1 Stock pile	Bag #2 Stock pile 2	Bag #3 Stock pile 3	Bag #4 Stock pile 4	Bag #5 Hill side	Bag #6 Stock pile / hill side	Avg	Min	Max
Conventional Parameters															
pH	-	6.5 - 9	6.5 - 8.5	6.5 - 9	6.5 - 9	6.5 - 9	8.5	8.0	8.0	7.9	7.9	8.1	8.1	7.9	8.5
Total alkalinity, as $CaCO_3$	mg/L	-	-	-	-	-	39	46	28	39	48	57	43	28	57
Sulphate	mg/L	-	-	-	-	-	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Dissolved Metals															
Aluminum	µg/L	100	-	75	-	75	**478**	**310**	**653**	**510**	**369**	**387**	**451**	**310**	**653**
Arsenic	µg/L	5	100	5	-	5	**5.2**	3.1	4.0	2.9	2.5	1.0	3.1	1.0	**5.2**
Boron	µg/L	1,500	-	200	-	200	21	15	16	16	14	14	16	14	21
Cadmium	µg/L	0.04	-	0.5	-	0.04	0.003	0.005	0.008	0.004	0.008	**0.058**	0.014	0.003	**0.058**
Chromium	µg/L	1	-	8.9	-	1	0.32	0.22	0.19	0.45	0.27	0.12	0.26	0.12	0.45
Cobalt	µg/L	50	-	0.9	-	0.9	0.04	0.08	0.05	0.10	0.11	0.03	0.07	0.03	0.11
Copper	µg/L	2	100	5	-	2	**3.1**	**4.3**	**2.1**	**5.2**	**5.4**	**3.2**	**3.9**	**2.1**	**5.4**
Iron	µg/L	300	-	300	-	300	**346**	58	62	146	74	20	118	20	**346**
Lead	µg/L	1	500	5	-	1	< 0.09	0.13	0.21	0.20	0.21	< 0.09	0.16	< 0.09	0.21
Manganese	µg/L	90	-		-	90	5.0	6.2	2.3	7.4	7.3	4.0	5.4	2.3	7.4
Mercury	µg/L	0.026	-	0.2	-	0.026	< 0.01	0.01	< 0.01	0.01	0.02	< 0.01	0.01	< 0.01	0.02
Molybdenum	µg/L	73	-	40	-	40	8.0	2.2	2.8	1.5	1.3	1.7	2.9	1.3	8.0
Nickel	µg/L	25	250	25	-	25	0.20	0.40	0.20	0.50	0.50	0.30	0.35	0.20	0.50

Parameter	Unit	CCME	MDMER	PWQO/ IPWQO	NWB	Most Conservative Guideline	Bag #1 Stock pile	Bag #2 Stock pile 2	Bag #3 Stock pile 3	Bag #4 Stock pile 4	Bag #5 Hill side	Bag #6 Stock pile / hill side	Avg	Min	Max
Selenium	µg/L	1	-	100	-	1	0.24	0.22	0.20	0.53	0.22	0.25	0.28	0.20	0.53
Silver	µg/L	0.25	-	0.1	-	0.1	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Thallium	µg/L	0.8	-	0.3	-	0.3	0.009	0.016	0.007	0.011	0.012	0.005	0.010	0.005	0.016
Uranium	µg/L	15	-	5	-	5	1.2	0.6	0.3	0.6	0.6	1.0	0.7	0.3	1.2
Vanadium	µg/L	100	-	6	-	6	3.5	1.8	4.7	2.1	1.4	1.1	2.4	1.1	4.7
Zinc	µg/L	2	400	20	-	2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2	< 2

Notes:

1. Values below detection were treated as at detection in calculating the summary statistics.
2. Grey highlighted values indicate that the value is above the most conservative guideline.

6.0 Conclusion

Results of the desktop study indicated there may be sulphidic minerals present in the quarry materials that may pose a risk of acid generation. However, the depositional environment of materials to be extracted from the quarry is not favourable to the retention of exposed sulphide minerals. Results of the laboratory verification confirmed that the sulphur contents of quarry samples were low with substantial neutralization sources, and thus materials were classified as non-PAG with NP/AP ratios greater than 7.

Analyses of the quarry rock solid chemistry showed that constituent contents were low and below the Earth's average crustal abundances reference. Potentially leachable concentrations of aluminum, arsenic, cadmium, copper, and iron screened above some water quality guidelines. However, the exceedances were not substantial (within 10X the guideline) and do not represent a likely exceedance in the receiving environment because concentrations are expected to be further diluted by natural precipitation and existing site drainages and run-off. These results are consistent with low solid constituent contents, and thus the long-term risk associated with metal leaching is expected to be low.

In summary the Sanikiluaq quarry rock geochemical characteristics, based on available information and verified by laboratory testing, appear to represent a low risk for ML/ARD.

7.0 References

Dimroth, E., Baragar, D.R., Bergeron, R., and Jackson, G.D., 1970. The Filling of the Circum-Ungava Geosyncline, In Baer, A.E. (ed.), Basins and Geosynclines of the Canadian Shield, Geol. Surv. Can., Paper 70-40, p. 45-142.

Faure, G. 1998. Principles and Applications of Geochemistry. Prentice Hall, New Jersey. p. 600.

Fryer, B.J., 1972. Age Determinations in the Circum-Ungava Geosyncline and the Evolution of Precambrian Banded Iron-Formations: Can. Journ. of Earth Sci., v.9, p. 652-663.

GNWT 2022. Draft Quarry Sampling and Testing Guidance for Identification of Acid Rock Drainage and Metal Leaching Potential. Government of the NWT, January 2022.

Hodgskiss, M. S. W., & Sperling, E. A. 2019. Stratigraphy and shale geochemistry of the Belcher Group, Belcher Islands, southern Nunavut. Summary of Activities, p. 65-78.

Hofmann, H.J. and Jackson, G.D. 1969, Precambrian (Aphebian) microfossils from Belcher Islands, Hudson Bay; Canadian Journal of Earth Sciences, v.6, p. 1137-1144.

Hutteri, H.P., 2011. Report on the 2011 Haig Inlet Phase 1 Drilling Program, Belcher Island Qikiqtaaaluk Region, Nunavut, Canada. Assessment Report for Canadian Orebodies.

McKenzie Judith A., 1991. The dolomite problem: an outstanding controversy, in D. W. Müller, J. A. McKenzie, H. Weissert (eds.), Controversies in modern geology, Academic press, London.

Price W. 1997. Draft Guidelines and Recommended Methods for the Prediction of Metal Leaching and Acid Rock Drainage at Minesites in British Columbia. Reclamation Section, British Columbia Ministry of Energy and Mines. April 1997.

Price W.A. 2009. Prediction Manual for Drainage Chemistry from Sulphidic Materials. Report prepared for MEND Program. MEND Report 1.20.1. 579p.

Ricketts, B.D. 1979. Sedimentology and stratigraphy of eastern and central Belcher Islands, Northwest Territories; Unpublished Ph.D. thesis, Carleton University, Ottawa, 314 p.

Whal, G. H., 2012. Haig Inlet Iron Project Technical Report – Belcher Islands, Qikiqtaaluk Region, Nunavut, Canada. Prepared for Canadian Orebodies Inc. 62 p.

A.1 Appendix A: Quarry Sample Photographs

Figure A1: Quarry Sample #1

Figure A2: Quarry Sample #2

Figure A3: Quarry Sample #3

Figure A4: Quarry Sample #4

Figure A5: Quarry Sample #5

Figure A6: Quarry Sample #6

A.2 Appendix B: Laboratory Certificates of Analysis

SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

ABA - Modified Sobek

12-September-2023

Ecometrix
Attn : Derek Amores

6800 Campobello Road
Mississauga, ON
L5N 2L8, Canada

Phone: 905-794-2325
Fax:905-794-2338

Date Rec. : 28 August 2023
LR Report: **CA19279-AUG23**
Reference: 23-3271

Copy: #1

CERTIFICATE OF ANALYSIS
Final Report

Analysis	1: Analysis Start Date	2: Analysis Start Time	3: Analysis Completed Date	4: Analysis Completed Time	5: Bag #1 Stock pile	6: Bag #2 Stock pile 2	7: Bag #3 Stock pile 3	8: Bag #4 Stock pile 4	9: Bag #5 Hill side	10: Bag #6 Stock pile / hill side
Sample Date & Time					21-Aug-23	21-Aug-23	21-Aug-23	21-Aug-23	21-Aug-23	21-Aug-23
Paste pH [no unit]	06-Sep-23	08:20	07-Sep-23	16:55	8.98	8.80	9.05	8.94	8.83	8.85
Fizz Rate [rating]	06-Sep-23	08:20	07-Sep-23	16:55	4	2	2	2	2	2
Sample weight [g]	06-Sep-23	08:20	07-Sep-23	16:55	2.02	2.16	2.12	2.07	1.94	2.07
HCl Added [mL]	07-Sep-23	06:11	07-Sep-23	16:55	40.00	20.00	35.00	20.00	30.00	30.00
HCl [Normality]	06-Sep-23	08:20	07-Sep-23	16:55	0.10	0.10	0.10	0.10	0.10	0.10
NaOH [Normality]	06-Sep-23	08:20	07-Sep-23	16:55	0.10	0.10	0.10	0.10	0.10	0.10
NaOH to pH=8.3 [mL]	07-Sep-23	08:27	07-Sep-23	16:55	18.14	11.48	22.91	9.98	15.52	18.02
Final pH [no unit]	07-Sep-23	08:27	07-Sep-23	16:55	1.69	1.91	1.53	1.95	1.50	1.51
NP [t CaCO3/1000 t]	07-Sep-23	08:27	07-Sep-23	16:55	54.1	19.7	28.5	24.2	37.3	28.9
AP [t CaCO3/1000 t]	12-Sep-23	08:57	12-Sep-23	08:57	1.25	1.25	1.25	1.25	1.25	1.25
Net NP [t CaCO3/1000 t]	12-Sep-23	08:57	12-Sep-23	08:57	52.8	18.4	27.2	23.0	36.0	27.6
NP/AP [ratio]	12-Sep-23	08:57	12-Sep-23	08:57	43.3	15.8	22.8	19.4	29.8	23.1
Sulphur (total) [%]	08-Sep-23	16:15	12-Sep-23	08:57	0.014	0.010	0.013	0.013	0.011	0.009
Acid Leachable SO4-S [%]	12-Sep-23	08:56	12-Sep-23	08:57	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04
Sulphide [%]	11-Sep-23	09:58	12-Sep-23	08:57	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04	< 0.04
Carbon (total) [%]	08-Sep-23	16:15	12-Sep-23	08:57	0.764	0.457	0.335	0.354	0.321	0.486
Carbonate (HCl) as %CO3 [%]	11-Sep-23	10:20	12-Sep-23	08:57	2.99	0.93	1.17	1.04	0.55	1.57

SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

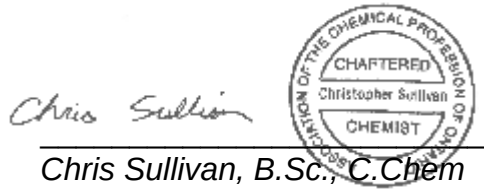
*NP (Neutralization Potential)
= 50 x (N of HCL x Total HCL added - N NaOH x NaOH added)

Weight of Sample

*AP (Acid Potential) = % Sulphide Sulphur x 31.25
*Net NP (Net Neutralization Potential) = NP-AP
NP/AP Ratio = NP/AP
*Results expressed as tonnes CaCO3 equivalent/1000 tonnes of material
Samples with a % Sulphide value of <0.04 will be calculated using a 0.04 value.

Method Descriptions

Parameter	SGS Method Code	Reference Method Code
Acid Potential	ME-CA-[ENV]ARD-LAK-AN-001/003	MEND PROJECT 1.16.1B
Carbon/Sulphur	ME-CA-[ENV]ARD-LAK-AN-019	ASTM E1915-07A
Carbon/Sulphur	ME-CA-[ENV]ARD-LAK-AN-020	ASTM E1915-07A
Neutralization Potential	ME-CA-[ENV]ARD-LAK-AN-001/003	MEND PROJECT 1.16.1B
Paste pH	ME-CA-[ENV]ARD-LAK-AN-005	ARD Predicition Manual, 2009



Chris Sullivan, B.Sc., C.Chem
Project Specialist,
Environment, Health & Safety

SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

ABA - Modified Sobek

LR Report : **CA19279-AUG23**

Quality Control Report

Inorganic Analysis														
Parameter	Reporting Limit	Unit	Method Blank	Duplicate				LCS / Spike Blank			Matrix Spike / Reference Material			
				Result 1	Result 2	RPD	Acceptance Criteria	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)		
							%		Low	High		Low	High	
Carbon/Sulphur - QCBatchID: ECS0017-SEP23														
Sulphide	0.04	%	< 0.04			5	20	108	80	120				
Carbon/Sulphur - QCBatchID: ECS0019-SEP23														
Carbon (total)	0.005	%	< 0.005			1	20				98	70	130	
Sulphur (total)	0.005	%	< 0.005			1	20				95	70	130	
Carbon/Sulphur - QCBatchID: ECS0020-SEP23														
Carbonate (HCl) as %CO3	0.04	%	< 0.04			1	20	99	80	120				

OnLine LIMS

0003464086

SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

21-September-2023

Ecometrix
Attn : Derek Amores

6800 Campobello Road
Mississauga, ON
L5N 2L8, Canada

Phone: 905-794-2325
Fax:905-794-2338

Date Rec. : 28 August 2023
LR Report: **CA19280-AUG23**
Reference: 23-3271

Copy: #1

CERTIFICATE OF ANALYSIS
Final Report

Analysis	1: Analysis Start Date	2: Analysis Start Time	3: Analysis Completed Date	4: Analysis Completed Time	5: Bag #1 Stock pile	6: Bag #2 Stock pile 2	7: Bag #3 Stock pile 3	8: Bag #4 Stock pile 4	9: Bag #5 Hill side	10: Bag #6 Stock pile / hill side
Sample Date & Time					21-Aug-23	21-Aug-23	21-Aug-23	21-Aug-23	21-Aug-23	21-Aug-23
% Moisture (wet wt) [%]	01-Sep-23	07:50	01-Sep-23	16:58	3.2	5.2	1.6	4.3	4.1	4.1
Hg MS [ug/g]	15-Sep-23	22:23	18-Sep-23	14:06	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Ag [µg/g]	15-Sep-23	22:23	18-Sep-23	14:06	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5
As [µg/g]	15-Sep-23	22:23	18-Sep-23	14:06	12	6.4	6.6	7.4	5.5	6.4
Al [µg/g]	15-Sep-23	22:23	18-Sep-23	14:06	22000	22000	22000	22000	19000	20000
Ba [µg/g]	15-Sep-23	22:23	18-Sep-23	14:06	24	24	25	23	23	29
Be [µg/g]	15-Sep-23	22:23	18-Sep-23	14:06	0.69	0.77	0.80	0.73	0.64	0.70
Bi [µg/g]	15-Sep-23	22:23	18-Sep-23	14:06	0.11	0.12	0.11	0.15	0.10	0.11
Ca [µg/g]	15-Sep-23	22:23	18-Sep-23	14:06	22000	9300	11000	12000	8400	11000
Cd [µg/g]	15-Sep-23	22:23	18-Sep-23	14:06	0.08	0.09	0.08	0.10	0.06	0.08
Co [µg/g]	15-Sep-23	22:23	18-Sep-23	14:06	16	16	17	17	14	15
Cr [µg/g]	15-Sep-23	22:23	18-Sep-23	14:06	140	140	130	140	120	130
Cu [µg/g]	15-Sep-23	22:23	18-Sep-23	14:06	30	32	35	42	24	29
Fe [µg/g]	15-Sep-23	22:23	18-Sep-23	14:06	40000	41000	42000	41000	40000	43000
K [µg/g]	15-Sep-23	22:23	18-Sep-23	14:06	1200	1300	1400	1200	1400	1200
Li [µg/g]	15-Sep-23	22:23	18-Sep-23	14:06	35	35	37	36	32	31
Mg [µg/g]	15-Sep-23	22:23	18-Sep-23	14:06	15000	15000	16000	14000	13000	15000
Mn [µg/g]	15-Sep-23	22:23	18-Sep-23	14:06	700	530	520	630	470	1400
Mo [µg/g]	15-Sep-23	22:23	18-Sep-23	14:06	0.5	0.4	0.4	0.4	0.4	0.5

SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

LR Report : **CA19280-AUG23**

Analysis	1: Analysis Start Date	2: Analysis Start Time	3: Analysis Completed Date	4: Analysis Completed Time	5: Bag #1 Stock pile	6: Bag #2 Stock pile 2	7: Bag #3 Stock pile 3	8: Bag #4 Stock pile 4	9: Bag #5 Hill side	10: Bag #6 Stock pile / hill side
Ni [µg/g]	15-Sep-23	22:23	18-Sep-23	14:06	43	45	46	45	39	42
Pb [µg/g]	15-Sep-23	22:23	18-Sep-23	14:06	11	9.2	10	12	8.4	8.6
Sb [µg/g]	15-Sep-23	22:23	18-Sep-23	14:06	< 6	< 6	< 6	< 6	< 6	< 6
Se [µg/g]	15-Sep-23	22:23	18-Sep-23	14:06	0.2	0.2	0.2	0.2	0.1	0.2
Sn [µg/g]	15-Sep-23	22:23	18-Sep-23	14:06	< 2	< 2	< 2	< 2	< 2	< 2
Sr [µg/g]	15-Sep-23	22:23	18-Sep-23	14:06	46	32	29	34	26	29
Ti [µg/g]	15-Sep-23	22:23	18-Sep-23	14:06	1700	1800	2000	2000	1900	2000
Tl [µg/g]	15-Sep-23	22:23	18-Sep-23	14:06	0.05	0.05	0.05	0.04	0.05	0.05
U [µg/g]	15-Sep-23	22:23	18-Sep-23	14:06	1.7	1.6	1.7	1.7	1.5	1.6
V [µg/g]	15-Sep-23	22:23	18-Sep-23	14:06	66	65	68	70	58	63
Y [µg/g]	15-Sep-23	22:23	18-Sep-23	14:06	11	12	13	13	12	12
Zn [µg/g]	15-Sep-23	22:23	18-Sep-23	14:06	72	76	75	82	63	68

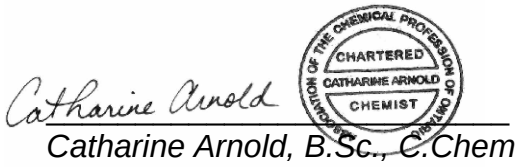
Method Descriptions

Units	Description	SGS Method Code
%	ARD Soil Moisture EPA 1310 or Reg.347	ME-CA-[ENV]ARD-LAK-AN-013
µg/g	Al by ICP-MS & aqua regia digest	ME-CA-[ENV]SPE-LAK-AN-005
µg/g	Sb by ICP-MS & aqua regia digest	ME-CA-[ENV]SPE-LAK-AN-005
µg/g	As by ICP-MS & aqua regia digest	ME-CA-[ENV]SPE-LAK-AN-005
µg/g	Ba by ICP-MS & aqua regia digest	ME-CA-[ENV]SPE-LAK-AN-005
µg/g	Be by ICP-MS & aqua regia digest	ME-CA-[ENV]SPE-LAK-AN-005
µg/g	Bi by ICP-MS & aqua regia digest	ME-CA-[ENV]SPE-LAK-AN-005
µg/g	Cd by ICP-MS & aqua regia digest	ME-CA-[ENV]SPE-LAK-AN-005
µg/g	Ca by ICP-MS & aqua regia digestion	ME-CA-[ENV]SPE-LAK-AN-005
µg/g	Cr by ICP-MS & aqua regia digest	ME-CA-[ENV]SPE-LAK-AN-005
µg/g	Co by ICP-MS & aqua regia digest	ME-CA-[ENV]SPE-LAK-AN-005
µg/g	Cu by ICP-MS & aqua regia digest	ME-CA-[ENV]SPE-LAK-AN-005
µg/g	Fe by ICP-MS & aqua regia digestion	ME-CA-[ENV]SPE-LAK-AN-005
µg/g	Pb by ICP-MS & aqua regia digest	ME-CA-[ENV]SPE-LAK-AN-005
µg/g	Li by ICP-MS & aqua regia digest	ME-CA-[ENV]SPE-LAK-AN-005
µg/g	Mg by ICP-MS & aqua regia digest	ME-CA-[ENV]SPE-LAK-AN-005
µg/g	Mn by ICP-MS & aqua regia digest	ME-CA-[ENV]SPE-LAK-AN-005
ug/g	Hg pulp by ICP-MS	ME-CA-[ENV]SPE-LAK-AN-004
µg/g	Mo by ICP-MS & aqua regia digest	ME-CA-[ENV]SPE-LAK-AN-005
µg/g	Ni by ICP-MS & aqua regia digest	ME-CA-[ENV]SPE-LAK-AN-005
µg/g	K by ICP-OES & aqua regia digestion	ME-CA-[ENV]SPE-LAK-AN-005
µg/g	Se by ICP-MS & aqua regia digest	ME-CA-[ENV]SPE-LAK-AN-005
µg/g	Ag by ICP-MS & aqua regia digest	ME-CA-[ENV]SPE-LAK-AN-005

SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

LR Report : **CA19280-AUG23**

Units	Description	SGS Method Code
µg/g	Sr by ICP-MS & aqua regia digest	ME-CA-[ENV]SPE-LAK-AN-005
µg/g	Tl by ICP-MS & aqua regia digest	ME-CA-[ENV]SPE-LAK-AN-005
µg/g	Sn by ICP-MS & aqua regia digest	ME-CA-[ENV]SPE-LAK-AN-005
µg/g	Ti by ICP-MS & aqua regia digest	ME-CA-[ENV]SPE-LAK-AN-005
µg/g	U by ICP-MS & aqua regia digest	ME-CA-[ENV]SPE-LAK-AN-005
µg/g	V by ICP-MS & aqua regia digest	ME-CA-[ENV]SPE-LAK-AN-005
µg/g	Y by ICP-MS & aqua regia digest	ME-CA-[ENV]SPE-LAK-AN-005
µg/g	Zn by ICP-MS & aqua regia digest	ME-CA-[ENV]SPE-LAK-AN-005



Catharine Arnold, B.Sc., C.Chem
Project Specialist,
Environment, Health & Safety

OnLine LIMS

0003474264

SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

LR Report : **CA19280-AUG23**

Quality Control Report

Inorganic Analysis													
Parameter	Reporting Limit	Unit	Method Blank	Duplicate				LCS / Spike Blank			Matrix Spike / Reference Material		
				Result 1	Result 2	RPD	Acceptance Criteria	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
							%		Low	High		Low	High
Mercury by CVAAS - QCBatchID: EMS0104-SEP23													
Mercury	0.05	ug/g	<0.05			ND	20	97	80	120	115	70	130
Metals in Soil - Aqua-regia/ICP-MS - QCBatchID: EMS0104-SEP23													
Aluminum	3	µg/g	<3			3	20	106	70	130	NV	70	130
Antimony	6	µg/g	<0.8			ND	20	102	70	130	NV	70	130
Arsenic	0.5	µg/g	<0.5			6	20	101	70	130	122	70	130
Barium	0.01	µg/g	<0.01			0	20	101	70	130	105	70	130
Beryllium	0.02	µg/g	<0.02			11	20	102	70	130	NV	70	130
Bismuth	0.09	µg/g	<0.09			4	20	94	70	130	NV	70	130
Cadmium	0.02	µg/g	<0.02			2	20	102	70	130	NV	70	130
Calcium	3	µg/g	4.8			1	20	97	70	130	NV	70	130
Chromium	0.5	µg/g	<0.5			1	20	108	70	130	94	70	130
Cobalt	0.01	µg/g	<0.01			3	20	109	70	130	108	70	130
Copper	0.1	µg/g	<0.1			1	20	108	70	130	103	70	130
Iron	3	µg/g	4.7			1	20	101	70	130	109	70	130
Lead	0.05	µg/g	<0.05			2	20	98	70	130	126	70	130
Lithium	2	µg/g	<2			1	20	100	70	130	NV	70	130
Magnesium	3	µg/g	<3			2	20	105	70	130	NV	70	130
Manganese	0.1	µg/g	<0.1			1	20	97	70	130	119	70	130
Molybdenum	0.1	µg/g	<0.1			2	20	102	70	130	NV	70	130
Nickel	0.1	µg/g	<0.1			1	20	101	70	130	98	70	130
Potassium	3	µg/g	<3			1	20	104	70	130	NV	70	130
Selenium	0.1	µg/g	<0.1			1	20	105	70	130	NV	70	130
Silver	0.5	µg/g	<0.01			1	20	95	70	130	126	70	130
Strontium	0.02	µg/g	<0.02			3	20	106	70	130	NV	70	130
Thallium	0.02	µg/g	<0.02			0	20	97	70	130	NV	70	130
Tin	2	µg/g	<2			ND	20	94	70	130	NV	70	130
Titanium	0.1	µg/g	<0.1			1	20	100	70	130	NV	70	130
Uranium	0.002	µg/g	<0.002			4	20	95	70	130	NV	70	130
Vanadium	1	µg/g	<1			0	20	104	70	130	111	70	130
Yttrium	0.004	µg/g	<0.004			1	20	107	70	130	NV	70	130
Zinc	0.7	µg/g	<0.7			2	20	109	70	130	101	70	130

SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

21-September-2023

Ecometrix
Attn : Derek Amores

6800 Campobello Road
Mississauga, ON
L5N 2L8, Canada

Phone: 905-794-2325
Fax:905-794-2338

Date Rec. : 28 August 2023
LR Report: **CA19281-AUG23**
Reference: 23-3271

Copy: #1

CERTIFICATE OF ANALYSIS
Final Report

Analysis	1: Analysis Start Date	2: Analysis Start Time	3: Analysis Completed Date	4: Analysis Completed Time	5: Bag #1 Stock pile	6: Bag #2 Stock pile 2	7: Bag #3 Stock pile 3	8: Bag #4 Stock pile 4	9: Bag #5 Hill side	10: Bag #6 Stock pile / hill side	11:BLK: $D.I. Leachate Blank
Sample Date & Time					21-Aug-23	21-Aug-23	21-Aug-23	21-Aug-23	21-Aug-23	21-Aug-23	
Sample weight [g]	11-Sep-23	06:30	12-Sep-23	16:37	250	250	250	250	250	250	---
Volume D.I. Water [mL]	11-Sep-23	06:30	12-Sep-23	16:37	750	750	750	750	750	750	750
pH [no unit]	12-Sep-23	08:30	12-Sep-23	16:37	9.08	8.71	9.32	8.92	8.53	8.98	5.60
pH [No unit]	13-Sep-23	10:22	14-Sep-23	10:36	8.52	7.97	7.95	7.91	7.94	8.12	5.72
Conductivity [uS/cm]	13-Sep-23	10:22	14-Sep-23	10:36	76	90	56	87	99	121	2
Alkalinity [mg/L as CaCO3]	13-Sep-23	10:22	14-Sep-23	10:36	39	46	28	39	48	57	< 2
SO4 [mg/L]	13-Sep-23	15:44	18-Sep-23	15:44	< 2	< 2	< 2	< 2	< 2	< 2	< 2
Hg [mg/L]	15-Sep-23	10:23	18-Sep-23	15:14	< 0.00001	0.00001	< 0.00001	0.00001	0.00002	< 0.00001	---
Ag (diss) [mg/L]	18-Sep-23	11:48	18-Sep-23	15:14	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005	< 0.00005
Al (diss) [mg/L]	18-Sep-23	11:48	18-Sep-23	15:14	0.478	0.310	0.653	0.510	0.369	0.387	< 0.001
As (diss) [mg/L]	18-Sep-23	11:48	18-Sep-23	15:14	0.0052	0.0031	0.0040	0.0029	0.0025	0.0010	< 0.0002
Ba (diss) [mg/L]	18-Sep-23	11:48	18-Sep-23	15:14	0.00202	0.00203	0.00091	0.00178	0.00306	0.00218	0.00015
B (diss) [mg/L]	18-Sep-23	11:48	18-Sep-23	15:14	0.021	0.015	0.016	0.016	0.014	0.014	< 0.002
Be (diss) [mg/L]	18-Sep-23	11:48	18-Sep-23	15:14	< 0.000007	0.000009	0.000014	0.000008	< 0.000007	< 0.000007	0.000019
Bi (diss) [mg/L]	18-Sep-23	11:48	18-Sep-23	15:14	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	< 0.00001	0.00002
Ca (diss) [mg/L]	18-Sep-23	11:48	18-Sep-23	15:14	9.60	10.4	6.32	8.56	10.9	12.8	0.02
Cd (diss) [mg/L]	18-Sep-23	11:48	18-Sep-23	15:14	0.000003	0.000005	0.000008	0.000004	0.000008	0.000058	< 0.000003
Co (diss) [mg/L]	18-Sep-23	11:48	18-Sep-23	15:14	0.000042	0.000079	0.000051	0.000100	0.000109	0.000033	< 0.000004
Cr (diss) [mg/L]	18-Sep-23	11:48	18-Sep-23	15:14	0.00032	0.00022	0.00019	0.00045	0.00027	0.00012	< 0.00008

SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

Analysis	1: Analysis Start Date	2: Analysis Start Time	3: Analysis Completed Date	4: Analysis Completed Time	5: Bag #1 Stock pile	6: Bag #2 Stock pile 2	7: Bag #3 Stock pile 3	8: Bag #4 Stock pile 4	9: Bag #5 Hill side	10: Bag #6 Stock pile / hill side	11:BLK: $D.I. Leachate Blank
Cu (diss) [mg/L]	18-Sep-23	11:48	18-Sep-23	15:14	0.0031	0.0043	0.0021	0.0052	0.0054	0.0032	< 0.0002
Fe (diss) [mg/L]	18-Sep-23	11:48	18-Sep-23	15:14	0.346	0.058	0.062	0.146	0.074	0.020	< 0.007
K (diss) [mg/L]	18-Sep-23	11:48	18-Sep-23	15:14	3.25	3.48	2.48	3.65	3.38	3.02	< 0.009
Li (diss) [mg/L]	18-Sep-23	11:48	18-Sep-23	15:14	0.0010	0.0015	0.0007	0.0011	0.0012	0.0009	< 0.0001
Mg (diss) [mg/L]	18-Sep-23	11:48	18-Sep-23	15:14	1.59	2.02	1.04	2.00	2.97	4.30	0.003
Mn (diss) [mg/L]	18-Sep-23	11:48	18-Sep-23	15:14	0.00503	0.00617	0.00233	0.00738	0.00727	0.00401	0.00012
Mo (diss) [mg/L]	18-Sep-23	11:48	18-Sep-23	15:14	0.00804	0.00220	0.00277	0.00154	0.00133	0.00169	0.00009
Na (diss) [mg/L]	18-Sep-23	11:48	18-Sep-23	15:14	3.66	3.66	3.12	4.01	3.68	3.02	0.01
Ni (diss) [mg/L]	18-Sep-23	11:48	18-Sep-23	15:14	0.0002	0.0004	0.0002	0.0005	0.0005	0.0003	< 0.0001
Pb (diss) [mg/L]	18-Sep-23	11:48	18-Sep-23	15:14	< 0.00009	0.00013	0.00021	0.00020	0.00021	< 0.00009	< 0.00009
Sb (diss) [mg/L]	18-Sep-23	11:48	18-Sep-23	15:14	0.0011	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009	< 0.0009
Se (diss) [mg/L]	18-Sep-23	11:48	18-Sep-23	15:14	0.00024	0.00022	0.00020	0.00053	0.00022	0.00025	< 0.00004
Si (diss) [mg/L]	18-Sep-23	11:48	18-Sep-23	15:14	2.72	2.55	2.69	2.43	2.18	2.14	< 0.02
Sn (diss) [mg/L]	18-Sep-23	11:48	18-Sep-23	15:14	0.00007	< 0.00006	< 0.00006	0.00030	0.00010	0.00006	0.00008
Sr (diss) [mg/L]	18-Sep-23	11:48	18-Sep-23	15:14	0.0341	0.0375	0.0236	0.0204	0.0242	0.0258	< 0.00008
Ti (diss) [mg/L]	18-Sep-23	11:48	18-Sep-23	15:14	0.00143	0.00241	0.00246	0.00544	0.00286	0.00092	< 0.00007
Tl (diss) [mg/L]	18-Sep-23	11:48	18-Sep-23	15:14	0.000009	0.000016	0.000007	0.000011	0.000012	0.000005	0.000036
U (diss) [mg/L]	18-Sep-23	11:48	18-Sep-23	15:14	0.001243	0.000583	0.000262	0.000580	0.000625	0.00102	0.000021
V (diss) [mg/L]	18-Sep-23	11:48	18-Sep-23	15:14	0.00353	0.00179	0.00473	0.00210	0.00144	0.00107	0.00003
Zn (diss) [mg/L]	18-Sep-23	11:48	18-Sep-23	15:14	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002	< 0.002

Method Descriptions

Units	Description	SGS Method Code
mg/L as CaCO3	Alkalinity by Titration	ME-CA-[ENV]EWL-LAK-AN-006
mg/L	Al by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
mg/L	Sb by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
mg/L	As by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
mg/L	Ba by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
mg/L	Be by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
mg/L	Bi by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
mg/L	B by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
mg/L	Cd by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
mg/L	Ca by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
mg/L	Cr by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
mg/L	Co by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
uS/cm	Conductivity by Conductivity Meter	ME-CA-[ENV]EWL-LAK-AN-006

SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

Units	Description	SGS Method Code
mg/L	Cu by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
mg/L	Fe by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
mg/L	Pb by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
mg/L	Ki by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
mg/L	Mg by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
mg/L	Mn by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
mg/L	Hg solutions by CVAAS	ME-CA-[ENV]SPE-LAK-AN-004
mg/L	Mo by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
mg/L	Ni by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
No unit	pH - solution	ME-CA-[ENV]EWL-LAK-AN-006
mg/L	K by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
no unit	pH taken prior to Filtration	NA
g	Weight of Sample used.	NA
mg/L	Se by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
mg/L	Si by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
mg/L	Ag by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
mg/L	Na by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
mg/L	Sr by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
mg/L	Sulphate by Ion Chromatography	ME-CA-[ENV]IC-LAK-AN-001
mg/L	Tl by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
mg/L	Sn by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
mg/L	Ti by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
mg/L	U by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
mg/L	V by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006
mL	---	NA
mg/L	Zn by ICP-MS solution (dissolved)	ME-CA-[ENV]SPE-LAK-AN-006

Catharine Arnold

CHARTERED CATHARINE ARNOLD CHEMIST — THE CHEMICAL PROFESSION OF ONTARIO

Catharine Arnold, B.Sc., C.Chem
Project Specialist,
Environment, Health & Safety

OnLine LIMS

0003474253

SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

Quality Control Report

Inorganic Analysis													
Parameter	Reporting Limit	Unit	Method Blank	Duplicate				LCS / Spike Blank			Matrix Spike / Reference Material		
				Result 1	Result 2	RPD	Acceptance Criteria	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
							%		Low	High		Low	High
Alkalinity - QCBatchID: EWL0222-SEP23													
Alkalinity	2	mg/L as Ca	< 2			1	20	109	80	120	NA		
Anions by IC - QCBatchID: DIO0315-SEP23													
Sulphate	0.2	mg/L	<0.2			10	20	99	90	110	103	75	125
Anions by IC - QCBatchID: DIO0464-SEP23													
Sulphate	0.2	mg/L	<0.2			ND	20	96	90	110	100	75	125
Conductivity - QCBatchID: EWL0222-SEP23													
Conductivity	2	uS/cm	2			1	20	100	90	110	NA		
Inorganics-General - QCBatchID: EHG0026-SEP23													
Mercury	0.00001	mg/L	< 0.00001			ND	20	92	80	120	80	70	130
Metals in aqueous samples - ICP-MS - QCBatchID: EMS0118-SEP23													
Aluminum (dissolved)	0.001	mg/L	<0.001			3	20	99	90	110	102	70	130
Antimony (dissolved)	0.0009	mg/L	<0.0009			ND	20	99	90	110	99	70	130
Arsenic (dissolved)	0.0002	mg/L	<0.0002			4	20	91	90	110	91	70	130
Barium (dissolved)	0.00008	mg/L	<0.00008			2	20	99	90	110	84	70	130
Beryllium (dissolved)	0.000007	mg/L	<0.000007			ND	20	96	90	110	100	70	130
Bismuth (dissolved)	0.00001	mg/L	<0.00001			ND	20	94	90	110	97	70	130
Boron (dissolved)	0.002	mg/L	<0.002			1	20	93	90	110	96	70	130
Cadmium (dissolved)	0.000003	mg/L	<0.000003			8	20	98	90	110	107	70	130
Calcium (dissolved)	0.01	mg/L	<0.01			4	20	101	90	110	102	70	130
Chromium (dissolved)	0.00008	mg/L	<0.00008			12	20	99	90	110	88	70	130
Cobalt (dissolved)	0.000004	mg/L	<0.000004			15	20	91	90	110	89	70	130
Copper (dissolved)	0.0002	mg/L	<0.0002			1	20	93	90	110	107	70	130
Iron (dissolved)	0.007	mg/L	<0.007			0	20	104	90	110	75	70	130
Lead (dissolved)	0.00009	mg/L	<0.00009			ND	20	97	90	110	99	70	130
Lithium (dissolved)	0.0001	mg/L	<0.0001			1	20	99	90	110	86	70	130
Magnesium (dissolved)	0.001	mg/L	<0.001			0	20	95	90	110	88	70	130
Manganese (dissolved)	0.00001	mg/L	<0.00001			1	20	92	90	110	84	70	130
Molybdenum (dissolved)	0.00004	mg/L	<0.00004			6	20	101	90	110	101	70	130
Nickel (dissolved)	0.0001	mg/L	<0.0001			4	20	91	90	110	85	70	130
Potassium (dissolved)	0.009	mg/L	<0.009			1	20	100	90	110	85	70	130
Selenium (dissolved)	0.00004	mg/L	<0.00004			7	20	99	90	110	100	70	130
Silicon (dissolved)	0.02	mg/L	<0.02			1	20	97	90	110	NV	70	130
Silver (dissolved)	0.00005	mg/L	<0.00005			ND	20	97	90	110	101	70	130
Sodium (dissolved)	0.01	mg/L	<0.01			1	20	96	90	110	91	70	130
Strontium (dissolved)	0.00008	mg/L	<0.00008			0	20	90	90	110	80	70	130

SGS Canada Inc.
P.O. Box 4300 - 185 Concession St.
Lakefield - Ontario - KOL 2HO
Phone: 705-652-2000 FAX: 705-652-6365

Inorganic Analysis														
Parameter	Reporting Limit	Unit	Method Blank	Duplicate				LCS / Spike Blank			Matrix Spike / Reference Material			
				Result 1	Result 2	RPD	Acceptance Criteria	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
							%		Low	High		Low	High
Thallium (dissolved)	0.000005	mg/L	<0.000005			ND	20	94	90	110	99	70	130
Tin (dissolved)	0.00006	mg/L	<0.00006			17	20	100	90	110	NV	70	130
Titanium (dissolved)	0.00007	mg/L	<0.00005			17	20	100	90	110	NV	70	130
Uranium (dissolved)	0.000002	mg/L	<0.000002			0	20	96	90	110	98	70	130
Vanadium (dissolved)	0.00001	mg/L	<0.00001			2	20	92	90	110	70	70	130
Zinc (dissolved)	0.002	mg/L	<0.002			1	20	95	90	110	112	70	130
pH - QCBatchID: EWL0222-SEP23													
pH	0.05	No unit	NA			0		100			NA		

Your Project #: 199-007
Your C.O.C. #: 954363-01-01

Attention: Kathryn Dawe

SEM Ltd.
79 Mew's Place
Second Floor
St. John's, NL
CANADA A1B 4N2

Report Date: 2023/11/21
Report #: R3429728
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C387130
Received: 2023/10/25, 09:20

Sample Matrix: Water
Samples Received: 7

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
pH @25°C (1, 2)	7	N/A	2023/11/01	AB SOP-00005	SM 24 4500-H+B m
Total Suspended Solids (NFR) (1)	7	2023/10/27	2023/10/27	AB SOP-00061	SM 24 2540 D m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by Bureau Veritas Calgary, 4000 - 19 St. , Calgary, AB, T2E 6P8
(2) The CCME method requires pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the CCME holding time. Bureau Veritas endeavours to analyze samples as soon as possible after receipt.

Your Project #: 199-007
Your C.O.C. #: 954363-01-01

Attention: Kathryn Dawe

SEM Ltd.
79 Mew's Place
Second Floor
St. John's, NL
CANADA A1B 4N2

Report Date: 2023/11/21
Report #: R3429728
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C387130
Received: 2023/10/25, 09:20

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:
Customer Solutions, Western Canada Customer Experience Team
Email: customersolutionswest@bureauveritas.com
Phone# (204) 772-7276

==========

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Scott Cantwell, General Manager responsible for Manitoba Environmental laboratory operations.

Bureau Veritas Job #: C387130
Report Date: 2023/11/21

SEM Ltd.
Client Project #: 199-007

RESULTS OF CHEMICAL ANALYSES OF WATER

Bureau Veritas ID			CCX343	CCX344	CCX345	CCX346		
Sampling Date			2023/10/21 10:30	2023/10/21 11:25	2023/10/22 12:02	2023/10/22 11:45		
COC Number			954363-01-01	954363-01-01	954363-01-01	954363-01-01		
	UNITS	Criteria	SANIKIUAGSITE 1	SANIKIUAGSITE 2	SANIKIUAGSITE 3	SANIKIUAGSITE 4	RDL	QC Batch
Misc. Inorganics								
pH	pH	6:9.5	7.72 (1)	8.12	8.11	8.16	N/A	B180741
Total Suspended Solids	mg/L	50	1.5	1.6	ND	ND	1.0	B173996

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
N/A = Not Applicable
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.
(1) Duplicate exceeds acceptance criteria due to sample non homogeneity. Reanalysis yields similar results.

Bureau Veritas ID			CCX347	CCX348	CCX349		
Sampling Date			2023/10/22 10:10	2023/10/22 09:35	2023/10/22 09:45		
COC Number			954363-01-01	954363-01-01	954363-01-01		
	UNITS	Criteria	SANIKIUAGSITE 5	CULVERT-UPSTM	CULVERT-DOWNSTM	RDL	QC Batch
Misc. Inorganics							
pH	pH	6:9.5	8.25	8.33	8.33	N/A	B180741
Total Suspended Solids	mg/L	50	ND	1.1	ND	1.0	B173996

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
N/A = Not Applicable
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.

Bureau Veritas Winnipeg: Unit D, 675 Berry Street R3H 1A7 Telephone (204) 772-7276 Fax (204) 772-2386

GENERAL COMMENTS

Criteria: TSS and pH Criteria for SEM Ltd.

Results relate only to the items tested.

Bureau Veritas Winnipeg: Unit D, 675 Berry Street R3H 1A7 Telephone (204) 772-7276 Fax (204) 772-2386

Bureau Veritas Job #: C387130
Report Date: 2023/11/21

SEM Ltd.
Client Project #: 199-007

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
B173996	HE1	Matrix Spike	Total Suspended Solids	2023/10/27		93	%	80 - 120
B173996	HE1	Spiked Blank	Total Suspended Solids	2023/10/27		99	%	80 - 120
B173996	HE1	Method Blank	Total Suspended Solids	2023/10/27	ND, RDL=1.0		mg/L	
B173996	HE1	RPD	Total Suspended Solids	2023/10/27	0.32		%	20
B180741	LQ1	Spiked Blank	pH	2023/11/01		101	%	97 - 103
B180741	LQ1	RPD [CCX343-01]	pH	2023/11/01	4.1		%	N/A

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Bureau Veritas Winnipeg: Unit D, 675 Berry Street R3H 1A7 Telephone (204) 772-7276 Fax (204) 772-2386

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Bureau Veritas Proprietary Software
Logiciel Propriétaire de Bureau Veritas

Automated Statchk

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Scott Cantwell, General Manager responsible for Manitoba Environmental laboratory operations.

Bureau Veritas Winnipeg: Unit D, 675 Berry Street R3H 1A7 Telephone (204) 772-7276 Fax (204) 772-2386

Your Project #: 199-007
Your C.O.C. #: 954363-01-01

Attention: Kathryn Dawe

SEM Ltd.
79 Mew's Place
Second Floor
St. John's, NL
CANADA A1B 4N2

Report Date: 2023/11/21
Report #: R3429728
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C387130
Received: 2023/10/25, 09:20

Sample Matrix: Water
Samples Received: 7

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
pH @25°C (1, 2)	7	N/A	2023/11/01	AB SOP-00005	SM 24 4500-H+B m
Total Suspended Solids (NFR) (1)	7	2023/10/27	2023/10/27	AB SOP-00061	SM 24 2540 D m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by Bureau Veritas Calgary, 4000 - 19 St. , Calgary, AB, T2E 6P8
(2) The CCME method requires pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the CCME holding time. Bureau Veritas endeavours to analyze samples as soon as possible after receipt.

Bureau Veritas Winnipeg: Unit D, 675 Berry Street R3H 1A7 Telephone (204) 772-7276 Fax (204) 772-2386

Your Project #: 199-007
Your C.O.C. #: 954363-01-01

Attention: Kathryn Dawe

SEM Ltd.
79 Mew's Place
Second Floor
St. John's, NL
CANADA A1B 4N2

Report Date: 2023/11/21
Report #: R3429728
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C387130
Received: 2023/10/25, 09:20

Encryption Key

Alejandro Escobar-Lopez
Customer Solutions Representative
22 Nov 2023 17:16:50

Please direct all questions regarding this Certificate of Analysis to:
Customer Solutions, Western Canada Customer Experience Team
Email: customersolutionswest@bureauveritas.com
Phone# (204) 772-7276

==========

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Scott Cantwell, General Manager responsible for Manitoba Environmental laboratory operations.

Bureau Veritas Winnipeg: Unit D, 675 Berry Street R3H 1A7 Telephone (204) 772-7276 Fax (204) 772-2386

Bureau Veritas Job #: C387130
Report Date: 2023/11/21

SEM Ltd.
Client Project #: 199-007

RESULTS OF CHEMICAL ANALYSES OF WATER

Bureau Veritas ID			CCX343	CCX344	CCX345	CCX346		
Sampling Date			2023/10/21 10:30	2023/10/21 11:25	2023/10/22 12:02	2023/10/22 11:45		
COC Number			954363-01-01	954363-01-01	954363-01-01	954363-01-01		
	UNITS	Criteria	SANIKIUAGSITE 1	SANIKIUAGSITE 2	SANIKIUAGSITE 3	SANIKIUAGSITE 4	RDL	QC Batch
Misc. Inorganics								
pH	pH	6:9.5	7.72 (1)	8.12	8.11	8.16	N/A	B180741
Total Suspended Solids	mg/L	50	1.5	1.6	ND	ND	1.0	B173996

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
N/A = Not Applicable
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.
(1) Duplicate exceeds acceptance criteria due to sample non homogeneity. Reanalysis yields similar results.

Bureau Veritas ID			CCX347	CCX348	CCX349		
Sampling Date			2023/10/22 10:10	2023/10/22 09:35	2023/10/22 09:45		
COC Number			954363-01-01	954363-01-01	954363-01-01		
	UNITS	Criteria	SANIKIUAGSITE 5	CULVERT-UPSTM	CULVERT-DOWNSTM	RDL	QC Batch
Misc. Inorganics							
pH	pH	6:9.5	8.25	8.33	8.33	N/A	B180741
Total Suspended Solids	mg/L	50	ND	1.1	ND	1.0	B173996

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
N/A = Not Applicable
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.

Bureau Veritas Winnipeg: Unit D, 675 Berry Street R3H 1A7 Telephone (204) 772-7276 Fax (204) 772-2386

GENERAL COMMENTS

Criteria: TSS and pH Criteria for SEM Ltd.

Results relate only to the items tested.

Bureau Veritas Winnipeg: Unit D, 675 Berry Street R3H 1A7 Telephone (204) 772-7276 Fax (204) 772-2386

Bureau Veritas Job #: C387130
Report Date: 2023/11/21

SEM Ltd.
Client Project #: 199-007

QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
B173996	HE1	Matrix Spike	Total Suspended Solids	2023/10/27		93	%	80 - 120
B173996	HE1	Spiked Blank	Total Suspended Solids	2023/10/27		99	%	80 - 120
B173996	HE1	Method Blank	Total Suspended Solids	2023/10/27	ND, RDL=1.0		mg/L	
B173996	HE1	RPD	Total Suspended Solids	2023/10/27	0.32		%	20
B180741	LQ1	Spiked Blank	pH	2023/11/01		101	%	97 - 103
B180741	LQ1	RPD [CCX343-01]	pH	2023/11/01	4.1		%	N/A

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

Bureau Veritas Winnipeg: Unit D, 675 Berry Street R3H 1A7 Telephone (204) 772-7276 Fax (204) 772-2386

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Bureau Veritas Proprietary Software
Logiciel Propriétaire de Bureau Veritas

Automated Statchk

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Scott Cantwell, General Manager responsible for Manitoba Environmental laboratory operations.

Bureau Veritas Winnipeg: Unit D, 675 Berry Street R3H 1A7 Telephone (204) 772-7276 Fax (204) 772-2386