

Mount Nansen May 2016

Groundwater Monitoring and Sampling

Prepared for:

Government of Yukon

Assessment and Abandoned Mines Branch

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September 2016

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1.0 INTRODUCTION

This Work was performed in accordance with Contract C00033455 between Hemmera Envirochem Inc. (“Hemmera”) and Government of Yukon (“Client”), dated May 13, 2016 (“Contract”). In performing this Work, Hemmera has relied in good faith on information provided by others, and has assumed that the information provided by those individuals is both complete and accurate. This Work was performed to current industry standard practice for similar environmental work, within the relevant jurisdiction and same locale. The findings presented herein should be considered within the context of the scope of work and project terms of reference; further, the findings are time sensitive and are considered valid only at the time the Report was produced. The conclusions and recommendations contained in this Report are based upon the applicable guidelines, regulations, and legislation existing at the time the Report was produced; any changes in the regulatory regime may alter the conclusions and/or recommendations.

Hemmera Envirochem Inc. and Ecological Logistics & Research Ltd. (Hemmera/ELR) were retained by the Government of Yukon (GY), Assessment and Abandoned Mines (AAM) to conduct a groundwater monitoring and sampling program at the Mount Nansen Site (the Site) in May, 2016. Hemmera/ELR’s scope of work included the monitoring of groundwater wells and collection of groundwater samples from a series of existing groundwater wells at the Site. This report summarizes the monitoring and sampling activities, a description of methodologies and field conditions encountered, a summary of field *in-situ* and laboratory analytical results including a comparison to applicable guidelines, a description of any observations and/or occurrences that may have influenced program results, and recommendations relating to sample procedures and monitoring well conditions. This report does not provide an interpretation of the results, nor does it provide recommendations relating to groundwater quality at the Site.

1.1 SITE LOCATION

The Mount Nansen site is located approximately 45 kilometres (km) west of the Town of Carmacks (70 km by road). This Type II abandoned mine site consists of three (3) primary areas of existing infrastructure: the Brown McDade Pit, a Mill Complex, and a Tailings Facility (**Figure 1-1**). Groundwater monitoring wells exist throughout the Site, a subset of which were sampled during the May 2016 groundwater monitoring and sampling program. The groundwater monitoring locations included in this program are described in **Sections 1.2** and **1.3**.

1.2 SCOPE OF WORK

The scope of work for this program included the coordination and execution of the May 2016 groundwater monitoring and sampling, analysis of samples, and the presentation of results in a report.

Groundwater sampling at the Site was conducted over a four (4) day period, between May 24 and May 27, 2016. Sampling was conducted by a team of four (4) qualified field staff from Hemmera/ELR (Jeremy Chua, Michelle McKay, Norbert Botca, and Kristina Beckmann). A total of 60 groundwater wells were included in the May 2016 sampling event (**Table 1-1**). It was not possible to sample two (2) of the groundwater wells listed in the scope of work as they have appeared to have been destroyed during placer mining operations in the summer of 2015 (GSI-PC-02-B and MP09-02; Hemmera, 2015).

At each well (sampling station) headspace gas concentrations were measured, well and water level parameters were measured (depth to water, depth to bottom, well diameter, and well stick-up height), the well was purged, and then prescribed *in-situ* groundwater quality parameters were measured. Lastly, groundwater samples were collected for laboratory analysis. A detailed description of the sampling methods and measured groundwater quality parameters is provided in **Section 2**.

1.3 SAMPLE SITES

The groundwater wells included in the May 2016 monitoring and sampling event were grouped into six (6) main areas of the Mount Nansen Site (**Table 1-1**). The majority of groundwater wells were located around existing infrastructure including the tailings facility and seepage dam (24 wells), the Brown McDade Pit (11 wells) and the Mill Complex (9 wells). Additional wells (primarily drive-point piezometer installations) were sampled in the vicinity of Dome Creek (9 wells) and Pony Creek (7 wells). **Table 1-1** provides the location, status, and sample recovery for groundwater wells included in the May 2016 sampling program. The well locations are also illustrated in **Figures 1-2** and **1-3**. Photographs of each sample site visited in May 2016 are included in **Appendix A**.

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NOTES:
 1. Units: Meters
 2. Projection: UTM Zone 8 NAD83
 3. 2008 Quickbird imagery (courtesy of Yukon Geomatics) and spatial data provided by Yukon government.

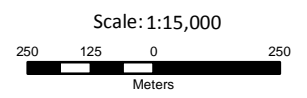
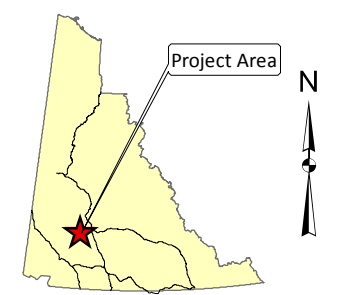
**Mount Nansen Site - May 2016
 Groundwater Monitoring Program**



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Yukon
 Energy, Mines and Resources
 Assessment and Abandoned Mines

Legend

— Watercourses



September 8, 2016

Hemerra Project: 1343-005.27
 ELR Project: 16-239.1

FIGURE 1-1
 Site Location - Mount Nansen Site

Table 1-1 Summary of Groundwater Well Locations and Samples Collected

Area	Well Name	UTM (Zone 08N)		Status	Sample Collected	QA/QC Sample Collected
		Easting	Northing			
Dome Creek	GSI-DC-01B	387675	6881124	Frozen	-	-
	GSI-DC-02B	387879	6881129	Frozen	-	-
	GSI-DC-03B	388107	6881079	Frozen	-	-
	GSI-DC-05B	388725	6880836	Frozen ²	-	-
	GSI-DC-06B	389788	6880567	Frozen	-	-
	GSI-DC-07B	390065	6880641	Frozen	-	-
	GSI-DC-08-B	390311	6880583	Frozen	-	-
	GSI-DC-09-B	390614	6880494	Frozen	-	-
	GSI-DC-10-B	390859	6880447	Frozen	-	-
Mill Complex	GSI-HA-01A	387842	6881132	Direct Sampled ¹	✓	-
	GSI-HA-02A	387861	6881135	Frozen	-	-
	GSI-HA-03A	387878	6881131	Frozen	-	-
	GSI-HA-04A	387916	6881130	Direct Sampled ¹	✓	-
	GSI-HA-05A	387898	6881125	Frozen	-	-
	MW09-16	387992	6881094	Good	✓	Field Blank
	MW09-17	388075	6880970	Frozen	-	-
	MW09-18	388054	6880986	Good	✓	-
	MW09-19	388051	6881016	Frozen	-	-
Brown McDade Pit	CH-P-13-01/10	388657	6881116	Frozen	-	-
	CH-P-13-03/50	389143	6881110	Direct Sampled ¹	✓	-
	CH-P-13-04/10	389138	6881472	Frozen	-	-
	CH-P-13-04/35	389138	6881472	Frozen	-	-
	CH-P-13-05/50	388954	6881466	Not Accessible ³	-	-
	GLL07-01	388851	6881783	Frozen	-	-
	GLL07-02	389069	6881703	Dry	-	-
	GLL07-03	388959	6881477	Not Accessible ³	-	-
	MW09-13	389006	6881664	Frozen	-	-
	MW09-14	389008	6881669	Frozen	-	-
MW09-15	388920	6881727	Frozen	-	-	
Pony Creek	GSI-PC-02-B	388907	6881786	Destroyed ⁴	-	-
	GSI-PC-03-B	389256	6881706	Direct Sample ¹	✓	Field Blank
	GSI-PC-04-B	389586	6881656	Frozen	-	-
	GSI-PC-05-B	389713	6881661	Frozen	-	-
	MP09-02	388867	6881816	Destroyed ⁴	-	-
	MP09-03	388956	6881739	Frozen	-	-
	MP09-08	389160	6881718	Good	✓	Duplicate

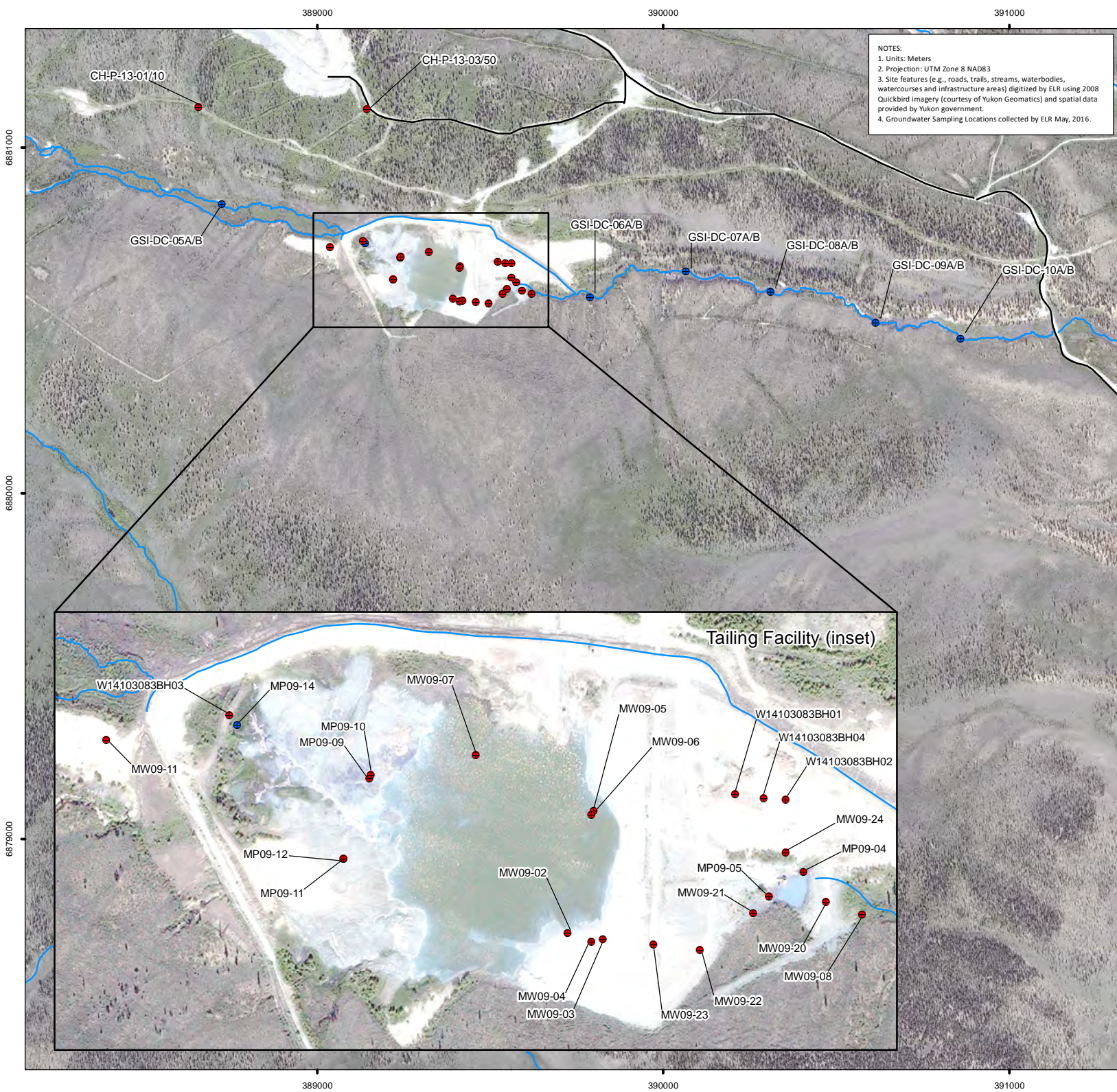
Area	Well Name	UTM (Zone 08N)		Status	Sample Collected	QA/QC Sample Collected
		Easting	Northing			
Seepage Dam	W14103083BH01	389522	6880669	Frozen	-	-
	W14103083BH02	389561	6880665	Frozen	-	-
	W14103083BH04	389544	6880666	Frozen	-	-
Tailings Facility	MP09-04	389575	6880609	Good	✓	-
	MP09-05	389548	6880590	Good	✓	Duplicate
	MP09-09	389240	6880681	Frozen	-	-
	MP09-10	389241	6880684	Frozen	-	-
	MP09-11	389220	6880619	Frozen	-	-
	MP09-12	389220	6880619	Frozen	-	-
	MP09-14	389138	6880722	Direct Sampled ¹	✓	-
	MW09-02	389393	6880562	Good	✓	-
	MW09-03	389411	6880555	Good	✓	-
	MW09-04	389420	6880557	Good	✓	-
	MW09-05	389413	6880656	Dry	-	-
	MW09-06	389411	6880653	Good	✓	-
	MW09-07	389322	6880699	Dry	-	-
	MW09-08	389620	6880576	Good	✓	-
	MW09-11	389037	6880711	Dry	-	-
	MW09-20	389592	6880586	Dry	-	-
	MW09-21	389536	6880577	Frozen	-	-
	MW09-22	389495	6880549	Direct Sampled ¹	✓	-
	MW09-23	389459	6880553	Good	✓	-
MW09-24	389561	6880624	Good	✓	Duplicate, Field Blank	
	W14103083BH03	389132	6880730	Frozen	-	-

Notes: ¹ Direct sampling was completed at sample stations where insufficient volume had been encountered during the event, which limited standard purging and sampling methodologies.

² Groundwater well was found buried beneath ice and could therefore not be monitored.

³ Monitoring wells CH-P-13-05/50 and GLL07-03 were not visited during the May 2016 field event due to pit wall stability safety concerns.

⁴ Destroyed wells are included in the scope of work and are therefore listed above in the summary table.



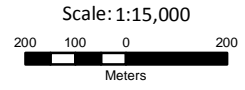
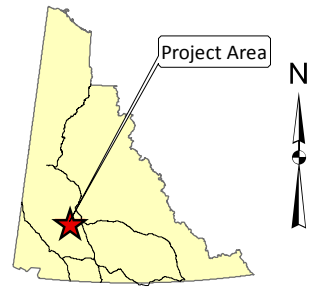
NOTES:
 1. Units: Meters
 2. Projection: UTM Zone 8 NAD83
 3. Site features (e.g., roads, trails, streams, waterbodies, watercourses and infrastructure areas) digitized by ELR using 2008 Quickbird imagery (courtesy of Yukon Geomatics) and spatial data provided by Yukon government.
 4. Groundwater Sampling Locations collected by ELR May, 2016.

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- Legend**
- ⊕ Destroyed
 - Drive Point
 - Monitoring Well
 - Watercourses



September 8, 2016

Hemmera Project: 1343-005.27
 ELR Project: 16-239.1

FIGURE 1-2
 Groundwater Sampling Locations
 Dome Creek and Tailings Facility

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NOTES:
 1. Units: Meters
 2. Projection: UTM Zone 8 NAD83
 3. Site features (e.g., roads, trails, streams, waterbodies, watercourses and infrastructure areas) digitized by ELR using 2008 Quickbird imagery and spatial data provided (courtesy of Yukon government).
 4. Groundwater Sampling Locations collected by ELR May, 2016.

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Mount Nansen Site - May 2016
 Groundwater Monitoring Program

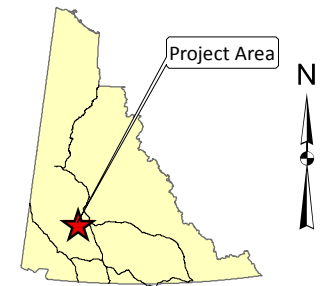


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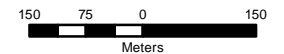


Legend

- Destroyed
- Drive Point
- Monitoring Well
- Watercourses



Scale: 1:10,000



September 08, 2016

Hemmera Project: 1343-005.27
 ELR Project: 16-239.1

FIGURE 1-3

Groundwater Sampling Locations
 Mill Complex and Brown McDade Pit

2.0 METHODOLOGY

1.4 PROTOCOLS

Groundwater purging, monitoring and sampling conducted by Hemmera/ELR were completed in accordance with the Groundwater Sampling Standard Operating Procedures included in the document *Scope of Work: Mount Nansen Groundwater Scope of Work*. These procedures were consistent with Environment Yukon's *Protocol for the Contaminated Sites Regulation #7 - Sampling and Decommissioning* (Environment Yukon, 2011). Methods used were also consistent with the ASTM D4448-01 *Standard Guide for Sampling Groundwater Monitoring Wells* (ASTM, 2013), and the D6452-99 *Guide for Purging Methods for Wells used for Groundwater Quality Investigations* (ASTM, 2012).

1.5 WELL MEASUREMENTS AND PURGING

Upon arriving at each sample station, headspace gases were measured prior to any other well measurements. Oxygen (%), carbon dioxide (ppm), and methane (%LEL) were measured using a Rae Systems MultiRAE Four-Gas Monitor with photoionization detector (PID).

The well structure and casing were inspected for damage, closure, and general conditions. Depth to water (DTW; m), depth to bottom (DTB; m), well diameter (cm), and well stick-up height (m) were then recorded at each well.

DTB and DTW were measured using either a Solinst - Model 102 Water Level Meter (for 2.54 cm diameter wells) or a Solinst – Model 122 Interface Meter (for wells with diameter greater than 2.54 cm). DTB and DTW were measured from (in order of preference): 1) a black mark drawn on the top of the well; 2) the bottom of the most significant notch found on the top of the PVC if a mark was not present; or 3) a line that was drawn on the highest point of the well if no distinguishable point of measure was present. Stick-up height was measured from the lowest point on the bottom of the well casing to the highest point (or distinguishing mark) on the well. Water level meters were cleaned between each sample site using Alconox low-foaming phosphate-free detergent solution and deionized water.

Following initial inspection and measurements, groundwater wells were purged and sampled using dedicated equipment. Groundwater wells were purged and sampled using one of three (3) techniques: 1) manual purging using high density polyethylene (HDPE) Waterra tubing and a footvalve, 2) GeoPump peristaltic pump with HDPE tubing, or 3) manual purging using disposable polyethylene bailers. The purging technique chosen for each well was that which would produce the most representative groundwater sample.

Groundwater wells were determined to be sufficiently purged when either three (3) successive field parameter measurements were recorded to be within an allowable tolerance level (as summarized in **Table 2-1**, below) or when a volume of water equivalent to three (3) standing well volumes of water had been purged.

Groundwater turbidity measured in Nephelometric Turbidity Units (NTU) or Attenuation Units (AU) was also measured prior to sampling (described below in **Section 2.4**) and was used as an indication of sample quality. Where possible, samples were not collected until turbidity was less than 50 NTU. Purge volumes and purge rates were measured using a graduated container and stop watch. All well measurements, purging details, and additional field notes were recorded on customized field forms in order to minimize the potential for field errors.

Table 2-1 Groundwater Sampling – Field Parameter Purging Criteria

Field Parameter	Allowable Variance
Temperature (°C)	± 3%
pH	± 0.1
Conductivity (µS/cm)	± 3%
Specific Conductivity (µS/cm)	± 3%

1.6 DIRECT SAMPLING

During previous events a select number of groundwater wells were found to have an insufficient volume of groundwater to sample using conventional methods, limiting the number of wells that were sampled during the event. An alternate sampling strategy was established in 2014 by AAM’s consultant (AMEC) in order to obtain samples from low producing wells; this continued to be followed during the May 2016 sampling event. At wells identified as regularly having insufficient volume of water or insufficient recharge, Hemmera/ELR direct sampled (analytical samples collected prior to purging or collecting field parameter measurements), after which time field parameter measurements were collected if possible. Additionally, a priority ranking order for analytical sample collection previously established by AAM’s consultant (AMEC) was used when collecting samples at these direct sampled wells (as summarized in **Table 2-2**). This ranking system was established to ensure that samples for the highest priority parameters were collected first at each well if limited recharge or volume was encountered. Where the volume or recharge limited sample collected, Hemmera/ELR also re-visited wells when feasible, to attempt to collect a more thorough or complete sample set.

In addition to the priority ranking order, Hemmera/ELR also adhered to minimum required sample volumes for laboratory procedures (provided to Hemmera/ELR by ALS Laboratories) where well volume was limited. This allowed the maximum number of program parameters to be collected when volumes were limited.

1.7 FIELD PARAMETERS

Hemmera/ELR measured *in-situ* water quality parameters using YSI Professional Plus multi-parameter field meters, Lamotte 2020we turbidity meters, and Hach DR 890 Portable Colorimeters. Flow-through cells were used with the YSI meters to minimize field parameter variability; flow-through cells improve the precision of field measurements by limiting sample water contact with air, and by continuously moving sample water across the field meter sensors. The *in-situ* groundwater quality parameters recorded at each sample station included water temperature (°C), specific conductivity (µs/cm), conductivity (µs/cm), oxidation/reduction potential (ORP; mv), pH (pH units), sulphide (mg/l), dissolved oxygen (mg/l and percent saturation), and turbidity (NTU).

During purging, field parameters were monitored at 3 minute intervals, or at volume related intervals (e.g., every 500 mL) in the case of wells with slow recharge. In-situ measurements for reporting purposes were recorded at the conclusion of purging.

1.8 GROUNDWATER SAMPLING

Groundwater quality samples were collected and preserved in accordance with laboratory directions, and using techniques consistent with *Standard Methods for the Examination of Water and Wastewater* (Rice et al., 2012). ALS Global was the analytical laboratory chosen for this project, and a summary of the sample bottle set (including parameters analysed and preservation techniques) is provided in **Table 2-2**.

Table 2-2 Groundwater Sampling Parameter Priority, Preservation, and Intended Analysis

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment	Preservative Added
1a	120 ml (plastic)	Dissolved Metals	100 ml	Field Filtered and Preserved	HNO ₃
1b	40 ml (glass)	Dissolved Mercury	15 mL	Field Filtered and Preserved	HCl
2	500 ml (plastic)	General Chemistry	100 ml	-	-
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	Preserved	NaOH
4	120 ml (glass amber)	Ammonia (NH ₃)	60 ml	Preserved	H ₂ SO ₄
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	Preserved	HNO ₃
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-

1.9 DATA MANAGEMENT AND ANALYSIS

Groundwater analytical field and laboratory results were tabulated and reviewed using Hemmera/ELR's EQWin Data Manager water quality database. Data was tabulated for the report and compared to the Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines for the Protection of Freshwater Aquatic Life (FAL; CCME, 2014) standards using the database application. All relevant CCME FAL guidelines are presented alongside data in **Table A**.

1.10 QUALITY ASSURANCE AND QUALITY CONTROL

1.10.1 FIELD QA/QC

Several controls were used by Hemmera/ELR staff while in the field to ensure that sample integrity was maintained and that data were recorded completely and accurately. All equipment used during the sampling process was dedicated to individual wells, including HDPE tubing and Waterra footvalves, laboratory provided pre-cleaned sample bottles, disposable filters, disposable syringes, and disposable polyethylene bailers. Field staff used dedicated disposable nitrile gloves for all measurements, purging, and sampling. Water level meters were cleaned between well locations using Alconox low-foaming phosphate-free detergent and deionized water, and field instruments (YSI field meters, turbidity meters, and portable colorimeters) were checked and calibrated before the site visit to ensure the parameters recorded were as accurate as possible.

Project-specific field data sheets were created for the sampling event to help ensure that all required measurements were taken, and that information was recorded correctly. Field data sheets have been included as **Appendix B** of this report.

1.10.2 ANALYTICAL QA/QC

Analytical QA/QC measures were included in the May 2016 sampling program as outlined in the scope of work and as per standard industry practice. This included the collection of field duplicates and field blanks, and the use of travel blanks. Duplicate samples were collected at a ratio of 10% of the regular samples (1 duplicate was collected for every 10 samples), and one (1) field blank was prepared during each day of sampling (4 field blanks collected). Two travel blanks accompanied the analytical supplies and samples from the laboratory to the field, and back to the laboratory again (1 for each shipment).

The variation between sample and duplicate results was calculated as relative percent difference (RPD). RPD provides a measure of the relative difference between two values in comparison to their mean value, and is calculated as the difference between a sample and its field duplicate over the average of two values. RPD values greater than 20% indicate a greater than expected variation in data that could potentially have affected the precision of sampling or analysis. RPD was calculated according to the following formula:

$$\%RPD = \left(\frac{\chi_1 - \chi_2}{\left(\frac{\chi_1 + \chi_2}{2} \right)} \right) \times 100$$

Where X_1 is the sample result and X_2 is the corresponding duplicate result. RPD is not considered valid and is therefore not calculated if either the sample or the field duplicate concentration is less than five times the detection limit.

The analytical results for field and travel blanks were reviewed to determine whether any of the parameters tested were detected (i.e., result exceeding the detection limit). In such cases, the parameter or element in question and its concentration were reviewed to determine potential sources of contamination or error.

3.0 RESULTS

A summary of laboratory analytical results in the context of CCME FAL guidelines is presented in **Table A** of this report. A summary of the QA/QC sampling results is presented in **Table B**, including analytical data for duplicates, field blanks, and travel blanks. Laboratory analytical reports are presented in **Appendix C**.

3.1 GROUNDWATER SAMPLING SUMMARY

Groundwater sampling was completed between May 24 and May 27, 2016. Weather conditions varied throughout the time of sampling with ambient air temperature ranging from 2 to 12 °C. Periods of heavy to light snow and rain, and heavy to light wind occurred throughout the sampling event.

Of the sixty (60) wells specified for the May 2016 sampling event, fifty-five (55) were located and assessed during the program. As noted in **Section 1.2**, two (2) groundwater wells listed in the scope of work had previously been reported as destroyed (GSI-PC-02-B and MP09-02), two (2) were not accessible due to safety concerns at the Brown McDade Pit (GLL07-03 and CH-P-13-05/50), and one (1) was covered in ice in the Dome Creek valley and could not be monitored (GSI-DC-05-B). Further details concerning these wells are provided in **Section 3.2**.

Of the fifty-five (55) wells located, eighteen (18) wells were sampled; twelve (12) using purging and sample methods as per the program protocols, and six (6) direct sampled without purging according to the sample priority ranking (**Table 2-2**). In three (3) of the six (6) direct sampled wells, volumes were insufficient to collect a full sample set. **Table 3-1** provides a summary of limited sample set collection.

Of the remaining thirty-seven (37) wells that were assessed but not sampled during the program, thirty-two (32) wells were frozen, and five (5) wells were dry. Despite not collecting water quality samples, these wells were still assessed and water/ice depth, well depth, and headspace gas measurements were collected to the extent possible. A summary of the overall condition (status) and sampling result for groundwater wells is provided in **Table 1-1**, and a summary of all well measurements, purge details, and *in-situ* parameter results is provided in **Table 3-2**.

Table 3-1 Summary of Direct Samples Collected During May 2016 Sampling Program

Well Name	Dissolved Metals	Dissolved Mercury	Physical Parameters/Anions/ Nutrients	Cyanide	Ammonia	Thiocyanate	Total Inorganic Carbon
Priority	1a	1b	2	3	4	5	6
GSI-PC-03B	✓	✓	✓	-	-	-	-
GSI-HA-01A	✓	✓	✓	✓	✓	✓	✓
GSI-HA-04A	✓	✓	✓	✓	✓	✓	✓
CH-P-13-03/50	✓	✓	✓	-	-	-	-
MP09-14	✓	-	-	-	-	-	-
MW09-22	✓	✓	✓	✓	✓	✓	✓

Notes: Refer to **Section 2.2** for details concerning direct sampling methodologies, including minimum volume collection. Samples were collected based on field priority ranking as specified in **Table 2-2**.

Table 3-2 Groundwater Field Parameters and Well Measurements for May 2016 Sampling Program

Area	Location ID	Sample Date	Status	Stick up Height (m)	Depth To Water (m)	Depth to Bottom (m)	Standing Water Volume (L)	Volume Purged (L)	Purge Start Time	Purge End Time	Elapsed Purge Time	Purge Rate (l/min)	Criteria ¹ (3WV/PS/DS)	Draw Down (m)	pH	Temperature (°C)	Conductivity (µS/cm)	Specific Conductivity (µS/cm)	ORP (mV)	Dissolved Oxygen (mg/L)	Field Sulphide (mg/L)	Methane (%LEL)	Oxygen (%)	Carbon Dioxide (ppm)	Field Turbidity (NTU)	Method Used	Well Diameter (cm)
Dome Creek	GSI-DC-01A	5/25/2016	Frozen	0.92	0.929	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	300	-	-	2.54	
	GSI-DC-01B	5/25/2016	Frozen	0.94	1.345	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	300	-	-	2.54	
	GSI-DC-02A	5/25/2016	Frozen	0.99	-	1.69	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	400	-	-	2.54	
	GSI-DC-02B	5/25/2016	Frozen	0.83	0.923	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	400	-	-	2.54	
	GSI-DC-03A	5/25/2016	Frozen	0.76	1.010	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	200	-	-	2.54	
	GSI-DC-03B	5/25/2016	Frozen	0.79	0.929	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	200	-	-	2.54	
	GSI-DC-05A	5/25/2016	Frozen	0.40	0.543	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	30.9	200	-	-	2.54	
	GSI-DC-05B ³	5/25/2016	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	GSI-DC-06A	5/26/2016	Frozen	0.84	1.433	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	49	200	-	-	2.54	
	GSI-DC-06B	5/26/2016	Frozen	0.25	1.213	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	49	200	-	-	2.54	
	GSI-DC-07A	5/27/2016	Frozen	0.81	0.922	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	300	-	-	2.54	
	GSI-DC-07B	5/27/2016	Frozen	0.86	0.922	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	1500	-	-	2.54	
	GSI-DC-08A	5/27/2016	Frozen	1.00	1.317	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	200	-	-	2.54	
	GSI-DC-08B	5/27/2016	Frozen	0.33	0.593	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	400	-	-	2.54	
	GSI-DC-09A	5/27/2016	Frozen	0.95	1.182	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	300	-	-	2.54	
	GSI-DC-09B	5/27/2016	Frozen	0.89	1.155	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	300	-	-	2.54	
GSI-DC-10A	5/27/2016	Frozen	1.18	1.431	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	300	-	-	2.54		
GSI-DC-10B	5/27/2016	Frozen	1.10	1.314	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	300	-	-	2.54		
Mill Complex	GSI-HA-01A ²	5/25/2016	Direct Sample	1.16	2.219	3.122	0.286	-	-	-	-	-	DS	-	-	-	-	-	-	-	0.06	0	20.9	400	76.1	peristaltic	2.54
	GSI-HA-02A	5/25/2016	Frozen	1.55	2.391	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	300	-	-	2.54	
	GSI-HA-03A	5/25/2016	Frozen	0.96	0.973	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	400	-	-	2.54	
	GSI-HA-04A ²	5/25/2016	Direct Sample	0.61	1.615	1.854	0.12	-	-	-	-	-	-	DS	-	-	-	-	-	-	0	20.7	400	-	-	peristaltic	2.54
	GSI-HA-05A	5/25/2016	Frozen	1.19	0.966	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	300	-	-	2.54	
	MW09-16	5/24/2016	Good	1.38	1.956	2.727	1.542	2.5	16:20	16:45	0:25	0.10	PS	0.001	6.7	4.2	1257	2086	170.2	0.97	0	0	20.3	2800	0.71	peristaltic	5.08
	MW09-17	5/25/2016	Frozen	0.98	1.310	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	30.9	2500	-	-	5.08	
	MW09-18	5/25/2016	Good	0.90	4.320	7.878	6.934	2.51	8:11	8:37	0:26	0.10	PS	0.004	6.77	0.5	1465	2750	185.9	2.27	0.02	0	20.9	200	6.16	peristaltic	5.08
MW09-19	5/25/2016	Frozen	0.99	2.025	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	300	-	-	5.08		

Area	Location ID	Sample Date	Status	Stick up Height (m)	Depth To Water (m)	Depth to Bottom (m)	Standing Water Volume (L)	Volume Purged (L)	Purge Start Time	Purge End Time	Elapsed Purge Time	Purge Rate (l/min)	Criteria ¹ (3WV/PS/DS)	Draw Down (m)	pH	Temperature (°C)	Conductivity (µS/cm)	Specific Conductivity (µS/cm)	ORP (mV)	Dissolved Oxygen (mg/L)	Field Sulphide (mg/L)	Methane (%LEL)	Oxygen (%)	Carbon Dioxide (ppm)	Field Turbidity (NTU)	Method Used	Well Diameter (cm)
Brown McDade Pit	CH-P-13-01/10	5/25/2016	Frozen	0.50	6.610	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	200	-	-	3.81	
	CH-P-13-03/50 ²	5/25/2016	Direct Sample	0.59	49.433	50.478	0.523	-	-	-	-	-	DS	-	-	-	-	-	-	-	-	0	20.9	200	-	disp. bailer	3.81
	CH-P-13-04/10	5/25/2016	Frozen	0.63	6.198	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	200	-	-	3.81
	CH-P-13-04/35	5/25/2016	Frozen	0.62	6.492	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	200	-	-	3.81
	CH-P-13-05/50 ⁴	5/25/2016	Not Accessible	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.08
	GLL07-01	5/25/2016	Frozen	0.78	13.853	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.6	700	-	-	5.08
	GLL07-02	5/27/2016	Dry	1.35	-	7.125	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	300	-	-	5.08
	GLL07-03 ⁴	5/25/2016	Not Accessible	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.08
	MW09-13	5/25/2016	Frozen	0.76	5.942	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	39.9	300	-	-	5.08
	MW09-14	5/25/2016	Frozen	0.74	5.070	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	200	-	-	5.08
Pony Creek	GSI-PC-02A ⁵	5/27/2016	Destroyed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	GSI-PC-03A	5/27/2016	Good	0.97	0.955	1.234	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	300	-	-	5.08	
	GSI-PC-03B ²	5/27/2016	Direct Sample	1.01	1.075	2.833	0.44	-	-	-	-	-	DS	-	-	-	-	-	-	-	0	20.9	500	-	peristaltic	1.27	
	GSI-PC-04A	5/27/2016	Frozen	0.98	1.257	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	300	-	-	1.27	
	GSI-PC-04B	5/27/2016	Frozen	0.99	1.278	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	200	-	-	1.27	
	GSI-PC-05A	5/27/2016	Frozen	0.92	1.119	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.8	9600	-	-	1.27	
	GSI-PC-05B	5/27/2016	Frozen	-	1.152	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	300	-	-	1.27	
	MP09-02 ⁵	5/27/2016	Destroyed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MP09-03	5/27/2016	Frozen	0.62	1.618	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	29.9	200	-	-	1.27	
MP09-08	5/27/2016	Good	0.77	0.548	1.971	0.36	2.1	11:39	11:53	0:14	0.15	PS	-	6.89	2.41	405	712	-22.6	5.06	0.14	0	20.9	300	0.85	-	1.27	
Seepage Dam	W14103083BH01	5/25/2016	Frozen	0.63	6.529	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.6	700	-	peristaltic	1.27	
	W14103083BH02	5/25/2016	Frozen	0.79	6.729	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.7	400	-	peristaltic	2.54	
	W14103083BH04	5/25/2016	Frozen	0.77	6.515	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.6	300	-	peristaltic	2.54	

Area	Location ID	Sample Date	Status	Stick up Height (m)	Depth To Water (m)	Depth to Bottom (m)	Standing Water Volume (L)	Volume Purged (L)	Purge Start Time	Purge End Time	Elapsed Purge Time	Purge Rate (l/min)	Criteria ¹ (3WV/PS/DS)	Draw Down (m)	pH	Temperature (°C)	Conductivity (µS/cm)	Specific Conductivity (µS/cm)	ORP (mV)	Dissolved Oxygen (mg/L)	Field Sulphide (mg/L)	Methane (%LEL)	Oxygen (%)	Carbon Dioxide (ppm)	Field Turbidity (NTU)	Method Used	Well Diameter (cm)
Tailings Facility	MP09-04	5/26/2016	Good	1.23	2.035	2.214	0.2	1.95	8:22	8:40	0:18	0.11	PS	0	6.93	2.10	691	1229	214.1	4.89	0.01	0	20.9	700	2.1	peristaltic	5.08
	MP09-05	5/26/2016	Good	1.05	1.447	1.829	0.42	1.65	7:58	8:13	0:15	0.11	3WV	0.016	6.79	1.5	1169	2121	-32.4	0.83	0.01	0	30.49	200	2.66	-	5.08
	MP09-09	5/26/2016	Frozen	2.55	3.052	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	30.9	300	-	peristaltic	5.08
	MP09-10	5/26/2016	Frozen	2.26	3.502	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	300	-	-	2.54
	MP09-11	5/26/2016	Frozen	1.96	2.715	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	99	17.2	1600	-	peristaltic	2.54
	MP09-12	5/26/2016	Frozen	2.00	2.664	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	300	-	-	2.54
	MP09-14 ²	5/26/2016	Direct Sample	0.72	1.140	1.61	0.09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	300	-	-	2.54
	MW09-02	5/26/2016	Good	0.73	3.420	4.728	2.616	1.2	11:08	11:24	0:16	0.08	PS	0.53	7.22	2.53	1387	2425	-87.2	0.39	0.05	0	20.9	400	11.83	-	2.54
	MW09-03	5/26/2016	Good	0.42	7.714	9.927	4.426	1.4	12:03	12:35	0:32	0.04	PS	0.146	8.5	4.21	1519	2519	-96.9	0.32	0.02	0	20.9	300	1.61	peristaltic	2.54
	MW09-23	26/05/2016	Good	0.19	13.428	15.928	5	12	9:50	10:02	0:12	1	PS	-	6.98	0.5	865	1624	-28.7	2.72	-	0	20.9	200	50.5	Waterra	5.08
	MW09-24	25/05/2016	Good	0.65	9.663	11.631	3.936	45	17:02	18:00	0:58	0.78	PS	0.022	7.41	2.06	572	1012	141.1	4.33	0.14	0	20.9	900	27.4	Waterra	5.08
	W14103083BH03	26/05/2016	Frozen	1.28	1.774	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	200	-	-	5.08
	MW09-04	5/26/2016	Good	0.33	4.983	7.666	5.366	1.5	12:54	13:18	0:24	0.06	PS	0.627	8.32	3.50	1479	2509	7.6	0.18	0	0	20.9	300	0.21	-	5.08
	MW09-05	5/26/2016	Dry	1.47	-	1.47	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	14.2	2400	-	-	5.08
	MW09-06	5/26/2016	Good	2.00	3.161	6.048	3.8	3.45	11:05	11:27	0:22	0.16	PS	0.269	7.11	3.3	1144	1957	118.2	0.52	0.07	0	34.9	300	24.7	-	5.08
	MW09-07	5/25/2016	Dry	1.40	-	3.405	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	400	-	-	5.08
	MW09-08	5/26/2016	Good	1.14	1.99	3.901	3.822	2.5	9:18	9:36	0:18	0.14	PS	0	6.65	1.87	373	669	-59.2	0.51	0.11	0	20.9	700	3.94	-	5.08
	MW09-11	5/25/2016	Dry	0.81	-	4.926	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.7	1000	-	-	5.08
	MW09-20	5/25/2016	Dry	0.91	-	3.692	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	200	-	-	5.08
	MW09-21	5/26/2016	Frozen	0.82	1.149	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	200	-	-	5.08
MW09-22 ²	5/26/2016	Direct Sample	0.87	5.107	5.28	0.346	-	-	-	-	-	-	DS	-	-	-	-	-	-	-	0	20.9	300	-	-	5.08	

Notes: To maximize the sample return for analytical analysis, field parameters were not collected at all direct sampled wells. Shaded rows indicate monitoring stations where analytical samples were collected.

¹ 3WV = Three standing well volumes purged prior to sample collection, PS = field parameters stabilized prior to sample collection, and DS = sample collected directly without purging.

² Due to low well volumes (direct sampling), field parameters were not measured.

³ Well found frozen beneath ice and therefore could not be monitored.

⁴ Well was not accessible during the sampling event due to health and safety concerns in the Brown McDade Pit.

⁵ Well has been destroyed by placer mining activity.

3.2 ANALYTICAL RESULTS

Analytical results are summarized below, including a brief summary of CCME FAL guideline exceedances and a description of any known factors that may have influenced the data. Details regarding well status, including a description of damaged or underperforming wells, are also provided.

In several instances, laboratory reportable detection limits (RDL) for parameters exceeded applicable CCME FAL standards (lightly shaded values in **Table A**). In these cases, samples having elevated levels of certain parameters required laboratory dilution prior to performing the required analyses, thereby resulting in an elevated RDL. For the purpose of this report, samples where the reported RDL is greater than the applicable guideline have not been reported as CCME FAL exceedances.

3.2.1 DOME CREEK

Groundwater wells along Dome Creek were monitored between May 25 and May 27, 2016. None of the nine (9) drive-point piezometers located in this area could be sampled as they were all frozen during the time of sampling (GSI-DC-01B, GSI-DC-02B, GSI-DC-03B, GSI-DC-05B, GSI-DC-06B, GSI-DC-07B, GSI-DC-08B, GSI-DC-09B, GSI-DC-10B). Of the nine (9) wells reported to be frozen, one (1) was completely buried beneath ice and could not be inspected or monitored. A summary of field measurements, including headspace gases, is provided in **Table 3-2**.

3.2.2 MILL COMPLEX

Groundwater in the Mill Complex Area was sampled on May 24 and May 25, 2016. Samples were obtained from four (4) of the nine (9) wells identified in this area. The other five (5) of the wells located in this area were found frozen during the time of sampling (GSI-HA-02A, GSI-HA-03A, GSI-HA-05A, MW09-17, and MW09-19). Drive-points GSI-HA-01A and GSI-HA-04A were direct sampled without purging, while wells MW09-16 and MW09-18 were sampled according program protocols. A summary of the samples collected is provided in **Table 3-1**, and analytical results are provide in **Table A**.

CCME FAL guideline exceedances were observed at all of the four (4) sites sampled in the Mill Complex area, including exceedances of dissolved fluoride (three sites), dissolved arsenic (four sites), dissolved copper (one site), dissolved iron (two sites) and dissolved zinc (one site). Where measured (two sites), field dissolved oxygen concentrations were below the CCME FAL minimum concentration. A summary of CCME FAL guideline exceedances is provided in **Table 3-3**.

Where measured, groundwater turbidity of three (3) of the samples collected within this area was below 50 NTU, while one (1) was measured at 76.1 NTU (GSI-HA-01A) (**Table 3-2**).

Table 3-3 Summary of CCME FAL Guideline Exceedances for May 2016 Sampling Program

Area	Sample ID	Date Sampled	Parameter	Field Dissolved Oxygen	Ammonia, Total (as N)	Fluoride (F)	Nitrite (as N)	Cyanide, Free	Dissolved Arsenic (As)	Dissolved Copper (Cu)	Dissolved Iron (Fe)	Dissolved Selenium (Se)	Dissolved Silver (Ag)	Dissolved Uranium (U)	Dissolved Zinc (Zn)		
			Units	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L	mg/L
			CCME-FAL ¹	9.5	Varies	0.12	0.06	0.005	0.005	Varies	0.3	0.001	0.0001	0.015	0.03		
Mill Complex	GSI-HA-01A	5/25/2016	Direct Sample	-	-	0.133	-	-	0.00534	-	5.07	-	-	-	-		
	GSI-HA-04A ²	5/25/2016	Direct Sample	-	-	-	-	-	0.0249	-	1.80	-	-	-	-		
	MW09-16	5/24/2016	Good	0.97	-	0.13	-	-	0.0244	0.00575	-	-	-	-	6.94		
	MW09-18	5/25/2016	Good	2.27	-	<0.20	-	-	0.0490	-	-	-	-	-	-		
Brown McDade Pit	CH-P-13-03/50 ³	5/25/2016	Direct Sample	-	-	<0.20	-	-	-	-	-	0.00717	-	-	-		
Pony Creek	GSI-PC-03B	5/27/2016	Direct Sample	-	-	<0.40	-	-	0.0874	0.00541	7.28	-	-	0.0239	0.0376		
	MP09-08	5/27/2016	Good	5.06	-	-	-	-	0.0148	-	1.11	-	-	-	-		
Tailings Facility	MP09-04	5/26/2016	Good	4.89	-	-	-	-	-	-	-	-	-	-	-		
	MP09-05	5/26/2016	Good	0.83	-	-	-	-	0.0230	-	50.9	-	-	-	-		
	MP09-14	5/26/2016	Direct Sample	-	-	-	-	-	0.809	-	0.600	-	-	-	-		
	MW09-02	5/26/2016	Good	0.39	-	0.54	-	<0.010	8.95	-	15.4	-	-	-	0.213		
	MW09-03	5/26/2016	Good	0.32	6.18	0.30	0.075	-	2.08	0.0047	-	-	-	-	-		
	MW09-04	5/26/2016	Good	0.18	7.04	0.32	-	-	3.55	-	-	-	-	-	0.630		
	MW09-06	5/26/2016	Good	0.52	-	0.23	-	-	0.108	0.0104	-	-	0.000120	-	0.383		
	MW09-08	5/26/2016	Good	0.51	-	0.124	-	-	0.208	-	80.0	-	-	-	-		
	MW09-22 ⁴	5/27/2016	Direct Sample	-	-	-	-	-	-	-	0.936	-	-	-	-		
	MW09-23	5/26/2016	Good	2.72	-	-	-	-	0.0283	-	18.0	-	-	-	-		
MW09-24	5/25/2016	Good	4.33	-	-	-	-	-	0.00579	-	-	-	-	-			

Notes: ¹ CCME guideline exceedances shaded with dark grey. Light grey shading denotes reportable detection limit in exceedance of CCME guideline.

² Due to slow recharge and low well volumes, samples were collected from GSI-HA-04A between May 25 and 27, 2016. Dissolved metals and dissolved mercury were collected on May 25, 2016. All other parameters were collected on May 27, 2016.

³ Due to slow recharge and low well volumes, samples were collected from CH-P-13-03/50 between May 25 and 27, 2016. Dissolved metals were collected on May 25, 2016. Dissolved mercury and general chemistry were collected on May 27, 2016.

⁴ Due to slow recharge and low well volumes, field parameters were measured for well MW09-22 on May 26, 2016. Laboratory analyzed samples were collected on May 27, 2016.

“-“ indicates either no exceedance was observed or no analysis was conducted. Refer to **Table A** for full analytical report.

3.2.3 BROWN MCDADE PIT

Groundwater wells in the Brown McDade Pit area were sampled between May 25 and May 27, 2016. Samples were obtained from only one (1) of the eleven (11) sites identified in this area (CH-P-13-03/50), which was direct sampled without purging. Seven (7) wells were frozen during the site visit (CH-P-13-01/10, CH-P-13-04/10, CH-P-13-04/35, GLL07-01, MW09-13, MW09-14, and MW09-15), and one (1) well was dry (GLL07-02). Two (2) wells (CH-P-13-05/50 and GLL07-03) were not accessible during the time of sampling due to safety concerns due to pit wall instability. Access to the Brown McDade Pit was restricted by AAM and Denison Environmental Services (DES) during the site visit. A summary of the samples collected is provided in **Table 3-1**, and analytical results are provide in **Table A**.

CCME FAL guideline exceedances were observed in the one (1) site sampled in this area, including exceedances of dissolved fluoride (one site), and dissolved selenium (one site). A summary of CCME FAL guideline exceedances is provided in **Table 3-3**.

Due to limited well volumes, groundwater turbidity was not measured at the sample location (CH-P-13-03/50) within the Brown McDade Pit area (**Table 3-2**).

3.2.4 PONY CREEK

Groundwater wells along Pony Creek were monitored on May 27, 2016. Three (3) of the seven (7) groundwater wells identified in the Pony Creek area were frozen during the time of sampling (GSI-PC-04B, GSI-PC-05B, and MP09-03). Two (2) of the four (4) remaining wells identified in this area were previously destroyed by placer mining activity (GSI-PC-02B and MP09-02) and therefore could not be monitored. Of the remaining two (2) wells sampled, one (1) was sampled directly without purging (GSI-PC-03B), and one (1) was sampled according to program protocols (MP09-08). A summary of the samples collected is provided in **Table 3-1**, and analytical results are provide in **Table A**.

CCME FAL guideline exceedances were observed at the two (2) sites sampled in the Pony Creek area, including exceedances of dissolved arsenic (two sites), dissolved copper (one site), dissolved iron (two sites), dissolved uranium (one site), and dissolved zinc (one site). Where measured (one site), field dissolved oxygen concentration was below the minimum CCME FAL guideline level. A summary of CCME FAL guideline exceedances is provided in **Table 3-3**.

Where measured, groundwater turbidity of the samples collected in this area were below 50 NTU. Due to limited well volumes, groundwater turbidity was not measured at the sample location (GSI-PC-03B) within the Pony Creek area (**Table 3-2**).

3.2.5 SEEPAGE DAM

Groundwater wells in the Seepage Dam area were monitored on May 25, 2016. All three (3) of the groundwater wells in this area were frozen at the time of sampling. A summary of field measurements collected for each site is provided **Table 3-2**.

3.2.6 TAILINGS FACILITY

Groundwater wells in the Tailings Facility area were sampled between May 25 and 26, 2016. Samples were obtained from eleven (11) of the twenty-one (21) sample sites located in this area. Six (6) of the twenty-one (21) groundwater wells identified in the Tailings Facility area were frozen at the time of sampling (MP09-09, MP09-10, MP09-11, MP09-12, MW09-21, and W14103083BH03). Four (4) of the twenty-one (21) groundwater wells identified in the Tailings Facility were dry at the time of sampling (MW09-05, MW09-07, MW09-11, and MW09-20). Of the eleven (11) wells sampled in the Tailings Facility area, two (2) were direct sampled (MP09-14, and MW09-22), while the other nine (9) were purged prior to sampling (MP09-04, MP09-05, MW09-02, MW09-03, MW09-04, MW09-06, MW09-08, MW09-23, and MW09-24). A summary of the samples collected is provided in **Table 3-1**, and analytical results are provide in **Table A**.

CCME FAL guideline exceedances were observed at all eleven (11) sites sampled in the Tailings Facility area, including exceedances of total ammonia (two sites), dissolved fluoride (five sites), nitrite (one site), free cyanide (one site), dissolved arsenic (eight sites), dissolved copper (three sites), dissolved iron (six sites), dissolved silver (one site), and dissolved zinc (three sites). Field dissolved oxygen concentrations were below the minimum CCME FAL guideline level at nine (9) of the sampled sites. Due to insufficient volume, field dissolved oxygen concentrations were not measured at two (2) of the eleven (11) sites sampled (MP09-14, and MW09-22). A summary of CCME FAL guideline exceedances is provided in **Table 3-3**.

Groundwater turbidity exceeded 50 NTU (50.5 NTU) at one (1) of the nine (9) sites (MW09-23) measured (**Table 3-2**).

3.3 QUALITY ASSURANCE AND QUALITY CONTROL RESULTS

Three (3) duplicate groundwater samples were collected during the May 2016 sampling event. Two (2) travel blanks were provided by the laboratory and accompanied the samples throughout the sampling program, and four (4) field blanks were prepared on site during the sampling program. Detailed results of QA/QC sampling are provided in **Table B**, including RPD values for all duplicate and sample pairs.

3.3.1 FIELD AND TRAVEL BLANKS

All travel blank analytical results were reported as less than the RDL with the exception of total ammonia (0.0354 mg/L) in the first of two travel blanks (**Table B**). The program analytical laboratory (ALS Global) indicated that the detection of low levels of ammonia should not be considered an indication of contamination as low concentrations of ammonia are occasionally detected in travel blanks that are prepared too early in advance of the field program. All other analytical results in both travel blanks were reported below RDL (**Table B**).

Across three (3) of the four (4) field blanks, analytical results were all reported as less than the RDL (**Table B**). In the fourth field blank (FB1) dissolved aluminum (0.0038 mg/L) and dissolved manganese (0.00023 mg/L) were detected. Although detectable, the observed values were very close to RDL (<4x RDL of 0.001 mg/L for aluminum and <3x RDL of 0.0001 mg/L for manganese). At the time of sampling the field crew experienced moderate to high winds capable of picking up small particles, which may have accounted for the detections.

3.3.2 FIELD DUPLICATES

3.3.2.1 MW09-24 and DUP-1

Duplicate and duplicate pair analytical results produced an RPD value for dissolved manganese of 26.44%, which was above the acceptable range of variability (i.e. 20%). Field notes and measurements do not identify any potential source of contamination or suggest variability in groundwater quality during the purging process (**Table 3-2**).

All other parameter duplicate and sample analytical results for MW09-24 and DUP-1 produced RPD values below the 20% RPD threshold limit (**Table B**).

3.3.2.2 MP09-05 and DUP-2

All sample and duplicate pair analytical results produced RPD values for samples MP09-05 and DUP-2 below the 20% RPD threshold limit (**Table B**).

3.3.2.3 MP09-08 and DUP-3

All sample and duplicate pair analytical results produced RPD values for samples MP09-08 and DUP-3 were below the 20% RPD threshold limit (**Table B**).

3.3.3 QUALITY ASSURANCE AND QUALITY CONTROL SUMMARY

Results for the QA/QC analytical program show minimal evidence of sampling variation or contamination during the field collection process and transportation, and that program results are acceptable.

Travel blank analytical results suggest no external sources of contamination during the transportation process. Although low levels of total ammonia were detected in one of the travel blanks, ALS has indicated that these results do not suggest an external source of contamination.

The detection of low levels (near RDL) of aluminum and manganese suggests that slight contamination from the field environment may have occurred, although the concentrations suggest that this type of contamination would not affect program results. The lack of detections in the other three field blanks also suggests that it is not a systematic occurrence.

Across the results for three sample and duplicate pairs, the occurrence of only one RDL exceedance suggests that overall variability was very low. Field notes for that result did not identify any potential sources of contamination or suggest variability in groundwater quality during the sampling process, and therefore a systematic or site-specific bias is not believed to have occurred (**Table 3-2**). The observed RPD value is considered to be most likely the result of small variations in groundwater quality during sampling, in particular because this site was sampled manually using Waterra tubing in a shallow water column (1.968 m), and groundwater turbidity at this site was observed to be moderately high (27.4 NTU). Therefore, the motion of the sampling technique could have stirred up fine sediments at the bottom of the well.

4.0 RECOMMENDATIONS

Hemmera/ELR do not have program recommendations based on the observations and results of the May 2016 groundwater sampling program.

5.0 CLOSURE

We have appreciated the opportunity of working with you on this project and trust that this report is satisfactory to your requirements. Please feel free to contact the undersigned regarding any questions or further information that you may require.

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6.0 REFERENCES

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TABLES

**Table A: Groundwater Sampling Analytical Results and CCME Guideline Exceedances
for 2015 September Sampling Program**

Site Location		Dome Creek										Mill Complex							
Sample ID		GSI-DC-01B	GSI-DC-02B	GSI-DC-03B	GSI-DC-05B	GSI-DC-06B	GSI-DC-07B	GSI-DC-08B	GSI-DC-09B	GSI-DC-10B	GSI-HA-01A	GSI-HA-02A	GSI-HA-03A	GSI-HA-04A ¹³	GSI-HA-05A	MW09-16	MW09-17	MW09-18	MW09-19
Date Sampled		25/05/2016	25/05/2016	25/05/2016	25/05/2016	26/05/2016	27/05/2016	27/05/2016	27/05/2016	27/05/2016	25/05/2016	25/05/2016	25/05/2016	25/05/2016	25/05/2016	24/05/2016	25/05/2016	25/05/2016	25/05/2016
ALS Work Number											L1774699			L1775300	L1774699			L1774699	
Station Status		Frozen	Frozen	Frozen	Frozen	Frozen	Frozen	Frozen	Frozen	Frozen	Direct Sample	Frozen	Frozen	Direct Sample	Frozen	Good	Frozen	Good	Frozen
Parameter	Units	CCME-FAL ^{1,2,3,4}																	
Physical Tests																			
Lab pH	pH units	6.5-9.0 ⁵	-	-	-	-	-	-	-	-	8.16	-	-	7.59	-	7.44	-	7.80	-
Field pH	pH units	6.5-9.0 ⁵	-	-	-	-	-	-	-	-	-	-	-	-	-	6.7	-	6.77	-
Field Temperature	C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.2	-	0.5	-
Lab Conductivity	uS/cm	-	-	-	-	-	-	-	-	-	823	-	-	347	-	2060	-	2740	-
Field Conductivity	uS/cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1257	-	1465	-
Field Specific Conductivity	uS/cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2086	-	2750	-
Total Hardness (as CaCO3)	mg/L	-	-	-	-	-	-	-	-	-	528	-	-	262	-	1390	-	1870	-
Field Dissolved Oxygen	mg/L	9.5 ⁶	-	-	-	-	-	-	-	-	-	-	-	-	-	0.97	-	2.27	-
Field Oxidation - Redox Potent	mV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	170.2	-	185.9	-
Field Turbidity	NTU	-	-	-	-	-	-	-	-	-	76.1	-	-	-	-	0.71	-	6.16	-
Anions and Nutrients																			
Alkalinity, Total (CaCO3)	mg/L	-	-	-	-	-	-	-	-	-	243	-	-	136	-	195	-	423	-
Alkalinity, Total (CaCO3, filtered)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia, Total (as N)	mg/L	Varies ⁷	-	-	-	-	-	-	-	-	0.0384	-	-	0.0641	-	0.0267	-	0.0118	-
Ammonia CCME-FAL	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	32.5	-	37.59	-
Chloride (Cl)	mg/L	-	-	-	-	-	-	-	-	-	0.97	-	-	<0.50	-	<2.5	-	<5.0	-
Fluoride (F)	mg/L	0.12	-	-	-	-	-	-	-	-	0.133	-	-	0.097	-	0.13	-	<0.20	-
Nitrate (as N)	mg/L	13	-	-	-	-	-	-	-	-	0.0123	-	-	0.0059	-	<0.025	-	0.077	-
Nitrite (as N)	mg/L	0.06	-	-	-	-	-	-	-	-	0.0036	-	-	<0.0010	-	<0.0050	-	<0.010	-
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	-	-	-	-	-	0.566	-	-	1.38	-	0.167	-	0.108	-
Sulfate (SO4)	mg/L	-	-	-	-	-	-	-	-	-	220	-	-	68.3	-	1100	-	1390	-
Field Sulphide	mg/L	-	-	-	-	-	-	-	-	-	0.06	-	-	-	-	0	-	0.02	-
Anion Sum	meq/L	-	-	-	-	-	-	-	-	-	9.47	-	-	-	-	26.8	-	37.3	-
Cation Sum	meq/L	-	-	-	-	-	-	-	-	-	11.1	-	-	-	-	28.5	-	38.1	-
Cation - Anion Balance	%	-	-	-	-	-	-	-	-	-	8.0	-	-	-	-	3.0	-	1.1	-
Cyanides																			
Cyanide, Total	mg/L	-	-	-	-	-	-	-	-	-	<0.0050	-	-	<0.0050	-	<0.010	-	<0.0050	-
Cyanide, Free	mg/L	0.005	-	-	-	-	-	-	-	-	<0.0050	-	-	<0.0050	-	<0.0050	-	<0.0050	-
Cyanide, Weak Acid Diss	mg/L	-	-	-	-	-	-	-	-	-	<0.0050	-	-	<0.0050	-	<0.0050	-	<0.0050	-
Thiocyanate (SCN)	mg/L	-	-	-	-	-	-	-	-	-	<0.50	-	-	<0.50	-	<0.50	-	<0.50	-
Organic/Inorganic Carbon																			
Total Inorganic Carbon	mg/L	-	-	-	-	-	-	-	-	-	60.4	-	-	30.8	-	53.2	-	118	-
Total Organic Carbon	mg/L	-	-	-	-	-	-	-	-	-	13.6	-	-	18.0	-	3.78	-	3.20	-

**Table A: Groundwater Sampling Analytical Results and CCME Guideline Exceedances
for 2015 September Sampling Program**

Site Location		Brown McDade Pit											Pony Creek						Seepage Dam				
Sample ID		CH-P-13-01/10	CH-P-13-03/50	CH-P-13-04/10	CH-P-13-04/35	CH-P-13-05/50	GLL07-01	GLL07-02	GLL07-03	MW09-13	MW09-14	MW09-15	GSI-PC-02B	GSI-PC-03B	GSI-PC-04B	GSI-PC-05B	MP09-02	MP09-03	MP09-08	W14103083BH01	W14103083BH02	W14103083BH04	
Date Sampled		25/05/2016	25/05/2016	25/05/2016	25/05/2016	25/05/2016	25/05/2016	27/05/2016	25/05/2016	25/05/2016	25/05/2016	25/05/2016	27/05/2016	27/05/2016	27/05/2016	27/05/2016	27/05/2016	27/05/2016	27/05/2016	25/05/2016	25/05/2016	25/05/2016	
ALS Work Number			L1774699											L1775300						L1775300			
Station Status		Frozen	Direct Sample	Frozen	Frozen	Not Accessible	Frozen	Dry	Not Accessible	Frozen	Frozen	Frozen	Destroyed	Direct Sample	Frozen	Frozen	Destroyed	Frozen	Good	Frozen	Frozen	Frozen	
Parameter	Units	CCME-FAL ^{1,2,3,4}																					
Physical Tests																							
Lab pH	pH units	6.5-9.0 ⁵	-	7.98	-	-	-	-	-	-	-	-	-	8.12	-	-	-	-	-	7.53	-	-	-
Field pH	pH units	6.5-9.0 ⁵	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6.89	-	-	-
Field Temperature	C	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.41	-	-	-
Lab Conductivity	uS/cm	-	-	3300	-	-	-	-	-	-	-	-	-	3920	-	-	-	-	-	726	-	-	-
Field Conductivity	uS/cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	405	-	-	-
Field Specific Conductivity	uS/cm	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	712	-	-	-
Total Hardness (as CaCO3)	mg/L	-	-	1760	-	-	-	-	-	-	-	-	-	2790	-	-	-	-	-	413	-	-	-
Field Dissolved Oxygen	mg/L	9.5 ⁶	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.06	-	-	-
Field Oxidation - Redox Potent	mV	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-22.6	-	-	-
Field Turbidity	NTU	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.85	-	-	-
Anions and Nutrients																							
Alkalinity, Total (CaCO3)	mg/L	-	-	374	-	-	-	-	-	-	-	-	-	900	-	-	-	-	-	225	-	-	-
Alkalinity, Total (CaCO3, filtered)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia, Total (as N)	mg/L	Varies ⁷	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.0318	-	-	-
Ammonia CCME-FAL	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	24.33	-	-	-
Chloride (Cl)	mg/L	-	-	30.2	-	-	-	-	-	-	-	-	-	<10	-	-	-	-	-	<0.50	-	-	-
Fluoride (F)	mg/L	0.12	-	<0.20	-	-	-	-	-	-	-	-	-	<0.40	-	-	-	-	-	0.077	-	-	-
Nitrate (as N)	mg/L	13	-	0.964	-	-	-	-	-	-	-	-	-	<0.10	-	-	-	-	-	<0.0050	-	-	-
Nitrite (as N)	mg/L	0.06	-	0.016	-	-	-	-	-	-	-	-	-	<0.020	-	-	-	-	-	<0.0010	-	-	-
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.233	-	-	-
Sulfate (SO4)	mg/L	-	-	1550	-	-	-	-	-	-	-	-	-	2030	-	-	-	-	-	172	-	-	-
Field Sulphide	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.14	-	-	-
Anion Sum	meq/L	-	-	-	-	-	-	-	-	-	-	-	-	60.3	-	-	-	-	-	8.08	-	-	-
Cation Sum	meq/L	-	-	-	-	-	-	-	-	-	-	-	-	62.0	-	-	-	-	-	8.65	-	-	-
Cation - Anion Balance	%	-	-	-	-	-	-	-	-	-	-	-	-	1.3	-	-	-	-	-	3.4	-	-	-
Cyanides																							
Cyanide, Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.0050	-	-	-	-	-	<0.0050	-	-	-
Cyanide, Free	mg/L	0.005	-	-	-	-	-	-	-	-	-	-	-	<0.0050	-	-	-	-	-	<0.0050	-	-	-
Cyanide, Weak Acid Diss	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	<0.0050	-	-	-	-	-	<0.0050	-	-	-
Thiocyanate (SCN)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.50	-	-	-
Organic/Inorganic Carbon																							
Total Inorganic Carbon	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	60.4	-	-	-
Total Organic Carbon	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.99	-	-	-

**Table A: Groundwater Sampling Analytical Results and CCME Guideline Exceedances
for 2015 September Sampling Program**

Site Location		Tailings Facility																				
Sample ID		MP09-04	MP09-05	MP09-09	MP09-10	MP09-11	MP09-12	MP09-14	MW09-02	MW09-03	MW09-04	MW09-05	MW09-06	MW09-07	MW09-08	MW09-11	MW09-20	MW09-21	MW09-22	MW09-23	MW09-24	W14103083BH03
Date Sampled		26/05/2016	26/05/2016	26/05/2016	26/05/2016	26/05/2016	26/05/2016	26/05/2016	26/05/2016	26/05/2016	26/05/2016	26/05/2016	26/05/2016	25/05/2016	26/05/2016	25/05/2016	25/05/2016	26/05/2016	27/05/2016	26/05/2016	25/05/2016	26/05/2016
ALS Work Number		L1774699	L1774699					L1775300	L1774699	L1774699	L1774699		L1774699		L1774699				L1775300	L1774699	L1774699	
Station Status		Good	Good	Frozen	Frozen	Frozen	Frozen	Direct Sample	Good	Good	Good	Dry	Good	Dry	Good	Dry	Dry	Frozen	Direct Sample	Good	Good	Frozen
Parameter	Units	CCME-FAL ^{1,2,3,4}																				
Physical Tests																						
Lab pH	pH units	6.5-9.0 ⁵	8.06	7.51	-	-	-	-	7.45	8.08	8.13	-	8.08	-	6.77	-	-	-	7.03	8.02	8.08	-
Field pH	pH units	6.5-9.0 ⁵	6.93	6.79	-	-	-	-	7.22	8.5	8.32	-	7.11	-	6.65	-	-	-	-	6.98	7.41	-
Field Temperature	C	-	2.10	1.5	-	-	-	-	2.53	4.21	3.50	-	3.3	-	1.87	-	-	-	-	0.5	2.06	-
Lab Conductivity	uS/cm	-	1240	1990	-	-	-	-	2510	2610	2570	-	1960	-	487	-	-	-	937	1590	1020	-
Field Conductivity	uS/cm	-	691	1169	-	-	-	-	1387	1519	1479	-	1144	-	373	-	-	-	-	865	572	-
Field Specific Conductivity	uS/cm	-	1229	2121	-	-	-	-	2425	2519	2509	-	1957	-	669	-	-	-	-	1624	1012	-
Total Hardness (as CaCO3)	mg/L	-	755	1150	-	-	-	144	1520	1650	1600	-	1220	-	245	-	-	-	471	955	661	-
Field Dissolved Oxygen	mg/L	9.5 ⁶	4.89	0.83	-	-	-	-	0.39	0.32	0.18	-	0.52	-	0.51	-	-	-	-	2.72	4.33	-
Field Oxidation - Redox Potent	mV	-	214.1	-32.4	-	-	-	-	-87.2	-96.9	7.6	-	118.2	-	-59.2	-	-	-	-	-28.7	141.1	-
Field Turbidity	NTU	-	2.1	2.66	-	-	-	-	11.83	1.61	0.21	-	24.7	-	3.94	-	-	-	-	50.5	27.4	-
Anions and Nutrients																						
Alkalinity, Total (CaCO3)	mg/L	-	167	252	-	-	-	-	70.1	111	116	-	189	-	171	-	-	-	165	395	239	-
Alkalinity, Total (CaCO3, filtered)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia, Total (as N)	mg/L	Varies ⁷	<0.0050	8.39	-	-	-	-	7.35	6.18	7.04	-	0.300	-	2.64	-	-	-	0.702	2.69	0.0119	-
Ammonia CCME-FAL	mg/L	-	22.76	33.02	-	-	-	-	11.28	0.5336	0.8445	-	13.63	-	44.20	-	-	-	-	23.19	7.576	-
Chloride (Cl)	mg/L	-	<1.0	<2.5	-	-	-	-	<2.5	<5.0	<5.0	-	<2.5	-	<0.50	-	-	-	<1.0	<2.5	<1.0	-
Fluoride (F)	mg/L	0.12	<0.040	<0.10	-	-	-	-	0.54	0.30	0.32	-	0.23	-	0.124	-	-	-	0.046	0.12	<0.040	-
Nitrate (as N)	mg/L	13	0.797	0.050	-	-	-	-	0.153	0.452	0.050	-	0.703	-	<0.0050	-	-	-	0.330	<0.025	1.91	-
Nitrite (as N)	mg/L	0.06	<0.0020	<0.0050	-	-	-	-	<0.0050	0.075	0.027	-	0.0496	-	<0.0010	-	-	-	0.0188	<0.0050	0.0020	-
Total Kjeldahl Nitrogen	mg/L	-	0.229	9.48	-	-	-	-	8.08	5.66	7.04	-	0.870	-	3.02	-	-	-	2.45	3.38	0.539	-
Sulfate (SO4)	mg/L	-	541	949	-	-	-	-	1440	1450	1340	-	996	-	91.9	-	-	-	343	592	331	-
Field Sulphide	mg/L	-	0.01	0.01	-	-	-	-	0.05	0.02	0	-	0.07	-	0.11	-	-	-	-	-	0.14	-
Anion Sum	meq/L	-	14.7	24.8	-	-	-	-	31.3	32.6	30.2	-	24.6	-	5.33	-	-	-	-	20.2	11.8	-
Cation Sum	meq/L	-	15.5	28.6	-	-	-	-	34.4	35.9	34.8	-	25.7	-	9.78	-	-	-	-	21.7	13.6	-
Cation - Anion Balance	%	-	2.7	7.1	-	-	-	-	4.6	4.9	7.2	-	2.3	-	29.5	-	-	-	-	3.6	7.1	-
Cyanides																						
Cyanide, Total	mg/L	-	0.0084	0.0078	-	-	-	-	<0.020	0.0142	<0.0050	-	<0.0050	-	<0.0050	-	-	-	0.0177	0.114	<0.0050	-
Cyanide, Free	mg/L	0.005	<0.0050	<0.0050	-	-	-	-	<0.010	<0.0050	<0.0050	-	<0.0050	-	<0.0050	-	-	-	<0.0050	<0.0050	<0.0050	-
Cyanide, Weak Acid Diss	mg/L	-	<0.0050	0.0051	-	-	-	-	<0.010	0.0054	<0.0050	-	<0.0050	-	<0.0050	-	-	-	<0.0050	<0.0050	<0.0050	-
Thiocyanate (SCN)	mg/L	-	<0.50	0.70	-	-	-	-	<0.50	<0.50	<0.50	-	<0.50	-	0.72	-	-	-	<0.50	0.54	<0.50	-
Organic/Inorganic Carbon																						
Total Inorganic Carbon	mg/L	-	42.5	72.1	-	-	-	-	17.6	23.4	24.6	-	47.2	-	59.9	-	-	-	59.2	101	59.6	-
Total Organic Carbon	mg/L	-	5.83	22.4	-	-	-	-	6.42	6.41	5.95	-	6.12	-	18.3	-	-	-	18.5	19.7	8.88	-

**Table A: Groundwater Sampling Analytical Results and CCME Guideline Exceedances
for 2015 September Sampling Program**

Site Location		Dome Creek										Mill Complex							
Sample ID		GSI-DC-01B	GSI-DC-02B	GSI-DC-03B	GSI-DC-05B	GSI-DC-06B	GSI-DC-07B	GSI-DC-08B	GSI-DC-09B	GSI-DC-10B	GSI-HA-01A	GSI-HA-02A	GSI-HA-03A	GSI-HA-04A ¹³	GSI-HA-05A	MW09-16	MW09-17	MW09-18	MW09-19
Date Sampled		25/05/2016	25/05/2016	25/05/2016	25/05/2016	26/05/2016	27/05/2016	27/05/2016	27/05/2016	27/05/2016	25/05/2016	25/05/2016	25/05/2016	25/05/2016	25/05/2016	24/05/2016	25/05/2016	25/05/2016	25/05/2016
ALS Work Number											L1774699			L1775300	L1774699			L1774699	
Station Status		Frozen	Frozen	Frozen	Frozen	Frozen	Frozen	Frozen	Frozen	Frozen	Direct Sample	Frozen	Frozen	Direct Sample	Frozen	Good	Frozen	Good	Frozen
Parameter	Units	CCME-FAL ^{1,2,3,4}																	
Dissolved Metals																			
Aluminum (Al)-Dissolved	mg/L	Varies ⁸	-	-	-	-	-	-	-	-	0.0030	-	-	0.0232	-	<0.0020	-	<0.0020	-
<i>Aluminum CCME-FAL</i>	mg/L	-	-	-	-	-	-	-	-	-	0.1	-	-	0.1	-	0.1	-	0.1	-
Antimony (Sb)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	0.00015	-	-	0.00090	-	0.0891	-	0.00035	-
Arsenic (As)-Dissolved	mg/L	0.005	-	-	-	-	-	-	-	-	0.00534	-	-	0.0249	-	0.0244	-	0.0490	-
Barium (Ba)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	0.126	-	-	0.0531	-	0.0149	-	0.00851	-
Beryllium (Be)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	<0.000020	-	-	<0.000020	-	<0.000040	-	<0.000040	-
Bismuth (Bi)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	<0.000050	-	-	<0.000050	-	<0.00010	-	<0.00010	-
Boron (B)-Dissolved	mg/L	1.5	-	-	-	-	-	-	-	-	<0.010	-	-	<0.010	-	0.051	-	<0.020	-
Cadmium (Cd)-Dissolved	mg/L	Varies ⁹	-	-	-	-	-	-	-	-	0.0000066	-	-	0.0000330	-	0.0503	-	0.000048	-
<i>Cadmium CCME-FAL</i>	mg/L	-	-	-	-	-	-	-	-	-	0.00037	-	-	0.00035	-	0.00037	-	0.00037	-
Calcium (Ca)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	136	-	-	67.0	-	320	-	332	-
Chromium (Cr)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	0.00438	-	-	0.00114	-	<0.00020	-	<0.00020	-
Cobalt (Co)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	0.00022	-	-	0.00025	-	0.00402	-	<0.00020	-
Copper (Cu)-Dissolved	mg/L	Varies ¹⁰	-	-	-	-	-	-	-	-	0.00044	-	-	0.00164	-	0.00575	-	<0.00040	-
<i>Copper CCME-FAL</i>	mg/L	-	-	-	-	-	-	-	-	-	0.004	-	-	0.004	-	0.004	-	0.004	-
Iron (Fe)-Dissolved	mg/L	0.3	-	-	-	-	-	-	-	-	5.07	-	-	1.80	-	0.023	-	0.014	-
Lead (Pb)-Dissolved	mg/L	Varies ¹¹	-	-	-	-	-	-	-	-	0.000095	-	-	0.000315	-	0.00502	-	<0.00010	-
<i>Lead CCME-FAL</i>	mg/L	-	-	-	-	-	-	-	-	-	0.007	-	-	0.007	-	0.007	-	0.007	-
Lithium (Li)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	0.0061	-	-	0.0020	-	0.0099	-	0.0228	-
Magnesium (Mg)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	45.9	-	-	23.1	-	143	-	254	-
Manganese (Mn)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	0.118	-	-	1.24	-	0.943	-	0.352	-
Mercury (Hg)-Dissolved	mg/L	0.000026	-	-	-	-	-	-	-	-	<0.0000050	-	-	<0.0000050	-	0.0000053	-	<0.0000050	-
Molybdenum (Mo)-Dissolved	mg/L	0.073	-	-	-	-	-	-	-	-	0.000456	-	-	0.000770	-	0.00024	-	<0.00010	-
Nickel (Ni)-Dissolved	mg/L	Varies ¹²	-	-	-	-	-	-	-	-	0.00360	-	-	0.00172	-	0.0061	-	<0.00010	-
<i>Nickel CCME-FAL</i>	mg/L	-	-	-	-	-	-	-	-	-	0.15	-	-	0.15	-	0.15	-	0.15	-
Phosphorus (P)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	<0.050	-	-	<0.050	-	<0.050	-	<0.050	-
Potassium (K)-Dissolved	mg/L	0.001	-	-	-	-	-	-	-	-	3.53	-	-	2.24	-	6.59	-	7.81	-
Selenium (Se)-Dissolved	mg/L	0.001	-	-	-	-	-	-	-	-	<0.000050	-	-	0.000061	-	<0.00010	-	0.00084	-
Silicon (Si)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	6.24	-	-	4.66	-	4.34	-	4.65	-
Silver (Ag)-Dissolved	mg/L	0.0001	-	-	-	-	-	-	-	-	<0.000010	-	-	<0.000010	-	0.000064	-	<0.000020	-
Sodium (Na)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	4.53	-	-	2.79	-	7.08	-	11.4	-
Strontium (Sr)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	0.315	-	-	0.165	-	0.706	-	1.03	-
Sulfur (S)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	88.7	-	-	38.9	-	389	-	466	-
Thallium (Tl)-Dissolved	mg/L	0.0008	-	-	-	-	-	-	-	-	<0.000010	-	-	<0.000010	-	0.000423	-	0.000290	-
Tin (Sn)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	<0.00010	-	-	<0.00010	-	<0.00020	-	<0.00020	-
Titanium (Ti)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	0.00034	-	-	0.00095	-	<0.00060	-	<0.00060	-
Uranium (U)-Dissolved	mg/L	0.015	-	-	-	-	-	-	-	-	0.000043	-	-	0.000367	-	0.00261	-	0.00702	-
Vanadium (V)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	<0.00050	-	-	0.00084	-	<0.0010	-	<0.0010	-
Zinc (Zn)-Dissolved	mg/L	0.03	-	-	-	-	-	-	-	-	0.0033	-	-	0.0037	-	6.94	-	0.0023	-
Zirconium (Zr)-Dissolved	mg/L	-	-	-	-	-	-	-	-	-	<0.00030	-	-	<0.00030	-	<0.00060	-	<0.00060	-

**Table A: Groundwater Sampling Analytical Results and CCME Guideline Exceedances
for 2015 September Sampling Program**

Site Location		Brown McDade Pit											Pony Creek						Seepage Dam				
Sample ID		CH-P-13-01/10	CH-P-13-03/50	CH-P-13-04/10	CH-P-13-04/35	CH-P-13-05/50	GLL07-01	GLL07-02	GLL07-03	MW09-13	MW09-14	MW09-15	GSI-PC-02B	GSI-PC-03B	GSI-PC-04B	GSI-PC-05B	MP09-02	MP09-03	MP09-08	W14103083BH01	W14103083BH02	W14103083BH04	
Date Sampled		25/05/2016	25/05/2016	25/05/2016	25/05/2016	25/05/2016	25/05/2016	27/05/2016	25/05/2016	25/05/2016	25/05/2016	25/05/2016	27/05/2016	27/05/2016	27/05/2016	27/05/2016	27/05/2016	27/05/2016	27/05/2016	25/05/2016	25/05/2016	25/05/2016	
ALS Work Number			L1774699											L1775300					L1775300				
Station Status		Frozen	Direct Sample	Frozen	Frozen	Not Accessible	Frozen	Dry	Not Accessible	Frozen	Frozen	Frozen	Destroyed	Direct Sample	Frozen	Frozen	Destroyed	Frozen	Good	Frozen	Frozen	Frozen	
Parameter	Units	CCME-FAL ^{1,2,3,4}																					
Dissolved Metals																							
Aluminum (Al)-Dissolved	mg/L	Varies ⁸	-	0.0051	-	-	-	-	-	-	-	-	-	0.0315	-	-	-	-	-	0.0046	-	-	-
<i>Aluminum CCME-FAL</i>	mg/L	-	-	0.1	-	-	-	-	-	-	-	-	-	0.1	-	-	-	-	-	0.1	-	-	-
Antimony (Sb)-Dissolved	mg/L	-	-	0.00032	-	-	-	-	-	-	-	-	-	0.00296	-	-	-	-	-	<0.00010	-	-	-
Arsenic (As)-Dissolved	mg/L	0.005	-	0.00079	-	-	-	-	-	-	-	-	-	0.0874	-	-	-	-	-	0.0148	-	-	-
Barium (Ba)-Dissolved	mg/L	-	-	0.0443	-	-	-	-	-	-	-	-	-	0.126	-	-	-	-	-	0.0446	-	-	-
Beryllium (Be)-Dissolved	mg/L	-	-	<0.000040	-	-	-	-	-	-	-	-	-	<0.000040	-	-	-	-	-	<0.000020	-	-	-
Bismuth (Bi)-Dissolved	mg/L	-	-	<0.00010	-	-	-	-	-	-	-	-	-	<0.00010	-	-	-	-	-	<0.000050	-	-	-
Boron (B)-Dissolved	mg/L	1.5	-	0.026	-	-	-	-	-	-	-	-	-	0.036	-	-	-	-	-	<0.010	-	-	-
Cadmium (Cd)-Dissolved	mg/L	Varies ⁹	-	0.000256	-	-	-	-	-	-	-	-	-	0.000135	-	-	-	-	-	<0.0000050	-	-	-
<i>Cadmium CCME-FAL</i>	mg/L	-	-	0.00037	-	-	-	-	-	-	-	-	-	0.00037	-	-	-	-	-	0.00037	-	-	-
Calcium (Ca)-Dissolved	mg/L	-	-	438	-	-	-	-	-	-	-	-	-	125	-	-	-	-	-	114	-	-	-
Chromium (Cr)-Dissolved	mg/L	-	-	<0.00020	-	-	-	-	-	-	-	-	-	0.0290	-	-	-	-	-	<0.00010	-	-	-
Cobalt (Co)-Dissolved	mg/L	-	-	0.00067	-	-	-	-	-	-	-	-	-	0.00579	-	-	-	-	-	0.00065	-	-	-
Copper (Cu)-Dissolved	mg/L	Varies ¹⁰	-	0.00197	-	-	-	-	-	-	-	-	-	0.00541	-	-	-	-	-	<0.00020	-	-	-
<i>Copper CCME-FAL</i>	mg/L	-	-	0.004	-	-	-	-	-	-	-	-	-	0.004	-	-	-	-	-	0.004	-	-	-
Iron (Fe)-Dissolved	mg/L	0.3	-	0.011	-	-	-	-	-	-	-	-	-	7.28	-	-	-	-	-	1.11	-	-	-
Lead (Pb)-Dissolved	mg/L	Varies ¹¹	-	<0.00010	-	-	-	-	-	-	-	-	-	0.00080	-	-	-	-	-	<0.000050	-	-	-
<i>Lead CCME-FAL</i>	mg/L	-	-	0.007	-	-	-	-	-	-	-	-	-	0.007	-	-	-	-	-	0.007	-	-	-
Lithium (Li)-Dissolved	mg/L	-	-	0.0029	-	-	-	-	-	-	-	-	-	0.0469	-	-	-	-	-	0.0036	-	-	-
Magnesium (Mg)-Dissolved	mg/L	-	-	163	-	-	-	-	-	-	-	-	-	603	-	-	-	-	-	30.9	-	-	-
Manganese (Mn)-Dissolved	mg/L	-	-	0.318	-	-	-	-	-	-	-	-	-	2.10	-	-	-	-	-	0.804	-	-	-
Mercury (Hg)-Dissolved	mg/L	0.000026	-	<0.0000050	-	-	-	-	-	-	-	-	-	<0.0000050	-	-	-	-	-	<0.0000050	-	-	-
Molybdenum (Mo)-Dissolved	mg/L	0.073	-	0.00069	-	-	-	-	-	-	-	-	-	0.0153	-	-	-	-	-	0.000406	-	-	-
Nickel (Ni)-Dissolved	mg/L	Varies ¹²	-	0.0199	-	-	-	-	-	-	-	-	-	0.0743	-	-	-	-	-	<0.00050	-	-	-
<i>Nickel CCME-FAL</i>	mg/L	-	-	0.15	-	-	-	-	-	-	-	-	-	0.15	-	-	-	-	-	0.15	-	-	-
Phosphorus (P)-Dissolved	mg/L	-	-	<0.050	-	-	-	-	-	-	-	-	-	<0.050	-	-	-	-	-	<0.050	-	-	-
Potassium (K)-Dissolved	mg/L	0.001	-	11.8	-	-	-	-	-	-	-	-	-	24.6	-	-	-	-	-	1.12	-	-	-
Selenium (Se)-Dissolved	mg/L	0.001	-	0.00717	-	-	-	-	-	-	-	-	-	0.00039	-	-	-	-	-	0.000100	-	-	-
Silicon (Si)-Dissolved	mg/L	-	-	6.10	-	-	-	-	-	-	-	-	-	8.84	-	-	-	-	-	7.39	-	-	-
Silver (Ag)-Dissolved	mg/L	0.0001	-	<0.000020	-	-	-	-	-	-	-	-	-	<0.000020	-	-	-	-	-	<0.000010	-	-	-
Sodium (Na)-Dissolved	mg/L	-	-	203	-	-	-	-	-	-	-	-	-	117	-	-	-	-	-	6.32	-	-	-
Strontium (Sr)-Dissolved	mg/L	-	-	1.24	-	-	-	-	-	-	-	-	-	2.18	-	-	-	-	-	1.15	-	-	-
Sulfur (S)-Dissolved	mg/L	-	-	554	-	-	-	-	-	-	-	-	-	629	-	-	-	-	-	59.6	-	-	-
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.000087	-	-	-	-	-	-	-	-	-	<0.000020	-	-	-	-	-	<0.000010	-	-	-
Tin (Sn)-Dissolved	mg/L	-	-	0.00281	-	-	-	-	-	-	-	-	-	0.00025	-	-	-	-	-	<0.00010	-	-	-
Titanium (Ti)-Dissolved	mg/L	-	-	<0.00060	-	-	-	-	-	-	-	-	-	0.00336	-	-	-	-	-	<0.00030	-	-	-
Uranium (U)-Dissolved	mg/L	0.015	-	0.0124	-	-	-	-	-	-	-	-	-	0.0239	-	-	-	-	-	0.00246	-	-	-
Vanadium (V)-Dissolved	mg/L	-	-	<0.0010	-	-	-	-	-	-	-	-	-	0.0033	-	-	-	-	-	<0.00050	-	-	-
Zinc (Zn)-Dissolved	mg/L	0.03	-	0.0159	-	-	-	-	-	-	-	-	-	0.0376	-	-	-	-	-	0.0026	-	-	-
Zirconium (Zr)-Dissolved	mg/L	-	-	<0.00060	-	-	-	-	-	-	-	-	-	0.00114	-	-	-	-	-	<0.00030	-	-	-

Table A: Groundwater Sampling Analytical Results and CCME Guideline Exceedances for 2015 September Sampling Program

Site Location		Tailings Facility																					
Sample ID		MP09-04	MP09-05	MP09-09	MP09-10	MP09-11	MP09-12	MP09-14	MW09-02	MW09-03	MW09-04	MW09-05	MW09-06	MW09-07	MW09-08	MW09-11	MW09-20	MW09-21	MW09-22	MW09-23	MW09-24	W14103083BH03	
Date Sampled		26/05/2016	26/05/2016	26/05/2016	26/05/2016	26/05/2016	26/05/2016	26/05/2016	26/05/2016	26/05/2016	26/05/2016	26/05/2016	26/05/2016	25/05/2016	26/05/2016	25/05/2016	25/05/2016	26/05/2016	27/05/2016	26/05/2016	25/05/2016	26/05/2016	
ALS Work Number		L1774699	L1774699					L1775300	L1774699	L1774699	L1774699		L1774699		L1774699				L1775300	L1774699	L1774699		
Station Status		Good	Good	Frozen	Frozen	Frozen	Frozen	Direct Sample	Good	Good	Good	Dry	Good	Dry	Good	Dry	Dry	Frozen	Direct Sample	Good	Good	Frozen	
Parameter	Units	CCME-FAL ^{1,2,3,4}																					
Dissolved Metals																							
Aluminum (Al)-Dissolved	mg/L	Varies ⁸	0.0024	0.0243	-	-	-	-	0.0021	<0.0050	<0.0050	0.0027	-	<0.0020	-	0.0607	-	-	-	0.0275	0.0230	0.0271	-
Aluminum CCME-FAL	mg/L	-	0.1	0.1	-	-	-	-	-	0.1	0.1	0.1	-	0.1	-	0.1	-	-	-	0.1	0.1	0.1	-
Antimony (Sb)-Dissolved	mg/L	-	0.00138	0.00031	-	-	-	-	0.00481	0.00401	0.401	0.339	-	0.201	-	0.00024	-	-	-	0.00031	<0.00050	0.00019	-
Arsenic (As)-Dissolved	mg/L	0.005	0.00061	0.0230	-	-	-	-	0.809	8.95	2.08	3.55	-	0.108	-	0.208	-	-	-	0.00206	0.0283	0.00135	-
Barium (Ba)-Dissolved	mg/L	-	0.0735	0.0410	-	-	-	-	0.0237	0.00462	0.0176	0.00857	-	0.00531	-	0.238	-	-	-	0.0829	0.0490	0.0928	-
Beryllium (Be)-Dissolved	mg/L	-	<0.000020	<0.000040	-	-	-	-	<0.000020	<0.00010	<0.00010	<0.000040	-	<0.000040	-	0.000021	-	-	-	<0.000020	<0.00010	<0.000020	-
Bismuth (Bi)-Dissolved	mg/L	-	<0.000050	<0.00010	-	-	-	-	<0.000050	<0.00025	<0.00025	<0.00010	-	<0.00010	-	<0.000050	-	-	-	<0.000050	<0.00025	<0.000050	-
Boron (B)-Dissolved	mg/L	1.5	0.012	0.052	-	-	-	-	0.020	0.058	0.172	0.204	-	0.100	-	<0.010	-	-	-	0.029	0.062	0.014	-
Cadmium (Cd)-Dissolved	mg/L	Varies ⁹	0.0000462	0.000149	-	-	-	-	0.0000467	0.000917	0.00181	0.000023	-	0.00720	-	0.0000053	-	-	-	0.0000550	<0.000025	0.0000653	-
Cadmium CCME-FAL	mg/L	-	0.00037	0.00037	-	-	-	-	0.00021	0.00037	0.00037	0.00037	-	0.00037	-	0.00033	-	-	-	0.00037	0.00037	0.00037	-
Calcium (Ca)-Dissolved	mg/L	-	180	330	-	-	-	-	44.7	477	493	482	-	389	-	73.7	-	-	-	167	252	194	-
Chromium (Cr)-Dissolved	mg/L	-	0.00024	0.00048	-	-	-	-	0.00015	<0.00050	<0.00050	<0.00020	-	<0.00020	-	0.00070	-	-	-	0.00047	<0.00050	0.00033	-
Cobalt (Co)-Dissolved	mg/L	-	0.00043	0.0153	-	-	-	-	0.00040	0.00995	0.00156	0.00086	-	0.00191	-	0.00161	-	-	-	0.00884	0.0130	0.00012	-
Copper (Cu)-Dissolved	mg/L	Varies ¹⁰	0.00250	0.00099	-	-	-	-	0.00043	<0.0010	0.0047	<0.00040	-	0.0104	-	<0.00020	-	-	-	0.00348	<0.0010	0.00579	-
Copper CCME-FAL	mg/L	-	0.004	0.004	-	-	-	-	0.00323	0.004	0.004	0.004	-	0.004	-	0.004	-	-	-	0.004	0.004	0.004	-
Iron (Fe)-Dissolved	mg/L	0.3	<0.010	50.9	-	-	-	-	0.600	15.4	0.036	<0.010	-	<0.010	-	80.0	-	-	-	0.936	18.0	<0.010	-
Lead (Pb)-Dissolved	mg/L	Varies ¹¹	<0.000050	<0.00010	-	-	-	-	0.000650	<0.00025	0.00061	0.00045	-	0.00036	-	0.000086	-	-	-	0.000081	<0.00025	<0.000050	-
Lead CCME-FAL	mg/L	-	0.007	0.007	-	-	-	-	0.00506	0.007	0.007	0.007	-	0.007	-	0.007	-	-	-	0.007	0.007	0.007	-
Lithium (Li)-Dissolved	mg/L	-	<0.0010	<0.0020	-	-	-	-	0.0022	0.0120	<0.0050	0.0120	-	0.0123	-	<0.0010	-	-	-	<0.0010	<0.0050	0.0011	-
Magnesium (Mg)-Dissolved	mg/L	-	74.1	78.1	-	-	-	-	7.83	79.0	101	95.6	-	59.0	-	14.7	-	-	-	13.0	79.2	42.9	-
Manganese (Mn)-Dissolved	mg/L	-	0.00046	10.1	-	-	-	-	0.115	19.8	19.5	7.76	-	3.04	-	6.89	-	-	-	3.49	22.4	0.0275	-
Mercury (Hg)-Dissolved	mg/L	0.000026	<0.0000050	<0.0000050	-	-	-	-	-	<0.0000050	<0.0000050	<0.0000050	-	0.0000167	-	<0.0000050	-	-	-	<0.0000050	<0.0000050	<0.0000050	-
Molybdenum (Mo)-Dissolved	mg/L	0.073	0.000212	0.00067	-	-	-	-	0.000727	0.00684	0.00554	0.00384	-	0.00163	-	0.000107	-	-	-	0.000195	0.00221	0.000270	-
Nickel (Ni)-Dissolved	mg/L	Varies ¹²	<0.00050	0.0052	-	-	-	-	0.00523	<0.0025	<0.0025	<0.0010	-	0.0033	-	<0.00050	-	-	-	0.00127	<0.0025	<0.00050	-
Nickel CCME-FAL	mg/L	-	0.15	0.15	-	-	-	-	0.126	0.15	0.15	0.15	-	0.15	-	0.15	-	-	-	0.15	0.15	0.15	-
Phosphorus (P)-Dissolved	mg/L	-	<0.050	<0.050	-	-	-	-	<0.050	<0.050	0.060	0.082	-	<0.050	-	0.110	-	-	-	<0.050	<0.050	<0.050	-
Potassium (K)-Dissolved	mg/L	0.001	1.89	8.70	-	-	-	-	9.49	32.4	29.6	42.2	-	19.3	-	1.92	-	-	-	3.01	6.83	1.90	-
Selenium (Se)-Dissolved	mg/L	0.001	0.000181	0.00017	-	-	-	-	<0.000050	<0.00025	<0.00025	<0.00010	-	0.00022	-	0.000096	-	-	-	0.000148	<0.00025	0.000840	-
Silicon (Si)-Dissolved	mg/L	-	5.68	5.49	-	-	-	-	0.932	7.24	12.8	15.6	-	8.35	-	10.7	-	-	-	4.35	6.56	7.38	-
Silver (Ag)-Dissolved	mg/L	0.0001	<0.000010	<0.000020	-	-	-	-	<0.000010	<0.000050	<0.000050	0.000054	-	0.000120	-	<0.000010	-	-	-	0.000019	<0.000050	<0.000010	-
Sodium (Na)-Dissolved	mg/L	-	8.02	41.2	-	-	-	-	4.80	27.3	24.8	24.3	-	18.6	-	2.36	-	-	-	22.5	11.5	7.63	-
Strontium (Sr)-Dissolved	mg/L	-	0.594	1.01	-	-	-	-	0.158	0.848	1.35	1.23	-	0.880	-	0.319	-	-	-	0.448	0.621	0.623	-
Sulfur (S)-Dissolved	mg/L	-	187	328	-	-	-	-	31.4	517	531	512	-	348	-	32.0	-	-	-	108	202	122	-
Thallium (Tl)-Dissolved	mg/L	0.0008	<0.000010	<0.000020	-	-	-	-	<0.000010	0.000199	0.000085	0.000116	-	0.000240	-	<0.000010	-	-	-	<0.000010	<0.000050	<0.000010	-
Tin (Sn)-Dissolved	mg/L	-	<0.00010	<0.00020	-	-	-	-	<0.00010	<0.00050	<0.00050	<0.00020	-	<0.00020	-	<0.00010	-	-	-	<0.00010	<0.00050	<0.00010	-
Titanium (Ti)-Dissolved	mg/L	-	<0.00030	0.00094	-	-	-	-	<0.00030	<0.0015	<0.0015	<0.00060	-	<0.00060	-	0.00275	-	-	-	0.00069	<0.0015	<0.00030	-
Uranium (U)-Dissolved	mg/L	0.015	0.00214	0.00167	-	-	-	-	0.000129	0.00109	0.00127	0.000303	-	0.00176	-	0.000067	-	-	-	0.000684	0.00285	0.00259	-
Vanadium (V)-Dissolved	mg/L	-	<0.00050	0.0017	-	-	-	-	<0.00050	<0.0025	<0.0025	<0.0010	-	<0.0010	-	0.00238	-	-	-	0.00053	<0.0025	<0.00050	-
Zinc (Zn)-Dissolved	mg/L	0.03	0.0024	0.0156	-	-	-	-	0.0059	0.213	0.0062	0.630	-	0.383	-	0.0038	-	-	-	0.0020	0.0289	0.0055	-
Zirconium (Zr)-Dissolved	mg/L	-	<0.00030	0.00079	-	-	-	-	<0.00030	<0.0015	<0.0015	<0.00060	-	<0.00060	-	0.00064	-	-	-	0.00031	<0.0015	<0.00030	-

Table B: QA/QC Analytical Data

Site Location		MW09-16		MW09-24			CH-P-13-03/50	GSI-PC-03B			MP09-05		MP09-08		Field Blank	Travel Blanks				
Sample ID	FB-1	MW09-16	FB-2	DUP-1	MW09-24	RPD (%) ¹⁴	CH-P-13-03/50	FB-4	GSI-PC-03B	DUP-2	MP09-05	RPD (%) ¹⁴	DUP-3	MP09-08	RPD (%) ¹⁴	FB-3	TRAVEL_BLANK	TRAVEL_BLANK		
Date Sampled	24/05/2016	24/05/2016	25/05/2016	25/05/2016	25/05/2016		25/05/2016	25/05/2016	27/05/2016	27/05/2016	26/05/2016		26/05/2016	27/05/2016		27/05/2016	26/05/2016	26/05/2016	27/05/2016	
ALS Work Number	L1774699	L1774699	L1774699	L1774699	L1774699		L1774699	L1774699	L1775300	L1775300	L1774699		L1774699	L1775300		L1775300	L1774699	L1774699	L1775300	
Station Status	Good	Good	Good	Good	Good		Good	Good	Good	Good	Good		Good	Good		Good	Good	Good	Good	
Parameter	Units	CCME-FAL ^{1,2,3,4}																		
Physical Tests																				
Lab pH	pH units	6.5-9.0 ⁵	5.47	7.44	5.28	8.15	8.08	0.86	7.98	5.41	8.12	7.41	7.51	1.34	7.45	7.53	1.07	5.34	5.34	5.47
Field pH	pH units	6.5-9.0 ⁵	6.7	6.7	7.41	7.41	7.41	-	-	-	-	6.79	6.79	-	6.89	6.89	-	-	-	-
Field Temperature	C	-	4.2	4.2	2.06	2.06	2.06	-	-	-	-	1.5	1.5	-	2.41	2.41	-	-	-	-
Lab Conductivity	uS/cm	-	<2.0	2060	<2.0	1010	1020	0.99	3300	<2.0	3920	1990	1990	-	728	726	0.28	<2.0	<2.0	<2.0
Field Conductivity	uS/cm	-	1257	1257	572	572	572	-	-	-	-	1169	1169	-	405	405	-	-	-	-
Field Specific Conductivity	uS/cm	-	2086	2086	1012	1012	1012	-	-	-	-	2121	2121	-	712	712	-	-	-	-
Total Hardness (as CaCO3)	mg/L	-	<0.50	1390	<0.50	612	661	7.70	1760	<0.50	2790	1150	1150	-	414	413	0.24	<0.50	<0.50	<0.50
Field Dissolved Oxygen	mg/L	9.5 ⁶	0.97	0.97	4.33	4.33	4.33	-	-	-	-	0.83	0.83	-	5.06	5.06	-	-	-	-
Field Oxidation - Redox Potent	mV	-	170.2	170.2	141.1	141.1	141.1	-	-	-	-	-32.4	-32.4	-	-22.6	-22.6	-	-	-	-
Field Turbidity	NTU	-	0.71	0.71	27.4	27.4	27.4	-	-	-	-	2.66	2.66	-	0.85	0.85	-	-	-	-
Anions and Nutrients																				
Alkalinity, Total (CaCO3)	mg/L	-	<1.0	195	<1.0	248	239	3.70	374	<1.0	900	252	252	-	225	225	-	<1.0	<1.0	<1.0
Alkalinity, Total (CaCO3, filtered)	mg/L	-	-	-	-	-	-	nc	-	-	-	-	-	nc	-	-	nc	-	-	-
Ammonia, Total (as N)	mg/L	Varies ⁷	<0.0050	0.0267	<0.0050	0.0164	0.0119	nc	-	<0.0050	-	9.33	8.39	10.61	0.0345	0.0318	8.14	<0.0050	0.0354	<0.0050
Ammonia CCME-FAL	mg/L	-	-	32.5	-	7.576	7.576	-	-	-	-	33.02	33.02	-	24.33	24.33	-	-	-	-
Chloride (Cl)	mg/L	-	<0.50	<2.5	<0.50	<1.0	<1.0	nc	30.2	<0.50	<10	<2.5	<2.5	nc	0.75	<0.50	nc	<0.50	<0.50	<0.50
Fluoride (F)	mg/L	0.12	<0.020	0.13	<0.020	<0.040	<0.040	nc	<0.20	<0.020	<0.40	<0.10	<0.10	nc	0.088	0.077	13.33	<0.020	<0.020	<0.020
Nitrate (as N)	mg/L	13	<0.0050	<0.025	<0.0050	1.97	1.91	3.09	0.964	<0.0050	<0.10	0.059	0.050	16.51	<0.0050	<0.0050	nc	<0.0050	<0.0050	<0.0050
Nitrite (as N)	mg/L	0.06	<0.0010	<0.0050	<0.0010	<0.0020	0.0020	nc	0.016	<0.0010	<0.020	<0.0050	<0.0050	nc	<0.0010	<0.0010	nc	<0.0010	<0.0010	<0.0010
Total Kjeldahl Nitrogen	mg/L	-	<0.050	0.167	<0.050	0.468	0.539	14.10	-	<0.050	-	9.38	9.48	1.06	0.265	0.233	12.85	<0.050	<0.050	<0.050
Sulfate (SO4)	mg/L	-	<0.30	1100	<0.30	330	331	0.30	1550	<0.30	2030	940	949	0.95	172	172	-	<0.30	<0.30	<0.30
Field Sulphide	mg/L	-	0	0	-	0.14	0.14	-	-	-	-	0.01	0.01	-	0.14	0.14	-	-	-	-
Anion Sum	meq/L	-	<0.10	26.8	<0.10	12.0	11.8	1.68	-	<0.10	60.3	24.6	24.8	0.81	8.10	8.08	0.25	<0.10	<0.10	<0.10
Cation Sum	meq/L	-	<0.10	28.5	<0.10	12.6	13.6	7.63	-	<0.10	62.0	28.7	28.6	0.35	8.66	8.65	0.12	<0.10	<0.10	<0.10
Cation - Anion Balance	%	-	0.0	3.0	0.0	2.6	7.1	-	-	0.0	1.3	7.7	7.1	8.11	3.3	3.4	2.99	0.0	97.5	0.0
Cyanides																				
Cyanide, Total	mg/L	-	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	nc	-	<0.0050	<0.0050	0.0098	0.0078	nc	<0.0050	<0.0050	nc	<0.0050	<0.0050	<0.0050
Cyanide, Free	mg/L	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	nc	-	<0.0050	<0.0050	0.0063	<0.0050	nc	<0.0050	<0.0050	nc	<0.0050	<0.0050	<0.0050
Cyanide, Weak Acid Diss	mg/L	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	nc	-	<0.0050	<0.0050	0.0061	0.0051	17.86	<0.0050	<0.0050	nc	<0.0050	<0.0050	<0.0050
Thiocyanate (SCN)	mg/L	-	<0.50	<0.50	<0.50	<0.50	<0.50	nc	-	<0.50	-	0.86	0.70	nc	<0.50	<0.50	nc	<0.50	<0.50	<0.50
Organic/Inorganic Carbon																				
Total Inorganic Carbon	mg/L	-	<0.50	53.2	<0.50	58.1	59.6	2.55	-	<0.50	-	72.8	72.1	0.97	61.3	60.4	1.48	<0.50	<0.50	<0.50
Total Organic Carbon	mg/L	-	<0.50	3.78	<0.50	9.54	8.88	7.17	-	<0.50	-	23.9	22.4	6.48	6.18	5.99	3.12	<0.50	<0.50	<0.50

Table B: QA/QC Analytical Data

Site Location		MW09-16		MW09-24			CH-P-13-03/50	GSI-PC-03B		MP09-05		MP09-08		Field Blank	Travel Blanks					
Sample ID	FB-1	MW09-16	FB-2	DUP-1	MW09-24	RPD (%) ¹⁴	CH-P-13-03/50	FB-4	GSI-PC-03B	DUP-2	MP09-05	RPD (%) ¹⁴	DUP-3	MP09-08	FB-3	TRAVEL_BLANK	TRAVEL_BLANK			
Date Sampled	24/05/2016	24/05/2016	25/05/2016	25/05/2016	25/05/2016		25/05/2016	25/05/2016	27/05/2016	27/05/2016	26/05/2016		26/05/2016	27/05/2016	27/05/2016	26/05/2016	26/05/2016	27/05/2016		
ALS Work Number	L1774699	L1774699	L1774699	L1774699	L1774699		L1774699	L1774699	L1775300	L1775300	L1774699		L1774699	L1775300	L1775300	L1774699	L1774699	L1775300		
Station Status	Good	Good	Good	Good	Good		Good	Direct Sample	Direct Sample	Direct Sample	Good		Good	Good	Good					
Parameter	Units	CCME-FAL ^{1,2,3,4}																		
Dissolved Metals																				
Aluminum (Al)-Dissolved	mg/L	Varies ⁸	0.0038	<0.0020	<0.0010	0.0021	0.0271	nc	0.0051	<0.0010	0.0315	0.0238	0.0243	2.08	0.0051	0.0046	10.31	<0.0010	-	-
Aluminum CCME-FAL	mg/L	-	0.1	-	-	0.1	0.1	-	0.1	-	0.1	0.1	0.1	-	0.1	0.1	-	-	-	-
Antimony (Sb)-Dissolved	mg/L	<0.00010	0.0891	<0.00010	0.00018	0.00019	5.41	0.00032	<0.00010	0.00296	0.00029	0.00031	6.67	<0.00010	<0.00010	nc	<0.00010	-	-	-
Arsenic (As)-Dissolved	mg/L	0.005	<0.00010	0.0244	<0.00010	0.00136	0.00135	0.74	<0.00010	0.0874	0.0226	0.0230	1.75	0.0152	0.0148	2.67	<0.00010	-	-	-
Barium (Ba)-Dissolved	mg/L	<0.000050	0.0149	<0.000050	0.0902	0.0928	2.84	0.0443	<0.000050	0.126	0.0408	0.0410	0.49	0.0434	0.0446	2.73	<0.000050	-	-	-
Beryllium (Be)-Dissolved	mg/L	<0.000020	<0.000040	<0.000020	<0.000020	<0.000020	nc	<0.000040	<0.000020	<0.000040	<0.000040	<0.000040	nc	<0.000020	<0.000020	nc	<0.000020	-	-	-
Bismuth (Bi)-Dissolved	mg/L	<0.000050	<0.00010	<0.000050	<0.000050	<0.000050	nc	<0.00010	<0.000050	<0.00010	<0.00010	<0.00010	nc	<0.000050	<0.000050	nc	<0.000050	-	-	-
Boron (B)-Dissolved	mg/L	1.5	<0.010	0.051	<0.010	<0.010	0.014	nc	0.026	<0.010	0.036	0.046	0.052	12.24	<0.010	<0.010	nc	<0.010	-	-
Cadmium (Cd)-Dissolved	mg/L	Varies ⁹	<0.000050	0.0503	<0.000050	0.0000545	0.0000653	18.03	0.000256	<0.000050	0.000135	0.000136	0.000149	9.12	<0.000050	<0.000050	nc	<0.000050	-	-
Cadmium CCME-FAL	mg/L	-	0.00037	-	0.00037	0.00037	-	0.00037	-	0.00037	0.00037	0.00037	0.00037	-	0.00037	0.00037	-	-	-	-
Calcium (Ca)-Dissolved	mg/L	<0.050	320	<0.050	176	194	9.73	438	<0.050	125	333	330	0.90	115	114	0.87	<0.050	-	-	-
Chromium (Cr)-Dissolved	mg/L	<0.00010	<0.00020	<0.00010	0.00017	0.00033	nc	<0.00020	<0.00010	0.0290	0.00030	0.00048	nc	<0.00010	<0.00010	nc	<0.00010	-	-	-
Cobalt (Co)-Dissolved	mg/L	<0.00010	0.00402	<0.00010	0.00011	0.00012	8.70	0.00067	<0.00010	0.00579	0.0151	0.0153	1.32	0.00066	0.00065	1.53	<0.00010	-	-	-
Copper (Cu)-Dissolved	mg/L	Varies ¹⁰	<0.00020	0.00575	<0.00020	0.00542	0.00579	6.60	0.00197	<0.00020	0.00541	0.00091	0.00099	8.42	<0.00020	<0.00020	nc	<0.00020	-	-
Copper CCME-FAL	mg/L	-	0.004	-	0.004	0.004	-	0.004	-	0.004	0.004	0.004	-	0.004	0.004	-	-	-	-	-
Iron (Fe)-Dissolved	mg/L	0.3	<0.010	0.023	<0.010	<0.010	<0.010	nc	0.011	<0.010	7.28	52.5	50.9	3.09	1.11	1.11	-	<0.010	-	-
Lead (Pb)-Dissolved	mg/L	Varies ¹¹	<0.000050	0.00502	<0.000050	<0.000050	<0.000050	nc	<0.00010	<0.000050	0.00080	<0.00010	<0.00010	nc	<0.000050	<0.000050	nc	<0.000050	-	-
Lead CCME-FAL	mg/L	-	0.007	-	0.007	0.007	-	0.007	-	0.007	0.007	0.007	-	0.007	0.007	-	-	-	-	-
Lithium (Li)-Dissolved	mg/L	<0.0010	0.0099	<0.0010	0.0012	0.0011	8.70	0.0029	<0.0010	0.0469	<0.0020	<0.0020	nc	0.0034	0.0036	5.71	<0.0010	-	-	-
Magnesium (Mg)-Dissolved	mg/L	<0.10	143	<0.10	42.1	42.9	1.88	163	<0.10	603	76.6	78.1	1.94	30.9	30.9	-	<0.10	-	-	-
Manganese (Mn)-Dissolved	mg/L	0.00023	0.943	<0.00010	0.0224	0.0275	20.44	0.318	<0.00010	2.10	9.84	10.1	2.61	0.810	0.804	0.74	<0.00010	-	-	-
Mercury (Hg)-Dissolved	mg/L	0.000026	<0.000050	0.0000053	<0.000050	<0.000050	nc	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	nc	<0.000050	<0.000050	nc	<0.000050	-	-	-
Molybdenum (Mo)-Dissolved	mg/L	0.073	<0.000050	0.00024	<0.000050	0.000238	0.000270	12.60	0.00069	<0.000050	0.0153	0.00064	0.00067	4.58	0.000382	0.000406	6.09	<0.000050	-	-
Nickel (Ni)-Dissolved	mg/L	Varies ¹²	<0.00050	0.0061	<0.00050	<0.00050	<0.00050	nc	0.0199	<0.00050	0.0743	0.0053	0.0052	1.90	<0.00050	<0.00050	nc	<0.00050	-	-
Nickel CCME-FAL	mg/L	-	0.15	-	0.15	0.15	-	0.15	-	0.15	0.15	0.15	-	0.15	0.15	-	-	-	-	-
Phosphorus (P)-Dissolved	mg/L	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050	<0.050	<0.050	nc	<0.050	<0.050	nc	<0.050	-	-	-
Potassium (K)-Dissolved	mg/L	0.001	<0.10	6.59	<0.10	1.96	1.90	3.11	11.8	<0.10	24.6	8.59	8.70	1.27	1.14	1.12	1.77	<0.10	-	-
Selenium (Se)-Dissolved	mg/L	0.001	<0.000050	<0.00010	<0.000050	0.000692	0.000840	19.32	0.00717	<0.000050	0.00039	0.00018	0.00017	5.71	0.000084	0.000100	17.39	<0.000050	-	-
Silicon (Si)-Dissolved	mg/L	<0.050	4.34	<0.050	7.19	7.38	2.61	6.10	<0.050	8.84	5.46	5.49	0.55	7.40	7.39	0.14	<0.050	-	-	-
Silver (Ag)-Dissolved	mg/L	0.0001	<0.000010	0.000064	<0.000010	<0.000010	<0.000010	nc	<0.000020	<0.000010	<0.000020	<0.000020	nc	<0.000010	<0.000010	nc	<0.000010	-	-	-
Sodium (Na)-Dissolved	mg/L	<0.050	7.08	<0.050	7.36	7.63	3.60	203	<0.050	117	40.4	41.2	1.96	6.31	6.32	0.16	<0.050	-	-	-
Strontium (Sr)-Dissolved	mg/L	<0.00023	0.706	<0.00020	0.614	0.623	1.46	1.24	<0.00020	2.18	0.991	1.01	1.90	1.12	1.15	2.64	<0.00020	-	-	-
Sulfur (S)-Dissolved	mg/L	<0.50	389	<0.50	121	122	0.82	554	<0.50	629	323	328	1.54	59.7	59.6	0.17	<0.50	-	-	-
Thallium (Tl)-Dissolved	mg/L	0.0008	<0.000010	0.000423	<0.000010	<0.000010	<0.000010	nc	0.000087	<0.000010	<0.000020	<0.000020	<0.000020	nc	<0.000010	<0.000010	nc	<0.000010	-	-
Tin (Sn)-Dissolved	mg/L	<0.00010	<0.00020	<0.00010	<0.00010	<0.00010	nc	0.00281	<0.00010	0.00025	<0.00020	<0.00020	nc	<0.00010	<0.00010	nc	<0.00010	-	-	-
Titanium (Ti)-Dissolved	mg/L	<0.00030	<0.00060	<0.00030	<0.00030	<0.00030	nc	<0.00060	<0.00030	0.00336	0.00116	0.00094	nc	<0.00030	<0.00030	nc	<0.00030	-	-	-
Uranium (U)-Dissolved	mg/L	0.015	<0.000010	0.00261	<0.000010	0.00256	0.00259	1.17	0.0124	<0.000010	0.0239	0.00164	0.00167	1.81	0.00241	0.00246	2.05	<0.000010	-	-
Vanadium (V)-Dissolved	mg/L	<0.00050	<0.0010	<0.00050	<0.00050	<0.00050	<0.00050	nc	<0.0010	<0.00050	0.0033	0.0016	0.0017	6.06	<0.00050	<0.00050	nc	<0.00050	-	-
Zinc (Zn)-Dissolved	mg/L	0.03	<0.0010	6.94	<0.0010	0.0012	0.0055	nc	0.0159	<0.0010	0.0376	0.0153	0.0156	1.94	<0.0010	0.0026	nc	<0.0010	-	-
Zirconium (Zr)-Dissolved	mg/L	<0.00030	<0.00060	<0.00030	<0.00030	<0.00030	nc	<0.00060	<0.00030	0.00114	0.00077	0.00079	2.56	<0.00030	<0.00030	nc	<0.00030	-	-	-

Table B: QA/QC Analytical Data

Site Location		MW09-16		MW09-24			CH-P-13-03/50	GSI-PC-03B		MP09-05		MP09-08		Field Blank	Travel Blanks			
Sample ID	FB-1	MW09-16	FB-2	DUP-1	MW09-24	RPD (%) ¹⁴	CH-P-13-03/50	FB-4	GSI-PC-03B	DUP-2	MP09-05	RPD (%) ¹⁴	DUP-3	MP09-08	RPD (%) ¹⁴	FB-3	TRAVEL_BLANK	TRAVEL_BLANK
Date Sampled	24/05/2016	24/05/2016	25/05/2016	25/05/2016	25/05/2016		25/05/2016	27/05/2016	27/05/2016	26/05/2016	26/05/2016		27/05/2016	27/05/2016		26/05/2016	26/05/2016	27/05/2016
ALS Work Number	L1774699	L1774699	L1774699	L1774699	L1774699		L1774699	L1775300	L1775300	L1774699	L1774699		L1775300	L1775300		L1774699	L1774699	L1775300
Station Status	Good	Good	Good	Good	Good		Direct Sample	Direct Sample	Direct Sample	Good	Good		Good	Good				
Parameter	Units	CCME-FAL ^{1,2,3,4}																
Total Metals																		
Aluminum (Al)-Total	mg/L	Varies ⁸	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0030	<0.0030
Aluminum CCME-FAL	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony (Sb)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	<0.00010
Arsenic (As)-Total	mg/L	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	<0.00010
Barium (Ba)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000050	<0.000050
Beryllium (Be)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000020	<0.000020
Bismuth (Bi)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000050	<0.000050
Boron (B)-Total	mg/L	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.010	<0.010
Cadmium (Cd)-Total	mg/L	Varies ⁹	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0000050	<0.0000050
Cadmium CCME-FAL	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium (Ca)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.050	<0.050
Chromium (Cr)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	<0.00010
Cobalt (Co)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	<0.00010
Copper (Cu)-Total	mg/L	Varies ¹⁰	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00050	<0.00050
Copper CCME-FAL	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron (Fe)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.010	<0.010
Lead (Pb)-Total	mg/L	Varies ¹¹	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000050	<0.000050
Lead CCME-FAL	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium (Li)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0010	<0.0010
Magnesium (Mg)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.10	<0.10
Manganese (Mn)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	<0.00010
Mercury (Hg)-Total	mg/L	0.000026	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0000050	<0.0000050
Molybdenum (Mo)-Total	mg/L	0.073	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000050	<0.000050
Nickel (Ni)-Total	mg/L	Varies ¹²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00050	<0.00050
Nickel CCME-FAL	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.050	<0.050
Potassium (K)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.10	<0.10
Selenium (Se)-Total	mg/L	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000050	<0.000050
Silicon (Si)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.050	<0.050
Silver (Ag)-Total	mg/L	0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000010	<0.000010
Sodium (Na)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.050	<0.050
Strontium (Sr)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00020	<0.00020
Thallium (Tl)-Total	mg/L	0.0008	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000010	<0.000010
Tin (Sn)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	<0.00010
Titanium (Ti)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00030	<0.00030
Uranium (U)-Total	mg/L	0.015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000010	<0.000010
Vanadium (V)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00050	<0.00050
Zinc (Zn)-Total	mg/L	0.03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0030	<0.0030
Zirconium (Zr)-Total	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00030	<0.00030

Notes

- (1) CCME guideline exceedences shaded with dark grey. Light grey shading denotes reportable detection limit in exceedance of CCME Guidelin Where guideline value is dependent on hardness or pH, reported values have been compared against a guideline value calculated for each site based on the relevant value, and the guideline value has been noted as "varies".
- (2) - = No standard or not analyzed
- (3) CCME = Canadian Council of Ministers of the Environment, Canadian Environmental Quality Guidelines, 1999, updated to November 2014
- (4) CCME FAL = Chapter 4, Canadian Water Quality Guidelines for the Protection of Aquatic Life, Freshwater, updated to November 2014
- (5) CCME FAL stipulates pH not < 6.5 and not > 9
- (6) Guideline note: Lowest acceptable dissolved oxygen concentration for cold-water biota, early life stages
- (7) Ammonia varies with pH and temperature for CCME FAL; see the CCME ammonia fact sheet for details regarding the applicable criteria, ammonia-NH₃ versus total ammonia-N, and other usage guidelines. CCME values listed in the table are expressed as ammonia (N) When field pH is not available, lab pH is used. When field and lab pH are both not available, the most stringent guideline has been used. If field temperature is not available ammonia standards can not be calculated.
- (8) Aluminum varies with pH as follows for CCME FAL:
0.005 if pH<6.5
0.1 if pH>=6.5
when field pH is not available, lab pH is used. When field and lab pH are both not available, the most stringent guideline has been used.
- (9) Cadmium varies with Hardness in mg/L as follows for CCME FAL:
0.00004 if H<17
0.00004 - 0.00037 if H>=17 and H<=280 as follows;
 $CWQG (\mu\text{g/L}) = 10\{0.83(\log[\text{hardness}]) - 2.46\}$
0.00037 if H>280
- (10) Copper varies with Hardness in mg/L as follows for CCME FAL:
0.002 if H<82
0.002 - 0.004 if H>=82 and H<=180 as follows;
 $CWQG (\mu\text{g/L}) = 0.2 * e\{0.8545[\ln(\text{hardness})]-1.465\}$
0.004 if H>180
- (11) Lead varies with Hardness in mg/L as follows for CCME FAL:
0.001 if H<60
0.001 - 0.007 if H>=60 and H<=180 as follows;
 $CWQG (\mu\text{g/L}) = e\{1.273[\ln(\text{hardness})]-4.705\}$
0.007 if H>180
- (12) Nickel varies with Hardness in mg/L as follows for CCME FAL:
0.025 if H<60
0.025 - 0.15 if H>=60 and H<=180 as follows;
 $CWQG (\mu\text{g/L}) = e\{0.76[\ln(\text{hardness})]+1.06\}$
0.15 if H>180
- (13) Due to slow recharge and low well volumes, samples were collected from GSI-HA-04A between May 25 and 27, 2016. Dissolved metals and dissolved mercury were collected on May 25, 2016. All other parameters were collected on May 27, 2016.
- (14) RPD = Relative Percent Difference. The difference between a sample and its field duplicate over the average of two values. *nc* = not calculated. RPD is not calculated if either the sample or the field duplicate concentration is less than five times the detection limit.
- (15) Due to slow recharge and low well volumes, samples were collected from CH-P-13-03/50 between May 25 and 27, 2016. Dissolved metals were collected on May 25, 2016. Dissolved mercury and general chemistry were collected on May 27, 2016.
- (16) Due to slow recharge and low well volumes, field parameters were measured for well MW09-22 on May 26, 2016. All laboratory samples were collected on May 27, 2016

and underlined indicates values above RDL in Field Blank or Travel Blank

and Italic Indicates QAQC values exceed expected results (i.e. RDP values exceed 20%).

APPENDIX A
Site Photographs

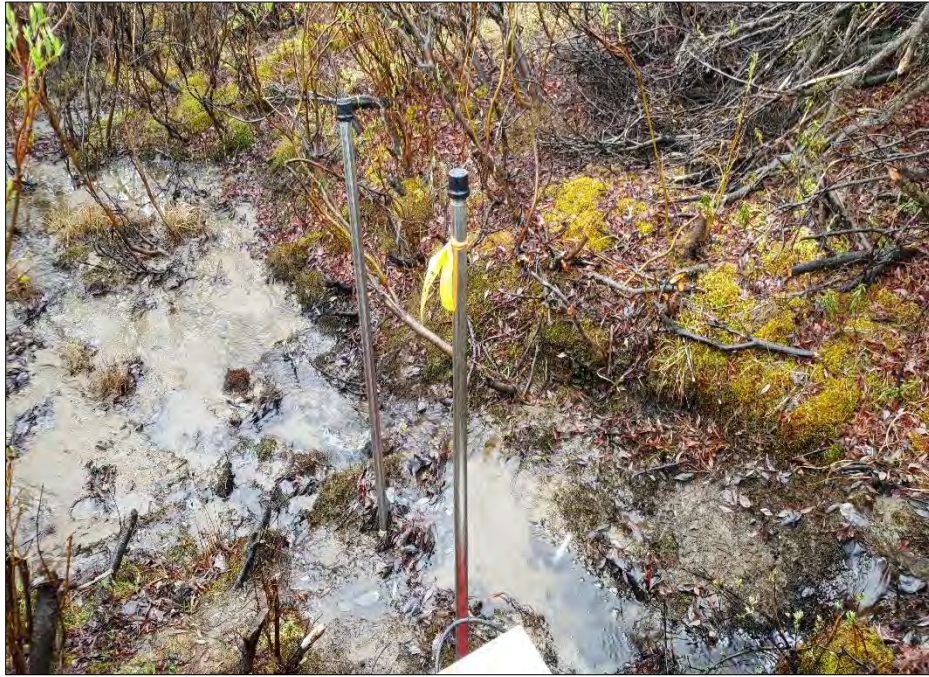


Photo 1: View of drive point wells GSI-DC-01A and GSI-DC-01B. Photo taken on May 25, 2016.



Photo 2: View of drive point wells GSI-DC-02A and GSI-DC-02B. Photo taken on May 25, 2016.



Photo 3: View of drive point wells GSI-DC-03A and GSI-DC-03B. Photo taken on May 25, 2016.



Photo 4: View of drive point wells GSI-DC-05A and GSI-DC-05B. Photo taken on May 25, 2016.



Photo 5: View of drive point wells GSI-DC-06A and GSI-DC-06B. Photo taken on May 26, 2016.



Photo 6: View of drive point wells GSI-DC-07A and GSI-DC-07B. Photo taken on May 27, 2016.



Photo 7: View of drive point wells GSI-DC-08A and GSI-DC-08B. Photo taken on May 27, 2016.



Photo 8: View of drive point wells GSI-DC-09A and GSI-DC-09B. Photo taken on May 27, 2016.

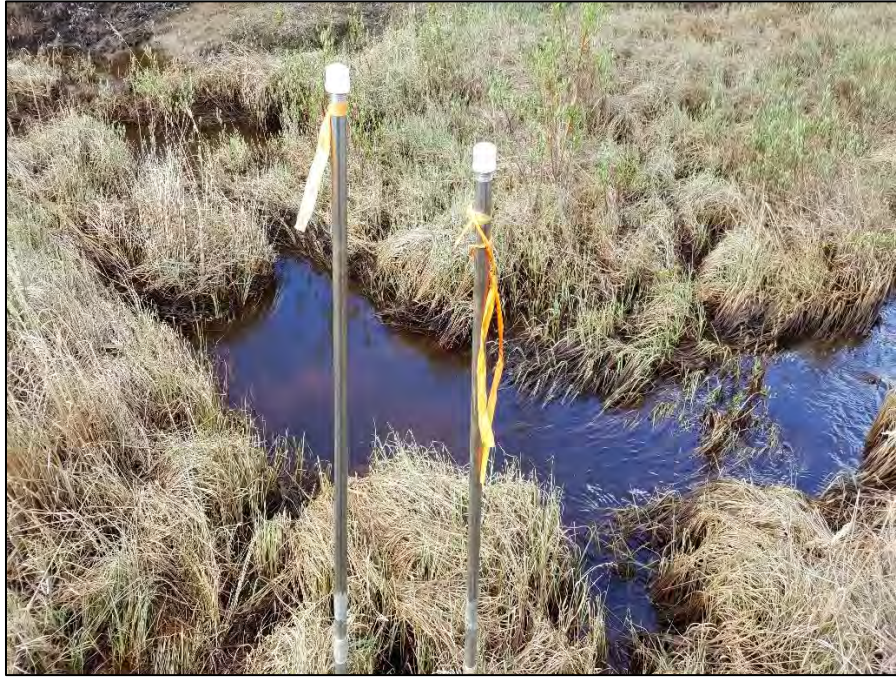


Photo 9: View of drive point wells GSI-DC-10A and GSI-DC-10B. Photo taken on May 27, 2016.



Photo 10: View of drive point well GSI-HA-01A. Photo taken on May 25, 2016.



Photo 11: View of drive point well GSI-HA-02A. Photo taken on May 25, 2016.



Photo 12: View of drive point well GSI-HA-03A. Photo taken on May 25, 2016.



Photo 13: View of drive point well GSI-HA-04A. Photo taken on May 25, 2016.



Photo 14: View of drive point well GSI-HA-05A. Photo taken on May 25, 2016.



Photo 15: View of well MW09-15. Photo taken on May 25, 2016.



Photo 16: View of well MW09-16. Photo taken on May 24, 2016.



Photo 17: View of well MW09-17. Photo taken on May 25, 2016.



Photo 18: View of well MW09-18. Photo taken on May 25, 2016.



Photo 19: View of well MW09-19. Photo taken on May 25, 2016.



Photo 20: View of well CH-P-13-01/10. Photo taken on May 25, 2016.



Photo 21: View of wells CH-P-13-03/50. Photo taken on May 25, 2016.



Photo 22: View of wells CH-P-13-04/10 and CH-P-13-04/35. Photo taken on May 25, 2016.



Photo 23: View of well GLL07-01. Photo taken on May 25, 2016.



Photo 24: View of well MW09-13. Photo taken on May 25, 2016.



Photo 25: View of well MW09-14. Photo taken on May 25, 2016.



Photo 26: View of drive point wells GSI-PC-03A and GSI-PC-03B. Photo taken on May 27, 2016.



Photo 27: View of drive point wells GSI-PC-04A and GSI-PC-04B. Photo taken on May 27, 2016.



Photo 28: View of drive point wells GSI-PC-05A and GSI-PC-05B. Photo taken on May 27, 2016.



Photo 29: View of drive point well MP09-03. Photo taken on May 27, 2016.



Photo 30: View of drive point well MP09-08. Photo taken on May 27, 2016.



Photo 31: View of well W14103083BH01. Photo taken on May 25, 2016.



Photo 32: View of well W14103083BH02. Photo taken on May 25, 2016.



Photo 33: View of well W14103083BH04. Photo taken on May 25, 2016.



Photo 34: View of well MP09-04. Photo taken on May 26, 2016.



Photo 35: View of well MP09-05. Photo taken on May 26, 2016.



Photo 36: View of wells MP09-09 and MP09-10. Photo taken on May 26, 2016.



Photo 37: View of wells MP09-11 and MP09-12. Photo taken on May 26, 2016.



Photo 38: View of drive point well MP09-14. Photo taken on May 26, 2016.



Photo 39: View of well MW09-02. Photo taken on May 26, 2016.



Photo 40: View of well MW09-03. Photo taken on May 26, 2016.



Photo 41: View of well MW09-04. Photo taken on May 26, 2016.

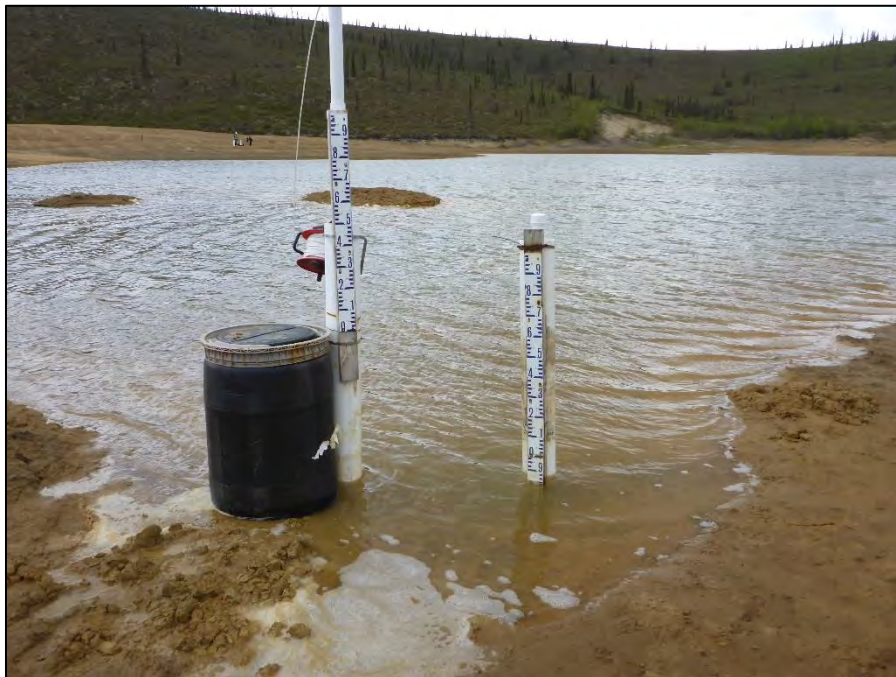


Photo 42: View of wells MW09-05 and MW09-06. Photo taken on May 26, 2016.



Photo 43: View of well MW09-07. Photo taken on May 25, 2016.



Photo 44: View of well MW09-08. Photo taken on May 26, 2016.



Photo 45: View of well MW09-11. Photo taken on May 25, 2016.



Photo 46: View of well MW09-20. Photo taken on May 25, 2016.



Photo 47: View of well MW09-21. Photo taken on May 26 2016.



Photo 48: View of wells MW09-22. Photo taken on May 26, 2016.



Photo 49: View of well MW09-23. Photo taken on May 26, 2016.



Photo 50: View of well MW09-24. Photo taken on May 25, 2016.



Photo 51: View of well W14103083BH03. Photo taken on May 26, 2016.

APPENDIX B

Field Forms

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site		CH-P-13-01/10 CH-P-13-01-CH-P-13-01/0		Project Number	1343-005.27	Date	25-May-16		
Piezometer Diameter		2 1"		Client	GY - AAM	Samplers	NB / Mtd		
UTM Location		Z: 08, E: 0388654 N: 6881121		Project Name	Mount Nansen 2016 GW Sampling Program	Weather/Temperature			
Waypoint		GPS: ELR Name: 004				Recovery		<input type="checkbox"/> Good <input checked="" type="checkbox"/> Bad	
Photos		Cam: ELR Nos: 419-421		Purge Method					
Duplicate Collected		<input type="checkbox"/> Yes Name: _____		Waterra	Peristaltic	Disp. Bailer	Other		
Field Blank Collected		<input type="checkbox"/> Yes Name: _____							
Initial Depth to Water (m)		6.610 ice		Purge Start Time:		Purge End Time:			
Depth to Bottom (m)		FROZEN		Pen or YSI:		<input type="checkbox"/> YSI Pro Plus <input type="checkbox"/> Pen Unit			
Submerged Tubing Depth (m)				Purge Interval Time () min / Vol. () L					
Well Stick-up Height (m)		0.50		Depth to water (m)					
Estimated Water Volume (L)				Temperature (°C) 3%					
<p>Calculations:</p> <p>(DTB - DTW) x (πr²) 1000 (for well diameter) = 1 well volume (DTB - DTW) x 8.1 (for 4" well diameter) = 1 well volume (DTB - DTW) x 2 (for 2" well diameter) = 1 well volume (DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume (DTB-DTW) x 0.5 (for 1" diameter) = 1 well volume</p>				pH (pH Units) ±0.1					
				Cond. (µs/cm) 3%					
				Specific Cond. (µs/cm) 3%					
				Redox (mV) 10%					
				DO (mg/L) 10%					
				DO (%) 10%					
				Appearance & Odour (Clear, Silty, HC odours, etc.)					
				Only for final readings		Sulphide (mg/L)			
						Turbidity (NTU)			
						Interval Purge Volume (L)			
				Cumulative Purge Volume (L):					
YSI ID				Sample Method:					
Logged Field Parameters		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Waterra	Peristaltic	Disp. Bailer	Other		
Time logged on YSI (24hr)									
Sample Time (24hr)									

Sample Site (Con't): A CH-P-13-01/10

Sample Date (Con't): _____

Well Head Seal: J-Plug PVC Cap Not Sealed Other _____

Seal Replaced: J-Plug PVC Cap Not required Other _____

Well properly sealed for gas monitoring: Yes No Details: slits on cap &

Head Space Gas Measurements

	Units	Values
Methane (CH ₄)	%LEL	0
Oxygen (O ₂)	%	20.9
Carbon Dioxide (CO ₂)	PPM	200

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HNO ₃ (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HCL (Hydrochloric)		
2	500 ml (plastic)	General Chemistry	100 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input type="checkbox"/> NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH ₃)	60 ml	-	<input type="checkbox"/> H ₂ SO ₄ (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input type="checkbox"/> HNO ₃ (Nitric)		
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-		

General Notes and Observations:

- Frozen @ 6.610m, attempt to thaw & break through w/ water for 20 minutes; attempt unsuccessful

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) _____ ft ^(7.610m)
- 3/8" HDPE (microwaterra tubing) _____ ft
- 5/8" HDPE (waterra tubing) _____ ft
- 1/4" Silicon tubing 0.5 ft
- High Capacity .45 micron filters _____
- D-25 (for 2" wells, use with 5/8") foot valves _____
- D-16 (for 1" wells, use with 5/8") foot valves _____
- SS-10 (for 5/8" wells, use with 3/8") foot valves _____
- 1" bailer _____
- 2" bailer _____
- other (describe) _____

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site	CH-P-13-03/50	Project Number	1343-005.27	Date	23-May-16
Piezometer Diameter	1"	Client	GY - AAM	Samplers	NB/MM
UTM Location	Z: 08, E: 0389148 N: 6881105	Project Name	Mount Nansen 2016 GW Sampling Program	Weather/Temperature	Rainy/Snowy
Waypoint	GPS: ELR Name: 0056			Recovery	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Bad
Photos	Cam: ELR Nos: 427-429.	Purge Method			
Duplicate Collected	<input type="checkbox"/> Yes Name:	Waterra	Peristaltic	Disp. Bailer	Other
Field Blank Collected	<input type="checkbox"/> Yes Name:			1" bailer	
Initial Depth to Water (m)	49.433	Purge Start Time:		Purge End Time:	
Depth to Bottom (m)	50.478	Purge Interval Time () min / Vol. () L		Pen or YSI:	<input type="checkbox"/> YSI Pro-Plus <input type="checkbox"/> Pen Unit
Submerged Tubing Depth (m)	N/A	Depth to water (m)			
Well Stick-up Height (m)	0.59	Temperature (°C) 3%			
Estimated Water Volume (L)	0.523	pH (pH Units) ±0.1			
<p>(DTB - DTW) x (πr²) 1000 (for well diameter) = 1 well volume (DTB - DTW) x 8.1 (for 4" well diameter) = 1 well volume (DTB - DTW) x 2 (for 2" well diameter) = 1 well volume (DTB - DTW) x 1.1 (for 1.5" diameter) = 1 well volume (DTB - DTW) x 0.5 (for 1" diameter) = 1 well volume</p> <p>Calculations: $\frac{50.478}{1.045} \times 0.5 = 0.5225$</p>	Cond. (µs/cm) 3%				
	Specific Cond. (µs/cm) 3%				
	Redox (mV) 10%				
	DO (mg/L) 10%				
	DO (%) 10%				
	Appearance & Odour (Clear, Silty, HC odours, etc.)				
	Only for final readings	Sulphide (mg/L)			
		Turbidity (NTU)			
	Interval Purge Volume (L)				
	Cumulative Purge Volume (L):				
YSI ID		Sample Method:			
Logged Field Parameters	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Waterra	Peristaltic	Disp. Bailer	Other
Time logged on YSI (24hr)					
Sample Time (24hr)	17:00			<input checked="" type="checkbox"/>	

INSUFFICIENT VOL.
DISS METALS SAMPLED

Sample Site (Con't): CH-P-13-03150

Sample Date (Con't): 25-May-16 @ 17:20 + 26-May-16 @ 15:10

Well Head Seal: J-Plug PVC Cap Not Sealed Other clear soft plastic cap

Seal Replaced: J-Plug PVC Cap Not required Other _____

Well properly sealed for gas monitoring: Yes No Details: _____

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	29.9
Carbon Dioxide (CO2)	PPM	200

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input checked="" type="checkbox"/> Field Filtered	<input checked="" type="checkbox"/> HNO ₃ (Nitric)	100	@ 17:20
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input checked="" type="checkbox"/> Field Filtered	<input checked="" type="checkbox"/> HCL (Hydrochloric)	15	@ 15:10 on 26-May-16
2	500 ml (plastic)	General Chemistry	100 ml	-	-	100	@ 15:10 on 26-May-16
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input type="checkbox"/> NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	60 ml	-	<input type="checkbox"/> H ₂ SO ₄ (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input type="checkbox"/> HNO ₃ (Nitric)		
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-		

General Notes and Observations:

- Direct Sampled w 1" bailer, unable to get water out w bailer. Will return with ^{a different} ~~same~~ bailer ~~same~~ for second attempt, assumed valve on bailer may not be closing properly.

- Second attempt @ 17:00 on 25-May-16 → able to direct sample the dissolved metals, will return tomorrow to check recharge level.

- DTN @ 49.524 @ 17:22.

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) _____ ft
- 3/8" HDPE (microwaterra tubing) _____ ft
- 5/8" HDPE (waterra tubing) _____ ft
- 1/4" Silicon tubing _____ ft
- High Capacity .45 micron filters _____
- D-25 (for 2" wells, use with 5/8") foot valves _____
- D-16 (for 1" wells, use with 5/8") foot valves _____
- SS-10 (for 5/8" wells, use with 3/8") foot valves _____
- 1" bailer x2 + bailer twine w _____
- 2" bailer _____
- other (describe) _____

- returned @ 15:10 on 26-May-16 → sampled min vols for diss, mercury & gen chem.

- well dry immediately after.

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site	CH-P-13-04/10	Project Number	1343-005.27	Date	25-May-16	
Piezometer Diameter	1"	Client	GY - AAM	Samplers	NB/MM	
UTM Location	Z: 080 E: 0389136 N: 6881472	Project Name	Mount Nansen 2016 GW Sampling Program	Weather/Temperature	overcast / ~4°C	
Waypoint	GPS: ELR Name: 010	Purge Method	<input type="checkbox"/> Waterra <input checked="" type="checkbox"/> Peristaltic <input type="checkbox"/> Disp. Bailer <input type="checkbox"/> Other	Recovery	<input type="checkbox"/> Good <input type="checkbox"/> Bad	
Photos	Cam: ELR Nos: 437-440			<input type="checkbox"/> Yes Name: _____ <input type="checkbox"/> Yes Name: _____	Pen or YSI:	<input type="checkbox"/> YSI Pro Plus <input type="checkbox"/> Pen Unit
Initial Depth to Water (m)	6.198 for ice.	Purge Start Time:	<input checked="" type="checkbox"/>	Purge End Time:	<input checked="" type="checkbox"/>	
Depth to Bottom (m)	FROZEN	Purge Interval Time () min / Vol. () L				
Submerged Tubing Depth (m)	/	Depth to water (m)				
Well Stick-up Height (m)	0.630	Temperature (°C) 3%				
Estimated Water Volume (L)	/	pH (pH Units) ±0.1				
<p>Calculations:</p> <p>(DTB - DTW) x (πr²)1000 (for well diameter) = 1 well volume (DTB - DTW) x 8.1 (for 4" well diameter) = 1 well volume (DTB - DTW) x 2 (for 2" well diameter) = 1 well volume (DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume (DTB-DTW) x 0.5 (for 1" diameter) = 1 well volume</p>	Conductivity (µs/cm) 3%	<div style="font-size: 2em; font-weight: bold;">FROZEN</div>				
	Specific Cond. (µs/cm) 3%					
	Redox (mV) 10%					
	DO (mg/L) 10%					
	DO (%) 10%					
	Appearance & Odour (Clear, Silty, HC odours, etc.)					
	Only for final readings					Sulphide (mg/L)
						Turbidity (NTU)
	Interval Purge Volume (L)					
	Cumulative Purge Volume (L):					
YSI ID		Sample Method:				
Logged Field Parameters	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Waterra <input checked="" type="checkbox"/> Peristaltic <input type="checkbox"/> Disp. Bailer <input type="checkbox"/> Other				
Time logged on YSI (24hr)	/					
Sample Time (24hr)	/					



Sample Site (Con't): CH-P-13-04/10

Sample Date (Con't): _____

Well Head Seal: J-Plug PVC Cap Not Sealed Other _____

Seal Replaced: J-Plug PVC Cap Not required Other _____

Well properly sealed for gas monitoring: Yes No Details: _____

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.9
Carbon Dioxide (CO2)	PPM	200

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HNO ₃ (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input type="checkbox"/> Field Filtered	<input checked="" type="checkbox"/> HCL (Hydrochloric)		
2	500 ml (plastic)	General Chemistry	100 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input type="checkbox"/> NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH ₃)	60 ml	-	<input type="checkbox"/> H ₂ SO ₄ (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input type="checkbox"/> HNO ₃ (Nitric)		
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-		

General Notes and Observations:

- Attempted to draw well for 30 minutes using boiling DI water, attempt unsuccessful
- Ice was found on the tip of the water level tape, indicating blockage was ice.

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) _____ ft
- 3/8" HDPE (microwaterra tubing) _____ ft
- 5/8" HDPE (waterra tubing) _____ ft
- 1/4" Silicon tubing _____ ft
- High Capacity .45 micron filters _____
- D-25 (for 2" wells, use with 5/8") foot valves _____
- D-16 (for 1" wells, use with 5/8") foot valves _____
- SS-10 (for 5/8" wells, use with 3/8") foot valves _____
- 1" bailer _____
- 2" bailer _____
- other (describe) _____

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site	CA-P-13-04/35	Project Number	1343-005.27	Date	25-May-16
Piezometer Diameter	1"	Client	GY - AAM	Samplers	NB/UM
UTM Location	Z: 089 E: 0389136 N: 681467	Project Name	Mount Nansen 2016 GW Sampling Program	Weather/Temperature	overcast ~ -4
Waypoint	GPS: ELR Name: 009	Recovery	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Bad		
Photos	Cam: ELR Nos: 437-440	Purge Method			
Duplicate Collected	<input type="checkbox"/> Yes Name: _____	Waterra	Peristaltic	Disp. Bailer	Other
Field Blank Collected	<input type="checkbox"/> Yes Name: _____				
Initial Depth to Water (m)	6.492 to ice	Purge Start Time:	/	Purge End Time:	/
		Pen or YSI:	<input type="checkbox"/> YSI Pro-Plus <input type="checkbox"/> Pen Unit		
Depth to Bottom (m)	FROZEN	Purge Interval Time () min / Vol. () L			
Submerged Tubing Depth (m)	/	Depth to water (m)			
Well Stick-up Height (m)	0.62	Temperature (°C) 3%			
Estimated Water Volume (L)	/	pH (pH Units) ±0.1			
Calculations: $(DTB - DTW) \times (\pi r^2) \times 1000$ (for well diameter) = 1 well volume $(DTB - DTW) \times 8.1$ (for 4" well diameter) = 1 well volume $(DTB - DTW) \times 2$ (for 2" well diameter) = 1 well volume $(DTB - DTW) \times 1.1$ (for 1.5" diameter) = 1 well volume $(DTB - DTW) \times 0.5$ (for 1" diameter) = 1 well volume	Cond. (µs/cm) 3%				
	Specific Cond. (µs/cm) 3%				
	Redox (mV) 10%				
	DO (mg/L) 10%				
	DO (%) 10%				
	Appearance & Odour (Clear, Silty, HC odours, etc.)				
	Only for final readings	Sulphide (mg/L)			
		Turbidity (NTU)			
	Interval Purge Volume (L)				
	Cumulative Purge Volume (L):				
YSI ID		Sample Method:			
Logged Field Parameters	<input type="checkbox"/> Yes <input type="checkbox"/> No	Waterra	Peristaltic	Disp. Bailer	Other
Time logged on YSI (24hr)	/				
Sample Time (24hr)	/				

Sample Site (Con't): CH-P-13-04/35

Sample Date (Con't):

Well Head Seal: J-Plug PVC Cap Not Sealed Other clear cap → doesn't fit properly

Seal Replaced: J-Plug PVC Cap Not required Other

Well properly sealed for gas monitoring: Yes No Details: cap too loose

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.9
Carbon Dioxide (CO2)	PPM	200

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HNO ₃ (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HCL (Hydrochloric)		
2	500 ml (plastic)	General Chemistry	100 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input type="checkbox"/> NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	60 ml	-	<input type="checkbox"/> H ₂ SO ₄ (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input type="checkbox"/> HNO ₃ (Nitric)		
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-		

General Notes and Observations:

- Attempted to draw well for 20 minutes, attempt unsuccessful.
 - ~~Depth~~ depth to ice (6.498m) is similar to well directly beside it (CH-P-13-04/10 @ 6.198 depth to ice), ~~that~~ therefore blockage is most likely ice.

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) _____ ft
- 3/8" HDPE (microwaterra tubing) _____ ft
- 5/8" HDPE (waterra tubing) _____ ft
- 1/4" Silicon tubing _____ ft
- High Capacity .45 micron filters _____
- D-25 (for 2" wells, use with 5/8" foot valves) _____
- D-16 (for 1" wells, use with 5/8" foot valves) _____
- SS-10 (for 5/8" wells, use with 3/8" foot valves) _____
- 1" bailer _____
- 2" bailer _____
- other (describe) _____

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site	CH-P-B-05/50	Project Number	1343-005.27	Date	25-May-16	
Piezometer Diameter	2"	Client	GY - AAM	Samplers	NB/MM	
UTM Location	Z: 08, E: 0388954 N: 6881466	Project Name	Mount Nansen 2016 GW Sampling Program	Weather/Temperature	overcast	
Waypoint	GPS: N/A Name:			Recovery	<input type="checkbox"/> Good <input type="checkbox"/> Bad	
Photos	Cam: N/A Nos:	Purge Method				
Duplicate Collected	<input type="checkbox"/> Yes Name:	Waterra	Peristaltic	Disp. Bailer	Other	
Field Blank Collected	<input type="checkbox"/> Yes Name:					
Initial Depth to Water (m)	/	Purge Start Time:		Purge End Time:		
Depth to Bottom (m)					Pen or YSI:	<input type="checkbox"/> YSI Pro Plus <input type="checkbox"/> Pen Unit
Submerged Tubing Depth (m)		Purge Interval Time () min / Vol. () L				
Well Stick-up Height (m)		Depth to water (m)				
Estimated Water Volume (L)		Temperature (°C) 3%				
<p>Calculations:</p> <p>(DTB - DTW) x (πr²)1000 (for well diameter) = 1 well volume (DTB - DTW) x 8.1 (for 4" well diameter) = 1 well volume (DTB - DTW) x 2 (for 2" well diameter) = 1 well volume (DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume (DTB-DTW) x 0.5 (for 1" diameter) = 1 well volume</p>		pH (pH Units) ±0.1				
		Cond. (µs/cm) 3%				
	Specific Cond. (µs/cm) 3%					
	Redox (mV) 10%					
	DO (mg/L) 10%					
	DO (%) 10%					
	Appearance & Odour (Clear, Silty, HC odours, etc.)					
	Only for final readings	Sulphide (mg/L)				
		Turbidity (NTU)				
		Interval Purge Volume (L)				
	Cumulative Purge Volume (L):					
YSI ID		Sample Method:				
Logged Field Parameters	<input type="checkbox"/> Yes <input type="checkbox"/> No					
Time logged on YSI (24hr)		Waterra	Peristaltic	Disp. Bailer	Other	
Sample Time (24hr)						



Sample Site (Con't): CH-P-B-05150

Sample Date (Con't): _____

Well Head Seal: J-Plug PVC Cap Not Sealed Other _____

Seal Replaced: J-Plug PVC Cap Not required Other _____

Well properly sealed for gas monitoring: Yes No Details: _____

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	
Oxygen (O2)	%	
Carbon Dioxide (CO2)	PPM	

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HNO ₃ (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HCL (Hydrochloric)		
2	500 ml (plastic)	General Chemistry	100 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input type="checkbox"/> NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH ₃)	60 ml	-	<input type="checkbox"/> H ₂ SO ₄ (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input type="checkbox"/> HNO ₃ (Nitric)		
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-		

General Notes and Observations:

- Not accessible, well located in the pit which is off limits due to overhead hazards as specified by YG (AAH)

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) _____ ft
- 3/8" HDPE (microwaterra tubing) _____ ft
- 5/8" HDPE (waterra tubing) _____ ft
- 1/4" Silicon tubing _____ ft
- High Capacity .45 micron filters _____
- D-25 (for 2" wells, use with 5/8") foot valves _____
- D-16 (for 1" wells, use with 5/8") foot valves _____
- SS-10 (for 5/8" wells, use with 3/8") foot valves _____
- 1" bailer _____
- 2" bailer _____
- other (describe) _____

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site	GLL-07-01	Project Number	1343-005.27	Date	May 25, 2016	
Piezometer Diameter	2-inch	Client	GY - AAM	Samplers	KB, PSC	
UTM Location	Z: 08 E: 0388848 N: 6881783	Project Name	Mount Nansen 2016 GW Sampling Program	Weather/Temperature	overcast	
Waypoint	GPS: Hem Name: N/A	Purge Method				
Photos	Cam: Jeremy Nos:	Water	Peristaltic	Disp. Bailer	Other	
Duplicate Collected	<input type="checkbox"/> Yes Name:					
Field Blank Collected	<input type="checkbox"/> Yes Name:					
Initial Depth to Water (m)	frozen	Purge Start Time:		Purge End Time:	Pen or YSI: <input type="checkbox"/> YSI Pro Plus <input type="checkbox"/> Pen Unit	
Depth to Bottom (m)	13.853	Purge Interval Time () min / Vol. () L				
Submerged Tubing Depth (m)	N/A	Depth to water (m)				
Well Stick-up Height (m)	0.777	Temperature (°C) 3%				
Estimated Water Volume (L)	N/A	pH (pH Units) ±0.1				
<p>Calculations:</p> <p>(DTB - DTW) x (πr²)1000 (for well diameter) = 1 well volume (DTB - DTW) x 8.1 (for 4" well diameter) = 1 well volume (DTB - DTW) x 2 (for 2" well diameter) = 1 well volume (DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume (DTB-DTW) x 0.5 (for 1" diameter) = 1 well volume</p>	Cond. (µs/cm) 3%					
	Specific Cond. (µs/cm) 3%					
	Redox (mV) 10%					
	DO (mg/L) 10%					
	DO (%) 10%					
	Appearance & Odour (Clear, Silty, HC odours, etc.)	frozen				
	Only for final readings	Sulphide (mg/L)				
		Turbidity (NTU)				
	Interval Purge Volume (L)					
	Cumulative Purge Volume (L):					
YSI ID		Sample Method:				
Logged Field Parameters	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Water	Peristaltic	Disp. Bailer	Other	
Time logged on YSI (24hr)	N/A					
Sample Time (24hr)	N/A					



Sample Site (Con't): GLL07-01

Sample Date (Con't): May 25, 2016

Well Head Seal: J-Plug PVC Cap Not Sealed Other _____

Seal Replaced: J-Plug PVC Cap Not required Other _____

Well properly sealed for gas monitoring: Yes No Details: _____

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.6
Carbon Dioxide (CO2)	PPM	700

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HNO ₃ (Nitric)	/	
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HCL (Hydrochloric)		
2	500 ml (plastic)	General Chemistry	100 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input type="checkbox"/> NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH ₃)	60 ml	-	<input type="checkbox"/> H ₂ SO ₄ (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input type="checkbox"/> HNO ₃ (Nitric)		
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-		

General Notes and Observations:

- frozen.
- did not attempt to thaw due to depth of well

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) _____ ft
- 3/8" HDPE (microwaterra tubing) _____ ft
- 5/8" HDPE (waterra tubing) _____ ft
- 1/4" Silicon tubing _____ ft
- High Capacity .45 micron filters _____
- D-25 (for 2" wells, use with 5/8") foot valves _____
- D-16 (for 1" wells, use with 5/8") foot valves _____
- SS-10 (for 5/8" wells, use with 3/8") foot valves _____
- 1" bailer _____
- 2" bailer _____
- other (describe) _____

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site	G L L 0 7 - 0 3	Project Number	1343-005.27	Date	25-May-16	
Piezometer Diameter	2"	Client	GY - AAM	Samplers	NBIMM	
UTM Location	Z: 08, E: 6388059 N: 6881477	Project Name	Mount Nansen 2016 GW Sampling Program	Weather/Temperature	Rainy	
Waypoint	GPS: N/A Name:	Purge Method	<input type="checkbox"/> Watterra <input type="checkbox"/> Peristaltic <input type="checkbox"/> Disp. Bailer <input type="checkbox"/> Other			
Photos	Cam: N/A Nos:	Duplicate Collected	<input type="checkbox"/> Yes Name: _____			
Field Blank Collected	<input type="checkbox"/> Yes Name: _____	Field Blank Collected	<input type="checkbox"/> Yes Name: _____			
Initial Depth to Water (m)	/	Purge Start Time:		Purge End Time:		
Depth to Bottom (m)		Pen or YSI:	<input type="checkbox"/> YSI Pro Plus <input type="checkbox"/> Pen Unit			
Submerged Tubing Depth (m)		Purge Interval	Time () min / Vol. () L			
Well Stick-up Height (m)		Depth to water (m)				
Estimated Water Volume (L)		Temperature (°C) 3%				
<p>Calculations:</p> <p>(DTB - DTW) x (πr²) 1000 (for well diameter) = 1 well volume (DTB - DTW) x 8.1 (for 4" well diameter) = 1 well volume (DTB - DTW) x 2 (for 2" well diameter) = 1 well volume (DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume (DTB-DTW) x 0.5 (for 1" diameter) = 1 well volume</p>		pH (pH Units) ±0.1	/ NOT ACCESSIBLE /			
		Cond. (µs/cm) 3%				
		Specific Cond. (µs/cm) 3%				
		Redox (mV) 10%				
		DO (mg/L) 10%				
	DO (%) 10%					
	Appearance & Odour (Clear, Silty, HC odours, etc.)					
	Only for final readings	Sulphide (mg/L)				
		Turbidity (NTU)				
		Interval Purge Volume (L)				
	Cumulative Purge Volume (L):					
YSI ID		Sample Method:				
Logged Field Parameters	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Watterra <input type="checkbox"/> Peristaltic <input type="checkbox"/> Disp. Bailer <input type="checkbox"/> Other				
Time logged on YSI (24hr)						
Sample Time (24hr)						



Sample Site (Con't): G1107-08

Sample Date (Con't): _____

Well Head Seal: J-Plug PVC Cap Not Sealed Other _____

Seal Replaced: J-Plug PVC Cap Not required Other _____

Well properly sealed for gas monitoring: Yes No Details: _____

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	
Oxygen (O2)	%	
Carbon Dioxide (CO2)	PPM	

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HNO ₃ (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HCL (Hydrochloric)		
2	500 ml (plastic)	General Chemistry	100 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input type="checkbox"/> NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	60 ml	-	<input type="checkbox"/> H ₂ SO ₄ (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input type="checkbox"/> HNO ₃ (Nitric)		
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-		

General Notes and Observations:

- unable to ~~locate~~ access wells in the pit due to overhead hazards as specified by YG.

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) _____ ft
- 3/8" HDPE (microwaterra tubing) _____ ft
- 5/8" HDPE (waterra tubing) _____ ft
- 1/4" Silicon tubing _____ ft
- High Capacity .45 micron filters _____
- D-25 (for 2" wells, use with 5/8" foot valves) _____
- D-16 (for 1" wells, use with 5/8" foot valves) _____
- SS-10 (for 5/8" wells, use with 3/8" foot valves) _____
- 1" bailer _____
- 2" bailer _____
- other (describe) _____

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site		GILL-07-02		Project Number	1343-005.27		Date	Aug 27 2016		
Piezometer Diameter		6"		Client	GY - AAM		Samplers	JC / KB		
UTM Location		Z: 08 E: 0389069 N: 6881703		Project Name	Mount Nansen 2016 GW Sampling Program		Weather/Temperature		11° Sunny	
Waypoint		GPS: Hem Name: N/A					Recovery		<input type="checkbox"/> Good <input checked="" type="checkbox"/> Bad	
Photos		Cam: Jeremy Nos: _____		Purge Method						
Duplicate Collected		<input type="checkbox"/> Yes Name: _____		Waterra		Peristaltic		Disp. Bailer		Other
Field Blank Collected		<input type="checkbox"/> Yes Name: _____		_____		_____		_____		_____
Initial Depth to Water (m)		Dry		Purge Start Time:		_____		Purge End Time:		_____
Depth to Bottom (m)		7.125		Pen or YSI:		<input type="checkbox"/> YSI Pro-Plus		<input type="checkbox"/> Pen Unit		
Submerged Tubing Depth (m)		_____		Purge Interval Time () min / Vol. () L						
Well Stick-up Height (m)		1.351		Depth to water (m)						
Estimated Water Volume (L)		_____		Temperature (°C) 3%						
<p>Calculations:</p> <p>(DTB - DTW) x (πr²) 1000 (for well diameter) = 1 well volume (DTB - DTW) x 8.1 (for 4" well diameter) = 1 well volume (DTB - DTW) x 2 (for 2" well diameter) = 1 well volume (DTB - DTW) x 1.1 (for 1.5" diameter) = 1 well volume (DTB - DTW) x 0.5 (for 1" diameter) = 1 well volume</p>		pH (pH Units) ±0.1								
		Cond. (µs/cm) 3%								
		Specific Cond. (µs/cm) 3%								
		Redox (mV) 10%								
		DO (mg/L) 10%								
		DO (%) 10%								
		Appearance & Odour (Clear, Silty, HC odours, etc.)								
		Only for final readings		Sulphide (mg/L)						
				Turbidity (NTU)						
				Interval Purge Volume (L)						
		Cumulative Purge Volume (L):								
YSI ID				Sample Method:						
Logged Field Parameters		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Waterra		Peristaltic		Disp. Bailer		Other
Time logged on YSI (24hr)		_____		_____		_____		_____		_____
Sample Time (24hr)		_____		_____		_____		_____		_____



Sample Site (Con't): GLL-07-02

Sample Date (Con't): May 27 2016

Well Head Seal: J-Plug PVC Cap Not Sealed Other Metal Flip cap

Seal Replaced: J-Plug PVC Cap Not required Other _____

Well properly sealed for gas monitoring: Yes No Details: _____

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.9
Carbon Dioxide (CO2)	PPM	300

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HNO ₃ (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HCL (Hydrochloric)		
2	500 ml (plastic)	General Chemistry	100 ml	-			
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input type="checkbox"/> NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	60 ml	-	<input type="checkbox"/> H ₂ SO ₄ (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input type="checkbox"/> HNO ₃ (Nitric)		
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-		

General Notes and Observations:

Well is dry
Dedicated Bailer in well

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) _____ ft
- 3/8" HDPE (microwater tubing) _____ ft
- 5/8" HDPE (water tubing) _____ ft
- 1/4" Silicon tubing _____ ft
- High Capacity .45 micron filters _____
- D-25 (for 2" wells, use with 5/8") foot valves _____
- D-16 (for 1" wells, use with 5/8") foot valves _____
- SS-10 (for 5/8" wells, use with 3/8") foot valves _____
- 1" bailer _____
- 2" bailer _____
- other (describe) _____

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site	675I-DC-01B1A	Project Number	1343-005.27	Date	May 25 2016
Piezometer Diameter	1-inch	Client	GY - AAM	Samplers	Schva K Beckman
UTM Location	Z: 08 E: 0387672 N: 6881126	Project Name	Mount Nansen 2016 GW Sampling Program	Weather/Temperature	70 Light Rain
Waypoint	GPS: Name:	Purge Method	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Bad		
Photos	Cam: <i>Screen Phone</i> Nos:	Watterra	Peristaltic	Disp. Bailer	Other
Duplicate Collected	<input type="checkbox"/> Yes Name:		<input checked="" type="checkbox"/>		
Field Blank Collected	<input type="checkbox"/> Yes Name:				
Initial Depth to Water (m)	B=1.345 A=0.929	Purge Start Time:		Purge End Time:	
Depth to Bottom (m)	B=1.536 A=1.200	Pen or YSI:	<input type="checkbox"/> YSI Pro Plus <input type="checkbox"/> Pen Unit		
Submerged Tubing Depth (m)	1.536	Purge Interval Time () min / Vol. () L			
Well Stick-up Height (m)	B=0.936 A=0.923	Depth to water (m)			
Estimated Water Volume (L)	0.047L	Temperature (°C) 3%			
<p> (DTB - DTW) x (πr²)1000 (for well diameter) = 1 well volume (DTB - DTW) x 8.1 (for 4" well diameter) = 1 well volume (DTB - DTW) x 2 (for 2" well diameter) = 1 well volume (DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume (DTB-DTW) x 0.5 (for 1" diameter) = 1 well volume Calculations: (1.536 - 1.345) x 0.25 = 0.047L 1/2" diameter </p>	pH (pH Units) ±0.1				
	Cond. (µs/cm) 3%				
	Specific Cond. (µs/cm) 3%				
	Redox (mV) 10%				
	DO (mg/L) 10%				
	DO (%) 10%				
	Appearance & Odour (Clear, Silty, HC odours, etc.)				
	Only for final readings	Sulphide (mg/L)			
		Turbidity (NTU)			
	Interval Purge Volume (L)				
Cumulative Purge Volume (L):					
YSI ID	N/A	Sample Method:			
Logged Field Parameters	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Watterra	Peristaltic	Disp. Bailer	Other
Time logged on YSI (24hr)	N/A		<input checked="" type="checkbox"/>		
Sample Time (24hr)	8:40				



Sample Site (Con't): GSI-DC-01 B/A

Sample Date (Con't): May 25 2016

Well Head Seal: J-Plug PVC Cap Not Sealed Other _____

Seal Replaced: J-Plug PVC Cap Not required Other _____

Well properly sealed for gas monitoring: Yes No Details: slit in cap

Head Space Gas Measurements well B

	Units	Values
Methane (CH4)	%LEL	B=0 A=0
Oxygen (O2)	%	B=20.9 A=20.9
Carbon Dioxide (CO2)	PPM	B=300 A=300

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input checked="" type="checkbox"/> Field Filtered	<input checked="" type="checkbox"/> HNO ₃ (Nitric)	50	insufficient vol.
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HCL (Hydrochloric)		
2	500 ml (plastic)	General Chemistry	100 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input type="checkbox"/> NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	60 ml	-	<input type="checkbox"/> H ₂ SO ₄ (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input type="checkbox"/> HNO ₃ (Nitric)		
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-		

General Notes and Observations:

- camera battery dying + memory full ~~Sample not Representative~~
 - used Jeremy's camera on phone, will upload tonight
 - wells not labeled, assumed well to flagging tape was well B
 - Returned May 27, well was dry.
 - well assumed frozen + sampled water above ice

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) 7 ft
- 3/8" HDPE (microwaterra tubing) _____ ft
- 5/8" HDPE (waterra tubing) _____ ft
- 1/4" Silicon tubing 0.5 ft
- High Capacity .45 micron filters _____
- D-25 (for 2" wells, use with 5/8" foot valves) _____
- D-16 (for 1" wells, use with 5/8" foot valves) _____
- SS-10 (for 5/8" wells, use with 3/8" foot valves) _____
- 1" bailer _____
- 2" bailer _____
- other (describe) _____

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site	GSI-DC-02B/A	Project Number	1343-005.27	Date	May 25 2016	
Piezometer Diameter	1"	Client	GY - AAM	Samplers	Schwan K Beckman	
UTM Location	Z: 08 E: 0387838 N: 6881129	Project Name	Mount Nansen 2016 GW Sampling Program	Weather/Temperature	80 Light Rain	
Waypoint	GPS: Hem Name: N/A	Recovery	<input type="checkbox"/> Good <input type="checkbox"/> Bad			
Photos	Cam: Jerry Nos:	Purge Method				
Duplicate Collected	<input type="checkbox"/> Yes Name: _____	Waterra	Peristaltic	Disp. Bailer	Other	
Field Blank Collected	<input type="checkbox"/> Yes Name: _____					
Initial Depth to Water (m)	B = Frozen/A = Dry	Purge Start Time:		Purge End Time:		
				Pen or YSI:	<input type="checkbox"/> YSI Pro Plus <input type="checkbox"/> Pen Unit	
Depth to Bottom (m)	B = 0.923/A = 1.69	Purge Interval Time () min / Vol. () L				
Submerged Tubing Depth (m)		Depth to water (m)				
Well Stick-up Height (m)	B = 0.827/A 0.989	Temperature (°C) 3%				
Estimated Water Volume (L)		pH (pH Units) ±0.1				
<p>Calculations:</p> <p>(DTB - DTW) x (πr²) 1000 (for well diameter) = 1 well volume (DTB - DTW) x 8.1 (for 4" well diameter) = 1 well volume (DTB - DTW) x 2 (for 2" well diameter) = 1 well volume (DTB - DTW) x 1.1 (for 1.5" diameter) = 1 well volume (DTB - DTW) x 0.5 (for 1" diameter) = 1 well volume</p>		Cond. (µs/cm) 3%				
		Specific Cond. (µs/cm) 3%				
		Redox (mV) 10%				
		DO (mg/L) 10%				
		DO (%) 10%				
		Appearance & Odour (Clear, Silty, HC odours, etc.)				
		Only for final readings	Sulphide (mg/L)			
			Turbidity (NTU)			
		Interval Purge Volume (L)				
		Cumulative Purge Volume (L):				
YSI ID		Sample Method:				
Logged Field Parameters	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Waterra	Peristaltic	Disp. Bailer	Other	
Time logged on YSI (24hr)						
Sample Time (24hr)						



Sample Site (Con't): GSI-DC-02B

Sample Date (Con't): May 25 2016

Well Head Seal: J-Plug PVC Cap Not Sealed Other _____

Seal Replaced: J-Plug PVC Cap Not required Other _____

Well properly sealed for gas monitoring: Yes No Details: Slit in cap

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	A=0 B=0
Oxygen (O2)	%	A=20.9 B=20.9
Carbon Dioxide (CO2)	PPM	A=400 B=400

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HNO ₃ (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HCL (Hydrochloric)		
2	500 ml (plastic)	General Chemistry	100 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input type="checkbox"/> NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	60 ml	-	<input type="checkbox"/> H ₂ SO ₄ (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input type="checkbox"/> HNO ₃ (Nitric)		
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-		

General Notes and Observations:

Well A was observed Dry
 Attempted to thaw well B, unsuccessful

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) 4 ft
- 3/8" HDPE (microwaterra tubing) _____ ft
- 5/8" HDPE (waterra tubing) _____ ft
- 1/4" Silicon tubing 0.5 ft
- High Capacity .45 micron filters _____
- D-25 (for 2" wells, use with 5/8") foot valves _____
- D-16 (for 1" wells, use with 5/8") foot valves _____
- SS-10 (for 5/8" wells, use with 3/8") foot valves _____
- 1" bailer _____
- 2" bailer _____
- other (describe) _____



GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site	GSI-DC-BBB	Project Number	1343-005.27	Date	25-Mar-16
Piezometer Diameter	0.5" DP	Client	GY - AAM	Samplers	NB/PM
UTM Location	Z:082 E:0388107 N:6881079	Project Name	Mount Nansen 2016 GW Sampling Program	Weather/Temperature	Sunny
Waypoint	GPS: ELR Name: 003	Purge Method	<input type="checkbox"/> Waterra <input type="checkbox"/> Peristaltic <input type="checkbox"/> Disp. Bailer <input type="checkbox"/> Other		
Photos	Cam: ELR Nos: 416-418	Duplicate Collected	<input type="checkbox"/> Yes Name: _____		
Field Blank Collected	<input type="checkbox"/> Yes Name: _____	Field Blank Collected	<input type="checkbox"/> Yes Name: _____		
Initial Depth to Water (m)	B] 0.924 A] 1.010	Purge Start Time:	Purge End Time:	Pen or YSI:	<input type="checkbox"/> YSI Pro Plus <input type="checkbox"/> Pen Unit
Depth to Bottom (m)	B] FROZEN A] FROZEN	Purge Interval Time () min / Vol. () L			
Submerged Tubing Depth (m)		Depth to water (m)			
Well Stick-up Height (m)	0.79 (+1.0) B] 0.25	Temperature (°C) 3%			
Estimated Water Volume (L)		pH (pH Units) ±0.1			
Calculations: $(DTB - DTW) \times (\pi r^2) \times 1000$ (for well diameter) = 1 well volume $(DTB - DTW) \times 8.1$ (for 4" well diameter) = 1 well volume $(DTB - DTW) \times 2$ (for 2" well diameter) = 1 well volume $(DTB - DTW) \times 1.1$ (for 1.5" diameter) = 1 well volume $(DTB - DTW) \times 0.5$ (for 1" diameter) = 1 well volume	Cond. (µs/cm) 3%				
	Specific Cond. (µs/cm) 3%				
	Redox (mV) 10%				
	DO (mg/L) 10%				
	DO (%) 10%				
	Appearance & Odour (Clear, Silty, HC odours, etc.)				
	Only for final readings	Sulphide (mg/L)			
		Turbidity (NTU)			
	Interval Purge Volume (L)				
	Cumulative Purge Volume (L):				
YSI ID		Sample Method:	<input type="checkbox"/> Waterra <input type="checkbox"/> Peristaltic <input type="checkbox"/> Disp. Bailer <input type="checkbox"/> Other		
Logged Field Parameters	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Time logged on YSI (24hr)			
Sample Time (24hr)					



Sample Site (Con't): COI-DC-028

Sample Date (Con't): _____

Well Head Seal: J-Plug PVC Cap Not Sealed Other screw cap on B

Seal Replaced: J-Plug PVC Cap Not required Other plastic bag on A

Well properly sealed for gas monitoring: Yes No Details: _____

Head Space Gas Measurements

	Units	Values	
Methane (CH4)	%LEL	0	0
Oxygen (O2)	%	20.9	20.9
Carbon Dioxide (CO2)	PPM	200	300

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HNO ₃ (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HCL (Hydrochloric)		
2	500 ml (plastic)	General Chemistry	100 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input type="checkbox"/> NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	60 ml	-	<input type="checkbox"/> H ₂ SO ₄ (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input type="checkbox"/> HNO ₃ (Nitric)		
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-		

General Notes and Observations:

- Frozen @ 0.029 m, attempt defrost for 20 minutes; attempt unsuccessful, still frozen
 - Lots of snow + ice in creek bed surrounding DP

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) _____ ft
- 3/8" HDPE (microwaterra tubing) _____ ft
- 5/8" HDPE (waterra tubing) _____ ft
- 1/4" Silicon tubing _____ ft
- High Capacity .45 micron filters _____
- D-25 (for 2" wells, use with 5/8") foot valves _____
- D-16 (for 1" wells, use with 5/8") foot valves _____
- SS-10 (for 5/8" wells, use with 3/8") foot valves _____
- 1" bailer _____
- 2" bailer _____
- other (describe) _____



GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site	GS1-DC-05 B/A	Project Number	1343-005.27	Date	25-May-16			
Piezometer Diameter	0.5' DP	Client	GY - AAM	Samplers	NB/MHT			
UTM Location	Z: 0200 E: 0388722 N: 6880836	Project Name	Mount Nansen 2016 GW Sampling Program	Weather/Temperature	Rainy / snowy			
Waypoint	GPS: EIR Name: 005	Recovery	<input type="checkbox"/> Good <input type="checkbox"/> Bad					
Photos	Cam: EIR Nos: 422-426	Purge Method						
Duplicate Collected	<input type="checkbox"/> Yes Name:	Waterra	Peristaltic	Disp. Bailer	Other			
Field Blank Collected	<input type="checkbox"/> Yes Name:							
Initial Depth to Water (m)	A = 0.548	Purge Start Time:	Purge End Time:	Pen or YSI:	<input type="checkbox"/> YSI Pro Plus <input type="checkbox"/> Pen Unit			
Depth to Bottom (m)	FROZEN (A)	Purge Interval Time () min / Vol. () L						
Submerged Tubing Depth (m)		Depth to water (m)						
Well Stick-up Height (m)	to 0.398 to ice	Temperature (°C) 3%						
Estimated Water Volume (L)		pH (pH Units) ±0.1						
(DTB - DTW) x (πr ²)1000 (for well diameter) = 1 well volume (DTB - DTW) x 8.1 (for 4" well diameter) = 1 well volume (DTB - DTW) x 2 (for 2" well diameter) = 1 well volume (DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume (DTB-DTW) x 0.5 (for 1" diameter) = 1 well volume Calculations:	Cond. (µs/cm) 3%	CANNOT LOCATE Pumped UNDER ICE?						
	Specific Cond. (µs/cm) 3%							
	Redox (mV) 10%							
	DO (mg/L) 10%							
	DO (%) 10%							
	Appearance & Odour (Clear, Silty, HC odours, etc.)							
	<table border="1"> <tr> <td rowspan="2">Only for final readings</td> <td>Sulphide (mg/L)</td> </tr> <tr> <td>Turbidity (NTU)</td> </tr> </table>					Only for final readings	Sulphide (mg/L)	Turbidity (NTU)
	Only for final readings						Sulphide (mg/L)	
						Turbidity (NTU)		
	Interval Purge Volume (L)							
Cumulative Purge Volume (L):								
YSI ID	Sample Method:							
Logged Field Parameters	<input type="checkbox"/> Yes <input type="checkbox"/> No	Waterra	Peristaltic	Disp. Bailer	Other			
Time logged on YSI (24hr)								
Sample Time (24hr)								



Sample Site (Con't): GSI-DR-051/B

Sample Date (Con't): _____

Well Head Seal: J-Plug PVC Cap Not Sealed Other _____

Seal Replaced: J-Plug PVC Cap Not required Other _____

Well properly sealed for gas monitoring: Yes No Details: _____

Head Space Gas Measurements

For A

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	30.9
Carbon Dioxide (CO2)	PPM	200

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HNO ₃ (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HCL (Hydrochloric)		
2	500 ml (plastic)	General Chemistry	100 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input type="checkbox"/> NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	60 ml	-	<input type="checkbox"/> H ₂ SO ₄ (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input type="checkbox"/> HNO ₃ (Nitric)		
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-		

General Notes and Observations:

B is buried under ice + snow, attempted to dig / chop away at ice, after 20 minutes still unable to locate. A is frozen @ 0.543m.
 - lots of flowing water, both DB buried under lots of ice + snow

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) _____ ft
- 3/8" HDPE (microwaterra tubing) _____ ft
- 5/8" HDPE (waterra tubing) _____ ft
- 1/4" Silicon tubing _____ ft
- High Capacity .45 micron filters _____
- D-25 (for 2" wells, use with 5/8") foot valves _____
- D-16 (for 1" wells, use with 5/8") foot valves _____
- SS-10 (for 5/8" wells, use with 3/8") foot valves _____
- 1" bailer _____
- 2" bailer _____
- other (describe) _____

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site	GSI-DC-06B/A	Project Number	1343-005.27	Date	26-May-16	
Piezometer Diameter	0.5 DP	Client	GY - AAM	Samplers	NB/MMW	
UTM Location	Z:08V E:0389788 N:6880567	Project Name	Mount Nansen 2016 GW Sampling Program	Weather/Temperature	Sunny, light breeze	
Waypoint	GPS: ELR Name: 024			Recovery	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Bad	
Photos	Cam: ELR Nos: 477 - 479	Purge Method				
Duplicate Collected	<input type="checkbox"/> Yes Name: /	Waterra	Peristaltic	Disp. Bailer	Other	
Field Blank Collected	<input type="checkbox"/> Yes Name: /					
Initial Depth to Water (m)	B/ 1.813 A/ 1.433	Purge Start Time:		Purge End Time:		
				Pen or YSI:	<input type="checkbox"/> YSI Pro Plus <input type="checkbox"/> Pen Unit	
Depth to Bottom (m)	B/ FROZEN A/ FROZEN	Purge Interval Time () min / Vol. () L				
Submerged Tubing Depth (m)		Depth to water (m)				
Well Stick-up Height (m)	B/ 0.247 A/ 0.840	Temperature (°C) 3%				
Estimated Water Volume (L)		pH (pH Units) ±0.1				
<p>Calculations:</p> <p>(DTB - DTW) x (πr²)1000 (for well diameter) = 1 well volume (DTB - DTW) x 8.1 (for 4" well diameter) = 1 well volume (DTB - DTW) x 2 (for 2" well diameter) = 1 well volume (DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume (DTB-DTW) x 0.5 (for 1" diameter) = 1 well volume</p>		Cond. (µs/cm) 3%				
			Specific Cond. (µs/cm) 3%			
			Redox (mV) 10%			
			DO (mg/L) 10%			
			DO (%) 10%			
			Appearance & Odour (Clear, Silty, HC odours, etc.)			
			Only for final readings	Sulphide (mg/L)		
				Turbidity (NTU)		
			Interval Purge Volume (L)			
			Cumulative Purge Volume (L):			
YSI ID		Sample Method:				
Logged Field Parameters	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Waterra	Peristaltic	Disp. Bailer	Other	
Time logged on YSI (24hr)						
Sample Time (24hr)						



Sample Site (Con't): CS1-DC-06B

Sample Date (Con't): _____

Well Head Seal: J-Plug PVC Cap Not Sealed Other SCREW CAP

Seal Replaced: J-Plug PVC Cap Not required Other _____

Well properly sealed for gas monitoring: Yes No Details: _____

Head Space Gas Measurements

	Units	Values	A
Methane (CH4)	%LEL	0	0
Oxygen (O2)	%	49.0	49.0 50.5
Carbon Dioxide (CO2)	PPM	200	200

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HNO ₃ (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HCL (Hydrochloric)		
2	500 ml (plastic)	General Chemistry	100 ml		-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input type="checkbox"/> NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	60 ml	-	<input type="checkbox"/> H ₂ SO ₄ (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input type="checkbox"/> HNO ₃ (Nitric)		
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-		

General Notes and Observations:

- Frozen @ 1.2Bm → attempted to thaw for 20 minutes, unsuccessful attempt
 - Peri tubing frozen (stuck in well)
 - Rainbow shear on water standing beside well, creek levels lower than usual

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) _____ ft
- 3/8" HDPE (microwaterra tubing) _____ ft
- 5/8" HDPE (waterra tubing) _____ ft
- 1/4" Silicon tubing _____ ft
- High Capacity .45 micron filters _____
- D-25 (for 2" wells, use with 5/8") foot valves _____
- D-16 (for 1" wells, use with 5/8") foot valves _____
- SS-10 (for 5/8" wells, use with 3/8") foot valves _____
- 1" bailer _____
- 2" bailer _____
- other (describe) _____

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site		GSI-DC-67B/A		Project Number	1343-005.27		Date	27-May-16		
Piezometer Diameter		0.5" DP		Client	GY - AAM		Samplers	NB/MM		
UTM Location		Z: 08 E: 0390062 N: 6880642		Project Name	Mount Nansen 2016 GW Sampling Program		Weather/Temperature	Sunny		
Waypoint		GPS: ELR Name: 025					Recovery	<input type="checkbox"/> Good <input type="checkbox"/> Bad		
Photos		Cam: ELR Nos: 0487-489		Purge Method						
Duplicate Collected		<input type="checkbox"/> Yes Name: /		Waterra		Peristaltic		Disp. Bailer		Other
Field Blank Collected		<input type="checkbox"/> Yes Name: /								
Initial Depth to Water (m)		0.922 / 0.922		Purge Start Time:		Purge End Time:		Pen or YSI:		<input type="checkbox"/> YSI Pro Plus <input type="checkbox"/> Pen Unit
Depth to Bottom (m)		FROZEN / FROZEN		Purge Interval Time () min / Vol. () L						
Submerged Tubing Depth (m)				Depth to water (m)						
Well Stick-up Height (m)		0.855 / 0.805		Temperature (°C) 3%						
Estimated Water Volume (L)				pH (pH Units) ±0.1						
<p>Calculations:</p> <p>(DTB - DTW) x (πr²)1000 (for well diameter) = 1 well volume (DTB - DTW) x 8.1 (for 4" well diameter) = 1 well volume (DTB - DTW) x 2 (for 2" well diameter) = 1 well volume (DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume (DTB-DTW) x 0.5 (for 1" diameter) = 1 well volume</p>				Cond. (µs/cm) 3%						
				Specific Cond. (µs/cm) 3%						
				Redox (mV) 10%						
				DO (mg/L) 10%						
				DO (%) 10%						
				Appearance & Odour (Clear, Silty, HC odours, etc.)						
				Only for final readings		Sulphide (mg/L)				
						Turbidity (NTU)				
						Interval Purge Volume (L)				
						Cumulative Purge Volume (L):				
YSI ID				Sample Method:						
Logged Field Parameters		<input type="checkbox"/> Yes <input type="checkbox"/> No		Waterra		Peristaltic		Disp. Bailer		Other
Time logged on YSI (24hr)										
Sample Time (24hr)										



Sample Site (Con't): GSI-DC-07B/A

Sample Date (Con't): _____

Well Head Seal: J-Plug PVC Cap Not Sealed Other screw cap

Seal Replaced: J-Plug PVC Cap Not required Other _____

Well properly sealed for gas monitoring: Yes No Details: _____

Head Space Gas Measurements

	Units	Values	
Methane (CH4)	%LEL	0	A 0
Oxygen (O2)	%	20.9	20.9
Carbon Dioxide (CO2)	PPM	1500	200

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HNO ₃ (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HCL (Hydrochloric)		
2	500 ml (plastic)	General Chemistry	100 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input type="checkbox"/> NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	60 ml	-	<input type="checkbox"/> H ₂ SO ₄ (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input type="checkbox"/> HNO ₃ (Nitric)		
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-		

General Notes and Observations:

- snow ~~and~~ ice surrounding stick-up
 - peri tubing frozen in well attempt to thaw for 20 minutes, attempt unsuccessful, there was 6cm of water in DP'B"
 - stick-up height taken from top of ice

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) _____ ft
- 3/8" HDPE (microwaterra tubing) _____ ft
- 5/8" HDPE (waterra tubing) _____ ft
- 1/4" Silicon tubing _____ ft
- High Capacity .45 micron filters _____
- D-25 (for 2" wells, use with 5/8") foot valves _____
- D-16 (for 1" wells, use with 5/8") foot valves _____
- SS-10 (for 5/8" wells, use with 3/8") foot valves _____
- 1" bailer _____
- 2" bailer _____
- other (describe) _____

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site	GSI-DC-088/A		Project Number	1343-005.27		Date	27-May-16		
Piezometer Diameter	0.5" DP		Client	GY - AAM		Samplers	NB/MLK		
UTM Location	Z: 081E: 0390310 N: 6880583		Project Name	Mount Nansen 2016 GW Sampling Program		Weather/Temperature	Sunny		
Waypoint	GPS: ELR Name: 026					Recovery	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Bad		
Photos	Cam: ELR Nos: 492-496		Purge Method						
Duplicate Collected	<input type="checkbox"/> Yes Name: _____		Waterra	Peristaltic	Disp. Bailer	Other			
Field Blank Collected	<input type="checkbox"/> Yes Name: _____								
Initial Depth to Water (m)	B 0.593	A 1.317	Purge Start Time:	/		Purge End Time:	/		
Depth to Bottom (m)	B FROZEN	A FROZEN	Purge Interval Time () min / Vol. () L						
Submerged Tubing Depth (m)			Depth to water (m)						
Well Stick-up Height (m)	B 0.330	A 0.995	Temperature (°C) 3%						
Estimated Water Volume (L)			pH (pH Units) ±0.1						
Calculations: $(DTB - DTW) \times (\pi r^2) \times 1000$ (for well diameter) = 1 well volume $(DTB - DTW) \times 8.1$ (for 4" well diameter) = 1 well volume $(DTB - DTW) \times 2$ (for 2" well diameter) = 1 well volume $(DTB - DTW) \times 1.1$ (for 1.5" diameter) = 1 well volume $(DTB - DTW) \times 0.5$ (for 1" diameter) = 1 well volume			Cond. (µs/cm) 3%						
			Specific Cond. (µs/cm) 3%						
			Redox (mV) 10%						
			DO (mg/L) 10%						
			DO (%) 10%						
			Appearance & Odour (Clear, Silty, HC odours, etc.)						
			Only for final readings	Sulphide (mg/L)					
				Turbidity (NTU)					
			Interval Purge Volume (L)						
			Cumulative Purge Volume (L):						
YSI ID			Sample Method:						
Logged Field Parameters	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Waterra	Peristaltic	Disp. Bailer	Other			
Time logged on YSI (24hr)	/								
Sample Time (24hr)	/								



Sample Site (Con't): GSI-DC-0881A

Sample Date (Con't): May 27 2016

Well Head Seal: J-Plug PVC Cap Not Sealed Other SCREWED

Seal Replaced: J-Plug PVC Cap Not required Other _____

Well properly sealed for gas monitoring: Yes No Details: _____

Head Space Gas Measurements

	Units	Values	A
Methane (CH4)	%LEL	0	0
Oxygen (O2)	%	20.9	20.9
Carbon Dioxide (CO2)	PPM	400	200

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HNO ₃ (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HCL (Hydrochloric)		
2	500 ml (plastic)	General Chemistry	100 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input type="checkbox"/> NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	60 ml	-	<input type="checkbox"/> H ₂ SO ₄ (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input type="checkbox"/> HNO ₃ (Nitric)		
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-		

General Notes and Observations:

-creek levels very low; lots of ice + snow covering bed (photo #492)
 -Frozen @ 0.593m w 3cm of water, per tubing frozen in well; attempt to thaw for 20 minutes; attempt unsuccessful

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) _____ ft
- 3/8" HDPE (microwaterra tubing) _____ ft
- 5/8" HDPE (waterra tubing) _____ ft
- 1/4" Silicon tubing _____ ft
- High Capacity .45 micron filters _____
- D-25 (for 2" wells, use with 5/8") foot valves _____
- D-16 (for 1" wells, use with 5/8") foot valves _____
- SS-10 (for 5/8" wells, use with 3/8") foot valves _____
- 1" bailer _____
- 2" bailer _____
- other (describe) _____

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site	GSI - DC - 09A/B	Project Number	1343-005.27	Date	May 27 2016
Piezometer Diameter	1 1/2"	Client	GY - AAM	Samplers	JC / KB
UTM Location	Z: 08 E: 390614 N: 6880494	Project Name	Mount Nansen 2016 GW Sampling Program	Weather/Temperature	10°C overcast
Waypoint	GPS: Hem Name: N/A			Recovery	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Bad
Photos	Cam: Sony Nos:	Purge Method			
Duplicate Collected	<input type="checkbox"/> Yes Name: _____	Waterra	Peristaltic	Disp. Bailer	Other
Field Blank Collected	<input type="checkbox"/> Yes Name: _____				
Initial Depth to Water (m)	B: Frozen A: Frozen	Purge Start Time:		Purge End Time:	
Depth to Bottom (m)	B: 1.155 A: 1.182			Pen or YSI:	<input type="checkbox"/> YSI Pro Plus <input type="checkbox"/> Pen Unit
Submerged Tubing Depth (m)		Purge Interval Time () min / Vol. () L			
Well Stick-up Height (m)	B: 0.891 A: 0.947	Depth to water (m)			
Estimated Water Volume (L)		Temperature (°C) 3%			
<p>Calculations:</p> <p>(DTB - DTW) x (πr²) 1000 (for well diameter) = 1 well volume (DTB - DTW) x 8.1 (for 4" well diameter) = 1 well volume (DTB - DTW) x 2 (for 2" well diameter) = 1 well volume (DTB - DTW) x 1.1 (for 1.5" diameter) = 1 well volume (DTB - DTW) x 0.5 (for 1" diameter) = 1 well volume</p>		pH (pH Units) ±0.1			
		Cond. (µs/cm) 3%			
		Specific Cond. (µs/cm) 3%			
		Redox (mV) 10%			
		DO (mg/L) 10%			
		DO (%) 10%			
		Appearance & Odour (Clear, Silty, HC odours, etc.)			
		Only for final readings	Sulphide (mg/L)		
			Turbidity (NTU)		
			Interval Purge Volume (L)		
		Cumulative Purge Volume (L):			
YSI ID		Sample Method:			
Logged Field Parameters	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No				
Time logged on YSI (24hr)		Waterra	Peristaltic	Disp. Bailer	Other
Sample Time (24hr)					

Sample Site (Con't): GSI-DC-09 A1B

 Sample Date (Con't): May 27 2016

 Well Head Seal: J-Plug PVC Cap Not Sealed Other _____

 Seal Replaced: J-Plug PVC Cap Not required Other _____

 Well properly sealed for gas monitoring: Yes No Details: _____

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	B=0 A=0
Oxygen (O2)	%	B=20.9 A=200
Carbon Dioxide (CO2)	PPM	B=300 A=300

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HNO ₃ (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HCL (Hydrochloric)		
2	500 ml (plastic)	General Chemistry	100 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input type="checkbox"/> NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	60 ml	-	<input type="checkbox"/> H ₂ SO ₄ (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input type="checkbox"/> HNO ₃ (Nitric)		
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-		

General Notes and Observations:

- Tubing frozen in well
 - Attempted to thaw well, unsuccessful

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) _____ ft
- 3/8" HDPE (microwaterra tubing) _____ ft
- 5/8" HDPE (waterra tubing) _____ ft
- 1/4" Silicon tubing _____ ft
- High Capacity .45 micron filters _____
- D-25 (for 2" wells, use with 5/8") foot valves _____
- D-16 (for 1" wells, use with 5/8") foot valves _____
- SS-10 (for 5/8" wells, use with 3/8") foot valves _____
- 1" bailer _____
- 2" bailer _____
- other (describe) _____

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site	GSI-DC-10A/B	Project Number	1343-005.27	Date	May 27, 2016
Piezometer Diameter	1/2-inch	Client	GY - AAM	Samplers	SC/KB
UTM Location	Z: 68 E: 0390858 N: 688450	Project Name	Mount Nansen 2016 GW Sampling Program	Weather/Temperature	10° overcast
Waypoint	GPS: Ham Name: U/A			Recovery	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Bad
Photos	Cam: Army Nos:	Purge Method			
Duplicate Collected	<input type="checkbox"/> Yes Name: _____	Waterra	Peristaltic	Disp. Bailer	Other
Field Blank Collected	<input type="checkbox"/> Yes Name: _____				
Initial Depth to Water (m)	A = Frozen B = Frozen	Purge Start Time:	Purge End Time:	Pen or YSI:	<input type="checkbox"/> YSI Pro Plus <input type="checkbox"/> Pen Unit
Depth to Bottom (m)	A = 1.431 B = 1.314	Purge Interval Time () min / Vol. () L			
Submerged Tubing Depth (m)	—	Depth to water (m)			
Well Stick-up Height (m)	A = 1.178 B = 1.095	Temperature (°C) 3%			
Estimated Water Volume (L)	—	pH (pH Units) ±0.1			
<p>Calculations:</p> <p>(DTB - DTW) x (πr²)1000 (for well diameter) = 1 well volume (DTB - DTW) x 8.1 (for 4" well diameter) = 1 well volume (DTB - DTW) x 2 (for 2" well diameter) = 1 well volume (DTB - DTW) x 1.1 (for 1.5" diameter) = 1 well volume (DTB - DTW) x 0.5 (for 1" diameter) = 1 well volume</p>	Cond. (µs/cm) 3%				 FROZEN
	Specific Cond. (µs/cm) 3%				
	Redox (mV) 10%				
	DO (mg/L) 10%				
	DO (%) 10%				
	Appearance & Odour (Clear, Silty, HC odours, etc.)				
	Only for final readings		Sulphide (mg/L)		
			Turbidity (NTU)		
	Interval Purge Volume (L)				
	Cumulative Purge Volume (L):				
YSI ID		Sample Method:			
Logged Field Parameters	<input type="checkbox"/> Yes <input type="checkbox"/> No	Waterra	Peristaltic	Disp. Bailer	Other
Time logged on YSI (24hr)					
Sample Time (24hr)					



Sample Site (Con't): GSI-DC-10A/B

Sample Date (Con't): May 27, 2016

Well Head Seal: J-Plug PVC Cap Not Sealed Other _____

Seal Replaced: J-Plug PVC Cap Not required Other _____

Well properly sealed for gas monitoring: Yes No Details: _____

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	B=0 A=0
Oxygen (O2)	%	B=20.9 A=20.9
Carbon Dioxide (CO2)	PPM	B=300 A=300

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HNO ₃ (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HCL (Hydrochloric)		
2	500 ml (plastic)	General Chemistry	100 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input type="checkbox"/> NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	60 ml	-	<input type="checkbox"/> H ₂ SO ₄ (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input type="checkbox"/> HNO ₃ (Nitric)		
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-		

General Notes and Observations:

- Tubing Frozen in well
 - Attempted to thaw, unsuccessful

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) _____ ft
- 3/8" HDPE (microwaterra tubing) _____ ft
- 5/8" HDPE (waterra tubing) _____ ft
- 1/4" Silicon tubing _____ ft
- High Capacity .45 micron filters _____
- D-25 (for 2" wells, use with 5/8") foot valves _____
- D-16 (for 1" wells, use with 5/8") foot valves _____
- SS-10 (for 5/8" wells, use with 3/8") foot valves _____
- 1" bailer _____
- 2" bailer _____
- other (describe) _____



GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site	GSI-HA-01A	Project Number	1343-005.27	Date	May 25 2016
Piezometer Diameter	1" Well	Client	GY - AAM	Samplers	KB / JC
UTM Location	Z: 08 E: 0387843 N: 6881133	Project Name	Mount Nansen 2016 GW Sampling Program	Weather/Temperature	snow/rain
Waypoint	GPS: Hem. Name: N/A	Purge Method	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Bad		
Photos	Cam: Jer Nos:				
Duplicate Collected	<input type="checkbox"/> Yes Name: _____	Waterra	Peristaltic	Disp. Bailer	Other
Field Blank Collected	<input type="checkbox"/> Yes Name: _____				
Initial Depth to Water (m)	2.219	Purge Start Time:	Purge End Time:	Pen or YSI:	<input type="checkbox"/> YSI Pro Plus <input type="checkbox"/> Pen Unit
Depth to Bottom (m)	2.790 3.122	Purge Interval Time () min / Vol. () L			
Submerged Tubing Depth (m)	2.790 3.122	Depth to water (m)			
Well Stick-up Height (m)	1.163	Temperature (°C) 3%			
Estimated Water Volume (L)	0.286L	pH (pH Units) ±0.1			
Calculations: $(2.790 - 2.219) = 0.571 \times 0.5$ $0.286L + 3$	Cond. (µs/cm) 3%				
	Specific Cond. (µs/cm) 3%				
	Redox (mV) 10%				
	DO (mg/L) 10%				
	DO (%) 10%				
	Appearance & Odour (Clear, Silty, HC odours, etc.)				direct sample
	Only for final readings	Sulphide (mg/L)	0.06		
		Turbidity (NTU)	76.1		
	Interval Purge Volume (L)				
	Cumulative Purge Volume (L):				
YSI ID	_____	Sample Method:			
Logged Field Parameters	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Waterra	Peristaltic	Disp. Bailer	Other
Time logged on YSI (24hr)	_____				
Sample Time (24hr)	10:25		✓		



Sample Site (Con't): C75L-HA-01A

Sample Date (Con't): May 25 2016

Well Head Seal: J-Plug PVC Cap Not Sealed Other _____

Seal Replaced: J-Plug PVC Cap Not required Other _____

Well properly sealed for gas monitoring: Yes No Details: _____

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.9
Carbon Dioxide (CO2)	PPM	400

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input checked="" type="checkbox"/> Field Filtered	<input checked="" type="checkbox"/> HNO ₃ (Nitric)	100	May 25
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input checked="" type="checkbox"/> Field Filtered	<input type="checkbox"/> HCL (Hydrochloric)	20	May 25
2	500 ml (plastic)	General Chemistry	100 ml	-	-	100 250	May 25
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input checked="" type="checkbox"/> NaOH (Sodium Hydroxide)	100	May 25
4	120 ml (glass)	Ammonia (NH3)	60 ml	-	<input checked="" type="checkbox"/> H ₂ SO ₄ (Sulfuric)	60	May 25
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input checked="" type="checkbox"/> HNO ₃ (Nitric)	50	May 25
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-	50	May 25

General Notes and Observations:

-photos- Jeremy phone

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) _____ ft
- 3/8" HDPE (microwaterra tubing) _____ ft
- 5/8" HDPE (waterra tubing) _____ ft
- 1/4" Silicon tubing @ .7 ft
- High Capacity .45 micron filters _____
- D-25 (for 2" wells, use with 5/8" foot valves) _____
- D-16 (for 1" wells, use with 5/8" foot valves) _____
- SS-10 (for 5/8" wells, use with 3/8" foot valves) _____
- 1" bailer _____
- 2" bailer _____
- other (describe) _____



GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site	GSI-HA-02A	Project Number	1343-005.27	Date	May 25 2016	
Piezometer Diameter	1/2"	Client	GY - AAM	Samplers	J. Chen, K. Beckmann	
UTM Location	Z: 08 E: 0387863 N: 6881131	Project Name	Mount Nansen 2016 GW Sampling Program	Weather/Temperature	7°C light snow	
Waypoint	GPS: Horn Name: N/A	Purge Method	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Bad			
Photos	Cam: J. Chen Nos:	Waterra	Peristaltic	Disp. Bailer	Other	
Duplicate Collected	<input type="checkbox"/> Yes Name:					
Field Blank Collected	<input type="checkbox"/> Yes Name:					
Initial Depth to Water (m)	3-Frozen 2.98	Purge Start Time:	Purge End Time:	Pen or YSI:	<input type="checkbox"/> YSI Pro Plus <input type="checkbox"/> Pen Unit	
Depth to Bottom (m)	2.391	Purge Interval Time () min / Vol. () L				
Submerged Tubing Depth (m)		Depth to water (m)				
Well Stick-up Height (m)	1.552	Temperature (°C) 3%				
Estimated Water Volume (L)		pH (pH Units) ±0.1				
<p>Calculations:</p> <p>(DTB - DTW) x (πr²) 1000 (for well diameter) = 1 well volume (DTB - DTW) x 8.1 (for 4" well diameter) = 1 well volume (DTB - DTW) x 2 (for 2" well diameter) = 1 well volume (DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume (DTB-DTW) x 0.5 (for 1" diameter) = 1 well volume</p>	Cond. (µs/cm) 3%					
	Specific Cond. (µs/cm) 3%					
	Redox (mV) 10%	Frozen				
	DO (mg/L) 10%					
	DO (%) 10%					
	Appearance & Odour (Clear, Silty, HC odours, etc.)					
	Only for final readings	Sulphide (mg/L)				
		Turbidity (NTU)				
	Interval Purge Volume (L)					
	Cumulative Purge Volume (L):					
YSI ID		Sample Method:				
Logged Field Parameters	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Waterra	Peristaltic	Disp. Bailer	Other	
Time logged on YSI (24hr)						
Sample Time (24hr)						



Sample Site (Con't): GSI-HA-02A

Sample Date (Con't): May 25 2006

Well Head Seal: J-Plug PVC Cap Not Sealed Other _____

Seal Replaced: J-Plug PVC Cap Not required Other _____

Well properly sealed for gas monitoring: Yes No Details: _____

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.9
Carbon Dioxide (CO2)	PPM	300

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HNO ₃ (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HCL (Hydrochloric)		
2	500 ml (plastic)	General Chemistry	100 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input type="checkbox"/> NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	60 ml	-	<input type="checkbox"/> H ₂ SO ₄ (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input type="checkbox"/> HNO ₃ (Nitric)		
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-		

General Notes and Observations:

Well Frozen, tubing in well Frozen in well.
 Attempting Round 1 of Thawing depth to bottom unchanged
 Round 2 of Thawing depth to bottom unchanged

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) 7 ft
- 3/8" HDPE (microwaterra tubing) _____ ft
- 5/8" HDPE (waterra tubing) _____ ft
- 1/4" Silicon tubing 0.5 ft
- High Capacity .45 micron filters _____
- D-25 (for 2" wells, use with 5/8") foot valves _____
- D-16 (for 1" wells, use with 5/8") foot valves _____
- SS-10 (for 5/8" wells, use with 3/8") foot valves _____
- 1" bailer _____
- 2" bailer _____
- other (describe) _____

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site	GSI-HA-03A	Project Number	1343-005.27	Date	May 25, 2016	
Piezometer Diameter	1-inch	Client	GY - AAM	Samplers	KB/BC	
UTM Location	Z: 08 E: 0387879 N: 6881131	Project Name	Mount Nansen 2016 GW Sampling Program	Weather/Temperature	Snow/rain	
Waypoint	GPS: Name: N/A	Recovery	<input type="checkbox"/> Good <input type="checkbox"/> Bad			
Photos	Cam: Nos:	Purge Method				
Duplicate Collected	<input type="checkbox"/> Yes Name:	Waterra	Peristaltic	Disp. Bailer	Other	
Field Blank Collected	<input type="checkbox"/> Yes Name:					
Initial Depth to Water (m)	0.973	Purge Start Time:	Purge End Time:	Pen or YSI:	<input type="checkbox"/> YSI Pro Plus <input type="checkbox"/> Pen Unit	
Depth to Bottom (m)	1.349	Purge Interval Time () min / Vol. () L				
Submerged Tubing Depth (m)	1.349	Depth to water (m)				
Well Stick-up Height (m)	0.960	Temperature (°C) 3%				
Estimated Water Volume (L)		pH (pH Units) ±0.1				
(DTB - DTW) x (πr ²) 1000 (for well diameter) = 1 well volume (DTB - DTW) x 8.1 (for 4" well diameter) = 1 well volume (DTB - DTW) x 2 (for 2" well diameter) = 1 well volume (DTB - DTW) x 1.1 (for 1.5" diameter) = 1 well volume (DTB - DTW) x 0.5 (for 1" diameter) = 1 well volume Calculations: $\begin{array}{r} 1.349 \\ - 0.973 \\ \hline 0.376 \times 0.5 = 0.188 \end{array}$	Cond. (µs/cm) 3%	FROZEN Direct Sample				
	Specific Cond. (µs/cm) 3%					
	Redox (mV) 10%					
	DO (mg/L) 10%					
	DO (%) 10%					
	Appearance & Odour (Clear, Silty, HC odours, etc.)					
	Only for final readings					Sulphide (mg/L)
						Turbidity (NTU)
	Interval Purge Volume (L)					
	Cumulative Purge Volume (L):					
YSI ID		Sample Method:				
Logged Field Parameters	<input type="checkbox"/> Yes <input type="checkbox"/> No	Waterra	Peristaltic	Disp. Bailer	Other	
Time logged on YSI (24hr)						
Sample Time (24hr)	12:30					



Sample Site (Con't): GSI-HA-03A

Sample Date (Con't): May 25, 2016

Well Head Seal: J-Plug PVC Cap Not Sealed Other slit in cap

Seal Replaced: J-Plug PVC Cap Not required Other _____

Well properly sealed for gas monitoring: Yes No Details: slit in cap

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.9
Carbon Dioxide (CO2)	PPM	400

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input checked="" type="checkbox"/> Field Filtered	<input checked="" type="checkbox"/> HNO ₃ (Nitric)	80 ml	insufficient sample
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input checked="" type="checkbox"/> Field Filtered	<input checked="" type="checkbox"/> HCL (Hydrochloric)	15 ml	
2	500 ml (plastic)	General Chemistry	100 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input type="checkbox"/> NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	60 ml	-	<input type="checkbox"/> H ₂ SO ₄ (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input type="checkbox"/> HNO ₃ (Nitric)		
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-		

General Notes and Observations:

- frozen

- 1/4 inch tubing in well - frozen

- water sampled above frozen section

- Checked again on May 27, 2016 → insufficient water; Frozen

*** Samples not Representative**

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) 6 ft (+)
- 3/8" HDPE (microwaterra tubing) _____ ft
- 5/8" HDPE (waterra tubing) _____ ft
- 1/4" Silicon tubing 0.5 ft
- High Capacity .45 micron filters _____
- D-25 (for 2" wells, use with 5/8") foot valves _____
- D-16 (for 1" wells, use with 5/8") foot valves _____
- SS-10 (for 5/8" wells, use with 3/8") foot valves _____
- 1" bailer _____
- 2" bailer _____
- other (describe) _____

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site	GISI - HA - 04A	Project Number	1343-005.27	Date	May 25 2016
Piezometer Diameter	1"	Client	GY - AAM	Samplers	Schum / K. Beckman
UTM Location	Z: 08 E: 6387915 N: 6881132	Project Name	Mount Nansen 2016 GW Sampling Program	Weather/Temperature	10° overcast
Waypoint	GPS: Hem Name: N/A			Recovery	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Bad
Photos	Cam: Jeremy Nos:	Purge Method			
Duplicate Collected	<input type="checkbox"/> Yes Name:	Waterra	Peristaltic	Disp. Bailer	Other
Field Blank Collected	<input type="checkbox"/> Yes Name:		✓		
Initial Depth to Water (m)	1.615	Purge Start Time:		Purge End Time:	
Depth to Bottom (m)	1.854	Purge Interval Time () min / Vol. () L			Pen or YSI: <input type="checkbox"/> YSI Pro Plus <input type="checkbox"/> Pen Unit
Submerged Tubing Depth (m)	1.854	Depth to water (m)			
Well Stick-up Height (m)	0.609	Temperature (°C) 3%			
Estimated Water Volume (L)	0.180	pH (pH Units) ±0.1			
Calculations: $(1.854 - 1.615) \times 0.5 = 0.1195$ (DTB - DTW) x (πr ²) 1000 (for well diameter) = 1 well volume (DTB - DTW) x 8.1 (for 4" well diameter) = 1 well volume (DTB - DTW) x 2 (for 2" well diameter) = 1 well volume (DTB - DTW) x 1.1 (for 1.5" diameter) = 1 well volume (DTB - DTW) x 0.5 (for 1" diameter) = 1 well volume	Cond. (µs/cm) 3%				
	Specific Cond. (µs/cm) 3%				
	Redox (mV) 10%				
	DO (mg/L) 10%				
	DO (%) 10%				
	Appearance & Odour (Clear, Silty, HC odours, etc.)				
	Only for final readings	Sulphide (mg/L)			
		Turbidity (NTU)			
	Interval Purge Volume (L)				
	Cumulative Purge Volume (L):				
YSI ID		Sample Method:			
Logged Field Parameters	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Waterra	Peristaltic	Disp. Bailer	Other
Time logged on YSI (24hr)					
Sample Time (24hr)	14:10		X		





Sample Site (Con't): GSI-MA-04A

Sample Date (Con't): May 25 2016

Well Head Seal: J-Plug PVC Cap Not Sealed Other _____

Seal Replaced: J-Plug PVC Cap Not required Other _____

Well properly sealed for gas monitoring: Yes No Details: Slit in Cap

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.7
Carbon Dioxide (CO2)	PPM	400

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input checked="" type="checkbox"/> Field Filtered	<input checked="" type="checkbox"/> HNO ₃ (Nitric)	100ml	May 25 @ 14:10
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input checked="" type="checkbox"/> Field Filtered	<input checked="" type="checkbox"/> HCL (Hydrochloric)	20ml	May 25 @ 14:10
2	500 ml (plastic)	General Chemistry	100 ml	-	-	~200	May 27 @ 8:10
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input checked="" type="checkbox"/> NaOH (Sodium Hydroxide)	145	May 27 @ 8:10
4	120 ml (glass)	Ammonia (NH3)	60 ml	-	<input type="checkbox"/> H ₂ SO ₄ (Sulfuric)	70	May 27 @ 16:10
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input type="checkbox"/> HNO ₃ (Nitric)	100 100	May 27 @ 16:10
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-	100	May 27 @ 16:10

General Notes and Observations:

Low producing well.
 - PCS - Jeremy phone.
 - May 27 - sampled again, cyanide + Gen Chem.
 - May 27 @ 16:10; w/ tubing stuck in well, able to pull out + get NH₃, SCN, TIC

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) _____ ft
- 3/8" HDPE (microwaterra tubing) _____ ft
- 5/8" HDPE (waterra tubing) _____ ft
- 1/4" Silicon tubing 0.5 ft
- High Capacity .45 micron filters _____
- D-25 (for 2" wells, use with 5/8") foot valves _____
- D-16 (for 1" wells, use with 5/8") foot valves _____
- SS-10 (for 5/8" wells, use with 3/8") foot valves _____
- 1" bailer _____
- 2" bailer _____
- other (describe) _____

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site	GSI-HA-05A	Project Number	1343-005.27	Date	May 25, 2016	
Piezometer Diameter	1-inch	Client	GY - AAM	Samplers	KB/SC	
UTM Location	Z: 08 E: 0387890 N: 6881122	Project Name	Mount Nansen 2016 GW Sampling Program	Weather/Temperature	overcast	
Waypoint	GPS: Name: N/A	Recovery	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Bad			
Photos	Cam: Serenitas	Purge Method				
Duplicate Collected	<input type="checkbox"/> Yes Name:	Waterra	Peristaltic	Disp. Bailer	Other	
Field Blank Collected	<input type="checkbox"/> Yes Name:					
Initial Depth to Water (m)	0.966	Purge Start Time:	Purge End Time:	Pen or YSI:	<input type="checkbox"/> YSI Pro Plus <input type="checkbox"/> Pen Unit	
Depth to Bottom (m)	1.519	Purge Interval Time () min / Vol. () L				
Submerged Tubing Depth (m)	1.519	Depth to water (m)				
Well Stick-up Height (m)	1.188	Temperature (°C) 3%				
Estimated Water Volume (L)	0.115	pH (pH Units) ±0.1				
Calculations: $(DTB - DTW) \times (\pi r^2) \times 1000$ (for well diameter) = 1 well volume $(DTB - DTW) \times 8.1$ (for 4" well diameter) = 1 well volume $(DTB - DTW) \times 2$ (for 2" well diameter) = 1 well volume $(DTB - DTW) \times 1.1$ (for 1.5" diameter) = 1 well volume $(DTB - DTW) \times 0.5$ (for 1" diameter) = 1 well volume	Cond. (µs/cm) 3%	 MOUNT NANSEN direct sample 				
	Specific Cond. (µs/cm) 3%					
	Redox (mV) 10%					
	DO (mg/L) 10%					
	DO (%) 10%					
	Appearance & Odour (Clear, Silty, HC odours, etc.)					
	Only for final readings					Sulphide (mg/L)
						Turbidity (NTU)
	Interval Purge Volume (L)					
	Cumulative Purge Volume (L):					
YSI ID		Sample Method:				
Logged Field Parameters	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Waterra	Peristaltic	Disp. Bailer	Other	
Time logged on YSI (24hr)			✓			
Sample Time (24hr)	13:40					

Sample Site (Con't): GSI-HA-05A

 Sample Date (Con't): May 25, 2016

 Well Head Seal: J-Plug PVC Cap Not Sealed Other _____

 Seal Replaced: J-Plug PVC Cap Not required Other _____

 Well properly sealed for gas monitoring: Yes No Details: slit in cap
Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.9
Carbon Dioxide (CO2)	PPM	300

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input checked="" type="checkbox"/> Field Filtered	<input checked="" type="checkbox"/> HNO ₃ (Nitric)	100	May 25
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input checked="" type="checkbox"/> Field Filtered	<input checked="" type="checkbox"/> HCL (Hydrochloric)	15	May 25
2	500 ml (plastic)	General Chemistry	100 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input type="checkbox"/> NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	60 ml	-	<input type="checkbox"/> H ₂ SO ₄ (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input type="checkbox"/> HNO ₃ (Nitric)		
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-		

General Notes and Observations:

- 1/4 inch tubing frozen inside well
- direct sampled water w/ new tubing.
- water on top of frozen ice
- in soft vol to complete^{all} samples
- pics Jeremy phone

*all samples
not representative*

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) 6 ft
- 3/8" HDPE (microwaterra tubing) _____ ft
- 5/8" HDPE (waterra tubing) _____ ft
- 1/4" Silicon tubing 1/2 ft
- High Capacity .45 micron filters _____
- D-25 (for 2" wells, use with 5/8") foot valves _____
- D-16 (for 1" wells, use with 5/8") foot valves _____
- SS-10 (for 5/8" wells, use with 3/8") foot valves _____
- 1" bailer _____
- 2" bailer _____
- other (describe) _____

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site	GSI-PC-02B		Project Number	1343-005.27		Date	May 27 2016			
Piezometer Diameter			Client	GY - AAM		Samplers	SC / KB			
UTM Location	Z:	E:	N:	Project Name	Mount Nansen 2016 GW Sampling Program		Weather/Temperature			
Waypoint	GPS:		Name:				Recovery		<input type="checkbox"/> Good <input type="checkbox"/> Bad	
Photos	Cam:	Nos:		Purge Method						
Duplicate Collected	<input type="checkbox"/> Yes	Name:		Waterra	Peristaltic	Disp. Bailer	Other			
Field Blank Collected	<input type="checkbox"/> Yes	Name:								
Initial Depth to Water (m)				Purge Start Time:			Purge End Time:			
							Pen or YSI:	<input type="checkbox"/> YSI Pro Plus <input type="checkbox"/> Pen Unit		
Depth to Bottom (m)				Purge Interval Time () min / Vol. () L						
Submerged Tubing Depth (m)				Depth to water (m)						
Well Stick-up Height (m)				Temperature (°C) 3%						
Estimated Water Volume (L)				pH (pH Units) ±0.1						
<p>Calculations:</p> <p>(DTB - DTW) x (πr²) 1000 (for well diameter) = 1 well volume (DTB - DTW) x 8.1 (for 4" well diameter) = 1 well volume (DTB - DTW) x 2 (for 2" well diameter) = 1 well volume (DTB - DTW) x 1.1 (for 1.5" diameter) = 1 well volume (DTB - DTW) x 0.5 (for 1" diameter) = 1 well volume</p>				Cond. (µs/cm) 3%			<div style="font-size: 2em; opacity: 0.5;">Destroyed</div>			
				Specific Cond. (µs/cm) 3%						
				Redox (mV) 10%						
				DO (mg/L) 10%						
				DO (%) 10%						
				Appearance & Odour (Clear, Silty, HC odours, etc.)						
				Only for final readings	Sulphide (mg/L)					
					Turbidity (NTU)					
				Interval Purge Volume (L)						
				Cumulative Purge Volume (L):						
YSI ID				Sample Method:						
Logged Field Parameters	<input type="checkbox"/> Yes <input type="checkbox"/> No									
Time logged on YSI (24hr)				Waterra	Peristaltic	Disp. Bailer	Other			
Sample Time (24hr)										



Sample Site (Con't): CSI-PC-02B

Sample Date (Con't): May 27 2016

Well Head Seal: J-Plug PVC Cap Not Sealed Other _____

Seal Replaced: J-Plug PVC Cap Not required Other _____

Well properly sealed for gas monitoring: Yes No Details: _____

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	
Oxygen (O2)	%	
Carbon Dioxide (CO2)	PPM	

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HNO ₃ (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HCL (Hydrochloric)		
2	500 ml (plastic)	General Chemistry	100 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input type="checkbox"/> NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	60 ml	-	<input type="checkbox"/> H ₂ SO ₄ (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input type="checkbox"/> HNO ₃ (Nitric)		
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-		

General Notes and Observations:

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) _____ ft
- 3/8" HDPE (microwaterra tubing) _____ ft
- 5/8" HDPE (waterra tubing) _____ ft
- 1/4" Silicon tubing _____ ft
- High Capacity .45 micron filters _____
- D-25 (for 2" wells, use with 5/8") foot valves _____
- D-16 (for 1" wells, use with 5/8") foot valves _____
- SS-10 (for 5/8" wells, use with 3/8") foot valves _____
- 1" bailer _____
- 2" bailer _____
- other (describe) _____

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site	GSI-PC-03A/B	Project Number	1343-005.27	Date	May 27 2016
Piezometer Diameter	1/2"	Client	GY - AAM	Samplers	SL/KB
UTM Location	Z: 08 E: 0389258N: 6881710	Project Name	Mount Nansen 2016 GW Sampling Program	Weather/Temperature	12° Sunny
Waypoint	GPS: Hem Name: N/A			Recovery	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Bad
Photos	Cam: Jeremy Nos:	Purge Method			
Duplicate Collected	<input type="checkbox"/> Yes Name: _____	Waterra	Peristaltic	Disp. Bailer	Other
Field Blank Collected	<input checked="" type="checkbox"/> Yes Name: FB-4				
Initial Depth to Water (m)	B = 1.075 A = 0.955	Purge Start Time:		Purge End Time:	
Depth to Bottom (m)	B = 2.833 A = 1.234	Purge Interval Time () min / Vol. () L			Pen or YSI: <input type="checkbox"/> YSI Pro Plus <input type="checkbox"/> Pen Unit
Submerged Tubing Depth (m)	#	Depth to water (m)			
Well Stick-up Height (m)	B = 1.008 A = 0.972	Temperature (°C) 3%			
Estimated Water Volume (L)	0.4395	pH (pH Units) ±0.1			
<p>(DTB - DTW) x (πr²)1000 (for well diameter) = 1 well volume (DTB - DTW) x 8.1 (for 4" well diameter) = 1 well volume (DTB - DTW) x 2 (for 2" well diameter) = 1 well volume (DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume (DTB-DTW) x 0.5 (for 1" diameter) = 1 well volume</p> <p>Calculations: $(2.833 - 1.075) \times 0.25 = 0.4395 \text{ L}$</p>	Cond. (µs/cm) 3%				
	Specific Cond. (µs/cm) 3%				
	Redox (mV) 10%				
	DO (mg/L) 10%				
	DO (%) 10%				
	Appearance & Odour (Clear, Silty, HC odours, etc.)				
	Only for final readings	Sulphide (mg/L)			
		Turbidity (NTU)			
	Interval Purge Volume (L)				
	Cumulative Purge Volume (L):				
YSI ID	_____	Sample Method:			
Logged Field Parameters	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Waterra	Peristaltic	Disp. Bailer	Other
Time logged on YSI (24hr)	_____				
Sample Time (24hr)	12:50				

direct sample partial



Sample Site (Con't): GSI-PC-03A/B

Sample Date (Con't): May 27 2016

Well Head Seal: J-Plug PVC Cap Not Sealed Other _____

Seal Replaced: J-Plug PVC Cap Not required Other _____

Well properly sealed for gas monitoring: Yes No Details: _____

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	B=0 B=0
Oxygen (O2)	%	B=20.9 B=20.9
Carbon Dioxide (CO2)	PPM	B=500 B=300

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input checked="" type="checkbox"/> Field Filtered	<input checked="" type="checkbox"/> HNO ₃ (Nitric)	100	
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input checked="" type="checkbox"/> Field Filtered	<input checked="" type="checkbox"/> HCL (Hydrochloric)	15	
2	500 ml (plastic)	General Chemistry	100 ml	-	-	150	
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input type="checkbox"/> NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH ₃)	60 ml	-	<input type="checkbox"/> H ₂ SO ₄ (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input type="checkbox"/> HNO ₃ (Nitric)		
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-		

General Notes and Observations:

well labeled as GSI-PC03-MP-B/A
re-labeled well as: GSI-PC-03-A/B
- PVC cap on well B, no cap (glove) on well A

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) 3 ft
- 3/8" HDPE (microwaterra tubing) _____ ft
- 5/8" HDPE (waterra tubing) _____ ft
- 1/4" Silicon tubing 0.5 ft
- High Capacity .45 micron filters _____
- D-25 (for 2" wells, use with 5/8") foot valves _____
- D-16 (for 1" wells, use with 5/8") foot valves _____
- SS-10 (for 5/8" wells, use with 3/8") foot valves _____
- 1" bailer _____
- 2" bailer _____
- other (describe) _____

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site	GSI-PC-04B/A	Project Number	1343-005.27	Date	27-may-16	
Piezometer Diameter	0.5" DP	Client	GY - AAM	Samplers	NB/MK	
UTM Location	Z:08N E:0389584 N:6881659	Project Name	Mount Nansen 2016 GW Sampling Program	Weather/Temperature	☒ Cloudy to Sun	
Waypoint	GPS: ELR Name: G27			Recovery	<input type="checkbox"/> Good <input type="checkbox"/> Bad	
Photos	Cam: ELR Nos: 497-499	Purge Method				
Duplicate Collected	<input type="checkbox"/> Yes Name: _____	Waterra	Peristaltic	Disp. Bailer	Other	
Field Blank Collected	<input type="checkbox"/> Yes Name: _____					
Initial Depth to Water (m)	B 1.278 A 1.257	Purge Start Time:		Purge End Time:		
Depth to Bottom (m)	B FROZEN A FROZEN	Pen or YSI:		<input type="checkbox"/> YSI Pro Plus	<input type="checkbox"/> Pen Unit	
Submerged Tubing Depth (m)		Purge Interval Time () min / Vol. () L				
Well Stick-up Height (m)	B 0.985 A 0.978	Depth to water (m)				
Estimated Water Volume (L)		Temperature (°C) 3%				
<p>Calculations:</p> <p>(DTB - DTW) x (πr²)1000 (for well diameter) = 1 well volume (DTB - DTW) x 8.1 (for 4" well diameter) = 1 well volume (DTB - DTW) x 2 (for 2" well diameter) = 1 well volume (DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume (DTB-DTW) x 0.5 (for 1" diameter) = 1 well volume</p>		pH (pH Units) ±0.1				
		Cond. (µs/cm) 3%				
		Specific Cond. (µs/cm) 3%				
		Redox (mV) 10%				
		DO (mg/L) 10%				
		DO (%) 10%				
		Appearance & Odour (Clear, Silty, HC odours, etc.)				
		Only for final readings	Sulphide (mg/L)			
			Turbidity (NTU)			
			Interval Purge Volume (L)			
		Cumulative Purge Volume (L):				
YSI ID		Sample Method:				
Logged Field Parameters	<input type="checkbox"/> Yes <input type="checkbox"/> No					
Time logged on YSI (24hr)		Waterra	Peristaltic	Disp. Bailer	Other	
Sample Time (24hr)						



Sample Site (Con't): GSI-PC-04B/A

Sample Date (Con't): _____

Well Head Seal: J-Plug PVC Cap Not Sealed Other screw cap

Seal Replaced: J-Plug PVC Cap Not required Other _____

Well properly sealed for gas monitoring: Yes No Details: _____

Head Space Gas Measurements

	Units	Values	A
Methane (CH4)	%LEL	0	0
Oxygen (O2)	%	20.9	20.9
Carbon Dioxide (CO2)	PPM	200	300

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HNO ₃ (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HCL (Hydrochloric)		
2	500 ml (plastic)	General Chemistry	100 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input type="checkbox"/> NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	60 ml	-	<input type="checkbox"/> H ₂ SO ₄ (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input type="checkbox"/> HNO ₃ (Nitric)		
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-		

General Notes and Observations:

-Peri tubing frozen in well, frozen @ _____ m; attempted to thaw for 20 mins; attempt unsuccessful

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) _____ ft
- 3/8" HDPE (microwaterra tubing) _____ ft
- 5/8" HDPE (waterra tubing) _____ ft
- 1/4" Silicon tubing _____ ft
- High Capacity .45 micron filters _____
- D-25 (for 2" wells, use with 5/8") foot valves _____
- D-16 (for 1" wells, use with 5/8") foot valves _____
- SS-10 (for 5/8" wells, use with 3/8") foot valves _____
- 1" bailer _____
- 2" bailer _____
- other (describe) _____

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site	GSI-PC-05B/A	Project Number	1343-005.27	Date	27-May-16	
Piezometer Diameter	0.5" DP	Client	GY - AAM	Samplers	NB/MM	
UTM Location	Z: 08 E: 0389712 N: 6891661	Project Name	Mount Nansen 2016 GW Sampling Program	Weather/Temperature	cloudy to sun breaks	
Waypoint	GPS: ELR Name: 028			Recovery	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Bad	
Photos	Cam: ELR Nos: 500-502	Purge Method				
Duplicate Collected	<input type="checkbox"/> Yes Name: _____	Waterra	Peristaltic	Disp. Bailer	Other	
Field Blank Collected	<input type="checkbox"/> Yes Name: _____					
Initial Depth to Water (m)	B 1.52 A 1.119	Purge Start Time:		Purge End Time:		
				Pen or YSI:	<input type="checkbox"/> YSI Pro Plus <input checked="" type="checkbox"/> Pen Unit	
Depth to Bottom (m)	B FROZEN A FROZEN	Purge Interval Time () min / Vol. () L				
Submerged Tubing Depth (m)		Depth to water (m)				
Well Stick-up Height (m)	B A 0.919	Temperature (°C) 3%				
Estimated Water Volume (L)		pH (pH Units) ±0.1				
<p>Calculations:</p> <p>(DTB - DTW) x (πr²) 1000 (for well diameter) = 1 well volume (DTB - DTW) x 8.1 (for 4" well diameter) = 1 well volume (DTB - DTW) x 2 (for 2" well diameter) = 1 well volume (DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume (DTB-DTW) x 0.5 (for 1" diameter) = 1 well volume</p>		Cond. (µs/cm) 3%				
		Specific Cond. (µs/cm) 3%				
		Redox (mV) 10%				
		DO (mg/L) 10%				
		DO (%) 10%				
		Appearance & Odour (Clear, Silty, HC odours, etc.)				
		Only for final readings	Sulphide (mg/L)			
			Turbidity (NTU)			
		Interval Purge Volume (L)				
		Cumulative Purge Volume (L):				
YSI ID		Sample Method:				
Logged Field Parameters	<input type="checkbox"/> Yes <input type="checkbox"/> No					
Time logged on YSI (24hr)		Waterra	Peristaltic	Disp. Bailer	Other	
Sample Time (24hr)						

Sample Site (Con't): GSI-PC-05B/A

Sample Date (Con't): _____

Well Head Seal: J-Plug PVC Cap Not Sealed Other SCREW CAP

Seal Replaced: J-Plug PVC Cap Not required Other _____

Well properly sealed for gas monitoring: Yes No Details: _____

Head Space Gas Measurements

	Units	Values	
Methane (CH4)	%LEL	0	A 0
Oxygen (O2)	%	20.9	20.8
Carbon Dioxide (CO2)	PPM	300	9600

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HNO ₃ (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HCL (Hydrochloric)		
2	500 ml (plastic)	General Chemistry	100 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input type="checkbox"/> NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH ₃)	60 ml	-	<input type="checkbox"/> H ₂ SO ₄ (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input type="checkbox"/> HNO ₃ (Nitric)		
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-		

General Notes and Observations:

- Frozen @ 1.15 am; perit tubing frozen in well; attempt to defrost for 20 mins, attempt unsuccessful.

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) _____ ft
- 3/8" HDPE (microwaterra tubing) _____ ft
- 5/8" HDPE (waterra tubing) _____ ft
- 1/4" Silicon tubing _____ ft
- High Capacity .45 micron filters _____
- D-25 (for 2" wells, use with 5/8") foot valves _____
- D-16 (for 1" wells, use with 5/8") foot valves _____
- SS-10 (for 5/8" wells, use with 3/8") foot valves _____
- 1" bailer _____
- 2" bailer _____
- other (describe) _____

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site	MP 09-02	Project Number	1343-005.27	Date	May 27 2016
Piezometer Diameter		Client	GY - AAM	Samplers	SEJ KB
UTM Location	Z: E: N:	Project Name	Mount Nansen 2016 GW Sampling Program	Weather/Temperature	
Waypoint	GPS: Name:	Purge Method	<input type="checkbox"/> Good <input type="checkbox"/> Bad		
Photos	Cam: Nos:	Waterra	Peristaltic	Disp. Bailer	Other
Duplicate Collected	<input type="checkbox"/> Yes Name:				
Field Blank Collected	<input type="checkbox"/> Yes Name:				
Initial Depth to Water (m)		Purge Start Time:	Purge End Time:	Pen or YSI:	<input type="checkbox"/> YSI Pro Plus <input type="checkbox"/> Pen Unit
Depth to Bottom (m)		Purge Interval Time () min / Vol. () L			
Submerged Tubing Depth (m)		Depth to water (m)			
Well Stick-up Height (m)		Temperature (°C) 3%			
Estimated Water Volume (L)		pH (pH Units) ±0.1			
Calculations: $(DTB - DTW) \times (\pi r^2) \times 1000$ (for well diameter) = 1 well volume $(DTB - DTW) \times 8.1$ (for 4" well diameter) = 1 well volume $(DTB - DTW) \times 2$ (for 2" well diameter) = 1 well volume $(DTB - DTW) \times 1.1$ (for 1.5" diameter) = 1 well volume $(DTB - DTW) \times 0.5$ (for 1" diameter) = 1 well volume		Cond. (µs/cm) 3%			
		Specific Cond. (µs/cm) 3%			
		Redox (mV) 10%			
		DO (mg/L) 10%			
		DO (%) 10%			
		Appearance & Odour (Clear, Silty, HC odours, etc.)			
		Only for final readings	Sulphide (mg/L)		
			Turbidity (NTU)		
		Interval Purge Volume (L)			
		Cumulative Purge Volume (L):			
YSI ID		Sample Method:			
Logged Field Parameters	<input type="checkbox"/> Yes <input type="checkbox"/> No	Waterra	Peristaltic	Disp. Bailer	Other
Time logged on YSI (24hr)					
Sample Time (24hr)					

Destroyed



Sample Site (Con't): MP09-02

Sample Date (Con't): May 27 2016

Well Head Seal: J-Plug PVC Cap Not Sealed Other _____

Seal Replaced: J-Plug PVC Cap Not required Other _____

Well properly sealed for gas monitoring: Yes No Details: _____

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	
Oxygen (O2)	%	
Carbon Dioxide (CO2)	PPM	

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HNO ₃ (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HCL (Hydrochloric)		
2	500 ml (plastic)	General Chemistry	100 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input type="checkbox"/> NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	60 ml	-	<input type="checkbox"/> H ₂ SO ₄ (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input type="checkbox"/> HNO ₃ (Nitric)		
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-		

General Notes and Observations:

Destroyed

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) _____ ft
- 3/8" HDPE (microwaterra tubing) _____ ft
- 5/8" HDPE (waterra tubing) _____ ft
- 1/4" Silicon tubing _____ ft
- High Capacity .45 micron filters _____
- D-25 (for 2" wells, use with 5/8") foot valves _____
- D-16 (for 1" wells, use with 5/8") foot valves _____
- SS-10 (for 5/8" wells, use with 3/8") foot valves _____
- 1" bailer _____
- 2" bailer _____
- other (describe) _____

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site	MP09-03	Project Number	1343-005.27	Date	07 - May - 16
Piezometer Diameter	0.5" DP	Client	GY - AAM	Samplers	NB/MM
UTM Location	Z: 08 E: 0388957 N: 6881743	Project Name	Mount Nansen 2016 GW Sampling Program	Weather/Temperature	sunny w clouds
Waypoint	GPS: ELR Name: 009			Recovery	<input type="checkbox"/> Good <input type="checkbox"/> Bad
Photos	Cam: ELR Nos: 504-505	Purge Method			
Duplicate Collected	<input type="checkbox"/> Yes Name: _____	Waterra	Peristaltic	Disp. Bailer	Other
Field Blank Collected	<input type="checkbox"/> Yes Name: _____				
Initial Depth to Water (m)	1.618	Purge Start Time:		Purge End Time:	
				Pen or YSI:	<input type="checkbox"/> YSI Pro-Plus <input type="checkbox"/> Pen Unit
Depth to Bottom (m)	FROZEN	Purge Interval Time () min / Vol. () L			
Submerged Tubing Depth (m)		Depth to water (m)			
Well Stick-up Height (m)	0.620	Temperature (°C) 3%			
Estimated Water Volume (L)		pH (pH Units) ±0.1			
<p>Calculations:</p> <p>(DTB - DTW) x (πr²)1000 (for well diameter) = 1 well volume (DTB - DTW) x 8.1 (for 4" well diameter) = 1 well volume (DTB - DTW) x 2 (for 2" well diameter) = 1 well volume (DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume (DTB-DTW) x 0.5 (for 1" diameter) = 1 well volume</p>		Cond. (µs/cm) 3%			
		Specific Cond. (µs/cm) 3%			
		Redox (mV) 10%			
		DO (mg/L) 10%			
		DO (%) 10%			
		Appearance & Odour (Clear, Silty, HC odours, etc.)			
		<u>Only for final readings</u> Sulphide (mg/L)			
		Turbidity (NTU)			
		Interval Purge Volume (L)			
		Cumulative Purge Volume (L):			
YSI ID		Sample Method:			
Logged Field Parameters	<input type="checkbox"/> Yes <input type="checkbox"/> No				
Time logged on YSI (24hr)		Waterra	Peristaltic	Disp. Bailer	Other
Sample Time (24hr)					

Sample Site (Con't): MP09-03

Sample Date (Con't): _____

Well Head Seal: J-Plug PVC Cap Not Sealed Other _____

Seal Replaced: J-Plug PVC Cap Not required Other do not have right cap

Well properly sealed for gas monitoring: Yes No Details: not sealed

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	29.9
Carbon Dioxide (CO2)	PPM	500

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HNO ₃ (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HCL (Hydrochloric)		
2	500 ml (plastic)	General Chemistry	100 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input type="checkbox"/> NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH ₃)	60 ml	-	<input type="checkbox"/> H ₂ SO ₄ (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input type="checkbox"/> HNO ₃ (Nitric)		
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-		

General Notes and Observations:

- watterra tubing frozen (stuck) in well; peri tubing loose in well; possibly sitting above ice.
 - ~~DP~~ Depth measured @ ± 1.618m; no water detected; assumed frozen due to watterra tubing being stuck; attempt to thaw for 20 mins; attempt unsuccessful
 - standing water surrounding DP

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) _____ ft
- 3/8" HDPE (microwatterra tubing) _____ ft
- 5/8" HDPE (watterra tubing) _____ ft
- 1/4" Silicon tubing _____ ft
- High Capacity .45 micron filters _____
- D-25 (for 2" wells, use with 5/8") foot valves _____
- D-16 (for 1" wells, use with 5/8") foot valves _____
- SS-10 (for 5/8" wells, use with 3/8") foot valves _____
- 1" bailer _____
- 2" bailer _____
- other (describe) _____

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site	MP09-04	Project Number	1343-005.27	Date	May 26, 2016					
Piezometer Diameter	1.5-inch	Client	GY - AAM	Samplers	KB/JC					
UTM Location	Z: 08 E: 0389567 N: 6880616	Project Name	Mount Nansen 2016 GW Sampling Program	Weather/Temperature	overcast					
Waypoint	GPS: Hemm Name: N/A	Purge Method	<input type="checkbox"/> Waterra <input checked="" type="checkbox"/> Peristaltic <input type="checkbox"/> Disp. Bailer <input type="checkbox"/> Other	Recovery	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Bad					
Photos	Cam: Jeremy Nos:									
Duplicate Collected	<input type="checkbox"/> Yes Name:									
Field Blank Collected	<input type="checkbox"/> Yes Name:									
Initial Depth to Water (m)	2.035	Purge Start Time:	08:22	Purge End Time:	08:40					
				Pen or YSI:	<input type="checkbox"/> YSI Pro-Plus <input type="checkbox"/> Pen Unit					
Depth to Bottom (m)	2.214	Purge Interval Time () min / Vol. () L	8:24	8:27	8:30	8:33	8:36	8:40		
Submerged Tubing Depth (m)	2.2	Depth to water (m)	2.111	2.080	2.081	2.075	2.075	2.02		
Well Stick-up Height (m)	1.234	Temperature (°C) 3%	2.96	2.87	2.52	2.22	2.20	2.06		
Estimated Water Volume (L)	0.1969	pH (pH Units) ±0.1	5.45	6.45	6.62	6.75	6.84	6.88		
(DTB - DTW) x (πr ²)1000 (for well diameter) = 1 well volume (DTB - DTW) x 8.1 (for 4" well diameter) = 1 well volume (DTB - DTW) x 2 (for 2" well diameter) = 1 well volume (DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume (DTB-DTW) x 0.5 (for 1" diameter) = 1 well volume Calculations: $\begin{array}{r} 2.214 \\ - 2.035 \\ \hline 0.179 \\ \times 1.1 \\ \hline 0.1969 \end{array}$	Cond. (µs/cm) 3%	0.753	0.708	0.704	0.697	0.694	0.691			
	Specific Cond. (µs/cm) 3%	1.209	1.234	1.233	1.237	1.231	1.231			
	Redox (mV) 10%	279.5	241.0	228.6	217.0	216.2	214.1			
	DO (mg/L) 10%	7.44	5.50	5.28	5.26	5.06	4.91			
	DO (%) 10%	51.1	40.6	38.9	38.4	36.8	35.7			
	Appearance & Odour (Clear, Silty, HC odours, etc.)	clear	clear	clear	clear	clear	clear			
	Only for final readings	Sulphide (mg/L)	/	/	/	/	/	0.01		
		Turbidity (NTU)	/	/	/	/	/	2.10		
	Interval Purge Volume (L)	0.20	0.3	0.35	0.45	0.35	0.30			
	Cumulative Purge Volume (L):	0.20	0.50	0.85	1.30	1.65	1.95			
YSI ID	13F19509-9ine	Sample Method:								
Logged Field Parameters	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No									
Time logged on YSI (24hr)	08:42	Waterra	Peristaltic	Disp. Bailer	Other					
Sample Time (24hr)	08:50		<input checked="" type="checkbox"/>							

preYDI (SS6)



Sample Site (Con't): MPO9-04

Sample Date (Con't): May 26, 2016

Well Head Seal: J-Plug PVC Cap Not Sealed Other _____

Seal Replaced: J-Plug PVC Cap Not required Other _____

Well properly sealed for gas monitoring: Yes No Details: _____

Head Space Gas Measurements

	Units	Values
Methane (CH ₄)	%LEL	Ø
Oxygen (O ₂)	%	20.9
Carbon Dioxide (CO ₂)	PPM	700

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input checked="" type="checkbox"/> Field Filtered	<input checked="" type="checkbox"/> HNO ₃ (Nitric)	120	
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input checked="" type="checkbox"/> Field Filtered	<input checked="" type="checkbox"/> HCL (Hydrochloric)	40	
2	500 ml (plastic)	General Chemistry	100 ml	-	-	500	
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input type="checkbox"/> NaOH (Sodium Hydroxide)	145	
4	120 ml (glass)	Ammonia (NH ₃)	60 ml	-	<input checked="" type="checkbox"/> H ₂ SO ₄ (Sulfuric)	120	
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input checked="" type="checkbox"/> HNO ₃ (Nitric)	120	
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-	120	

General Notes and Observations:

- ~0.2 m of water above frozen section, HDPE tubing was frozen in well, but we dis-lodged it
- sampled w/ tubing, well had good re-charge.

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) _____ ft
- 3/8" HDPE (microwaterra tubing) _____ ft
- 5/8" HDPE (waterra tubing) _____ ft
- 1/4" Silicon tubing 1/2 ft
- High Capacity .45 micron filters _____
- D-25 (for 2" wells, use with 5/8") foot valves _____
- D-16 (for 1" wells, use with 5/8") foot valves _____
- SS-10 (for 5/8" wells, use with 3/8") foot valves _____
- 1" bailer _____
- 2" bailer _____
- other (describe) _____

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site	MP09-05	Project Number	1343-005.27	Date	26 May -16					
Piezometer Diameter	1"	Client	GY - AAM	Samplers	NB/MU					
UTM Location	Z:08, E:0389560 N: 6880558	Project Name	Mount Nansen 2016 GW Sampling Program	Weather/Temperature	overcast, snow					
Waypoint	GPS: ELR Name: 014			Recovery	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Bad					
Photos	Cam: ELR Nos: 450-452	Purge Method								
Duplicate Collected	<input checked="" type="checkbox"/> Yes Name: Dup-2	Waterra	Peristaltic	Disp. Bailer	Other					
Field Blank Collected	<input type="checkbox"/> Yes - Name: _____		X							
Initial Depth to Water (m)	1.447	Purge Start Time:	7:58	Purge End Time:	8:13					
				Pen or YSI:	<input checked="" type="checkbox"/> YSI Pro Plus <input type="checkbox"/> Pen Unit					
Depth to Bottom (m)	1.829	Purge Interval Time (3) min / Vol. () L	8:01	8:04	8:07	8:10	8:13			
Submerged Tubing Depth (m)	~1.6	Depth to water (m)	1.463	1.463	1.463	1.463	1.463			
Well Stick-up Height (m)	1.048	Temperature (°C) 3%	2.2	1.9	1.7	1.6	1.6			
Estimated Water Volume (L)	0.419 0.4202	pH (pH Units) ±0.1	5.67	6.61	6.71	6.74	6.76			
(DTB - DTW) x (πr ²) 1000 (for well diameter) = 1 well volume (DTB - DTW) x 8.1 (for 4" well diameter) = 1 well volume (DTB - DTW) x 2 (for 2" well diameter) = 1 well volume (DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume (DTB-DTW) x 0.5 (for 1" diameter) = 1 well volume Calculations: $\frac{1.829 - 1.447}{0.5} \times 0.4202 = 0.419$	Cond. (µs/cm) 3%	1269	1199	1177	1168	1165				
	Specific Cond. (µs/cm) 3%	2263	2144	2119	2112	2109				
	Redox (mV) 10%	37.5	-19.3	-34.1	-46.5	-56.7				
	DO (mg/L) 10%	3.50	1.19	1.00	1.0	1.29				
	DO (%) 10%	28.0	8.9	7.3	7.6	9.2				
	Appearance & Odour (Clear, Silty, HC odours, etc.)	slightly turbid	same	clear	slightly turbid	clear				
	Only for final readings	Sulphide (mg/L)	/	/	/	/	0.01			
		Turbidity (NTU)	/	/	/	/	2.66			
		Interval Purge Volume (L)	/	0.6	0.35	0.35	0.25			
		Cumulative Purge Volume (L):	/	0.6	0.95	1.30	1.65			
YSI ID	MP09-05	Sample Method:								
Logged Field Parameters	<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Waterra	Peristaltic	Disp. Bailer	Other					
Time logged on YSI (24hr)	8:24		X							
Sample Time (24hr)	8:20									



Sample Site (Con't): MP09-05

Sample Date (Con't): 25 May 16 @ 8:20

Well Head Seal: J-Plug PVC Cap Not Sealed Other _____

Seal Replaced: J-Plug PVC Cap Not required Other _____

Well properly sealed for gas monitoring: Yes No Details: _____

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	31 30.49
Carbon Dioxide (CO2)	PPM	200

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input checked="" type="checkbox"/> Field Filtered	<input checked="" type="checkbox"/> HNO ₃ (Nitric)	20	+ Dup-2
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input checked="" type="checkbox"/> Field Filtered	<input checked="" type="checkbox"/> HCL (Hydrochloric)	40	+ Dup-2
2	500 ml (plastic)	General Chemistry	100 ml	-	-	500	+ Dup-2
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input checked="" type="checkbox"/> NaOH (Sodium Hydroxide)	145	2 Dup-2
4	120 ml (glass)	Ammonia (NH3)	60 ml	-	<input checked="" type="checkbox"/> H ₂ SO ₄ (Sulfuric)	20	+ Dup-2
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input checked="" type="checkbox"/> HNO ₃ (Nitric)	120	+ Dup-2
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-	120	+ Dup-2

} full vol's

General Notes and Observations:

- guys from Deneon started pump ^{from seepage pond} during purge

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) _____ ft (25m)
- 3/8" HDPE (microwaterra tubing) _____ ft
- 5/8" HDPE (waterra tubing) _____ ft
- 1/4" Silicon tubing 6.5 ft
- High Capacity .45 micron filters _____
- D-25 (for 2" wells, use with 5/8") foot valves _____
- D-16 (for 1" wells, use with 5/8") foot valves _____
- SS-10 (for 5/8" wells, use with 3/8") foot valves _____
- 1" bailer _____
- 2" bailer _____
- other (describe) _____

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site	MPO9-08	Project Number	1343-005.27	Date	May 27, 2016	
Piezometer Diameter	5/8 tubing	Client	GY - AAM	Samplers	KB/SC	
UTM Location	Z: 08 E: 0389160 N: 6881718	Project Name	Mount Nansen 2016 GW Sampling Program	Weather/Temperature	Sunny	
Waypoint	GPS: Hemmi -Name: n/a			Recovery	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Bad	
Photos	Cam: Jeremy Nos:	Purge Method				
Duplicate Collected	<input checked="" type="checkbox"/> Yes Name: DUP-3	Waterra	Peristaltic	Disp. Bailer	Other	
Field Blank Collected	<input type="checkbox"/> Yes Name: _____		<input checked="" type="checkbox"/>			
Initial Depth to Water (m)	0.548	Purge Start Time:	11:39	Purge End Time:		
				Pen or YSI:	<input type="checkbox"/> YSI Pro Plus <input type="checkbox"/> Pen Unit	
Depth to Bottom (m)	1.971	Purge Interval Time (3) min / Vol. () L	11:41	11:44	11:47	
Submerged Tubing Depth (m)	1.9	Depth to water (m)	\	\	\	
Well Stick-up Height (m)	0.796	Temperature (°C) 3%	3.71	3.18	2.94	
Estimated Water Volume (L)	0.35575	pH (pH Units) ±0.1	6.16	6.50	6.66	
(DTB - DTW) x (πr ²)1000 (for well diameter) = 1 well volume (DTB - DTW) x 8.1 (for 4" well diameter) = 1 well volume (DTB - DTW) x 2 (for 2" well diameter) = 1 well volume (DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume (DTB-DTW) x 0.5 (for 1" diameter) = 1 well volume Calculations: $\begin{array}{r} 1.971 \\ - 0.548 \\ \hline 1.423 \\ \times 0.25 \\ \hline 0.35575 \end{array}$	Conductivity (µs/cm) 3%	0.450	0.420	0.411	0.411	
	Specific Cond. (µs/cm) 3%	0.759	0.729	0.710	0.711	
	Redox (mV) 10%	23.3	-0.7	-12.5	-17.7	-21.1
	DO (mg/L) 10%	1.01	0.60	2.04	3.55	4.86
	DO (%) 10%	7.4	4.5	15.8	26.7	35.8
	Appearance & Odour (Clear, Silty, HC odours, etc.)	grey/clear	grey/clear	grey/clear	grey/clear	clear
	Only for final readings	Sulphide (mg/L)	/	/	/	/
		Turbidity (NTU)	/	/	/	/
		Interval Purge Volume (L)	0.300	0.4	0.5	0.4
		Cumulative Purge Volume (L):	0.3	0.7	1.20	1.60
YSI ID	MPO9-08-	Sample Method:				
Logged Field Parameters	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Waterra	Peristaltic	Disp. Bailer	Other	
Time logged on YSI (24hr)	11:56		<input checked="" type="checkbox"/>			
Sample Time (24hr)	11:50					

Sample Site (Con't): MPO9-08

Sample Date (Con't): May 27, 2016

Well Head Seal: J-Plug PVC Cap Not Sealed Other _____

Seal Replaced: J-Plug PVC Cap Not required Other _____

Well properly sealed for gas monitoring: Yes No Details: _____

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.9
Carbon Dioxide (CO2)	PPM	300

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input checked="" type="checkbox"/> Field Filtered	<input checked="" type="checkbox"/> HNO ₃ (Nitric)	120	
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input checked="" type="checkbox"/> Field Filtered	<input checked="" type="checkbox"/> HCL (Hydrochloric)	40	
2	500 ml (plastic)	General Chemistry	100 ml	-	-	500	
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input checked="" type="checkbox"/> NaOH (Sodium Hydroxide)	145	
4	120 ml (glass)	Ammonia (NH3)	60 ml	-	<input checked="" type="checkbox"/> H ₂ SO ₄ (Sulfuric)	120	
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input checked="" type="checkbox"/> HNO ₃ (Nitric)	120	
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-	120	

General Notes and Observations:

- not enough space in well to measure DTB while doing parameters (5/8)
 - purged > 3 well volumes before sampling; DO + ORP still not stable.
 - no cap on well

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) _____ ft
- 3/8" HDPE (microwaterra tubing) _____ ft
- 5/8" HDPE (waterra tubing) _____ ft
- 1/4" Silicon tubing 0.5 ft
- High Capacity .45 micron filters 1
- D-25 (for 2" wells, use with 5/8") foot valves _____
- D-16 (for 1" wells, use with 5/8") foot valves _____
- SS-10 (for 5/8" wells, use with 3/8") foot valves _____
- 1" bailer _____
- 2" bailer _____
- other (describe) _____

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site	MPO9-09	Project Number	1343-005.27	Date	26-May-16
Piezometer Diameter	1"	Client	GY - AAM	Samplers	NB/MM
UTM Location	Z: 08, E: 0389239 N: 6880681	Project Name	Mount Nansen 2016 GW Sampling Program	Weather/Temperature	OVERCAST / WINDY
Waypoint	GPS: ELR Name: 023			Recovery	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Bad
Photos	Cam: ELR Nos: 441-443	Purge Method			
Duplicate Collected	<input type="checkbox"/> Yes Name: _____	Waterra	Peristaltic	Disp. Bailer	Other
Field Blank Collected	<input type="checkbox"/> Yes Name: _____				
Initial Depth to Water (m)	3.052 to ice	Purge Start Time:		Purge End Time:	
Depth to Bottom (m)	FROZEN	Pen or YSI:		<input type="checkbox"/> YSI Pro Plus	<input type="checkbox"/> Pen Unit
Submerged Tubing Depth (m)	/	Purge Interval Time () min / Vol. () L			
Well Stick-up Height (m)	2.552	Depth to water (m)			
Estimated Water Volume (L)	/	Temperature (°C) 3%			
Calculations: $(DTB - DTW) \times (\pi r^2) 1000$ (for well diameter) = 1 well volume $(DTB - DTW) \times 8.1$ (for 4" well diameter) = 1 well volume $(DTB - DTW) \times 2$ (for 2" well diameter) = 1 well volume $(DTB - DTW) \times 1.1$ (for 1.5" diameter) = 1 well volume $(DTB - DTW) \times 0.5$ (for 1" diameter) = 1 well volume	pH (pH Units) ±0.1				
	Cond. (µs/cm) 3%				
	Specific Cond. (µs/cm) 3%				
	Redox (mV) 10%				
	DO (mg/L) 10%				
	DO (%) 10%				
	Appearance & Odour (Clear, Silty, HC odours, etc.)				
	Only for final readings	Sulphide (mg/L)			
		Turbidity (NTU)			
	Interval Purge Volume (L)				
Cumulative Purge Volume (L):					
YSI ID		Sample Method:			
Logged Field Parameters	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Waterra	Peristaltic	Disp. Bailer	Other
Time logged on YSI (24hr)	/				
Sample Time (24hr)	/				

Sample Site (Con't): MPO9-09

Sample Date (Con't): _____

 Well Head Seal: J-Plug PVC Cap Not Sealed Other _____

 Seal Replaced: J-Plug PVC Cap Not required Other _____

 Well properly sealed for gas monitoring: Yes No Details: lid was loose
Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	30.9
Carbon Dioxide (CO2)	PPM	300

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HNO ₃ (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input type="checkbox"/> Field Filtered	<input checked="" type="checkbox"/> HCL (Hydrochloric)		
2	500 ml (plastic)	General Chemistry	100 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input type="checkbox"/> NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	60 ml	-	<input type="checkbox"/> H ₂ SO ₄ (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input type="checkbox"/> HNO ₃ (Nitric)		
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-		

General Notes and Observations:

- Frozen at 3.05am. → Attempted to draw for 20 minutes, attempt unsuccessful.
 - Ice found on water level tape.

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) _____ ft
- 3/8" HDPE (microwaterra tubing) _____ ft
- 5/8" HDPE (waterra tubing) _____ ft
- 1/4" Silicon tubing _____ ft
- High Capacity .45 micron filters _____
- D-25 (for 2" wells, use with 5/8") foot valves _____
- D-16 (for 1" wells, use with 5/8") foot valves _____
- SS-10 (for 5/8" wells, use with 3/8") foot valves _____
- 1" bailer _____
- 2" bailer _____
- other (describe) _____

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site	MPO9-10	Project Number	1343-005.27	Date	26-May-16	
Piezometer Diameter	1"	Client	GY - AAM	Samplers	NB/MM	
UTM Location	Z: 081 E: 0384239 N: 6880681	Project Name	Mount Nansen 2016 GW Sampling Program	Weather/Temperature	overcast to breeze	
Waypoint	GPS: ELR Name: 023			Recovery	<input type="checkbox"/> Good <input type="checkbox"/> Bad	
Photos	Cam: ELR Nos: 441-443	Purge Method				
Duplicate Collected	<input type="checkbox"/> Yes Name: /	Waterra	Peristaltic	Disp. Bailer	Other	
Field Blank Collected	<input type="checkbox"/> Yes Name: /					
Initial Depth to Water (m)	3.502	Purge Start Time:		Purge End Time:		
Depth to Bottom (m)	3.948 to ice	Pen or YSI:		<input type="checkbox"/> YSI Pro Plus <input type="checkbox"/> Pen Unit		
Submerged Tubing Depth (m)	/	Purge Interval Time () min / Vol. () L				
Well Stick-up Height (m)	2.255	Depth to water (m)				
Estimated Water Volume (L)	/	Temperature (°C) 3%				
<p>(DTB - DTW) x (πr²)1000 (for well diameter) = 1 well volume (DTB - DTW) x 8.1 (for 4" well diameter) = 1 well volume (DTB - DTW) x 2 (for 2" well diameter) = 1 well volume (DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume (DTB-DTW) x 0.5 (for 1" diameter) = 1 well volume</p> <p>Calculations: 3.948 3.502 0.446 x 0.5 =</p>	<p>pH (pH Units) ±0.1</p> <p>Cond. (µs/cm) 3%</p> <p>Specific Cond. (µs/cm) 3%</p> <p>Redox (mV) 10%</p> <p>DO (mg/L) 10%</p> <p>DO (%) 10%</p> <p>Appearance & Odour (Clear, Silty, HC odours, etc.)</p> <p><u>Only for final readings</u></p> <p>Sulphide (mg/L)</p> <p>Turbidity (NTU)</p> <p>Interval Purge Volume (L)</p> <p>Cumulative Purge Volume (L):</p>	<p style="font-size: 2em; transform: rotate(-45deg); opacity: 0.5;">FROZEN</p>				
	YSI ID					
	Logged Field Parameters	<input type="checkbox"/> Yes <input type="checkbox"/> No	Sample Method:			
	Time logged on YSI (24hr)	/	Waterra	Peristaltic	Disp. Bailer	Other
	Sample Time (24hr)	/				

Sample Site (Con't): WPOA-10

Sample Date (Con't): _____

Well Head Seal: J-Plug PVC Cap Not Sealed Other _____

Seal Replaced: J-Plug PVC Cap Not required Other _____

Well properly sealed for gas monitoring: Yes No Details: _____

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.9
Carbon Dioxide (CO2)	PPM	300

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HNO ₃ (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HCL (Hydrochloric)		
2	500 ml (plastic)	General Chemistry	100 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input type="checkbox"/> NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	60 ml	-	<input type="checkbox"/> H ₂ SO ₄ (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input type="checkbox"/> HNO ₃ (Nitric)		
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-		

General Notes and Observations:

- Frozen @ 3.948m the DTB previously recorded was 5.3m, therefore water detected was sitting above the ice.
 - Attempted to draw well after trying to remove standing water w/ bailer. Attempt unsuccessful.

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) _____ ft
- 3/8" HDPE (microwaterra tubing) _____ ft
- 5/8" HDPE (waterra tubing) _____ ft
- 1/4" Silicon tubing _____ ft
- High Capacity .45 micron filters _____
- D-25 (for 2" wells, use with 5/8") foot valves _____
- D-16 (for 1" wells, use with 5/8") foot valves _____
- SS-10 (for 5/8" wells, use with 3/8") foot valves _____
- 1" bailer _____
- 2" bailer _____
- other (describe) _____

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site	MPO9-11	Project Number	1343-005.27	Date	26-May-16
Piezometer Diameter	1.5"	Client	GY - AAM	Samplers	NB/ML
UTM Location	Z:08 E:0389000 N:6880610	Project Name	Mount Nansen 2016 GW Sampling Program	Weather/Temperature	windy in sunbreaks
Waypoint	GPS: ELR Name: 000	Purge Method			
Photos	Cam: ELR Nos: 471-473	Water	Peristaltic	Disp. Bailer	Other
Duplicate Collected	<input type="checkbox"/> Yes Name: /				
Field Blank Collected	<input type="checkbox"/> Yes Name: /				
Initial Depth to Water (m)	2.715 to ice	Purge Start Time:	/	Purge End Time:	/
Depth to Bottom (m)	FROZEN	Pen or YSI:	<input type="checkbox"/> YSI Pro Plus <input type="checkbox"/> Pen Unit		
Submerged Tubing Depth (m)	/	Purge Interval Time () min / Vol. () L	/		
Well Stick-up Height (m)	1.96	Depth to water (m)	/		
Estimated Water Volume (L)	/	Temperature (°C) 3%	/		
Calculations: $(DTB - DTW) \times (\pi r^2) \times 1000$ (for well diameter) = 1 well volume $(DTB - DTW) \times 8.1$ (for 4" well diameter) = 1 well volume $(DTB - DTW) \times 2$ (for 2" well diameter) = 1 well volume $(DTB - DTW) \times 1.1$ (for 1.5" diameter) = 1 well volume $(DTB - DTW) \times 0.5$ (for 1" diameter) = 1 well volume	pH (pH Units) ±0.1	/			
	Cond. (µs/cm) 3%	/			
	Specific Cond. (µs/cm) 3%	/			
	Redox (mV) 10%	/			
	DO (mg/L) 10%	/			
	DO (%) 10%	/			
	Appearance & Odour (Clear, Silty, HC odours, etc.)	/			
	Only for final readings	Sulphide (mg/L)	/		
		Turbidity (NTU)	/		
	Interval Purge Volume (L)	/			
Cumulative Purge Volume (L):	/				
YSI ID					
Logged Field Parameters	<input type="checkbox"/> Yes <input type="checkbox"/> No				
Time logged on YSI (24hr)					
Sample Time (24hr)					
	Water	Peristaltic	Disp. Bailer	Other	

Sample Site (Con't): WPO9-11

Sample Date (Con't): _____

Well Head Seal: J-Plug PVC Cap Not Sealed Other _____

Seal Replaced: J-Plug PVC Cap Not required Other _____

Well properly sealed for gas monitoring: Yes No Details: _____

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	18.2 99
Oxygen (O2)	%	18.2 17.2
Carbon Dioxide (CO2)	PPM	1600

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HNO ₃ (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HCL (Hydrochloric)		
2	500 ml (plastic)	General Chemistry	100 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input type="checkbox"/> NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	60 ml	-	<input type="checkbox"/> H ₂ SO ₄ (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input type="checkbox"/> HNO ₃ (Nitric)		
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-		

General Notes and Observations:

- Frozen @ 2.75 m → attempted to draw well for 30 minutes, attempt unsuccessful.
 - Pen tubing ≠ stuck (frozen) in well.

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) _____ ft
- 3/8" HDPE (microwaterra tubing) _____ ft
- 5/8" HDPE (waterra tubing) _____ ft
- 1/4" Silicon tubing _____ ft
- High Capacity .45 micron filters _____
- D-25 (for 2" wells, use with 5/8") foot valves _____
- D-16 (for 1" wells, use with 5/8") foot valves _____
- SS-10 (for 5/8" wells, use with 3/8") foot valves _____
- 1" bailer _____
- 2" bailer _____
- other (describe) _____

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site	MPO9-12	Project Number	1343-005.27	Date	26-May-16
Piezometer Diameter	1"	Client	GY - AAM	Samplers	NB/MM
UTM Location	Z: 08, E: 0800000 N: 6800612	Project Name	Mount Nansen 2016 GW Sampling Program	Weather/Temperature	windy w sunbreaks
Waypoint	GPS: ELR Name: 022			Recovery	<input type="checkbox"/> Good <input type="checkbox"/> Bad
Photos	Cam: ELR Nos: 471-473	Purge Method			
Duplicate Collected	<input type="checkbox"/> Yes Name: /	Waterra	Peristaltic	Disp. Bailer	Other
Field Blank Collected	<input type="checkbox"/> Yes Name: /				
Initial Depth to Water (m)	2.664 to ice	Purge Start Time:	/	Purge End Time:	/
		Pen or YSI:	<input type="checkbox"/> YSI Pro Plus <input type="checkbox"/> Pen Unit		
Depth to Bottom (m)	FROZEN	Purge Interval Time () min / Vol. () L			
Submerged Tubing Depth (m)	/	Depth to water (m)	FROZEN		
Well Stick-up Height (m)	2.0	Temperature (°C) 3%			
Estimated Water Volume (L)	/	pH (pH Units) ±0.1			
<p>Calculations:</p> <p>(DTB - DTW) x (πr²) 1000 (for well diameter) = 1 well volume (DTB - DTW) x 8.1 (for 4" well diameter) = 1 well volume (DTB - DTW) x 2 (for 2" well diameter) = 1 well volume (DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well-volume (DTB-DTW) x 0.5 (for 1" diameter) = 1 well volume</p>	Cond. (µs/cm) 3%				
	Specific Cond. (µs/cm) 3%				
	Redox (mV) 10%				
	DO (mg/L) 10%				
	DO (%) 10%				
	Appearance & Odour (Clear, Silty, HC odours, etc.)				
	<u>Only for final readings</u> Sulphide (mg/L)				
	Turbidity (NTU)				
	Interval Purge Volume (L)				
	Cumulative Purge Volume (L):				
YSI ID		Sample Method:			
Logged Field Parameters	<input type="checkbox"/> Yes <input type="checkbox"/> No	Waterra	Peristaltic	Disp. Bailer	Other
Time logged on YSI (24hr)	/				
Sample Time (24hr)	/				

Sample Site (Con't): MD09-18

Sample Date (Con't): _____

Well Head Seal: J-Plug PVC Cap Not Sealed Other _____

Seal Replaced: J-Plug PVC Cap Not required Other _____

Well properly sealed for gas monitoring: Yes No Details: _____

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.9
Carbon Dioxide (CO2)	PPM	300

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HNO ₃ (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 ml	<input type="checkbox"/> Field Filtered	<input checked="" type="checkbox"/> HCL (Hydrochloric)		
2	500 ml (plastic)	General Chemistry	100 ml				
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input type="checkbox"/> NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	60 ml	-	<input type="checkbox"/> H ₂ SO ₄ (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input type="checkbox"/> HNO ₃ (Nitric)		
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-		

General Notes and Observations:

- Frozen @ 2.664 m → DTB previously record 4.2m
 ↳ attempted to thaw the well, attempt is unsuccessful.
 - Per tubing stuck (frozen) in well.

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) _____ ft
- 3/8" HDPE (microwaterra tubing) _____ ft
- 5/8" HDPE (waterra tubing) _____ ft
- 1/4" Silicon tubing _____ ft
- High Capacity .45 micron filters _____
- D-25 (for 2" wells, use with 5/8") foot valves _____
- D-16 (for 1" wells, use with 5/8") foot valves _____
- SS-10 (for 5/8" wells, use with 3/8") foot valves _____
- 1" bailer _____
- 2" bailer _____
- other (describe) _____

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site	MPO9-14	Project Number	1343-005.27	Date	26 May 16
Piezometer Diameter	1" DP 0.5" DP	Client	GY - AAM	Samplers	NB/NT
UTM Location	Z: 000 E: 6389139 N: 6880719	Project Name	Mount Nansen 2016 GW Sampling Program	Weather/Temperature	rainy/snowy/windy
Waypoint	GPS: ELR Name: 020	Recovery	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Bad		
Photos	Cam: ELR Nos: 0465-467	Purge Method			
Duplicate Collected	<input type="checkbox"/> Yes Name:	Waterra	Peristaltic	Disp. Bailer	Other
Field Blank Collected	<input type="checkbox"/> Yes Name:		X		
Initial Depth to Water (m)	1.140 0.915	Purge Start Time:		Purge End Time:	Pen or YSI: <input type="checkbox"/> YSI Pro Plus <input type="checkbox"/> Pen Unit
Depth to Bottom (m)	2.100 1.610	Purge Interval Time () min / Vol. () L			
Submerged Tubing Depth (m)		Depth to water (m)			
Well Stick-up Height (m)	0.72 (above water)	Temperature (°C) 3%			
Estimated Water Volume (L)		pH (pH Units) ±0.1			
<p>(DTB - DTW) x (πr²)1000 (for well diameter) = 1 well volume (DTB - DTW) x 8.1 (for 4" well diameter) = 1 well volume (DTB - DTW) x 2 (for 2" well diameter) = 1 well volume (DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume (DTB-DTW) x 0.5 (for 1" diameter) = 1 well volume</p> <p>Calculations: $\frac{1.610}{1.140} = 0.370$</p>	Conductivity (µs/cm) 3%				
	Specific Cond. (µs/cm) 3%				
	Redox (mV) 10%				
	DO (mg/L) 10%				
	DO (%) 10%				
	Appearance & Odour (Clear, Silty, HC odours, etc.)				
	Only for final readings	Sulphide (mg/L)			
		Turbidity (NTU)			
	Interval Purge Volume (L)				
	Cumulative Purge Volume (L):				
YSI ID		Sample Method:			
Logged Field Parameters	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Waterra	Peristaltic	Disp. Bailer	Other
Time logged on YSI (24hr)			X		
Sample Time (24hr)	12:45				

Sample Site (Con't): MP 09 - 14

Sample Date (Con't): 20 May - 16

Well Head Seal: J-Plug PVC Cap Not Sealed Other plastic bag + tape

Seal Replaced: J-Plug PVC Cap Not required Other Not available

Well properly sealed for gas monitoring: Yes No Details: plastic bag

Head Space Gas Measurements

	Units	Values
Methane (CH ₄)	%LEL	0
Oxygen (O ₂)	%	20.9
Carbon Dioxide (CO ₂)	PPM	300

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input checked="" type="checkbox"/> Field Filtered	<input checked="" type="checkbox"/> HNO ₃ (Nitric)	100	
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HCL (Hydrochloric)		
2	500 ml (plastic)	General Chemistry	100 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input type="checkbox"/> NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH ₃)	60 ml	-	<input type="checkbox"/> H ₂ SO ₄ (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input type="checkbox"/> HNO ₃ (Nitric)		
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-		

General Notes and Observations:

- Hydrocarbon ~~stare~~ sheer on surface of water surrounding DP
 - water tubing stuck in well; attempts to remove it resulted in stick up pull up; stick up unstable + moves a lot
 - able to fit water level into the tubing
 - Attempt to direct sample went dry almost immediately; waited briefly for recharge; ~~insufficient volume collected for metals;~~
 - able to collect enough water for diss. metals min vol (100 ml);

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) _____ ft (2 m)
- 3/8" HDPE (microwaterra tubing) _____ ft
- 5/8" HDPE (waterra tubing) _____ ft
- 1/4" Silicon tubing 0.5 ft
- High Capacity .45 micron filters _____
- D-25 (for 2" wells, use with 5/8") foot valves _____
- D-16 (for 1" wells, use with 5/8") foot valves _____
- SS-10 (for 5/8" wells, use with 3/8") foot valves _____
- 1" bailer _____
- 2" bailer _____
- other (describe) _____

Insufficient vol for full sample.

- very slow recharge, will not return to ~~full~~ sample more.

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site	MW09-02	Project Number	1343-005.27	Date	May 26, 2016	
Piezometer Diameter	2"	Client	GY - AAM	Samplers	JC / KB	
UTM Location	Z: 08 E: 0389395 N: 6880558	Project Name	Mount Nansen 2016 GW Sampling Program	Weather/Temperature	10°C Sunny	
Waypoint	GPS: Hem Name:			Recovery	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Bad	
Photos	Cam: Jony Nos:	Purge Method				
Duplicate Collected	<input type="checkbox"/> Yes Name:	Waterra	Peristaltic	Disp. Bailer	Other	
Field Blank Collected	<input type="checkbox"/> Yes Name:		<input checked="" type="checkbox"/>			
Initial Depth to Water (m)	3.420	Purge Start Time:	11:08	Purge End Time:	11:24	
				Pen or YSI:	<input checked="" type="checkbox"/> YSI Pro Plus 556 <input type="checkbox"/> Pen Unit	
Depth to Bottom (m)	4.728	Purge Interval Time (3) min / Vol. () L	11:12	11:15	11:18	
Submerged Tubing Depth (m)	4.528	Depth to water (m)	3.75	3.79	3.87	
Well Stick-up Height (m)	0.725	Temperature (°C) 3%	2.66	2.55	2.64	
Estimated Water Volume (L)	2.616 L	pH (pH Units) ±0.1	7.04	7.14	7.18	
Calculations: $(4.728 - 3.420) = 1.308$ $1.308 \times 2 = 2.616 L$	Cond. (µs/cm) 3%	1.384	1.390	1.390	1.388	
	Specific Cond. (µs/cm) 3%	2.418	2.424	2.426	2.426	
	Redox (mV) 10%	-76.1	-83.9	-90.4	-88.2	
	DO (mg/L) 10%	5.19	0.87	0.30	0.29	
	DO (%) 10%	36.2	6.2	2.2	2.1	
	Appearance & Odour (Clear, Silty, HC odours, etc.)	clear slat/white	Same	Same	Same	
	Only for final readings	Sulphide (mg/L)	/	/	/	0.05
		Turbidity (NTU)	/	/	/	11.83
		Interval Purge Volume (L)	0.200	0.200	0.300	0.300
		Cumulative Purge Volume (L):	0.200	0.400	0.700	1.000
YSI ID	MW09-03 (556)	Sample Method:				
Logged Field Parameters	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Waterra	Peristaltic	Disp. Bailer	Other	
Time logged on YSI (24hr)	11:27		<input checked="" type="checkbox"/>			
Sample Time (24hr)	11:40					

Sample Site (Con't): MW09-02

Sample Date (Con't): May 26, 2016

Well Head Seal: J-Plug PVC Cap Not Sealed Other _____

Seal Replaced: J-Plug PVC Cap Not required Other _____

Well properly sealed for gas monitoring: Yes No Details: _____

Head Space Gas Measurements

	Units	Values
Methane (CH ₄)	%LEL	Ø
Oxygen (O ₂)	%	20.9
Carbon Dioxide (CO ₂)	PPM	400

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input checked="" type="checkbox"/> Field Filtered	<input checked="" type="checkbox"/> HNO ₃ (Nitric)	120	
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input checked="" type="checkbox"/> Field Filtered	<input checked="" type="checkbox"/> HCL (Hydrochloric)	40	
2	500 ml (plastic)	General Chemistry	100 ml	-	-	500	
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input checked="" type="checkbox"/> NaOH (Sodium Hydroxide)	145	
4	120 ml (glass)	Ammonia (NH ₃)	60 ml	-	<input checked="" type="checkbox"/> H ₂ SO ₄ (Sulfuric)	120	
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input checked="" type="checkbox"/> HNO ₃ (Nitric)	120	
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-	120	

General Notes and Observations:

Good productivity well
 Note YSI save file is MW09-03 (could not change in field)
 will save

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) _____ ft
- 3/8" HDPE (microwaterra tubing) _____ ft
- 5/8" HDPE (waterra tubing) _____ ft
- 1/4" Silicon tubing 0.5 ft
- High Capacity .45 micron filters _____
- D-25 (for 2" wells, use with 5/8") foot valves _____
- D-16 (for 1" wells, use with 5/8") foot valves _____
- SS-10 (for 5/8" wells, use with 3/8") foot valves _____
- 1" bailer _____
- 2" bailer _____
- other (describe) _____

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site	MW09-03	Project Number	1343-005.27	Date	May 26, 2016					
Piezometer Diameter	2"	Client	GY - AAM	Samplers	KB/SC					
UTM Location	Z: 08 E: 0389419 N: 6880556	Project Name	Mount Nansen 2016 GW Sampling Program	Weather/Temperature	partly cloudy					
Waypoint	GPS: Hehm Name: N/A			Recovery	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Bad					
Photos	Cam: Xamp Nos:	Purge Method								
Duplicate Collected	<input type="checkbox"/> Yes Name:	Waterra	Peristaltic	Disp. Bailer	Other					
Field Blank Collected	<input type="checkbox"/> Yes Name:		✓							
Initial Depth to Water (m)	7.714	Purge Start Time:	12:03	Purge End Time:	12:35					
				Pen or YSI:	<input checked="" type="checkbox"/> YSI Pro Plus <input type="checkbox"/> Pen Unit					
Depth to Bottom (m)	9.927	Purge Interval Time (3) min / Vol. () L	12:17	12:20	12:23	12:26	12:31	12:35		
Submerged Tubing Depth (m)	9.727	Depth to water (m)	7.86	7.86	same	same	same	same	7.82	
Well Stick-up Height (m)	0.415	Temperature (°C) 3%	3.61	3.85	4.10	4.23	4.21	4.21		
Estimated Water Volume (L)	4.426	pH (pH Units) ±0.1	8.11	8.27	8.37	8.40	8.45	8.50		
(DTB - DTW) x (πr ²)1000 (for well diameter) = 1 well volume (DTB - DTW) x 8.1 (for 4" well diameter) = 1 well volume (DTB - DTW) x 2 (for 2" well diameter) = 1 well volume (DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume (DTB-DTW) x 0.5 (for 1" diameter) = 1 well volume Calculations: (9.927 - 7.714) x 2 = 4.426	Cond. (µs/cm) 3%	1.498	1.495	1.502	1.508	1.517	1.519			
	Specific Cond. (µs/cm) 3%	2.531	2.567	2.501	2.500	2.514	2.519			
	Redox (mV) 10%	-111.7	-113.3	-94.6	-87.2	-86.1	-96.9			
	DO (mg/L) 10%	0.96	0.61	0.43	0.47	0.38	0.32			
	DO (%) 10%	7.1	4.6	3.3	3.6	2.9	2.5			
	Appearance & Odour (Clear, Silty, HC odours, etc.)	clear	clear	clear	clear	clear	clear			
	Only for final readings	Sulphide (mg/L)	/	/	/	/	/	0.02		
		Turbidity (NTU)	/	/	/	/	/	1.61		
		Interval Purge Volume (L)	0.200	0.200	0.200	0.200	0.250	0.250		
		Cumulative Purge Volume (L):	0.200	0.400	0.600	0.800	1.050	1.300		
YSI ID	MW09-04 (656)	Sample Method:								
Logged Field Parameters	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Waterra	Peristaltic	Disp. Bailer	Other					
Time logged on YSI (24hr)	12:36		✓							
Sample Time (24hr)	12:40									

Sample Site (Con't): MW 09-03

Sample Date (Con't): May 26, 2016

Well Head Seal: J-Plug PVC Cap Not Sealed Other _____

Seal Replaced: J-Plug PVC Cap Not required Other _____

Well properly sealed for gas monitoring: Yes No Details: _____

Head Space Gas Measurements

	Units	Values
Methane (CH ₄)	%LEL	0
Oxygen (O ₂)	%	20.9
Carbon Dioxide (CO ₂)	PPM	300

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input checked="" type="checkbox"/> Field Filtered	<input checked="" type="checkbox"/> HNO ₃ (Nitric)	120 ml	
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input checked="" type="checkbox"/> Field Filtered	<input checked="" type="checkbox"/> HCL (Hydrochloric)	40	
2	500 ml (plastic)	General Chemistry	100 ml	-	-	500	
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input checked="" type="checkbox"/> NaOH (Sodium Hydroxide)	145	
4	120 ml (glass)	Ammonia (NH ₃)	60 ml	-	<input checked="" type="checkbox"/> H ₂ SO ₄ (Sulfuric)	120	
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input checked="" type="checkbox"/> HNO ₃ (Nitric)	120	
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-	120	

General Notes and Observations:

Water table is deep, need to run peristaltic pump @ higher speed to start water flow. speed turned down once water reached XSI flow cell.

good productivity well

XSI Saved as MW09-04

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) 30 ft
- 3/8" HDPE (microwaterra tubing) _____ ft
- 5/8" HDPE (waterra tubing) _____ ft
- 1/4" Silicon tubing 10.5 ft
- High Capacity .45 micron filters _____
- D-25 (for 2" wells, use with 5/8") foot valves _____
- D-16 (for 1" wells, use with 5/8") foot valves _____
- SS-10 (for 5/8" wells, use with 3/8") foot valves _____
- 1" bailer _____
- 2" bailer _____
- other (describe) _____

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site	MW09-04	Project Number	1343-005.27	Date	May 26, 2016	
Piezometer Diameter	2-inch	Client	GY - AAM	Samplers	KB/SC	
UTM Location	Z: 08 E: 0389420 N: 6880556	Project Name	Mount Nansen 2016 GW Sampling Program	Weather/Temperature	Sunny	
Waypoint	GPS: Hemm Name: N/A	Purge Method	<input type="checkbox"/> Waterra <input checked="" type="checkbox"/> Peristaltic <input type="checkbox"/> Disp. Bailer <input type="checkbox"/> Other	Recovery	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Bad	
Photos	Cam: Jeremy Nos:					
Duplicate Collected	<input type="checkbox"/> Yes Name:					
Field Blank Collected	<input type="checkbox"/> Yes Name:					
Initial Depth to Water (m)	4.983	Purge Start Time:	12:54	Purge End Time:	13:18	
Depth to Bottom (m)	7.666	Pen or YSI:	<input checked="" type="checkbox"/> YSI Pro Plus 556 <input type="checkbox"/> Pen Unit			
Submerged Tubing Depth (m)	7.100	Purge Interval Time () min / Vol. () L	12:59	13:02	13:05	
Well Stick-up Height (m)	0.333	Depth to water (m)	5.28	5.44	5.412	
Estimated Water Volume (L)	5.366	Temperature (°C) 3%	3.80	3.39	3.77	
(DTB - DTW) x (πr ²)1000 (for well diameter) = 1 well volume (DTB - DTW) x 8.1 (for 4" well diameter) = 1 well volume (DTB - DTW) x 2 (for 2" well diameter) = 1 well volume (DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume (DTB-DTW) x 0.5 (for 1" diameter) = 1 well volume Calculations: $\begin{array}{r} 7.666 \\ - 4.983 \\ \hline 2.683 \\ 2 \\ \times \\ \hline 5.366 \end{array}$	pH (pH Units) ±0.1	8.26	8.31	8.32	8.31	
	Cond. (µs/cm) 3%	1.499	1.486	1.493	1.497	1.499
	Specific Cond. (µs/cm) 3%	2.518	2.529	2.510	2.509	2.510
	Redox (mV) 10%	19.1	15.8	11.0	8.5	7.4
	DO (mg/L) 10%	3.33	0.25	0.20	0.15	0.20
	DO (%) 10%	84.3	1.9	1.5	1.2	1.9
	Appearance & Odour (Clear, Silty, HC odours, etc.)	clear	clear	clear	clear	clear
	Only for final readings	Sulphide (mg/L)	/	/	/	/
		Turbidity (NTU)	/	/	/	/
	Interval Purge Volume (L)	0.10	0.50	0.25	0.20	0.25
Cumulative Purge Volume (L):	0.10	0.60	0.85	1.05	1.50	
YSI ID	MW09-03R	Sample Method:				
Logged Field Parameters	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No					
Time logged on YSI (24hr)	13:18	<input type="checkbox"/> Waterra <input checked="" type="checkbox"/> Peristaltic <input type="checkbox"/> Disp. Bailer <input type="checkbox"/> Other				
Sample Time (24hr)	13:40					



Sample Site (Con't): MW09-04

Sample Date (Con't): May 26, 2016

Well Head Seal: J-Plug PVC Cap Not Sealed Other _____

Seal Replaced: J-Plug PVC Cap Not required Other _____

Well properly sealed for gas monitoring: Yes No Details: _____

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	Ø
Oxygen (O2)	%	20.9
Carbon Dioxide (CO2)	PPM	300

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input checked="" type="checkbox"/> Field Filtered	<input checked="" type="checkbox"/> HNO ₃ (Nitric)	120	
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input checked="" type="checkbox"/> Field Filtered	<input checked="" type="checkbox"/> HCL (Hydrochloric)	40	
2	500 ml (plastic)	General Chemistry	100 ml	-	-	500	
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input checked="" type="checkbox"/> NaOH (Sodium Hydroxide)	145	
4	120 ml (glass)	Ammonia (NH3)	60 ml	-	<input checked="" type="checkbox"/> H ₂ SO ₄ (Sulfuric)	120	
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input checked="" type="checkbox"/> HNO ₃ (Nitric)	120	
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-	120	

General Notes and Observations:


good productivity well

FSI saved as MW09-03r

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) _____ ft
- 3/8" HDPE (microwaterra tubing) _____ ft
- 5/8" HDPE (waterra tubing) _____ ft
- 1/4" Silicon tubing _____ ft
- High Capacity .45 micron filters _____
- D-25 (for 2" wells, use with 5/8" foot valves) _____
- D-16 (for 1" wells, use with 5/8" foot valves) _____
- SS-10 (for 5/8" wells, use with 3/8" foot valves) _____
- 1" bailer _____
- 2" bailer _____
- other (describe) _____

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site	NW004-05	Project Number	1343-005.27	Date	26 - May - 16
Piezometer Diameter	2	Client	GY - AAM	Samplers	NB / MP
UTM Location	Z: 080E: 6399413 N: 68801656	Project Name	Mount Nansen 2016 GW Sampling Program	Weather/Temperature	Windy / overcast
Waypoint	GPS: ELR Name: 018	Purge Method	<input type="checkbox"/> Waterra <input checked="" type="checkbox"/> Peristaltic <input type="checkbox"/> Disp. Bailer <input type="checkbox"/> Other	Recovery	<input type="checkbox"/> Good <input type="checkbox"/> Bad
Photos	Cam: ELR Nos: 462-464				
Duplicate Collected	<input type="checkbox"/> Yes Name: /				
Field Blank Collected	<input type="checkbox"/> Yes Name: /				
Initial Depth to Water (m)	DRY	Purge Start Time:	/	Purge End Time:	/
Depth to Bottom (m)	7.570	Pen or YSI:	<input type="checkbox"/> YSI Pro Plus <input type="checkbox"/> Pen Unit		
Submerged Tubing Depth (m)	/	Purge Interval Time () min / Vol. () L			
Well Stick-up Height (m)	1.420	Depth to water (m)			
Estimated Water Volume (L)	/	Temperature (°C) 3%			
<p>Calculations:</p> <p>(DTB - DTW) x (πr²)1000 (for well diameter) = 1 well volume (DTB - DTW) x 8.1 (for 4" well diameter) = 1 well volume (DTB - DTW) x 2 (for 2" well diameter) = 1 well volume (DTB - DTW) x 1.1 (for 1.5" diameter) = 1 well volume (DTB - DTW) x 0.5 (for 1" diameter) = 1 well volume</p>	Cond. (µs/cm) 3%				
	Specific Cond. (µs/cm) 3%				
	Redox (mV) 10%				
	DO (mg/L) 10%				
	DO (%) 10%				
	Appearance & Odour (Clear, Silty, HC odours, etc.)				
	<input type="checkbox"/> Only for final readings Sulphide (mg/L)				
	<input type="checkbox"/> Only for final readings Turbidity (NTU)				
	Interval Purge Volume (L)				
	Cumulative Purge Volume (L):				
YSI ID					
Logged Field Parameters	<input type="checkbox"/> Yes <input type="checkbox"/> No	Sample Method:			
Time logged on YSI (24hr)	/	<input type="checkbox"/> Waterra <input checked="" type="checkbox"/> Peristaltic <input type="checkbox"/> Disp. Bailer <input type="checkbox"/> Other			
Sample Time (24hr)	/				



Sample Site (Con't): MW09-05

Sample Date (Con't): _____

Well Head Seal: J-Plug PVC Cap Not Sealed Other _____

Seal Replaced: J-Plug PVC Cap Not required Other _____

Well properly sealed for gas monitoring: Yes No Details: slits on cap

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	21.2
Carbon Dioxide (CO2)	PPM	2400

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HNO ₃ (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HCL (Hydrochloric)		
2	500 ml (plastic)	General Chemistry	100 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input type="checkbox"/> NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	60 ml	-	<input type="checkbox"/> H ₂ SO ₄ (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input type="checkbox"/> HNO ₃ (Nitric)		
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-		

General Notes and Observations:

Dry @ 7.57m

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) _____ ft
- 3/8" HDPE (microwaterra tubing) _____ ft
- 5/8" HDPE (waterra tubing) _____ ft
- 1/4" Silicon tubing _____ ft
- High Capacity .45 micron filters _____
- D-25 (for 2" wells, use with 5/8" foot valves) _____
- D-16 (for 1" wells, use with 5/8" foot valves) _____
- SS-10 (for 5/8" wells, use with 3/8" foot valves) _____
- 1" bailer _____
- 2" bailer _____
- other (describe) _____

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site	NW09-06	Project Number	1343-005.27	Date	26 May -16					
Piezometer Diameter	2"	Client	GY - AAM	Samplers	NB/MM					
UTM Location	Z: 08 E: 08944 N: 6880655	Project Name	Mount Nansen 2016 GW Sampling Program	Weather/Temperature	Windy / overcast					
Waypoint	GPS: ELD Name: 019			Recovery	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Bad					
Photos	Cam: ELD Nos: 462 - 464	Purge Method								
Duplicate Collected	<input type="checkbox"/> Yes Name:	Waterra	Peristaltic	Disp. Bailer	Other					
Field Blank Collected	<input type="checkbox"/> Yes Name:		X							
Initial Depth to Water (m)	3.161	Purge Start Time:	11:05	Purge End Time:	11:27					
				Pen or YSI:	<input checked="" type="checkbox"/> YSI Pro Plus <input type="checkbox"/> Pen Unit					
Depth to Bottom (m)	6.048	Purge Interval Time () min / Vol. () L	11:07	11:10	11:13	11:16	11:19	11:21	11:24	11:27
Submerged Tubing Depth (m)	~ 5.0	Depth to water (m)	3.310	3.348	3.367	3.380	3.382	3.396	3.398	3.420
Well Stick-up Height (m)	1.75 2	Temperature (°C) 3%	3.7	3.4	3.4	3.3	3.3	3.1	3.1	3.2
Estimated Water Volume (L)	3.8	pH (pH Units) ±0.1	7.05	7.22	7.18	7.17	7.18	7.14	7.16	7.16
Calculations: $(DTB - DTW) \times (\pi r^2) \times 1000$ (for well diameter) = 1 well volume $(DTB - DTW) \times 8.1$ (for 4" well diameter) = 1 well volume $(DTB - DTW) \times 2$ (for 2" well diameter) = 1 well volume $(DTB - DTW) \times 1.1$ (for 1.5" diameter) = 1 well volume $(DTB - DTW) \times 0.5$ (for 1" diameter) = 1 well volume $\begin{array}{r} 6.048 \\ 3.161 \\ \hline 2.887 \end{array} \times 2 = 3.774$	Cond. (µs/cm) 3%	1181	1168	1165	1162	1158	1153	1148	1146	
	Specific Cond. (µs/cm) 3%	1996	1986	1984	1990	1981	1980	1970	1969	
	Redox (mV) 10%	108.9	112.7	114.6	116.3	117.7	118.4	118.9	118.6	
	DO (mg/L) 10%	1.20	0.67	0.60	0.56	0.52	0.52	0.52	0.52	
	DO (%) 10%	16.3	5.0	4.5	4.3	3.9	3.8	4.0	4.0	
	Appearance & Odour (Clear, Silty, HC odours, etc.)	sl. grey turbid	same	same	clear	same	same	same	same	
	Only for final readings	Sulphide (mg/L)	/	/	/	/	/	/	/	0.07
	Turbidity (NTU)	/	/	/	/	/	/	/	/	24.7
	Interval Purge Volume (L)	/	0.7	0.45	0.4	0.5	0.4	0.5	0.5	
	Cumulative Purge Volume (L):	/	0.7	1.15	1.55	2.05	2.45	2.95	3.45	
YSI ID	NW09-06	Sample Method:								
Logged Field Parameters	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Waterra	Peristaltic	Disp. Bailer	Other					
Time logged on YSI (24hr)	11:27		X							
Sample Time (24hr)	11:30		X							



Sample Site (Con't): MW09-06

Sample Date (Con't): 26-May-16 @ 11:30

Well Head Seal: J-Plug PVC Cap Not Sealed Other _____

Seal Replaced: J-Plug PVC Cap Not required Other _____

Well properly sealed for gas monitoring: Yes No Details: slits in PVC cap

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	34.9
Carbon Dioxide (CO2)	PPM	300

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input checked="" type="checkbox"/> Field Filtered	<input checked="" type="checkbox"/> HNO ₃ (Nitric)	120	
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input checked="" type="checkbox"/> Field Filtered	<input checked="" type="checkbox"/> HCL (Hydrochloric)	40	
2	500 ml (plastic)	General Chemistry	100 ml	-	-	500	
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input type="checkbox"/> NaOH (Sodium Hydroxide)	145	
4	120 ml (glass)	Ammonia (NH3)	60 ml	-	<input checked="" type="checkbox"/> H ₂ SO ₄ (Sulfuric)	120	
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input checked="" type="checkbox"/> HNO ₃ (Nitric)	120	
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-	120	

General Notes and Observations:

- Stick up very high, had to stand on barrel to take water level.

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) _____ ft (8m)
- 3/8" HDPE (microwaterra tubing) _____ ft
- 5/8" HDPE (waterra tubing) _____ ft
- 1/4" Silicon tubing 0.5 ft
- High Capacity .45 micron filters _____
- D-25 (for 2" wells, use with 5/8") foot valves _____
- D-16 (for 1" wells, use with 5/8") foot valves _____
- SS-10 (for 5/8" wells, use with 3/8") foot valves _____
- 1" bailer _____
- 2" bailer _____
- other (describe) _____

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site UWD9-07		Project Number 1343-005.27		Date 25-May-16		
Piezometer Diameter 2"		Client GY-AAM		Samplers NB/MM		
UTM Location Z: 080 E: 0389 322 N: 6890698		Project Name Mount Nansen 2016 GW Sampling Program		Weather/Temperature Windy Overcast		
Waypoint GPS: ELR Name: 012				Recovery <input type="checkbox"/> Good <input type="checkbox"/> Bad		
Photos Cam: ELR Nos: 444-446		Purge Method				
Duplicate Collected <input type="checkbox"/> Yes Name: _____		Waterra	Peristaltic	Disp. Bailer	Other	
Field Blank Collected <input type="checkbox"/> Yes Name: _____						
Initial Depth to Water (m) 8 DRY		Purge Start Time: _____	Purge End Time: _____	Pen or YSI: <input type="checkbox"/> YSI Pro Plus <input type="checkbox"/> Pen Unit		
Depth to Bottom (m) 3.405		Purge Interval Time () min / Vol. () L				
Submerged Tubing Depth (m) _____		Depth to water (m)				
Well Stick-up Height (m) 1.395		Temperature (°C) 3%				
Estimated Water Volume (L) _____		pH (pH Units) ±0.1				
<p>Calculations:</p> <p>(DTB - DTW) x (πr²)1000 (for well diameter) = 1 well volume (DTB - DTW) x 8.1 (for 4" well diameter) = 1 well volume (DTB - DTW) x 2 (for 2" well diameter) = 1 well volume (DTB - DTW) x 1.1 (for 1.5" diameter) = 1 well volume (DTB - DTW) x 0.5 (for 1" diameter) = 1 well volume</p>		Cond. (µs/cm) 3%				
		Specific Cond. (µs/cm) 3%				
		Redox (mV) 10%				
		DO (mg/L) 10%				
		DO (%) 10%				
		Appearance & Odour (Clear, Silty, HC odours, etc.)				
		Only for final readings	Sulphide (mg/L)			
			Turbidity (NTU)			
		Interval Purge Volume (L)				
		Cumulative Purge Volume (L):				
YSI ID		Sample Method:				
Logged Field Parameters <input type="checkbox"/> Yes <input type="checkbox"/> No		Waterra	Peristaltic	Disp. Bailer	Other	
Time logged on YSI (24hr)						
Sample Time (24hr)						



Sample Site (Con't): W09-07

Sample Date (Con't): _____

Well Head Seal: J-Plug PVC Cap Not Sealed Other _____

Seal Replaced: J-Plug PVC Cap Not required Other _____

Well properly sealed for gas monitoring: Yes No Details: electrical tape @ top; possibly covering slits.

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.9
Carbon Dioxide (CO2)	PPM	400

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HNO ₃ (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HCL (Hydrochloric)		
2	500 ml (plastic)	General Chemistry	100 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input type="checkbox"/> NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	60 ml	-	<input type="checkbox"/> H ₂ SO ₄ (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input type="checkbox"/> HNO ₃ (Nitric)		
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-		

<p>General Notes and Observations:</p> <p><u>Dry @ 3.405 m</u></p>	<p>Consumables Used:</p> <p><input type="checkbox"/> 1/4" HDPE (peristaltic pump tubing) _____ ft</p> <p><input type="checkbox"/> 3/8" HDPE (microwaterra tubing) _____ ft</p> <p><input type="checkbox"/> 5/8" HDPE (waterra tubing) _____ ft</p> <p><input type="checkbox"/> 1/4" Silicon tubing _____ ft</p> <p><input type="checkbox"/> High Capacity .45 micron filters _____</p> <p><input type="checkbox"/> D-25 (for 2" wells, use with 5/8") foot valves _____</p> <p><input type="checkbox"/> D-16 (for 1" wells, use with 5/8") foot valves _____</p> <p><input type="checkbox"/> SS-10 (for 5/8" wells, use with 3/8") foot valves _____</p> <p><input type="checkbox"/> 1" bailer _____</p> <p><input type="checkbox"/> 2" bailer _____</p> <p><input type="checkbox"/> other (describe) _____</p>
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GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site	MW09-08	Project Number	1343-005.27	Date	May 26, 2016		
Piezometer Diameter	2-inch	Client	GY - AAM	Samplers	KB/SC		
UTM Location	Z: 08 E: 0389620 N: 6880577	Project Name	Mount Nansen 2016 GW Sampling Program	Weather/Temperature	overcast		
Waypoint	GPS: Hemm Name: n/a			Recovery	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Bad		
Photos	Cam: Screen Nos:	Purge Method					
Duplicate Collected	<input type="checkbox"/> Yes Name:	Waterra	Peristaltic	Disp. Bailer	Other		
Field Blank Collected	<input type="checkbox"/> Yes Name:		✓				
Initial Depth to Water (m)	1.990	Purge Start Time:	09:18	Purge End Time:	09:36		
				Pen or YSI:	<input checked="" type="checkbox"/> YSI Pro-Plus ^{55b} <input type="checkbox"/> Pen Unit		
Depth to Bottom (m)	3.901	Purge Interval Time (3) min / Vol. () L	9:20	9:23	9:26		
Submerged Tubing Depth (m)	3.300	Depth to water (m)	1.29	1.30	Same		
Well Stick-up Height (m)	1.139	Temperature (°C) 3%	2.56	2.38	2.06		
Estimated Water Volume (L)	3.822	pH (pH Units) ±0.1	7.63	6.76	6.72		
(DTB - DTW) x (πr ²) 1000 (for well diameter) = 1 well volume (DTB - DTW) x 8.1 (for 4" well diameter) = 1 well volume (DTB - DTW) x 2 (for 2" well diameter) = 1 well volume (DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume (DTB-DTW) x 0.5 (for 1" diameter) = 1 well volume Calculations: $\begin{array}{r} 3.901 \\ - 1.990 \\ \hline 1.911 \\ \times 2 \\ \hline 3.822 \end{array}$	Cond. (µs/cm) 3%	0.357	0.358	0.357	0.359		
	Specific Cond. (µs/cm) 3%	0.626	0.631	0.636	0.648	0.650	
	Redox (mV) 10%	-65.4	-60.1	-66.0	-62.2	-60.4	
	DO (mg/L) 10%	5.17	0.86	0.30	0.21	0.28	
	DO (%) 10%	35.7	6.0	2.0	1.5	2.1	
	Appearance & Odour (Clear, Silty, HC odours, etc.)	clear following	clear	Same	Same	clear	
	Only for final readings	Sulphide (mg/L)	/	/	-	-	0.11
		Turbidity (NTU)	/	/	-	-	3.94
		Interval Purge Volume (L)	0.200	0.400	0.300	0.550	0.500
		Cumulative Purge Volume (L):	0.200	0.600	0.900	1.450	2.000
YSI ID	MW09-08	Sample Method:					
Logged Field Parameters	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Waterra	Peristaltic	Disp. Bailer	Other		
Time logged on YSI (24hr)	09:36		✓				
Sample Time (24hr)	09:45						



Sample Site (Con't): MW09-08

Sample Date (Con't): May 26, 2016

Well Head Seal: J-Plug PVC Cap Not Sealed Other _____

Seal Replaced: J-Plug PVC Cap Not required Other _____

Well properly sealed for gas monitoring: Yes No Details: _____

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.9
Carbon Dioxide (CO2)	PPM	700

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input checked="" type="checkbox"/> Field Filtered	<input checked="" type="checkbox"/> HNO ₃ (Nitric)	120	
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input checked="" type="checkbox"/> Field Filtered	<input checked="" type="checkbox"/> HCL (Hydrochloric)	40	
2	500 ml (plastic)	General Chemistry	100 ml	-	-	500	
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input checked="" type="checkbox"/> NaOH (Sodium Hydroxide)	145	
4	120 ml (glass)	Ammonia (NH3)	60 ml	-	<input checked="" type="checkbox"/> H ₂ SO ₄ (Sulfuric)	120	
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input checked="" type="checkbox"/> HNO ₃ (Nitric)	120	
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-	120	

General Notes and Observations:

- replaced tubing
- good producing well

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) 15 ft
- 3/8" HDPE (microwaterra tubing) _____ ft
- 5/8" HDPE (waterra tubing) _____ ft
- 1/4" Silicon tubing 1/2 ft
- High Capacity .45 micron filters _____
- D-25 (for 2" wells, use with 5/8") foot valves _____
- D-16 (for 1" wells, use with 5/8") foot valves _____
- SS-10 (for 5/8" wells, use with 3/8") foot valves _____
- 1" bailer _____
- 2" bailer _____
- other (describe) _____

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site MW09-11		Project Number 1343-005.27		Date 25-Mar-16		
Piezometer Diameter 2"		Client GY - AAM		Samplers NB/MA		
UTM Location Z: 08 E: 0389038 N: 6880712		Project Name Mount Nansen 2016 GW Sampling Program		Weather/Temperature Partly Overcast		
Waypoint GPS: ELR Name: 011				Recovery <input type="checkbox"/> Good <input checked="" type="checkbox"/> Bad		
Photos Cam: ELR Nos: 441-443		Purge Method				
Duplicate Collected <input type="checkbox"/> Yes Name: _____		Waterra	Peristaltic	Disp. Bailer	Other	
Field Blank Collected <input type="checkbox"/> Yes Name: _____						
Initial Depth to Water (m) 4.926 DRY		Purge Start Time:	Purge End Time:	Pen or YSI:	<input type="checkbox"/> YSI Pro Plus <input type="checkbox"/> Pen Unit	
Depth to Bottom (m) 4.926		Purge Interval Time () min / Vol. () L				
Submerged Tubing Depth (m) /		Depth to water (m)				
Well Stick-up Height (m) 0.808		Temperature (°C) 3%				
Estimated Water Volume (L) /		pH (pH Units) ±0.1				
<p>Calculations:</p> <p>(DTB - DTW) x (πr²)1000 (for well diameter) = 1 well volume (DTB - DTW) x 8.1 (for 4" well diameter) = 1 well volume (DTB - DTW) x 2 (for 2" well diameter) = 1 well volume (DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume (DTB-DTW) x 0.5 (for 1" diameter) = 1 well volume</p>		Cond. (µs/cm) 3%				
		Specific Cond. (µs/cm) 3%				
		Redox (mV) 10%				
		DO (mg/L) 10%				
		DO (%) 10%				
		Appearance & Odour (Clear, Silty, HC odours, etc.)				
		Only for final readings	Sulphide (mg/L)			
			Turbidity (NTU)			
		Interval Purge Volume (L)				
		Cumulative Purge Volume (L):				
YSI ID		Sample Method:				
Logged Field Parameters <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Waterra	Peristaltic	Disp. Bailer	Other	
Time logged on YSI (24hr)						
Sample Time (24hr)						



Sample Site (Con't): MW09-11

Sample Date (Con't): _____

Well Head Seal: J-Plug PVC Cap Not Sealed Other _____

Seal Replaced: J-Plug PVC Cap Not required Other _____

Well properly sealed for gas monitoring: Yes No Details: slits in PVC

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.7
Carbon Dioxide (CO2)	PPM	1000

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HNO ₃ (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HCL (Hydrochloric)		
2	500 ml (plastic)	General Chemistry	100 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input type="checkbox"/> NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	60 ml	-	<input type="checkbox"/> H ₂ SO ₄ (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input type="checkbox"/> HNO ₃ (Nitric)		
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-		

General Notes and Observations:

Dry @ 4.926m → sand + ice on water level (ice most likely from condensation).

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) _____ ft
- 3/8" HDPE (microwaterra tubing) _____ ft
- 5/8" HDPE (waterra tubing) _____ ft
- 1/4" Silicon tubing _____ ft
- High Capacity .45 micron filters _____
- D-25 (for 2" wells, use with 5/8") foot valves _____
- D-16 (for 1" wells, use with 5/8") foot valves _____
- SS-10 (for 5/8" wells, use with 3/8") foot valves _____
- 1" bailer _____
- 2" bailer _____
- other (describe) _____

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site		MW09-13		Project Number	1343-005.27		Date	05-May-16				
Piezometer Diameter		2"		Client	GY - AAM		Samplers	NB / MW				
UTM Location		Z: 08, E: 0289005 N: 688149		Project Name	Mount Nansen 2016 GW Sampling Program		Weather/Temperature					
Waypoint		GPS: ELR Name: 008					overcast, cold			Recovery		
Photos		Cam: ELR Nos: 433-435		Purge Method								
Duplicate Collected		<input type="checkbox"/> Yes Name: /		Waterra		Peristaltic		Disp. Bailer		Other		
Field Blank Collected		<input type="checkbox"/> Yes Name: /										
Initial Depth to Water (m)		5.942 to water 5.945 to ice		Purge Start Time:		/		Purge End Time:		/		
Depth to Bottom (m)		FROZEN		Purge Interval Time () min / Vol. () L								
Submerged Tubing Depth (m)		/		Depth to water (m)		/						
Well Stick-up Height (m)		0.760		Temperature (°C) 3%		/						
Estimated Water Volume (L)		/		pH (pH Units) ±0.1		/						
<p>(DTB - DTW) x (πr²)1000 (for well diameter) = 1 well volume (DTB - DTW) x 8.1 (for 4" well diameter) = 1 well volume (DTB - DTW) x 2 (for 2" well diameter) = 1 well volume (DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume (DTB-DTW) x 0.5 (for 1" diameter) = 1 well volume</p> <p>Calculations:</p>		/		Cond. (µs/cm) 3%		/						
				Specific Cond. (µs/cm) 3%		/						
				Redox (mV) 10%		/						
				DO (mg/L) 10%		/						
				DO (%) 10%		/						
				Appearance & Odour (Clear, Silty, HC odours, etc.)		/						
				Only for final readings		Sulphide (mg/L)		/				
						Turbidity (NTU)		/				
						Interval Purge Volume (L)		/				
						Cumulative Purge Volume (L):		/				
YSI ID		/		Sample Method:								
Logged Field Parameters		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No										
Time logged on YSI (24hr)		/		Waterra		Peristaltic		Disp. Bailer		Other		
Sample Time (24hr)		/										



Sample Site (Con't): MW09-13

Sample Date (Con't): _____

Well Head Seal: J-Plug PVC Cap Not Sealed Other _____

Seal Replaced: J-Plug PVC Cap Not required Other _____

Well properly sealed for gas monitoring: Yes No Details: slits in PVC

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	39.9
Carbon Dioxide (CO2)	PPM	300

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HNO ₃ (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HCL (Hydrochloric)		
2	500 ml (plastic)	General Chemistry	100 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input type="checkbox"/> NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	60 ml	-	<input type="checkbox"/> H ₂ SO ₄ (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input type="checkbox"/> HNO ₃ (Nitric)		
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-		

General Notes and Observations:

- 0.003m of water above ice; attempted to draw well for 20 mins using DI water (boiling) + watterra tubing; attempt was unsuccessful

- Placer miner actively working around well;

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) _____ ft
- 3/8" HDPE (microwatterra tubing) _____ ft
- 5/8" HDPE (watterra tubing) _____ ft (6m)
- 1/4" Silicon tubing _____ ft
- High Capacity .45 micron filters _____
- D-25 (for 2" wells, use with 5/8") foot valves _____
- D-16 (for 1" wells, use with 5/8") foot valves _____
- SS-10 (for 5/8" wells, use with 3/8") foot valves _____
- 1" bailer _____
- 2" bailer _____
- other (describe) _____

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site		MWO9-14		Project Number		1343-005.27		Date		25-May-16			
Piezometer Diameter		Ø		Client		GY - AAM		Samplers		NB / MM			
UTM Location		Z: 08 E: 03 89004 N: 6881665		Project Name		Mount Nansen 2016 GW Sampling Program		Weather/Temperature		Rainy / overcast			
Waypoint		GPS: ELR Name: 007		Purge Method				Recovery		<input type="checkbox"/> Good <input type="checkbox"/> Bad			
Photos		Cam: ELR Nos: 430-432		Water		Peristaltic		Disp. Bailer		Other			
Duplicate Collected		<input type="checkbox"/> Yes Name:		Purge Start Time:		Purge End Time:		Pen or YSI:		<input type="checkbox"/> YSI Pro Plus <input checked="" type="checkbox"/> Pen Unit			
Field Blank Collected		<input type="checkbox"/> Yes Name:		Purge Interval		Time () min / Vol. () L							
Initial Depth to Water (m)		5.070 to ice		Depth to Bottom (m)		FROZEN							
Submerged Tubing Depth (m)				Well Stick-up Height (m)		0.742							
Estimated Water Volume (L)				Temperature (°C) 3%									
Calculations: $(DTB - DTW) \times (\pi r^2) \times 1000$ (for well diameter) = 1 well volume $(DTB - DTW) \times 8.1$ (for 4" well diameter) = 1 well volume $(DTB - DTW) \times 2$ (for 2" well diameter) = 1 well volume $(DTB - DTW) \times 1.1$ (for 1.5" diameter) = 1 well volume $(DTB - DTW) \times 0.5$ (for 1" diameter) = 1 well volume		pH (pH Units) ±0.1		DO (mg/L) 10%		DO (%) 10%							
		Cond. (µs/cm) 3%		Specific Cond. (µs/cm) 3%		Redox (mV) 10%		Appearance & Odour (Clear, Silty, HC odours, etc.)					
		Only for final readings		Sulphide (mg/L)		Turbidity (NTU)							
		Interval Purge Volume (L)				Cumulative Purge Volume (L):							
		YSI ID				Sample Method:							
		Logged Field Parameters		<input type="checkbox"/> Yes <input type="checkbox"/> No		Water		Peristaltic		Disp. Bailer		Other	
		Time logged on YSI (24hr)											
		Sample Time (24hr)											



Sample Site (Con't): NW09-14

Sample Date (Con't): _____

Well Head Seal: J-Plug PVC Cap Not Sealed Other _____

Seal Replaced: J-Plug PVC Cap Not required Other _____

Well properly sealed for gas monitoring: Yes No Details: _____

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.9
Carbon Dioxide (CO2)	PPM	200

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HNO ₃ (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HCL (hydrochloric)		
2	500 ml (plastic)	General Chemistry	100 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input type="checkbox"/> NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	60 ml	-	<input type="checkbox"/> H ₂ SO ₄ (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input type="checkbox"/> HNO ₃ (Nitric)		
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-		

General Notes and Observations:

- Attempted to throw for 20 minutes using boiling D.I. water + watererra tubing; attemp was unsuccessful.

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) _____ ft
- 3/8" HDPE (microwaterra tubing) _____ ft
- 5/8" HDPE (waterra tubing) _____ ft
- 1/4" Silicon tubing _____ ft
- High Capacity .45 micron filters _____
- D-25 (for 2" wells, use with 5/8") foot valves _____
- D-16 (for 1" wells, use with 5/8") foot valves _____
- SS-10 (for 5/8" wells, use with 3/8") foot valves _____
- 1" bailer _____
- 2" bailer _____
- other (describe) _____

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site	MW09-15	Project Number	1343-005.27	Date	May 25, 2016
Piezometer Diameter	2-inch	Client	GY - AAM	Samplers	KB/SC
UTM Location	Z: 08 E: 6388920 N: 6881723	Project Name	Mount Nansen 2016 GW Sampling Program	Weather/Temperature	10°C overcast
Waypoint	GPS: Hemmera Name: N/A	Purge Method	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Bad		
Photos	Cam: Jeremy Nos:				
Duplicate Collected	<input type="checkbox"/> Yes Name:	Waterra	Peristaltic	Disp. Bailer	Other
Field Blank Collected	<input type="checkbox"/> Yes Name:				
Initial Depth to Water (m)	14.030	Purge Start Time:	Purge End Time:	Pen or YSI:	<input type="checkbox"/> YSI Pro Plus <input type="checkbox"/> Pen Unit
Depth to Bottom (m)	14.151	Purge Interval Time () min / Vol. () L			
Submerged Tubing Depth (m)	-	Depth to water (m)			
Well Stick-up Height (m)	0.876	Temperature (°C) 3%			
Estimated Water Volume (L)	0.842	pH (pH Units) ±0.1			
<p> (DTB - DTW) x (πr²)1000 (for well diameter) = 1 well volume (DTB - DTW) x 8.1 (for 4" well diameter) = 1 well volume (DTB - DTW) x 2 (for 2" well diameter) = 1 well volume (DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume (DTB-DTW) x 0.5 (for 1" diameter) = 1 well volume </p> <p>Calculations:</p> $\frac{14.151 - 14.030}{0.121} \times \frac{2}{2} = 24.2L$	Cond. (µs/cm) 3%	Frozen Direct sample			
	Specific Cond. (µs/cm) 3%				
	Redox (mV) 10%				
	DO (mg/L) 10%				
	DO (%) 10%				
	Appearance & Odour (Clear, Silty, HC odours, etc.)				
	Only for final readings		Sulphide (mg/L)		
			Turbidity (NTU)		
			Interval Purge Volume (L)		
			Cumulative Purge Volume (L):		
YSI ID	-	Sample Method:			
Logged Field Parameters	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Waterra	Peristaltic	Disp. Bailer	Other
Time logged on YSI (24hr)	-			✓	
Sample Time (24hr)	15:36				



Sample Site (Con't): MW09-15

Sample Date (Con't): May 25, 2016

Well Head Seal: J-Plug PVC Cap Not Sealed Other _____

Seal Replaced: J-Plug PVC Cap Not required Other _____

Well properly sealed for gas monitoring: Yes No Details: _____

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	Ø
Oxygen (O2)	%	20.6
Carbon Dioxide (CO2)	PPM	300

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input checked="" type="checkbox"/> Field Filtered	<input type="checkbox"/> HNO ₃ (Nitric)	70 ml	
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HCL (Hydrochloric)		
2	500 ml (plastic)	General Chemistry	100 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input type="checkbox"/> NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH ₃)	60 ml	-	<input type="checkbox"/> H ₂ SO ₄ (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input type="checkbox"/> HNO ₃ (Nitric)		
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-		

General Notes and Observations:

TPICS - Jeremy phone
 - 0.242 L of water on top of frozen ice
 - A sample is not representative

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) _____ ft
- 3/8" HDPE (microwaterra tubing) _____ ft
- 5/8" HDPE (waterra tubing) _____ ft
- 1/4" Silicon tubing _____ ft
- High Capacity .45 micron filters _____
- D-25 (for 2" wells, use with 5/8") foot valves _____
- D-16 (for 1" wells, use with 5/8") foot valves _____
- SS-10 (for 5/8" wells, use with 3/8") foot valves _____
- 1" bailer _____
- 2" bailer 1
- other (describe) _____

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site	MW09-16	Project Number	1343-005.27	Date	May 24, 2016	
Piezometer Diameter	2"	Client	GY - AAM	Samplers	1 NB, UM, JC, KB	
UTM Location	Z: 08, E: 0387990 N: 6881097	Project Name	Mount Nansen 2016 GW Sampling Program	Weather/Temperature	same, overcast	
Waypoint	GPS: ELR Name: MW09-16	Purge Method	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Bad			
Photos	Cam: ELR Nos: 404-406	Water	Peristaltic	Disp. Bailer	Other	
Duplicate Collected	<input type="checkbox"/> Yes Name: _____					
Field Blank Collected	<input checked="" type="checkbox"/> Yes Name: FB-1		X			
Initial Depth to Water (m)	1.956	Purge Start Time:	16:20	Purge End Time:	4:45	
				Pen or YSI:	<input checked="" type="checkbox"/> YSI Pro Plus <input type="checkbox"/> Pen Unit	
Depth to Bottom (m)	2.707 2.707	Purge Interval Time (3) min / Vol. () L	4:21	4:25	4:30	
Submerged Tubing Depth (m)	~2.5	Depth to water (m)	1.959	1.959	1.956	
Well Stick-up Height (m)	1.378	Temperature (°C) 3%	4.6	4.2	4.8	
Estimated Water Volume (L)	1.542	pH (pH Units) ±0.1	6.08	6.56	6.64	
(DTB - DTW) x (πr ²) 1000 (for well diameter) = 1 well volume (DTB - DTW) x 8.1 (for 4" well diameter) = 1 well volume (DTB - DTW) x 2 (for 2" well diameter) = 1 well volume (DTB - DTW) x 1.1 (for 1.5" diameter) = 1 well volume (DTB - DTW) x 0.5 (for 1" diameter) = 1 well volume Calculations: $\frac{1.956}{0.771} * 2 = 1.542$	Conductivity (µs/cm) 3%	1323	1287	1288	1284	
	Specific Cond. (µs/cm) 3%	2182	2127	2091	2093	2085
	Redox (mV) 10%	217.2	206.2	196.8	185.0	179.3
	DO (mg/L) 10%	2.08	1.43	1.31	1.29	1.14
	DO (%) 10%	16.0	11.1	10.4	10.0	8.9
	Appearance & Odour (Clear, Silty, HC odours, etc.)	clear no smell	clear no smell	clear no smell	clear no smell	clear no smell
	Only for final readings	Sulphide (mg/L)	/	/	/	/
		Turbidity (NTU)	/	/	/	0.71
		Interval Purge Volume (L)	0.3	0.35	0.6	0.45
		Cumulative Purge Volume (L):	0.3	0.65	1.25	1.70
YSI ID	MW09-16	Sample Method:				
Logged Field Parameters	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Water	Peristaltic	Disp. Bailer	Other	
Time logged on YSI (24hr)	16:47		X			
Sample Time (24hr)	16:50					



Sample Site (Con't): MW09-16

Sample Date (Con't): 25 May - 16

Well Head Seal: J-Plug PVC Cap Not Sealed Other _____

Seal Replaced: J-Plug PVC Cap Not required Other _____

Well properly sealed for gas monitoring: Yes No Details: slits on the side

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.3
Carbon Dioxide (CO2)	PPM	2800

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input checked="" type="checkbox"/> Field Filtered	<input checked="" type="checkbox"/> HNO ₃ (Nitric)	120	
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input checked="" type="checkbox"/> Field Filtered	<input checked="" type="checkbox"/> HCL (Hydrochloric)	40	
2	500 ml (plastic)	General Chemistry	100 ml	-	-	400	
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input checked="" type="checkbox"/> NaOH (Sodium Hydroxide)	145	
4	120 ml (glass)	Ammonia (NH ₃)	60 ml	-	<input checked="" type="checkbox"/> H ₂ SO ₄ (Sulfuric)	120	
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input checked="" type="checkbox"/> HNO ₃ (Nitric)	120	
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-	180	

General Notes and Observations:

First well sampled as a full team to learn sampling procedure.

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) 2 ft
- 3/8" HDPE (microwaterra tubing) _____ ft
- 5/8" HDPE (waterra tubing) _____ ft
- 1/4" Silicon tubing 0.5 ft
- High Capacity .45 micron filters _____
- D-25 (for 2" wells, use with 5/8") foot valves _____
- D-16 (for 1" wells, use with 5/8") foot valves _____
- SS-10 (for 5/8" wells, use with 3/8") foot valves _____
- 1" bailer _____
- 2" bailer _____
- other (describe) _____

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site	MW09-17	Project Number	1343-005.27	Date	25-May-16
Piezometer Diameter	2"	Client	GY - AAM	Samplers	NB, RM
UTM Location	ZOB, E: 0388075 N: 6880974	Project Name	Mount Nansen 2016 GW Sampling Program	Weather/Temperature	Sunny
Waypoint	GPS: ELP Name: 002	Purge Method			
Photos	Cam: ELP Nos: 410-412	Water	Peristaltic	Disp. Bailer	Other
Duplicate Collected	<input type="checkbox"/> Yes Name:				
Field Blank Collected	<input type="checkbox"/> Yes Name:				
Initial Depth to Water (m)	1.310 bentonite	Purge Start Time:		Purge End Time:	
Depth to Bottom (m)		Purge Interval Time () min / Vol. () L		Pen or YSI:	<input type="checkbox"/> YSI Pro Plus <input type="checkbox"/> Pen Unit
Submerged Tubing Depth (m)		Depth to water (m)		<div style="font-size: 2em; opacity: 0.5; transform: rotate(-15deg);"> BENTONITE BLOCKAGE </div>	
Well Stick-up Height (m)	0.975	Temperature (°C) 3%			
Estimated Water Volume (L)		pH (pH Units) ±0.1			
<p> $(DTB - DTW) \times (\pi r^2) \times 1000$ (for well diameter) = 1 well volume $(DTB - DTW) \times 8.1$ (for 4" well diameter) = 1 well volume $(DTB - DTW) \times 2$ (for 2" well diameter) = 1 well volume $(DTB - DTW) \times 1.1$ (for 1.5" diameter) = 1 well volume $(DTB - DTW) \times 0.5$ (for 1" diameter) = 1 well volume </p> <p>Calculations:</p>	Cond. (µs/cm) 3%				
	Specific Cond. (µs/cm) 3%				
	Redox (mV) 10%				
	DO (mg/L) 10%				
	DO (%) 10%				
	Appearance & Odour (Clear, Silty, HC odours, etc.)				
	Only for final readings	Sulphide (mg/L)			
		Turbidity (NTU)			
	Interval Purge Volume (L)				
	Cumulative Purge Volume (L):				
YSI ID		Sample Method:			
Logged Field Parameters	<input type="checkbox"/> Yes <input type="checkbox"/> No	Water	Peristaltic	Disp. Bailer	Other
Time logged on YSI (24hr)					
Sample Time (24hr)					



Sample Site (Con't): MW09-17

Sample Date (Con't): _____

Well Head Seal: J-Plug PVC Cap Not Sealed Other _____

Seal Replaced: J-Plug PVC Cap Not required Other _____

Well properly sealed for gas monitoring: Yes No Details: _____

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	30.9
Carbon Dioxide (CO2)	PPM	2500

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HNO ₃ (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HCL (Hydrochloric)		
2	500 ml (plastic)	General Chemistry	100 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input type="checkbox"/> NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	60 ml	-	<input type="checkbox"/> H ₂ SO ₄ (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input type="checkbox"/> HNO ₃ (Nitric)		
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-		

General Notes and Observations:

- Bentonite @ 1.31m unable to get the tubing ^{or water level} into the well (possible frozen bentonite)
 - existing tubing was present, however once adjusted to get water level in, unable to get tubing back in; bentonite most likely collapsed on the tubing at concrete level (1.310m)

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) _____ ft
- 3/8" HDPE (microwaterra tubing) _____ ft
- 5/8" HDPE (waterra tubing) _____ ft
- 1/4" Silicon tubing _____ ft
- High Capacity .45 micron filters _____
- D-25 (for 2" wells, use with 5/8") foot valves _____
- D-16 (for 1" wells, use with 5/8") foot valves _____
- SS-10 (for 5/8" wells, use with 3/8") foot valves _____
- 1" bailer _____
- 2" bailer _____
- other (describe) _____



GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site		MW09-18		Project Number		1343-005.27		Date		May 05 2008			
Piezometer Diameter		2"		Client		GY - AAM		Samplers		NB, MM			
UTM Location		Z: 08, E: 0388054 N: 6880985		Project Name		Mount Nansen 2016 GW Sampling Program		Weather/Temperature		Raining heavily			
Waypoint		GPS: EIR Name: 001		Purge Method				Recovery		<input checked="" type="checkbox"/> Good <input type="checkbox"/> Bad			
Photos		Cam: EIR Nos: 407-409		Water		Peristaltic		Disp. Bailer		Other			
Duplicate Collected		<input type="checkbox"/> Yes Name: —				X							
Field Blank Collected		<input type="checkbox"/> Yes Name: —											
Initial Depth to Water (m)		4.320		Purge Start Time:		8:11		Purge End Time:		8:37			
Depth to Bottom (m)		7.787		Purge Interval Time (3) min / Vol. () L		8:13 8:16		8:19 8:23		8:28 8:32 8:37			
Submerged Tubing Depth (m)		~6.79		Depth to water (m)		4.324 4.324		4.324 4.324		4.324 4.324 4.324			
Well Stick-up Height (m)		0.9		Temperature (°C) 3%		1.8 0.9		6.7 0.6		0.5 0.6 0.5			
Estimated Water Volume (L)		~6.934		pH (pH Units) ±0.1		5.77 6.44		6.65 6.72		6.74 6.76 6.77			
<p>(DTB - DTW) x (πr²)1000 (for well diameter) = 1 well volume (DTB - DTW) x 8.1 (for 4" well diameter) = 1 well volume (DTB - DTW) x 2 (for 2" well diameter) = 1 well volume (DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume (DTB-DTW) x 0.5 (for 1" diameter) = 1 well volume</p> <p>Calculations: $\frac{7.787 - 4.320}{2} \times 2 = 6.934$</p>		Cond. (µs/cm) 3%		1521 1492		1471 1466		1463 1467		1465			
		Specific Cond. (µs/cm) 3%		2798 2765		2743 2743		2747 2749		2752			
		Redox (mV) 10%		254.0 314.5		210.8 207.1		201.5 195.6		187.1			
		DO (mg/L) 10%		8.76 3.64		3.21 2.964		2.70 2.50		2.30			
		DO (%) 10%		76.95 25.9		22.8 20.6		18.6 17.6		16.13			
		Appearance & Odour (Clear, Silty, HC odours, etc.)		turbid (grey)		same		clear no smell		same		same	
		Only for final readings		Sulphide (mg/L)		/		/		/		0.00	
				Turbidity (NTU)		/		/		/		6.16	
				Interval Purge Volume (L)		0 0.32		0.36 0.36		0.4 0.47		0.6	
				Cumulative Purge Volume (L):		0 0.32		0.68 1.04		1.44 1.91		2.51	
YSI ID		MW09-18		Sample Method:									
Logged Field Parameters		<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		Water		Peristaltic		Disp. Bailer		Other			
Time logged on YSI (24hr)		8:39				X							
Sample Time (24hr)		8:40 8:45											



Sample Site (Con't): MW09-18

Sample Date (Con't): 25 - May - 16

Well Head Seal: J-Plug PVC Cap Not Sealed Other _____

Seal Replaced: J-Plug PVC Cap Not required Other _____

Well properly sealed for gas monitoring: Yes No Details: slits in electrical tape over them

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.9
Carbon Dioxide (CO2)	PPM	200

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input checked="" type="checkbox"/> Field Filtered	<input checked="" type="checkbox"/> HNO ₃ (Nitric)	120	
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input checked="" type="checkbox"/> Field Filtered	<input checked="" type="checkbox"/> HCL (Hydrochloric)	40	
2	500 ml (plastic)	General Chemistry	100 ml	-	-	500	
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input checked="" type="checkbox"/> NaOH (Sodium Hydroxide)	145	
4	120 ml (glass)	Ammonia (NH3)	60 ml	-	<input checked="" type="checkbox"/> H ₂ SO ₄ (Sulfuric)	120	
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input checked="" type="checkbox"/> HNO ₃ (Nitric)	120	
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-	120	

General Notes and Observations:

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) 2624 ft (Bart)
- 3/8" HDPE (microwaterra tubing) _____ ft
- 5/8" HDPE (waterra tubing) _____ ft
- 1/4" Silicon tubing 0.5 ft
- High Capacity .45 micron filters _____
- D-25 (for 2" wells, use with 5/8") foot valves _____
- D-16 (for 1" wells, use with 5/8") foot valves _____
- SS-10 (for 5/8" wells, use with 3/8") foot valves _____
- 1" bailer _____
- 2" bailer _____
- other (describe) _____

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site	MW09-R1	Project Number	1343-005.27	Date	25-May-16
Piezometer Diameter	2	Client	GY - AAM	Samplers	NB/MMJ
UTM Location	Z: 55 E: 5388000 N: 6921016	Project Name	Mount Nansen 2016 GW Sampling Program	Weather/Temperature	Rain (snow)
Waypoint	GPS: FRL Name: N/A	Purge Method	<input type="checkbox"/> Waterra <input type="checkbox"/> Peristaltic <input type="checkbox"/> Disp. Bailer <input type="checkbox"/> Other		
Photos	Cam: F12 Nos: 415	Recovery	<input type="checkbox"/> Good <input type="checkbox"/> Bad		
Duplicate Collected	<input type="checkbox"/> Yes Name: _____	Field Blank Collected	<input type="checkbox"/> Yes Name: _____		
Initial Depth to Water (m)	2.025 ice	Purge Start Time:		Purge End Time:	
Depth to Bottom (m)	2.025 ice	Pen or YSI:	<input type="checkbox"/> YSI Pro Plus <input type="checkbox"/> Pen Unit		
Submerged Tubing Depth (m)		Purge Interval	Time () min / Vol. () L		
Well Stick-up Height (m)	0.991	Depth to water (m)			
Estimated Water Volume (L)		Temperature (°C) 3%			
<p>Calculations:</p> <p>(DTB - DTW) x (πr²) 1000 (for well diameter) = 1 well volume (DTB - DTW) x 8.1 (for 4" well diameter) = 1 well volume (DTB - DTW) x 2 (for 2" well diameter) = 1 well volume (DTB - DTW) x 1.1 (for 1.5" diameter) = 1 well volume (DTB - DTW) x 0.5 (for 1" diameter) = 1 well volume</p>	pH (pH Units) ±0.1				
	Cond. (µs/cm) 3%				
	Specific Cond. (µs/cm) 3%				
	Redox (mV) 10%				
	DO (mg/L) 10%				
	DO (%) 10%				
	Appearance & Odour (Clear, Silty, HC odours, etc.)				
	Only for final readings	Sulphide (mg/L)			
		Turbidity (NTU)			
		Interval Purge Volume (L)			
	Cumulative Purge Volume (L):				
YSI ID		Sample Method:	<input type="checkbox"/> Waterra <input type="checkbox"/> Peristaltic <input type="checkbox"/> Disp. Bailer <input type="checkbox"/> Other		
Logged Field Parameters	<input type="checkbox"/> Yes <input type="checkbox"/> No				
Time logged on YSI (24hr)					
Sample Time (24hr)					



Sample Site (Con't): NW09-19

Sample Date (Con't): _____

Well Head Seal: J-Plug PVC Cap Not Sealed Other _____

Seal Replaced: J-Plug PVC Cap Not required Other _____

Well properly sealed for gas monitoring: Yes No Details: slits w electrical tape over top.

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.9
Carbon Dioxide (CO2)	PPM	300

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HNO ₃ (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HCL (Hydrochloric)		
2	500 ml (plastic)	General Chemistry	100 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input type="checkbox"/> NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	60 ml	-	<input type="checkbox"/> H ₂ SO ₄ (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input type="checkbox"/> HNO ₃ (Nitric)		
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-		

General Notes and Observations:

- Frozen @ 2.025 m, ice found on water level tape.
 - spent 20 minutes defrosting w DI water and a long used watterra to try to break thru ice; unsuccessful attempt

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) _____ ft
- 3/8" HDPE (microwatterra tubing) _____ ft
- 5/8" HDPE (watterra tubing) _____ ft
- 1/4" Silicon tubing _____ ft
- High Capacity .45 micron filters _____
- D-25 (for 2" wells, use with 5/8") foot valves _____
- D-16 (for 1" wells, use with 5/8") foot valves _____
- SS-10 (for 5/8" wells, use with 3/8") foot valves _____
- 1" bailer _____
- 2" bailer _____
- other (describe) _____

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site	MW09-20	Project Number	1343-005.27	Date	25-May-16
Piezometer Diameter	2"	Client	GY - AAM	Samplers	NB/MKL
UTM Location	Z:08, E:0389589 N: 6880586	Project Name	Mount Nansen 2016 GW Sampling Program	Weather/Temperature	overcast, windy
Waypoint	GPS: ELR Name: 013	Purge Method	<input type="checkbox"/> Waterra <input checked="" type="checkbox"/> Peristaltic <input type="checkbox"/> Disp. Bailer <input type="checkbox"/> Other	Recovery	<input type="checkbox"/> Good <input type="checkbox"/> Bad
Photos	Cam: ELR Nos: 447-449				
Duplicate Collected	<input type="checkbox"/> Yes Name:				
Field Blank Collected	<input type="checkbox"/> Yes Name:				
Initial Depth to Water (m)	DR4	Purge Start Time:		Purge End Time:	
Depth to Bottom (m)	3.690			Pen or YSI:	<input type="checkbox"/> YSI Pro Plus <input checked="" type="checkbox"/> Pen Unit
Submerged Tubing Depth (m)	/	Purge Interval Time () min / Vol. () L			
Well Stick-up Height (m)	0.912	Depth to water (m)			
Estimated Water Volume (L)	/	Temperature (°C) 3%			
<p>Calculations:</p> <p>(DTB - DTW) x (πr²) 1000 (for well diameter) = 1 well volume (DTB - DTW) x 8.1 (for 4" well diameter) = 1 well volume (DTB - DTW) x 2 (for 2" well diameter) = 1 well volume (DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume (DTB-DTW) x 0.5 (for 1" diameter) = 1 well volume</p>		pH (pH Units) ±0.1			
		Cond. (µs/cm) 3%			
		Specific Cond. (µs/cm) 3%			
		Redox (mV) 10%			
		DO (mg/L) 10%			
		DO (%) 10%			
		Appearance & Odour (Clear, Silty, HC odours, etc.)			
		Only for final readings	Sulphide (mg/L)		
			Turbidity (NTU)		
		Interval Purge Volume (L)			
	Cumulative Purge Volume (L):				
YSI ID		Sample Method:			
Logged Field Parameters	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	<input checked="" type="checkbox"/> Waterra <input type="checkbox"/> Peristaltic <input type="checkbox"/> Disp. Bailer <input type="checkbox"/> Other			
Time logged on YSI (24hr)					
Sample Time (24hr)					



Sample Site (Con't): MW09-20

Sample Date (Con't): _____

Well Head Seal: J-Plug PVC Cap Not Sealed Other _____

Seal Replaced: J-Plug PVC Cap Not required Other _____

Well properly sealed for gas monitoring: Yes No Details: slits in PVC

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.9
Carbon Dioxide (CO2)	PPM	200

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HNO ₃ (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HCL (Hydrochloric)		
2	500 ml (plastic)	General Chemistry	100 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input type="checkbox"/> NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	60 ml	-	<input type="checkbox"/> H ₂ SO ₄ (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input type="checkbox"/> HNO ₃ (Nitric)		
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-		

General Notes and Observations:

Dry @ 3.962m

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) _____ ft
- 3/8" HDPE (microwaterra tubing) _____ ft
- 5/8" HDPE (waterra tubing) _____ ft
- 1/4" Silicon tubing _____ ft
- High Capacity .45 micron filters _____
- D-25 (for 2" wells, use with 5/8") foot valves _____
- D-16 (for 1" wells, use with 5/8") foot valves _____
- SS-10 (for 5/8" wells, use with 3/8") foot valves _____
- 1" bailer _____
- 2" bailer _____
- other (describe) _____

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site	MW09-21	Project Number	1343-005.27	Date	26 May - 16
Piezometer Diameter	2"	Client	GY - AAM	Samplers	NB/ MM
UTM Location	Z: 08, E: 6389535 N: 6880576	Project Name	Mount Nansen 2016 GW Sampling Program	Weather/Temperature	overcast, ~20c
Waypoint	GPS: ELR Name: 015	Purge Method			
Photos	Cam: ELR Nos: 453, 455	Recovery	<input type="checkbox"/> Good <input type="checkbox"/> Bad		
Duplicate Collected	<input type="checkbox"/> Yes Name:	Waterra	Peristaltic	Disp. Bailer	Other
Field Blank Collected	<input type="checkbox"/> Yes Name:				
Initial Depth to Water (m)	1.149	Purge Start Time:		Purge End Time:	
		Pen or YSI:	<input type="checkbox"/> YSI Pro Plus <input type="checkbox"/> Pen Unit		
Depth to Bottom (m)	1.958 to ice	Purge Interval Time () min / Vol. () L			
Submerged Tubing Depth (m)		Depth to water (m)			
Well Stick-up Height (m)	0.82	Temperature (°C) 3%			
Estimated Water Volume (L)		pH (pH Units) ±0.1			
<p> (DTB - DTW) x (πr²) 1000 (for well diameter) = 1 well volume (DTB - DTW) x 8.1 (for 4" well diameter) = 1 well volume (DTB - DTW) x 2 (for 2" well diameter) = 1 well volume (DTB - DTW) x 1.1 (for 1.5" diameter) = 1 well volume (DTB - DTW) x 0.5 (for 1" diameter) = 1 well volume </p> <p>Calculations:</p>		Cond. (µs/cm) 3%			
		Specific Cond. (µs/cm) 3%			
		Redox (mV) 10%			
		DO (mg/L) 10%			
		DO (%) 10%			
		Appearance & Odour (Clear, Silty, HC odours, etc.)			
		Only for final readings	Sulphide (mg/L)		
			Turbidity (NTU)		
		Interval Purge Volume (L)			
		Cumulative Purge Volume (L):			
YSI ID		Sample Method:			
Logged Field Parameters	<input type="checkbox"/> Yes <input type="checkbox"/> No	Waterra	Peristaltic	Disp. Bailer	Other
Time logged on YSI (24hr)					
Sample Time (24hr)					



Sample Site (Con't): MW09-21

Sample Date (Con't): _____

Well Head Seal: J-Plug PVC Cap Not Sealed Other _____

Seal Replaced: J-Plug PVC Cap Not required Other _____

Well properly sealed for gas monitoring: Yes No Details: _____

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.9
Carbon Dioxide (CO2)	PPM	200

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HNO ₃ (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HCL (Hydrochloric)		
2	500 ml (plastic)	General Chemistry	100 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input type="checkbox"/> NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH ₃)	60 ml	-	<input type="checkbox"/> H ₂ SO ₄ (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input type="checkbox"/> HNO ₃ (Nitric)		
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-		

General Notes and Observations:

- Transducer frozen in well; Frozen @ 1.958m
- Attempt to draw for 20 minutes, attempt unsuccessful.
- Pen tubing frozen in well.

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) _____ ft
- 3/8" HDPE (microwaterra tubing) _____ ft
- 5/8" HDPE (waterra tubing) _____ ft
- 1/4" Silicon tubing _____ ft
- High Capacity .45 micron filters _____
- D-25 (for 2" wells, use with 5/8") foot valves _____
- D-16 (for 1" wells, use with 5/8") foot valves _____
- SS-10 (for 5/8" wells, use with 3/8") foot valves _____
- 1" bailer _____
- 2" bailer _____
- other (describe) _____

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site	MW09-20	Project Number	1343-005.27	Date	26 May - 16
Piezometer Diameter	2"	Client	GY - AAM	Samplers	NB/ML
UTM Location	Z: 08 E: 0389498 N: 6886550	Project Name	Mount Nansen 2016 GW Sampling Program	Weather/Temperature	overcast ~20°C
Waypoint	GPS: ELR Name: 046	Purge Method			
Photos	Cam: ELR Nos: 456 - 458	Water	Peristaltic	Disp. Bailer	Other
Duplicate Collected	<input type="checkbox"/> Yes Name:				
Field Blank Collected	<input type="checkbox"/> Yes Name:				
Initial Depth to Water (m)	5.107	Purge Start Time:		Purge End Time:	
Depth to Bottom (m)	5.280	Pen or YSI:	<input type="checkbox"/> YSI Pro Plus <input type="checkbox"/> Pen Unit		
Submerged Tubing Depth (m)	~5.20	Purge Interval Time () min / Vol. () L			
Well Stick-up Height (m)	0.867	Depth to water (m)			
Estimated Water Volume (L)	0.346	Temperature (°C) 3%			
<p> (DTB - DTW) x (πr²) 1000 (for well diameter) = 1 well volume (DTB - DTW) x 8.1 (for 4" well diameter) = 1 well volume (DTB - DTW) x 2 (for 2" well diameter) = 1 well volume (DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume (DTB-DTW) x 0.5 (for 1" diameter) = 1 well volume </p> <p> Calculations: $\frac{5.280 - 5.107}{0.173} \times 2 = 0.346$ </p>	pH (pH Units) ±0.1				
	Cond. (µs/cm) 3%				
	Specific Cond. (µs/cm) 3%				
	Redox (mV) 10%				
	DO (mg/L) 10%				
	DO (%) 10%				
	Appearance & Odour (Clear, Silty, HC odours, etc.)				
	Only for final readings	Sulphide (mg/L)			
		Turbidity (NTU)			
	Interval Purge Volume (L)				
Cumulative Purge Volume (L):					
YSI ID		Sample Method:			
Logged Field Parameters	<input type="checkbox"/> Yes <input type="checkbox"/> No	Water	Peristaltic	Disp. Bailer	Other
Time logged on YSI (24hr)					
Sample Time (24hr)	9:30				

DIRECT SAMPLES

Sample Site (Con't): MW09-22

Sample Date (Con't): 26-May-16 @ 9:20

Well Head Seal: J-Plug PVC Cap Not Sealed Other _____

Seal Replaced: J-Plug PVC Cap Not required Other _____

Well properly sealed for gas monitoring: Yes No Details: _____

No → slits in PVC

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.9
Carbon Dioxide (CO2)	PPM	300

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input checked="" type="checkbox"/> Field Filtered	<input checked="" type="checkbox"/> HNO ₃ (Nitric)	100	27-May-16 @ 10:10
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input checked="" type="checkbox"/> Field Filtered	<input checked="" type="checkbox"/> HCL (Hydrochloric)	15	27-May-16 @ 10:10
2	500 ml (plastic)	General Chemistry	100 ml	-	-	150	27-May-16 @ 16:25
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input checked="" type="checkbox"/> NaOH (Sodium Hydroxide)	100	27-May-16 @ 10:10
4	120 ml (glass)	Ammonia (NH3)	60 ml	-	<input checked="" type="checkbox"/> H ₂ SO ₄ (Sulfuric)	60	27-May-16 @ 10:10
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input checked="" type="checkbox"/> HNO ₃ (Nitric)	50	27-May-16 @ 10:10
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-	70	27-May-16 @ 16:25

General Notes and Observations:

- small water column, attempt to direct sample.
- dry @ 5.280 m, will wait to see if recharge occurs; 5.272 m recharge, will return tomorrow to collect a representative sample.
- returned on 27-May-16 @ 10:10 to sample min vol of diss metals, mercury, cyanide, NH₃ + SCN.
- sample for gen chem + TIC collected 27-May-16 @ 16:25

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) _____ ft (4.5m)
- 3/8" HDPE (microwaterra tubing) _____ ft
- 5/8" HDPE (waterra tubing) _____ ft
- 1/4" Silicon tubing 0.5 ft
- High Capacity .45 micron filters _____
- D-25 (for 2" wells, use with 5/8" foot valves) _____
- D-16 (for 1" wells, use with 5/8" foot valves) _____
- SS-10 (for 5/8" wells, use with 3/8" foot valves) _____
- 1" bailer _____
- 2" bailer _____
- other (describe) _____

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site	MW09-23	Project Number	1343-005.27	Date	26-May-16				
Piezometer Diameter	2"	Client	GY - AAM	Samplers	NB/MM				
UTM Location	Z: 08 E: 0389460 N: 6980555	Project Name	Mount Nansen 2016 GW Sampling Program	Weather/Temperature	Windy, overcast				
Waypoint	GPS: EL7 Name: 017	Purge Method	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Bad						
Photos	Cam: FLIR Nos: 459-461								
Duplicate Collected	<input type="checkbox"/> Yes Name:	Waterra	Peristaltic	Disp. Bailer	Other				
Field Blank Collected	<input type="checkbox"/> Yes Name:								
Initial Depth to Water (m)	13.428	Purge Start Time:	9:50	Purge End Time:					
Depth to Bottom (m)	15.928	Pen or YSI:	<input checked="" type="checkbox"/> YSI Pro Plus <input type="checkbox"/> Pen Unit						
Submerged Tubing Depth (m)	~ 14.9	Purge Interval Time () min / Vol. () L	9:52	9:53	9:55	9:58	9:59	10:01	10:02
Well Stick-up Height (m)	0.185	Depth to water (m)	/	/	/	/	/	/	/
Estimated Water Volume (L)	5.0	Temperature (°C) 3%	1.8	1.0	6.8	6.6	0.6	0.6	0.6
<p> (DTB - DTW) x (πr²) 1000 (for well diameter) = 1 well volume (DTB - DTW) x 8.1 (for 4" well diameter) = 1 well volume (DTB - DTW) x 2 (for 2" well diameter) = 1 well volume (DTB - DTW) x 1.1 (for 1.5" diameter) = 1 well volume (DTB - DTW) x 0.5 (for 1" diameter) = 1 well volume </p> <p>Calculations:</p> $\frac{15.928 - 13.428}{2.5} \times 2 = 5$	pH (pH Units) ±0.1	6.95	6.98	6.99	6.93	6.96	9.97	6.96	
	Cond. (µs/cm) 3%	855	840	830	864	861	857	959	
	Specific Cond. (µs/cm) 3%	1536	1566	1547	1666	1609	1609	1611	
	Redox (mV) 10%	10.3	-18.0	-32.1	-25.8	-28.1	-29.5	-30.3	
	DO (mg/L) 10%	4.63	2.99	3.91	2.46	2.43	2.44	2.47	
	DO (%) 10%	35.3	21.5	27.6	16.7	17.6	15.8	16.8	
	Appearance & Odour (Clear, Silty, HC odours, etc.)	turid	same	same	same	same	same	same	
	Only for final readings	Sulphide (mg/L)	/	/	/	/	/	0.2	
	Turbidity (NTU)	/	/	/	/	/	/	20.5	
	Interval Purge Volume (L)	1	1	1	6.95	1	1	1	
Cumulative Purge Volume (L):	1	2	3	9	10	11	10		
YSI ID	MW09-23	Sample Method:							
Logged Field Parameters	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Waterra	Peristaltic	Disp. Bailer	Other				
Time logged on YSI (24hr)	15:02								
Sample Time (24hr)	10:10								



Sample Site (Con't): MN09-23

Sample Date (Con't): 26-May-16 @ 11:10

Well Head Seal: J-Plug PVC Cap Not Sealed Other _____

Seal Replaced: J-Plug PVC Cap Not required Other _____

Well properly sealed for gas monitoring: Yes No Details: _____

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.9
Carbon Dioxide (CO2)	PPM	200

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input checked="" type="checkbox"/> Field Filtered	<input checked="" type="checkbox"/> HNO ₃ (Nitric)	120	
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input checked="" type="checkbox"/> Field Filtered	<input checked="" type="checkbox"/> HCL (Hydrochloric)	40	
2	500 ml (plastic)	General Chemistry	100 ml	-	-	500	
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input checked="" type="checkbox"/> NaOH (Sodium Hydroxide)	145	
4	120 ml (glass)	Ammonia (NH3)	60 ml	-	<input checked="" type="checkbox"/> H ₂ SO ₄ (Sulfuric)	120	
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input checked="" type="checkbox"/> HNO ₃ (Nitric)	120	
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-	120	

General Notes and Observations:

- Not monitoring draw down due to friction from twisting.

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) _____ ft
- 3/8" HDPE (microwaterra tubing) _____ ft
- 5/8" HDPE (waterra tubing) _____ ft
- 1/4" Silicon tubing _____ ft
- High Capacity .45 micron filters 1
- D-25 (for 2" wells, use with 5/8" foot valves) 1x
- D-16 (for 1" wells, use with 5/8" foot valves) _____
- SS-10 (for 5/8" wells, use with 3/8" foot valves) _____
- 1" bailer _____
- 2" bailer _____
- other (describe) _____

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site	MW 09-24	Project Number	1343-005.27	Date	May 25, 2016						
Piezometer Diameter	2-inch	Client	GY - AAM	Samplers	KB/SC						
UTM Location	Z:08 E:0389558 N:6880621	Project Name	Mount Nansen 2016 GW Sampling Program	Weather/Temperature	partly cloudy						
Waypoint	GPS: Hemm Name: N/A			Recovery	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Bad						
Photos	Cam: Jeremy Nos:	Purge Method									
Duplicate Collected	<input checked="" type="checkbox"/> Yes Name: DUP-1	Waterra	Peristaltic	Disp. Bailer	Other						
Field Blank Collected	<input checked="" type="checkbox"/> Yes Name: FB-2	<input checked="" type="checkbox"/>									
Initial Depth to Water (m)	9.663	Purge Start Time:	17:02	Purge End Time:	17:38						
				Pen or YSI:	<input checked="" type="checkbox"/> YSI Pro Plus 556 <input type="checkbox"/> Pen Unit						
Depth to Bottom (m)	11.631	Purge Interval Time () min / Vol. (10) L	17:20	17:25	17:30	17:38	18:00				
Submerged Tubing Depth (m)	11.6	Depth to water (m)	9.677	9.689	9.70	9.685	same				
Well Stick-up Height (m)	0.645	Temperature (°C) 3%	3.16	1.38	1.11	0.91	2.06				
Estimated Water Volume (L)	3.936	pH (pH Units) ±0.1	7.55	7.49	7.34	7.28	7.41				
Calculations: $\begin{array}{r} 11.631 \\ - 09.663 \\ \hline 1.968 \\ \times 2 \\ \hline 3.936 \end{array}$	(DTB - DTW) x (πr ²) 1000 (for well diameter) = 1 well volume	Cond. (µs/cm) 3%	0.596	0.576	0.560	0.560	0.572				
	(DTB - DTW) x 8.1 (for 4" well diameter) = 1 well volume	Specific Cond. (µs/cm) 3%	1.016	1.049	1.030	1.037	1.012				
	(DTB - DTW) x 2 (for 2" well diameter) = 1 well volume	Redox (mV) 10%	88.5	123.4	129.2	141.4	141.1				
	(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume	DO (mg/L) 10%	4.70	4.99	4.96	4.42	4.33				
	(DTB-DTW) x 0.5 (for 1" diameter) = 1 well volume	DO (%) 10%	35.3	35.4	35.0	31.0	31.7				
		Appearance & Odour (Clear, Silty, HC odours, etc.)	dirty silty	clear	clear	clear	clear				
		Only for final readings	Sulphide (mg/L)	/	/	/	/	0.14			
			Turbidity (NTU)	/	/	/	/	27.4			
			Interval Purge Volume (L)	10.0	10.0	10	10	5			
			Cumulative Purge Volume (L):	10.0	20.0	30.0	40.0	45.0			
YSI ID	13F100509-Pine	Sample Method:									
Logged Field Parameters	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Waterra	Peristaltic	Disp. Bailer	Other						
Time logged on YSI (24hr)	18:05	<input checked="" type="checkbox"/>									
Sample Time (24hr)	17:20										



Sample Site (Con't): MW09-24

Sample Date (Con't): May 25, 2016

Well Head Seal: J-Plug PVC Cap Not Sealed Other _____

Seal Replaced: J-Plug PVC Cap Not required Other _____

Well properly sealed for gas monitoring: Yes No Details: _____

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	Ø
Oxygen (O2)	%	20.9
Carbon Dioxide (CO2)	PPM	900

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input checked="" type="checkbox"/> Field Filtered	<input type="checkbox"/> HNO ₃ (Nitric)	120	
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input checked="" type="checkbox"/> Field Filtered	<input type="checkbox"/> HCl (Hydrochloric)	40	
2	500 ml (plastic)	General Chemistry	100 ml	-	-	500	
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input checked="" type="checkbox"/> NaOH (Sodium Hydroxide)	145	
4	120 ml (glass)	Ammonia (NH ₃)	60 ml	-	<input checked="" type="checkbox"/> H ₂ SO ₄ (Sulfuric)	120	
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input checked="" type="checkbox"/> HNO ₃ (Nitric)	120	
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-	120	

General Notes and Observations:

Good producing well

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) _____ ft
- 3/8" HDPE (microwaterra tubing) _____ ft
- 5/8" HDPE (waterra tubing) 37 ft
- 1/4" Silicon tubing _____ ft
- High Capacity .45 micron filters 1
- D-25 (for 2" wells, use with 5/8") foot valves 1
- D-16 (for 1" wells, use with 5/8") foot valves _____
- SS-10 (for 5/8" wells, use with 3/8") foot valves _____
- 1" bailer _____
- 2" bailer _____
- other (describe) _____

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site	W14103083BH01	Project Number	1343-005.27	Date	May 25, 2016
Piezometer Diameter	2-inch	Client	GY - AAM	Samplers	KB / SC
UTM Location	Z: 09 E: 0389520 N: 6880668	Project Name	Mount Nansen 2016 GW Sampling Program	Weather/Temperature	partly cloudy
Waypoint	GPS: Hemm Name: N/A			Recovery	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Bad
Photos	Cam: Scramy Nos:	Purge Method			
Duplicate Collected	<input type="checkbox"/> Yes Name:	Waterra	Peristaltic	Disp. Bailer	Other
Field Blank Collected	<input type="checkbox"/> Yes Name:				
Initial Depth to Water (m)	frozen	Purge Start Time:		Purge End Time:	Pen or YSI: <input type="checkbox"/> YSI Pro Plus <input type="checkbox"/> Pen Unit
Depth to Bottom (m)	6.529	Purge Interval Time () min / Vol. () L			
Submerged Tubing Depth (m)	-	Depth to water (m)			
Well Stick-up Height (m)	0.630	Temperature (°C) 3%			
Estimated Water Volume (L)	-	pH (pH Units) ±0.1			
Calculations: $(DTB - DTW) \times (\pi r^2) \times 1000$ (for well diameter) = 1 well volume $(DTB - DTW) \times 8.1$ (for 4" well diameter) = 1 well volume $(DTB - DTW) \times 2$ (for 2" well diameter) = 1 well volume $(DTB - DTW) \times 1.1$ (for 1.5" diameter) = 1 well volume $(DTB - DTW) \times 0.5$ (for 1" diameter) = 1 well volume	Cond. (µs/cm) 3%				
	Specific Cond. (µs/cm) 3%				
	Redox (mV) 10%				
	DO (mg/L) 10%				
	DO (%) 10%				
	Appearance & Odour (Clear, Silty, HC odours, etc.)				
	<u>Only for final readings</u> Sulphide (mg/L)				
	Turbidity (NTU)				
	Interval Purge Volume (L)				
	Cumulative Purge Volume (L):				
YSI ID	-	Sample Method:			
Logged Field Parameters	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No				
Time logged on YSI (24hr)	-	Waterra	Peristaltic	Disp. Bailer	Other
Sample Time (24hr)	-				



Sample Site (Con't): W14163083 BHO1

Sample Date (Con't): May 25, 2016

Well Head Seal: J-Plug PVC Cap Not Sealed Other _____

Seal Replaced: J-Plug PVC Cap Not required Other _____

Well properly sealed for gas monitoring: Yes No Details: _____

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.6
Carbon Dioxide (CO2)	PPM	700

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HNO ₃ (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HCL (Hydrochloric)		
2	500 ml (plastic)	General Chemistry	100 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input type="checkbox"/> NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	60 ml	-	<input type="checkbox"/> H ₂ SO ₄ (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input type="checkbox"/> HNO ₃ (Nitric)		
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-		

General Notes and Observations:

Well was frozen
did not attempt to thaw due to low
DE and historical frozen well

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) _____ ft
- 3/8" HDPE (microwaterra tubing) _____ ft
- 5/8" HDPE (waterra tubing) _____ ft
- 1/4" Silicon tubing _____ ft
- High Capacity .45 micron filters _____
- D-25 (for 2" wells, use with 5/8" foot valves) _____
- D-16 (for 1" wells, use with 5/8" foot valves) _____
- SS-10 (for 5/8" wells, use with 3/8" foot valves) _____
- 1" bailer _____
- 2" bailer _____
- other (describe) _____

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site	W14103083B40Z	Project Number	1343-005.27	Date	May 25, 2016
Piezometer Diameter	2"	Client	GY - AAM	Samplers	J. Chua / K. Beckmann
UTM Location	Z: 08 E: 0389561 N: 6880665	Project Name	Mount Nansen 2016 GW Sampling Program	Weather/Temperature	10°C overcast
Waypoint	GPS: hem Name: NIA	Purge Method			
Photos	Cam: Jeremy Nos:	Water	Peristaltic	Disp. Bailer	Other
Duplicate Collected	<input type="checkbox"/> Yes Name:				
Field Blank Collected	<input type="checkbox"/> Yes Name:				
Initial Depth to Water (m)	Frozen	Purge Start Time:		Purge End Time:	
Depth to Bottom (m)	6.729	Purge Interval Time () min / Vol. () L			
Submerged Tubing Depth (m)	-	Depth to water (m)			
Well Stick-up Height (m)	0.788	Temperature (°C) 3%			
Estimated Water Volume (L)	-	pH (pH Units) ±0.1			
Calculations: $(DTB - DTW) \times (\pi r^2) \times 1000$ (for well diameter) = 1 well volume $(DTB - DTW) \times 8.1$ (for 4" well diameter) = 1 well volume $(DTB - DTW) \times 2$ (for 2" well diameter) = 1 well volume $(DTB - DTW) \times 1.1$ (for 1.5" diameter) = 1 well volume $(DTB - DTW) \times 0.5$ (for 1" diameter) = 1 well volume	Cond. (µs/cm) 3%				
	Specific Cond. (µs/cm) 3%				
	Redox (mV) 10%				
	DO (mg/L) 10%				
	DO (%) 10%				
	Appearance & Odour (Clear, Silty, HC odours, etc.)				
	<u>Only for final readings</u>	Sulphide (mg/L)			
		Turbidity (NTU)			
	Interval Purge Volume (L)				
	Cumulative Purge Volume (L):				
YSI ID	-	Sample Method:			
Logged Field Parameters	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Water	Peristaltic	Disp. Bailer	Other
Time logged on YSI (24hr)	-				
Sample Time (24hr)	-				



Sample Site (Con't): W1410 3083 BHO2

Sample Date (Con't): May 25, 2016

Well Head Seal: J-Plug PVC Cap Not Sealed Other _____

Seal Replaced: J-Plug PVC Cap Not required Other _____

Well properly sealed for gas monitoring: Yes No Details: Equipment and wires down hole.

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.7
Carbon Dioxide (CO2)	PPM	400

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HNO ₃ (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HCL (Hydrochloric)		
2	500 ml (plastic)	General Chemistry	100 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input type="checkbox"/> NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	60 ml	-	<input type="checkbox"/> H ₂ SO ₄ (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input type="checkbox"/> HNO ₃ (Nitric)		
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-		

General Notes and Observations:

Well is Frozen
Did not attempt to thaw due to low DI water
and historical frozen well

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) _____ ft
- 3/8" HDPE (microwaterra tubing) _____ ft
- 5/8" HDPE (waterra tubing) _____ ft
- 1/4" Silicon tubing _____ ft
- High Capacity .45 micron filters _____
- D-25 (for 2" wells, use with 5/8") foot valves _____
- D-16 (for 1" wells, use with 5/8") foot valves _____
- SS-10 (for 5/8" wells, use with 3/8") foot valves _____
- 1" bailer _____
- 2" bailer _____
- other (describe) _____

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site	W141030838403	Project Number	1343-005.27	Date	26 - May - 16	
Piezometer Diameter	2"	Client	GY - AAM	Samplers	NB / MM	
UTM Location	Z: 08, E: 0389132 N: 6880731	Project Name	Mount Nansen 2016 GW Sampling Program	Weather/Temperature	Rain/snow/wind	
Waypoint	GPS: ELR Name: 021			Recovery	<input type="checkbox"/> Good <input type="checkbox"/> Bad	
Photos	Cam: ELR Nos: 468-470	Purge Method				
Duplicate Collected	<input type="checkbox"/> Yes Name: /	Waterra	Peristaltic	Disp. Bailer	Other	
Field Blank Collected	<input type="checkbox"/> Yes Name: /					
Initial Depth to Water (m)	1.774	Purge Start Time:	/	Purge End Time:	/	
				Pen or YSI:	<input type="checkbox"/> YSI Pro Plus <input type="checkbox"/> Pen Unit	
Depth to Bottom (m)	4.537	Purge Interval Time () min / Vol. () L				
Submerged Tubing Depth (m)	/	Depth to water (m)				
Well Stick-up Height (m)	1276	Temperature (°C) 3%				
Estimated Water Volume (L)	N/A	pH (pH Units) ±0.1				
<p>Calculations:</p> <p>(DTB - DTW) x (πr²)1000 (for well diameter) = 1 well volume (DTB - DTW) x 8.1 (for 4" well diameter) = 1 well volume (DTB - DTW) x 2 (for 2" well diameter) = 1 well volume (DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume (DTB-DTW) x 0.5 (for 1" diameter) = 1 well volume</p>	Cond. (µs/cm) 3%					
	Specific Cond. (µs/cm) 3%					
	Redox (mV) 10%					
	DO (mg/L) 10%					
	DO (%) 10%					
	Appearance & Odour (Clear, Silty, HC odours, etc.)					
	Only for final readings	Sulphide (mg/L)				
		Turbidity (NTU)				
		Interval Purge Volume (L)				
		Cumulative Purge Volume (L):				
YSI ID		Sample Method:				
Logged Field Parameters	<input type="checkbox"/> Yes <input type="checkbox"/> No	Waterra	Peristaltic	Disp. Bailer	Other	
Time logged on YSI (24hr)	/					
Sample Time (24hr)	/					

Sample Site (Con't): W14103083BH03

Sample Date (Con't): _____

 Well Head Seal: J-Plug PVC Cap Not Sealed Other _____

 Seal Replaced: J-Plug PVC Cap Not required Other _____

 Well properly sealed for gas monitoring: Yes No Details: unable to fit gas meter into metal measurement fully, no cap on well
Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.9
Carbon Dioxide (CO2)	PPM	200

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HNO ₃ (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HCL (Hydrochloric)		
2	500 ml (plastic)	General Chemistry	100 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input type="checkbox"/> NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH ₃)	60 ml	-	<input type="checkbox"/> H ₂ SO ₄ (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input type="checkbox"/> HNO ₃ (Nitric)		
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-		

General Notes and Observations:

- Some perit tubing ~~from~~ stuck in well; another piece was easy to move & pull out
- Frozen @ 4.537m → spent 20 mins attempting thaw; purged cold water out for well first using waterz; attempt unsuccessful.
- Attempt to purge by adding extension onto existing perit tubing, attempt unsuccessful.
- Removed perit tubing that we were able to move from well bc it was just sitting over ice
- previously record DTB was 10m,

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) _____ ft (5.0m)
- 3/8" HDPE (microwaterra tubing) _____ ft
- 5/8" HDPE (waterra tubing) _____ ft ~~(4.7m)~~ (5.5m)
- 1/4" Silicon tubing 0.5 ft
- High Capacity .45 micron filters _____
- D-25 (for 2" wells, use with 5/8" foot valves) 1
- D-16 (for 1" wells, use with 5/8" foot valves) _____
- SS-10 (for 5/8" wells, use with 3/8" foot valves) _____
- 1" bailer _____
- 2" bailer _____
- other (describe) _____

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site	W14103083 BH04	Project Number	1343-005.27	Date	May 25, 2016
Piezometer Diameter	2-inch	Client	GY - AAM	Samplers	KB YSC
UTM Location	Z:08 E: 0389543N: 6280662	Project Name	Mount Nansen 2016 GW Sampling Program	Weather/Temperature	partly cloudy
Waypoint	GPS: Hemm. Name: N/A			Recovery	<input type="checkbox"/> Good <input type="checkbox"/> Bad
Photos	Cam: Jeremy Nos:	Purge Method			
Duplicate Collected	<input type="checkbox"/> Yes Name:	Waterra	Peristaltic	Disp. Bailer	Other
Field Blank Collected	<input type="checkbox"/> Yes Name:				
Initial Depth to Water (m)	frozen	Purge Start Time:	Purge End Time:	Pen or YSI:	<input type="checkbox"/> YSI Pro Plus <input type="checkbox"/> Pen Unit
Depth to Bottom (m)	6.515	Purge Interval Time () min / Vol. () L			
Submerged Tubing Depth (m)	N/A	Depth to water (m)			
Well Stick-up Height (m)	0.77 @ 0.765	Temperature (°C) 3%			
Estimated Water Volume (L) $(DTB - DTW) \times (\pi r^2) \times 1000$ (for well diameter) = 1 well volume $(DTB - DTW) \times 8.1$ (for 4" well diameter) = 1 well volume $(DTB - DTW) \times 2$ (for 2" well diameter) = 1 well volume $(DTB - DTW) \times 1.1$ (for 1.5" diameter) = 1 well volume $(DTB - DTW) \times 0.5$ (for 1" diameter) = 1 well volume Calculations:	pH (pH Units) ± 0.1				
	Cond. ($\mu\text{s/cm}$) 3%				
	Specific Cond. ($\mu\text{s/cm}$) 3%				
	Redox (mV) 10%				
	DO (mg/L) 10%				
	DO (%) 10%				
	Appearance & Odour (Clear, Silty, HC odours, etc.)				
	<u>Only for final readings</u> Sulphide (mg/L)				
	Turbidity (NTU)				
	Interval Purge Volume (L)				
Cumulative Purge Volume (L):					
YSI ID		Sample Method:			
Logged Field Parameters	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	Waterra	Peristaltic	Disp. Bailer	Other
Time logged on YSI (24hr)	—				
Sample Time (24hr)	—				



Sample Site (Con't): W14103083 B104

Sample Date (Con't): May 25, 2016

Well Head Seal: J-Plug PVC Cap Not Sealed Other _____

Seal Replaced: J-Plug PVC Cap Not required Other _____

Well properly sealed for gas monitoring: Yes No Details: _____

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	Ø
Oxygen (O2)	%	20.6
Carbon Dioxide (CO2)	PPM	300

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment <input checked="" type="checkbox"/>	Preservative Added <input checked="" type="checkbox"/>	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HNO ₃ (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	<input type="checkbox"/> Field Filtered	<input type="checkbox"/> HCL (Hydrochloric)		
2	500 ml (plastic)	General Chemistry	100 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	<input type="checkbox"/> NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	60 ml	-	<input type="checkbox"/> H ₂ SO ₄ (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	<input type="checkbox"/> HNO ₃ (Nitric)		
6	120 ml (glass amber)	Total Inorganic Carbon (TIC)	50 ml	-	-		

General Notes and Observations:

Well was frozen
did not attempt to thaw due to low
DI and historical frozen well

Consumables Used:

- 1/4" HDPE (peristaltic pump tubing) _____ ft
- 3/8" HDPE (microwaterra tubing) _____ ft
- 5/8" HDPE (waterra tubing) _____ ft
- 1/4" Silicon tubing _____ ft
- High Capacity .45 micron filters _____
- D-25 (for 2" wells, use with 5/8" foot valves) _____
- D-16 (for 1" wells, use with 5/8" foot valves) _____
- SS-10 (for 5/8" wells, use with 3/8" foot valves) _____
- 1" bailer _____
- 2" bailer _____
- other (describe) _____

APPENDIX C
Laboratory Reports



HEMMERA ENVIROCHEM INC.
ATTN: Natasha Sandys
230 - 2237 2nd Avenue
Whitehorse YK Y1A 0K7

Date Received: 27-MAY-16
Report Date: 15-JUL-16 13:40 (MT)
Version: FINAL REV. 4

Client Phone: 867-456-4865

Certificate of Analysis

Lab Work Order #: L1774699
Project P.O. #: NOT SUBMITTED
Job Reference: 1343-005.27
C of C Numbers: 1, 2
Legal Site Desc:

Comments:

15-JUL-2016 This report replaces the previous version and contains a corrected TKN result for the Travel Blank

Brent Mack, B.Sc.
Account Manager

[This report shall not be reproduced except in full without the written authority of the Laboratory.]

ADDRESS: 8081 Lougheed Hwy, Suite 100, Burnaby, BC V5A 1W9 Canada | Phone: +1 604 253 4188 | Fax: +1 604 253 6700
ALS CANADA LTD Part of the ALS Group A Campbell Brothers Limited Company

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID	L1774699-1 Water 24-MAY-16 16:50 MW09-16	L1774699-2 Water 25-MAY-16 08:45 MW09-18	L1774699-3 Water 25-MAY-16 17:20 MW09-24	L1774699-4 Water 25-MAY-16 10:25 GSI-HA-01A	L1774699-5 Water 26-MAY-16 11:40 MW09-02
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (uS/cm)	2060	2740	1020	823	2510
	Hardness (as CaCO3) (mg/L)	1390	1870	661	528	1520
	pH (pH)	7.44	7.80	8.08	8.16	7.45
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	195	423	239	243	70.1
	Ammonia, Total (as N) (mg/L)	0.0267	0.0118	0.0119	0.0384	7.35
	Chloride (Cl) (mg/L)	<2.5 ^{DLDS}	<5.0 ^{DLDS}	<1.0 ^{DLDS}	0.97	<2.5 ^{DLDS}
	Fluoride (F) (mg/L)	0.13	<0.20 ^{DLDS}	<0.040 ^{DLDS}	0.133	0.54
	Nitrate (as N) (mg/L)	<0.025 ^{DLDS}	0.077	1.91	0.0123	0.153
	Nitrite (as N) (mg/L)	<0.0050 ^{DLDS}	<0.010 ^{DLDS}	0.0020	0.0036	<0.0050 ^{DLDS}
	Total Kjeldahl Nitrogen (mg/L)	0.167	0.108	0.539	0.566	8.08
	Sulfate (SO4) (mg/L)	1100	1390	331	220	1440
	Anion Sum (meq/L)	26.8	37.3	11.8	9.47	31.3
	Cation Sum (meq/L)	28.5	38.1	13.6	11.1	34.4
	Cation - Anion Balance (%)	3.0	1.1	7.1	8.0	4.6
	Cyanides	Cyanide, Weak Acid Diss (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050
Cyanide, Total (mg/L)		<0.010 ^{DLM}	<0.0050	<0.0050	<0.0050	<0.020 ^{DLM}
Thiocyanate (SCN) (mg/L)		<0.50	<0.50	<0.50	<0.50	<0.50
Cyanide, Free (mg/L)		<0.0050	<0.0050	<0.0050	<0.0050	<0.010
Organic / Inorganic Carbon	Total Inorganic Carbon (mg/L)	53.2	118	59.6	60.4	17.6
	Total Organic Carbon (mg/L)	3.78	3.20	8.88	13.6	6.42
Total Metals	Aluminum (Al)-Total (mg/L)					
	Antimony (Sb)-Total (mg/L)					
	Arsenic (As)-Total (mg/L)					
	Barium (Ba)-Total (mg/L)					
	Beryllium (Be)-Total (mg/L)					
	Bismuth (Bi)-Total (mg/L)					
	Boron (B)-Total (mg/L)					
	Cadmium (Cd)-Total (mg/L)					
	Calcium (Ca)-Total (mg/L)					
	Chromium (Cr)-Total (mg/L)					
	Cobalt (Co)-Total (mg/L)					
	Copper (Cu)-Total (mg/L)					
	Iron (Fe)-Total (mg/L)					
	Lead (Pb)-Total (mg/L)					
	Lithium (Li)-Total (mg/L)					
Magnesium (Mg)-Total (mg/L)						

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

15-JUL-16 13:40 (MT)

Version: FINAL REV. 4

Sample ID Description Sampled Date Sampled Time Client ID	L1774699-6 Water 26-MAY-16 12:40 MW09-03	L1774699-7 Water 26-MAY-16 13:40 MW09-04	L1774699-8 Water 26-MAY-16 08:20 MP09-05	L1774699-9 Water 26-MAY-16 11:30 MW09-06	L1774699-10 Water 26-MAY-16 10:10 MW09-23	
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (uS/cm)	2610	2570	1990	1960	1590
	Hardness (as CaCO3) (mg/L)	1650	1600	1150	1220	955
	pH (pH)	8.08	8.13	7.51	8.08	8.02
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	111	116	252	189	395
	Ammonia, Total (as N) (mg/L)	6.18	7.04	8.39	0.300	2.69
	Chloride (Cl) (mg/L)	<5.0 ^{DLDS}	<5.0 ^{DLDS}	<2.5 ^{DLDS}	<2.5 ^{DLDS}	<2.5 ^{DLDS}
	Fluoride (F) (mg/L)	0.30	0.32	<0.10	0.23	0.12
	Nitrate (as N) (mg/L)	0.452	0.050	0.050	0.703	<0.025 ^{DLDS}
	Nitrite (as N) (mg/L)	0.075	0.027	<0.0050 ^{DLDS}	0.0496	<0.0050 ^{DLDS}
	Total Kjeldahl Nitrogen (mg/L)	5.66	7.04	9.48	0.870	3.38
	Sulfate (SO4) (mg/L)	1450	1340	949	996	592
	Anion Sum (meq/L)	32.6	30.2	24.8	24.6	20.2
	Cation Sum (meq/L)	35.9	34.8	28.6	25.7	21.7
	Cation - Anion Balance (%)	4.9	7.2	7.1	2.3	3.6
Cyanides	Cyanide, Weak Acid Diss (mg/L)	0.0054	<0.0050	0.0051	<0.0050	<0.0050
	Cyanide, Total (mg/L)	0.0142	<0.0050	0.0078	<0.0050	0.114
	Thiocyanate (SCN) (mg/L)	<0.50	<0.50	0.70	<0.50	0.54
	Cyanide, Free (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Organic / Inorganic Carbon	Total Inorganic Carbon (mg/L)	23.4	24.6	72.1	47.2	101
	Total Organic Carbon (mg/L)	6.41	5.95	22.4	6.12	19.7
Total Metals	Aluminum (Al)-Total (mg/L)					
	Antimony (Sb)-Total (mg/L)					
	Arsenic (As)-Total (mg/L)					
	Barium (Ba)-Total (mg/L)					
	Beryllium (Be)-Total (mg/L)					
	Bismuth (Bi)-Total (mg/L)					
	Boron (B)-Total (mg/L)					
	Cadmium (Cd)-Total (mg/L)					
	Calcium (Ca)-Total (mg/L)					
	Chromium (Cr)-Total (mg/L)					
	Cobalt (Co)-Total (mg/L)					
	Copper (Cu)-Total (mg/L)					
	Iron (Fe)-Total (mg/L)					
	Lead (Pb)-Total (mg/L)					
	Lithium (Li)-Total (mg/L)					
Magnesium (Mg)-Total (mg/L)						

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L1774699-11	L1774699-12	L1774699-13	L1774699-14	L1774699-15
		Description	Water	Water	Water	Water	Water
		Sampled Date	26-MAY-16	26-MAY-16	26-MAY-16	25-MAY-16	26-MAY-16
		Sampled Time	15:10	08:50	09:45	17:20	08:20
		Client ID	CH-P-13-03/50	MP09-04	MW09-08	DUP-1	DUP-2
Grouping	Analyte						
WATER							
Physical Tests	Conductivity (uS/cm)		3300	1240	487	1010	1990
	Hardness (as CaCO3) (mg/L)			755	245	612	1150
	pH (pH)		7.98	8.06	6.77	8.15	7.41
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)		374	167	171	248	252
	Ammonia, Total (as N) (mg/L)			<0.0050	2.64	0.0164	9.33
	Chloride (Cl) (mg/L)		30.2	<1.0 ^{DLDS}	<0.50	<1.0 ^{DLDS}	<2.5 ^{DLDS}
	Fluoride (F) (mg/L)		<0.20 ^{DLDS}	<0.040 ^{DLDS}	0.124	<0.040 ^{DLDS}	<0.10 ^{DLDS}
	Nitrate (as N) (mg/L)		0.964	0.797	<0.0050	1.97	0.059
	Nitrite (as N) (mg/L)		0.016	<0.0020 ^{DLDS}	<0.0010	<0.0020 ^{DLDS}	<0.0050 ^{DLDS}
	Total Kjeldahl Nitrogen (mg/L)			0.229	3.02	0.468	9.38
	Sulfate (SO4) (mg/L)		1550	541	91.9	330	940
	Anion Sum (meq/L)			14.7	5.33	12.0	24.6
	Cation Sum (meq/L)			15.5	9.78	12.6	28.7
	Cation - Anion Balance (%)			2.7	29.5	2.6	7.7
	Cyanides	Cyanide, Weak Acid Diss (mg/L)			<0.0050	<0.0050	<0.0050
Cyanide, Total (mg/L)				0.0084	<0.0050	<0.0050	0.0098
Thiocyanate (SCN) (mg/L)				<0.50	0.72	<0.50	0.86
Cyanide, Free (mg/L)				<0.0050	<0.0050	<0.0050	0.0063
Organic / Inorganic Carbon	Total Inorganic Carbon (mg/L)			42.5	59.9	58.1	72.8
	Total Organic Carbon (mg/L)			5.83	18.3	9.54	23.9
Total Metals	Aluminum (Al)-Total (mg/L)						
	Antimony (Sb)-Total (mg/L)						
	Arsenic (As)-Total (mg/L)						
	Barium (Ba)-Total (mg/L)						
	Beryllium (Be)-Total (mg/L)						
	Bismuth (Bi)-Total (mg/L)						
	Boron (B)-Total (mg/L)						
	Cadmium (Cd)-Total (mg/L)						
	Calcium (Ca)-Total (mg/L)						
	Chromium (Cr)-Total (mg/L)						
	Cobalt (Co)-Total (mg/L)						
	Copper (Cu)-Total (mg/L)						
	Iron (Fe)-Total (mg/L)						
	Lead (Pb)-Total (mg/L)						
	Lithium (Li)-Total (mg/L)						
	Magnesium (Mg)-Total (mg/L)						

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID	L1774699-16 Water 24-MAY-16 16:50 FB-1	L1774699-17 Water 25-MAY-16 18:10 FB-2	L1774699-18 Water 26-MAY-16 17:00 FB-3	L1774699-19 Water 26-MAY-16 TRAVEL BLANK-1	L1774699-20 Water 25-MAY-16 17:20 CH-P-13-03/50
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (uS/cm)	<2.0	<2.0	<2.0	<2.0	
	Hardness (as CaCO3) (mg/L)	<0.50	<0.50	<0.50	<0.50	1760
	pH (pH)	5.47	5.28	5.34	5.34	
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	<1.0	<1.0	<1.0	<1.0	
	Ammonia, Total (as N) (mg/L)	<0.0050	<0.0050	<0.0050	0.0354 ^{RRV}	
	Chloride (Cl) (mg/L)	<0.50	<0.50	<0.50	<0.50	
	Fluoride (F) (mg/L)	<0.020	<0.020	<0.020	<0.020	
	Nitrate (as N) (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	<0.0010	<0.0010	
	Total Kjeldahl Nitrogen (mg/L)	<0.050	<0.050	<0.050	<0.050	
	Sulfate (SO4) (mg/L)	<0.30	<0.30	<0.30	<0.30	
	Anion Sum (meq/L)	<0.10	<0.10	<0.10	<0.10	
	Cation Sum (meq/L)	<0.10	<0.10	<0.10	<0.10	
	Cation - Anion Balance (%)	0.0	0.0	0.0	0.0	
Cyanides	Cyanide, Weak Acid Diss (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	
	Cyanide, Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	
	Thiocyanate (SCN) (mg/L)	<0.50	<0.50	<0.50	<0.50	
	Cyanide, Free (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	
Organic / Inorganic Carbon	Total Inorganic Carbon (mg/L)	<0.50	<0.50	<0.50	<0.50	
	Total Organic Carbon (mg/L)	<0.50	<0.50	<0.50	<0.50	
Total Metals	Aluminum (Al)-Total (mg/L)				<0.0030	
	Antimony (Sb)-Total (mg/L)				<0.00010	
	Arsenic (As)-Total (mg/L)				<0.00010	
	Barium (Ba)-Total (mg/L)				<0.000050	
	Beryllium (Be)-Total (mg/L)				<0.000020	
	Bismuth (Bi)-Total (mg/L)				<0.000050	
	Boron (B)-Total (mg/L)				<0.010	
	Cadmium (Cd)-Total (mg/L)				<0.000050	
	Calcium (Ca)-Total (mg/L)				<0.050	
	Chromium (Cr)-Total (mg/L)				<0.00010	
	Cobalt (Co)-Total (mg/L)				<0.00010	
	Copper (Cu)-Total (mg/L)				<0.00050	
	Iron (Fe)-Total (mg/L)				<0.010	
	Lead (Pb)-Total (mg/L)				<0.000050	
	Lithium (Li)-Total (mg/L)				<0.0010	
	Magnesium (Mg)-Total (mg/L)				<0.10	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID	L1774699-1 Water 24-MAY-16 16:50 MW09-16	L1774699-2 Water 25-MAY-16 08:45 MW09-18	L1774699-3 Water 25-MAY-16 17:20 MW09-24	L1774699-4 Water 25-MAY-16 10:25 GSI-HA-01A	L1774699-5 Water 26-MAY-16 11:40 MW09-02
Grouping	Analyte					
WATER						
Total Metals	Manganese (Mn)-Total (mg/L)					
	Mercury (Hg)-Total (mg/L)					
	Molybdenum (Mo)-Total (mg/L)					
	Nickel (Ni)-Total (mg/L)					
	Phosphorus (P)-Total (mg/L)					
	Potassium (K)-Total (mg/L)					
	Selenium (Se)-Total (mg/L)					
	Silicon (Si)-Total (mg/L)					
	Silver (Ag)-Total (mg/L)					
	Sodium (Na)-Total (mg/L)					
	Strontium (Sr)-Total (mg/L)					
	Sulfur (S)-Total (mg/L)					
	Thallium (Tl)-Total (mg/L)					
	Tin (Sn)-Total (mg/L)					
	Titanium (Ti)-Total (mg/L)					
	Uranium (U)-Total (mg/L)					
	Vanadium (V)-Total (mg/L)					
	Zinc (Zn)-Total (mg/L)					
	Zirconium (Zr)-Total (mg/L)					
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	<0.0020 ^{DLA}	<0.0020 ^{DLA}	0.0271	0.0030	<0.0050 ^{DLA}
	Antimony (Sb)-Dissolved (mg/L)	0.0891	0.00035	0.00019	0.00015	0.00401
	Arsenic (As)-Dissolved (mg/L)	0.0244	0.0490	0.00135	0.00534	8.95
	Barium (Ba)-Dissolved (mg/L)	0.0149	0.00851	0.0928	0.126	0.00462
	Beryllium (Be)-Dissolved (mg/L)	<0.000040 ^{DLA}	<0.000040 ^{DLA}	<0.000020	<0.000020	<0.00010 ^{DLA}
	Bismuth (Bi)-Dissolved (mg/L)	<0.00010 ^{DLA}	<0.00010 ^{DLA}	<0.000050	<0.000050	<0.00025 ^{DLA}
	Boron (B)-Dissolved (mg/L)	0.051	<0.020 ^{DLA}	0.014	<0.010	0.058
	Cadmium (Cd)-Dissolved (mg/L)	0.0503	0.000048	0.0000653	0.0000066	0.000917
	Calcium (Ca)-Dissolved (mg/L)	320	332	194	136	477
	Chromium (Cr)-Dissolved (mg/L)	<0.00020 ^{DLA}	<0.00020 ^{DLA}	0.00033	0.00438	<0.00050 ^{DLA}
	Cobalt (Co)-Dissolved (mg/L)	0.00402	<0.00020 ^{DLA}	0.00012	0.00022	0.00995 ^{DLA}
	Copper (Cu)-Dissolved (mg/L)	0.00575	<0.00040 ^{DLA}	0.00579	0.00044	<0.0010 ^{DLA}
	Iron (Fe)-Dissolved (mg/L)	0.023	0.014	<0.010	5.07	15.4
	Lead (Pb)-Dissolved (mg/L)	0.00502	<0.00010 ^{DLA}	<0.000050	0.000095	<0.00025 ^{DLA}
	Lithium (Li)-Dissolved (mg/L)	0.0099	0.0228	0.0011	0.0061	0.0120
	Magnesium (Mg)-Dissolved (mg/L)	143	254	42.9	45.9	79.0

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID	L1774699-6 Water 26-MAY-16 12:40 MW09-03	L1774699-7 Water 26-MAY-16 13:40 MW09-04	L1774699-8 Water 26-MAY-16 08:20 MP09-05	L1774699-9 Water 26-MAY-16 11:30 MW09-06	L1774699-10 Water 26-MAY-16 10:10 MW09-23
Grouping	Analyte					
WATER						
Total Metals	Manganese (Mn)-Total (mg/L)					
	Mercury (Hg)-Total (mg/L)					
	Molybdenum (Mo)-Total (mg/L)					
	Nickel (Ni)-Total (mg/L)					
	Phosphorus (P)-Total (mg/L)					
	Potassium (K)-Total (mg/L)					
	Selenium (Se)-Total (mg/L)					
	Silicon (Si)-Total (mg/L)					
	Silver (Ag)-Total (mg/L)					
	Sodium (Na)-Total (mg/L)					
	Strontium (Sr)-Total (mg/L)					
	Sulfur (S)-Total (mg/L)					
	Thallium (Tl)-Total (mg/L)					
	Tin (Sn)-Total (mg/L)					
	Titanium (Ti)-Total (mg/L)					
	Uranium (U)-Total (mg/L)					
	Vanadium (V)-Total (mg/L)					
	Zinc (Zn)-Total (mg/L)					
	Zirconium (Zr)-Total (mg/L)					
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	<0.0050 ^{DLA}	0.0027	0.0243	<0.0020 ^{DLA}	0.0230 ^{DLA}
	Antimony (Sb)-Dissolved (mg/L)	0.401	0.339	0.00031	0.201	<0.00050 ^{DLA}
	Arsenic (As)-Dissolved (mg/L)	2.08	3.55	0.0230	0.108	0.0283
	Barium (Ba)-Dissolved (mg/L)	0.0176	0.00857	0.0410	0.00531	0.0490
	Beryllium (Be)-Dissolved (mg/L)	<0.00010 ^{DLA}	<0.000040 ^{DLA}	<0.000040 ^{DLA}	<0.000040 ^{DLA}	<0.00010 ^{DLA}
	Bismuth (Bi)-Dissolved (mg/L)	<0.00025 ^{DLA}	<0.00010 ^{DLA}	<0.00010 ^{DLA}	<0.00010 ^{DLA}	<0.00025 ^{DLA}
	Boron (B)-Dissolved (mg/L)	0.172	0.204	0.052	0.100	0.062
	Cadmium (Cd)-Dissolved (mg/L)	0.00181	0.000023	0.000149	0.00720	<0.000025 ^{DLA}
	Calcium (Ca)-Dissolved (mg/L)	493	482	330	389	252
	Chromium (Cr)-Dissolved (mg/L)	<0.00050 ^{DLA}	<0.00020 ^{DLA}	0.00048	<0.00020 ^{DLA}	<0.00050 ^{DLA}
	Cobalt (Co)-Dissolved (mg/L)	0.00156	0.00086	0.0153	0.00191	0.0130
	Copper (Cu)-Dissolved (mg/L)	0.0047	<0.00040 ^{DLA}	0.00099	0.0104	<0.0010 ^{DLA}
	Iron (Fe)-Dissolved (mg/L)	0.036	<0.010	50.9	<0.010	18.0
	Lead (Pb)-Dissolved (mg/L)	0.00061	0.00045	<0.00010 ^{DLA}	0.00036	<0.00025 ^{DLA}
	Lithium (Li)-Dissolved (mg/L)	<0.0050 ^{DLA}	0.0120	<0.0020 ^{DLA}	0.0123	<0.0050 ^{DLA}
	Magnesium (Mg)-Dissolved (mg/L)	101	95.6	78.1	59.0	79.2

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID	L1774699-11 Water 26-MAY-16 15:10 CH-P-13-03/50	L1774699-12 Water 26-MAY-16 08:50 MP09-04	L1774699-13 Water 26-MAY-16 09:45 MW09-08	L1774699-14 Water 25-MAY-16 17:20 DUP-1	L1774699-15 Water 26-MAY-16 08:20 DUP-2
Grouping	Analyte					
WATER						
Total Metals	Manganese (Mn)-Total (mg/L)					
	Mercury (Hg)-Total (mg/L)					
	Molybdenum (Mo)-Total (mg/L)					
	Nickel (Ni)-Total (mg/L)					
	Phosphorus (P)-Total (mg/L)					
	Potassium (K)-Total (mg/L)					
	Selenium (Se)-Total (mg/L)					
	Silicon (Si)-Total (mg/L)					
	Silver (Ag)-Total (mg/L)					
	Sodium (Na)-Total (mg/L)					
	Strontium (Sr)-Total (mg/L)					
	Sulfur (S)-Total (mg/L)					
	Thallium (Tl)-Total (mg/L)					
	Tin (Sn)-Total (mg/L)					
	Titanium (Ti)-Total (mg/L)					
	Uranium (U)-Total (mg/L)					
	Vanadium (V)-Total (mg/L)					
	Zinc (Zn)-Total (mg/L)					
	Zirconium (Zr)-Total (mg/L)					
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Dissolved Metals Filtration Location		FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)		0.0024	0.0607	0.0021	0.0238
	Antimony (Sb)-Dissolved (mg/L)		0.00138	0.00024	0.00018	0.00029
	Arsenic (As)-Dissolved (mg/L)		0.00061	0.208	0.00136	0.0226
	Barium (Ba)-Dissolved (mg/L)		0.0735	0.238	0.0902	0.0408
	Beryllium (Be)-Dissolved (mg/L)		<0.000020	0.000021	<0.000020	<0.000040 ^{DLA}
	Bismuth (Bi)-Dissolved (mg/L)		<0.000050	<0.000050	<0.000050	<0.00010 ^{DLA}
	Boron (B)-Dissolved (mg/L)		0.012	<0.010	<0.010	0.046
	Cadmium (Cd)-Dissolved (mg/L)		0.0000462	0.0000053	0.0000545	0.000136
	Calcium (Ca)-Dissolved (mg/L)		180	73.7	176	333
	Chromium (Cr)-Dissolved (mg/L)		0.00024	0.00070	0.00017	0.00030
	Cobalt (Co)-Dissolved (mg/L)		0.00043	0.00161	0.00011	0.0151
	Copper (Cu)-Dissolved (mg/L)		0.00250	<0.00020	0.00542	0.00091
	Iron (Fe)-Dissolved (mg/L)		<0.010	80.0	<0.010	52.5
	Lead (Pb)-Dissolved (mg/L)		<0.000050	0.000086	<0.000050	<0.00010 ^{DLA}
	Lithium (Li)-Dissolved (mg/L)		<0.0010	<0.0010	0.0012	<0.0020 ^{DLA}
	Magnesium (Mg)-Dissolved (mg/L)		74.1	14.7	42.1	76.6

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID	L1774699-16 Water 24-MAY-16 16:50 FB-1	L1774699-17 Water 25-MAY-16 18:10 FB-2	L1774699-18 Water 26-MAY-16 17:00 FB-3	L1774699-19 Water 26-MAY-16 TRAVEL BLANK-1	L1774699-20 Water 25-MAY-16 17:20 CH-P-13-03/50
Grouping	Analyte					
WATER						
Total Metals	Manganese (Mn)-Total (mg/L)				<0.00010	
	Mercury (Hg)-Total (mg/L)				<0.0000050	
	Molybdenum (Mo)-Total (mg/L)				<0.000050	
	Nickel (Ni)-Total (mg/L)				<0.00050	
	Phosphorus (P)-Total (mg/L)				<0.050	
	Potassium (K)-Total (mg/L)				<0.10	
	Selenium (Se)-Total (mg/L)				<0.000050	
	Silicon (Si)-Total (mg/L)				<0.050	
	Silver (Ag)-Total (mg/L)				<0.000010	
	Sodium (Na)-Total (mg/L)				<0.050	
	Strontium (Sr)-Total (mg/L)				<0.00020	
	Sulfur (S)-Total (mg/L)				<0.50	
	Thallium (Tl)-Total (mg/L)				<0.000010	
	Tin (Sn)-Total (mg/L)				<0.00010	
	Titanium (Ti)-Total (mg/L)				<0.00030	
	Uranium (U)-Total (mg/L)				<0.000010	
	Vanadium (V)-Total (mg/L)				<0.00050	
	Zinc (Zn)-Total (mg/L)				<0.0030	
	Zirconium (Zr)-Total (mg/L)				<0.00030	
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD		
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD		FIELD
	Aluminum (Al)-Dissolved (mg/L)	0.0038 ^{RRV}	<0.0010	<0.0010		0.0051
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010		0.00032
	Arsenic (As)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010		0.00079
	Barium (Ba)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050		0.0443
	Beryllium (Be)-Dissolved (mg/L)	<0.000020	<0.000020	<0.000020		<0.000040 ^{DLA}
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050		<0.00010 ^{DLA}
	Boron (B)-Dissolved (mg/L)	<0.010	<0.010	<0.010		0.026
	Cadmium (Cd)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050		0.000256
	Calcium (Ca)-Dissolved (mg/L)	<0.050	<0.050	<0.050		438
	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010		<0.00020 ^{DLA}
	Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010		0.00067
	Copper (Cu)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020		0.00197
	Iron (Fe)-Dissolved (mg/L)	<0.010	<0.010	<0.010		0.011
	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050		<0.00010 ^{DLA}
	Lithium (Li)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010		0.0029
	Magnesium (Mg)-Dissolved (mg/L)	<0.10	<0.10	<0.10		163

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1774699-1	L1774699-2	L1774699-3	L1774699-4	L1774699-5
Description	Water	Water	Water	Water	Water	Water
Sampled Date	24-MAY-16	25-MAY-16	25-MAY-16	25-MAY-16	25-MAY-16	26-MAY-16
Sampled Time	16:50	08:45	08:45	17:20	10:25	11:40
Client ID	MW09-16	MW09-18	MW09-18	MW09-24	GSI-HA-01A	MW09-02
Grouping	Analyte					
WATER						
Dissolved Metals	Manganese (Mn)-Dissolved (mg/L)	0.943	0.352	0.0275	0.118	19.8
	Mercury (Hg)-Dissolved (mg/L)	0.0000053	<0.0000050 ^{DLA}	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)	0.00024	<0.00010 ^{DLA}	0.000270	0.000456	0.00684 ^{DLA}
	Nickel (Ni)-Dissolved (mg/L)	0.0061	<0.0010 ^{DLA}	<0.00050	0.00360	<0.0025 ^{DLA}
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Dissolved (mg/L)	6.59	7.81	1.90	3.53	32.4
	Selenium (Se)-Dissolved (mg/L)	<0.00010 ^{DLA}	0.00084	0.000840	<0.000050	<0.00025 ^{DLA}
	Silicon (Si)-Dissolved (mg/L)	4.34	4.65 ^{DLA}	7.38	6.24	7.24 ^{DLA}
	Silver (Ag)-Dissolved (mg/L)	0.000064	<0.000020 ^{DLA}	<0.000010	<0.000010	<0.000050 ^{DLA}
	Sodium (Na)-Dissolved (mg/L)	7.08	11.4	7.63	4.53	27.3
	Strontium (Sr)-Dissolved (mg/L)	0.706	1.03	0.623	0.315	0.848
	Sulfur (S)-Dissolved (mg/L)	389	466	122	88.7	517
	Thallium (Tl)-Dissolved (mg/L)	0.000423	0.000290	<0.000010	<0.000010	0.000199
	Tin (Sn)-Dissolved (mg/L)	<0.00020 ^{DLA}	<0.00020 ^{DLA}	<0.00010	<0.00010	<0.00050 ^{DLA}
	Titanium (Ti)-Dissolved (mg/L)	<0.00060 ^{DLA}	<0.00060 ^{DLA}	<0.00030	0.00034	<0.0015 ^{DLA}
	Uranium (U)-Dissolved (mg/L)	0.00261	0.00702	0.00259	0.000043	0.00109
	Vanadium (V)-Dissolved (mg/L)	<0.0010 ^{DLA}	<0.0010 ^{DLA}	<0.00050	<0.00050	<0.0025 ^{DLA}
	Zinc (Zn)-Dissolved (mg/L)	6.94	0.0023	0.0055	0.0033	0.213
	Zirconium (Zr)-Dissolved (mg/L)	<0.00060 ^{DLA}	<0.00060 ^{DLA}	<0.00030	<0.00030	<0.0015 ^{DLA}

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	Description	Sampled Date	Sampled Time	Client ID	L1774699-6	L1774699-7	L1774699-8	L1774699-9	L1774699-10
					Water	Water	Water	Water	Water
		26-MAY-16	12:40	MW09-03	26-MAY-16	26-MAY-16	26-MAY-16	26-MAY-16	26-MAY-16
					12:40	13:40	08:20	11:30	10:10
					MW09-03	MW09-04	MP09-05	MW09-06	MW09-23
Grouping	Analyte								
WATER									
Dissolved Metals	Manganese (Mn)-Dissolved (mg/L)	19.5	7.76	10.1	3.04	22.4			
	Mercury (Hg)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	0.0000167	<0.000050			
	Molybdenum (Mo)-Dissolved (mg/L)	0.00554	0.00384	0.00067	0.00163	0.00221			
	Nickel (Ni)-Dissolved (mg/L)	<0.0025 ^{DLA}	<0.0010 ^{DLA}	0.0052	0.0033	<0.0025 ^{DLA}			
	Phosphorus (P)-Dissolved (mg/L)	0.060	0.082	<0.050	<0.050	<0.050			
	Potassium (K)-Dissolved (mg/L)	29.6	42.2	8.70	19.3	6.83			
	Selenium (Se)-Dissolved (mg/L)	<0.00025 ^{DLA}	<0.00010 ^{DLA}	0.00017	0.00022	<0.00025 ^{DLA}			
	Silicon (Si)-Dissolved (mg/L)	12.8	15.6	5.49	8.35	6.56			
	Silver (Ag)-Dissolved (mg/L)	<0.000050 ^{DLA}	0.000054	<0.000020 ^{DLA}	0.000120	<0.000050 ^{DLA}			
	Sodium (Na)-Dissolved (mg/L)	24.8	24.3	41.2	18.6	11.5			
	Strontium (Sr)-Dissolved (mg/L)	1.35	1.23	1.01	0.880	0.621			
	Sulfur (S)-Dissolved (mg/L)	531	512	328	348	202			
	Thallium (Tl)-Dissolved (mg/L)	0.000085	0.000116	<0.000020 ^{DLA}	0.000240	<0.000050 ^{DLA}			
	Tin (Sn)-Dissolved (mg/L)	<0.00050 ^{DLA}	<0.00020 ^{DLA}	<0.00020 ^{DLA}	<0.00020 ^{DLA}	<0.00050 ^{DLA}			
	Titanium (Ti)-Dissolved (mg/L)	<0.0015 ^{DLA}	<0.00060 ^{DLA}	0.00094	<0.00060 ^{DLA}	<0.0015 ^{DLA}			
	Uranium (U)-Dissolved (mg/L)	0.00127	0.000303	0.00167	0.00176	0.00285			
	Vanadium (V)-Dissolved (mg/L)	<0.0025 ^{DLA}	<0.0010 ^{DLA}	0.0017	<0.0010 ^{DLA}	<0.0025 ^{DLA}			
	Zinc (Zn)-Dissolved (mg/L)	0.0062	0.630	0.0156	0.383	0.0289			
	Zirconium (Zr)-Dissolved (mg/L)	<0.0015 ^{DLA}	<0.00060 ^{DLA}	0.00079	<0.00060 ^{DLA}	<0.0015 ^{DLA}			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L1774699-11	L1774699-12	L1774699-13	L1774699-14	L1774699-15
		Description	Water	Water	Water	Water	Water
		Sampled Date	26-MAY-16	26-MAY-16	26-MAY-16	25-MAY-16	26-MAY-16
		Sampled Time	15:10	08:50	09:45	17:20	08:20
		Client ID	CH-P-13-03/50	MP09-04	MW09-08	DUP-1	DUP-2
Grouping	Analyte						
WATER							
Dissolved Metals	Manganese (Mn)-Dissolved (mg/L)			0.00046	6.89	0.0224	9.84
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)			0.000212	0.000107	0.000238	0.00064
	Nickel (Ni)-Dissolved (mg/L)			<0.00050	<0.00050	<0.00050	0.0053
	Phosphorus (P)-Dissolved (mg/L)			<0.050	0.110	<0.050	<0.050
	Potassium (K)-Dissolved (mg/L)			1.89	1.92	1.96	8.59
	Selenium (Se)-Dissolved (mg/L)			0.000181	0.000096	0.000692	0.00018
	Silicon (Si)-Dissolved (mg/L)			5.68	10.7	7.19	5.46
	Silver (Ag)-Dissolved (mg/L)			<0.000010	<0.000010	<0.000010	<0.000020 ^{DLA}
	Sodium (Na)-Dissolved (mg/L)			8.02	2.36	7.36	40.4
	Strontium (Sr)-Dissolved (mg/L)			0.594	0.319	0.614	0.991
	Sulfur (S)-Dissolved (mg/L)			187	32.0	121	323
	Thallium (Tl)-Dissolved (mg/L)			<0.000010	<0.000010	<0.000010	<0.000020 ^{DLA}
	Tin (Sn)-Dissolved (mg/L)			<0.00010	<0.00010	<0.00010	<0.00020 ^{DLA}
	Titanium (Ti)-Dissolved (mg/L)			<0.00030	0.00275	<0.00030	0.00116
	Uranium (U)-Dissolved (mg/L)			0.00214	0.000067	0.00256	0.00164
	Vanadium (V)-Dissolved (mg/L)			<0.00050	0.00238	<0.00050	0.0016
	Zinc (Zn)-Dissolved (mg/L)			0.0024	0.0038	0.0012	0.0153
	Zirconium (Zr)-Dissolved (mg/L)			<0.00030	0.00064	<0.00030	0.00077

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	Description	Sampled Date	Sampled Time	Client ID	L1774699-16	L1774699-17	L1774699-18	L1774699-19	L1774699-20
					Water	Water	Water	Water	Water
		24-MAY-16	16:50	FB-1	24-MAY-16	25-MAY-16	26-MAY-16	26-MAY-16	25-MAY-16
					FB-1	FB-2	FB-3	TRAVEL BLANK-1	CH-P-13-03/50
Grouping	Analyte								
WATER									
Dissolved Metals	Manganese (Mn)-Dissolved (mg/L)				0.00023 ^{RRV}	<0.00010	<0.00010		0.318
	Mercury (Hg)-Dissolved (mg/L)				<0.0000050	<0.0000050	<0.0000050		
	Molybdenum (Mo)-Dissolved (mg/L)				<0.000050	<0.000050	<0.000050		0.00069
	Nickel (Ni)-Dissolved (mg/L)				<0.00050	<0.00050	<0.00050		0.0199
	Phosphorus (P)-Dissolved (mg/L)				<0.050	<0.050	<0.050		<0.050
	Potassium (K)-Dissolved (mg/L)				<0.10	<0.10	<0.10		11.8
	Selenium (Se)-Dissolved (mg/L)				<0.000050	<0.000050	<0.000050		0.00717
	Silicon (Si)-Dissolved (mg/L)				<0.050	<0.050	<0.050		6.10 ^{DLA}
	Silver (Ag)-Dissolved (mg/L)				<0.000010	<0.000010	<0.000010		<0.000020 ^{DLA}
	Sodium (Na)-Dissolved (mg/L)				<0.050	<0.050	<0.050		203
	Strontium (Sr)-Dissolved (mg/L)				0.00023 ^{RRV}	<0.00020	<0.00020		1.24
	Sulfur (S)-Dissolved (mg/L)				<0.50	<0.50	<0.50		554
	Thallium (Tl)-Dissolved (mg/L)				<0.000010	<0.000010	<0.000010		0.000087
	Tin (Sn)-Dissolved (mg/L)				<0.00010	<0.00010	<0.00010		0.00281
	Titanium (Ti)-Dissolved (mg/L)				<0.00030	<0.00030	<0.00030		<0.00060 ^{DLA}
	Uranium (U)-Dissolved (mg/L)				<0.000010	<0.000010	<0.000010		0.0124 ^{DLA}
	Vanadium (V)-Dissolved (mg/L)				<0.00050	<0.00050	<0.00050		<0.0010 ^{DLA}
	Zinc (Zn)-Dissolved (mg/L)				<0.0010	<0.0010	<0.0010		0.0159 ^{DLA}
	Zirconium (Zr)-Dissolved (mg/L)				<0.00030	<0.00030	<0.00030		<0.00060 ^{DLA}

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Alkalinity, Total (as CaCO3)	B	L1774699-10, -11, -12, -13, -14, -15, -17, -18, -19, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Beryllium (Be)-Dissolved	DLA	L1774699-1, -10, -12, -13, -14, -15, -16, -17, -18, -2, -20, -3, -4, -5, -6, -7, -8, -9
Duplicate	Aluminum (Al)-Dissolved	DLA	L1774699-1, -10, -12, -13, -14, -15, -16, -17, -18, -2, -20, -3, -4, -5, -6, -7, -8, -9
Duplicate	Antimony (Sb)-Dissolved	DLA	L1774699-1, -10, -12, -13, -14, -15, -16, -17, -18, -2, -20, -3, -4, -5, -6, -7, -8, -9
Duplicate	Bismuth (Bi)-Dissolved	DLA	L1774699-1, -10, -12, -13, -14, -15, -16, -17, -18, -2, -20, -3, -4, -5, -6, -7, -8, -9
Duplicate	Chromium (Cr)-Dissolved	DLA	L1774699-1, -10, -12, -13, -14, -15, -16, -17, -18, -2, -20, -3, -4, -5, -6, -7, -8, -9
Duplicate	Lead (Pb)-Dissolved	DLA	L1774699-1, -10, -12, -13, -14, -15, -16, -17, -18, -2, -20, -3, -4, -5, -6, -7, -8, -9
Duplicate	Selenium (Se)-Dissolved	DLA	L1774699-1, -10, -12, -13, -14, -15, -16, -17, -18, -2, -20, -3, -4, -5, -6, -7, -8, -9
Duplicate	Silver (Ag)-Dissolved	DLA	L1774699-1, -10, -12, -13, -14, -15, -16, -17, -18, -2, -20, -3, -4, -5, -6, -7, -8, -9
Duplicate	Thallium (Tl)-Dissolved	DLA	L1774699-1, -10, -12, -13, -14, -15, -16, -17, -18, -2, -20, -3, -4, -5, -6, -7, -8, -9
Duplicate	Tin (Sn)-Dissolved	DLA	L1774699-1, -10, -12, -13, -14, -15, -16, -17, -18, -2, -20, -3, -4, -5, -6, -7, -8, -9
Duplicate	Titanium (Ti)-Dissolved	DLA	L1774699-1, -10, -12, -13, -14, -15, -16, -17, -18, -2, -20, -3, -4, -5, -6, -7, -8, -9
Duplicate	Vanadium (V)-Dissolved	DLA	L1774699-1, -10, -12, -13, -14, -15, -16, -17, -18, -2, -20, -3, -4, -5, -6, -7, -8, -9
Duplicate	Zirconium (Zr)-Dissolved	DLA	L1774699-1, -10, -12, -13, -14, -15, -16, -17, -18, -2, -20, -3, -4, -5, -6, -7, -8, -9
Duplicate	Beryllium (Be)-Dissolved	DLA	L1774699-1, -10, -12, -13, -14, -15, -16, -17, -18, -2, -20, -3, -4, -5, -6, -7, -8, -9
Duplicate	Aluminum (Al)-Dissolved	DLA	L1774699-1, -10, -12, -13, -14, -15, -16, -17, -18, -2, -20, -3, -4, -5, -6, -7, -8, -9
Duplicate	Bismuth (Bi)-Dissolved	DLA	L1774699-1, -10, -12, -13, -14, -15, -16, -17, -18, -2, -20, -3, -4, -5, -6, -7, -8, -9
Duplicate	Boron (B)-Dissolved	DLA	L1774699-1, -10, -12, -13, -14, -15, -16, -17, -18, -2, -20, -3, -4, -5, -6, -7, -8, -9
Duplicate	Chromium (Cr)-Dissolved	DLA	L1774699-1, -10, -12, -13, -14, -15, -16, -17, -18, -2, -20, -3, -4, -5, -6, -7, -8, -9
Duplicate	Cobalt (Co)-Dissolved	DLA	L1774699-1, -10, -12, -13, -14, -15, -16, -17, -18, -2, -20, -3, -4, -5, -6, -7, -8, -9
Duplicate	Copper (Cu)-Dissolved	DLA	L1774699-1, -10, -12, -13, -14, -15, -16, -17, -18, -2, -20, -3, -4, -5, -6, -7, -8, -9
Duplicate	Lead (Pb)-Dissolved	DLA	L1774699-1, -10, -12, -13, -14, -15, -16, -17, -18, -2, -20, -3, -4, -5, -6, -7, -8, -9
Duplicate	Molybdenum (Mo)-Dissolved	DLA	L1774699-1, -10, -12, -13, -14, -15, -16, -17, -18, -2, -20, -3, -4, -5, -6, -7, -8, -9
Duplicate	Nickel (Ni)-Dissolved	DLA	L1774699-1, -10, -12, -13, -14, -15, -16, -17, -18, -2, -20, -3, -4, -5, -6, -7, -8, -9
Duplicate	Silver (Ag)-Dissolved	DLA	L1774699-1, -10, -12, -13, -14, -15, -16, -17, -18, -2, -20, -3, -4, -5, -6, -7, -8, -9
Duplicate	Tin (Sn)-Dissolved	DLA	L1774699-1, -10, -12, -13, -14, -15, -16, -17, -18, -2, -20, -3, -4, -5, -6, -7, -8, -9
Duplicate	Titanium (Ti)-Dissolved	DLA	L1774699-1, -10, -12, -13, -14, -15, -16, -17, -18, -2, -20, -3, -4, -5, -6, -7, -8, -9
Duplicate	Vanadium (V)-Dissolved	DLA	L1774699-1, -10, -12, -13, -14, -15, -16, -17, -18, -2, -20, -3, -4, -5, -6, -7, -8, -9
Duplicate	Zirconium (Zr)-Dissolved	DLA	L1774699-1, -10, -12, -13, -14, -15, -16, -17, -18, -2, -20, -3, -4, -5, -6, -7, -8, -9
Duplicate	Thiocyanate (SCN)	DLM	L1774699-19
Duplicate	Cadmium (Cd)-Dissolved	DLM	L1774699-1, -10, -12, -13, -14, -15, -16, -17, -18, -2, -20, -3, -4, -5, -6, -7, -8, -9
Duplicate	Cyanide, Weak Acid Diss	HTP	L1774699-1, -14, -16, -17, -2, -3, -4
Matrix Spike	Sulfate (SO4)	MS-B	L1774699-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -3, -4, -5, -6, -7, -8, -9

Reference Information

	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1774699-1, -10, -12, -13, -14, -15, -16, -17, -18, -2, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Iron (Fe)-Dissolved	MS-B	L1774699-1, -10, -12, -13, -14, -15, -16, -17, -18, -2, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L1774699-1, -10, -12, -13, -14, -15, -16, -17, -18, -2, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Silicon (Si)-Dissolved	MS-B	L1774699-1, -10, -12, -13, -14, -15, -16, -17, -18, -2, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sulfur (S)-Dissolved	MS-B	L1774699-1, -10, -12, -13, -14, -15, -16, -17, -18, -2, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1774699-1, -10, -12, -13, -14, -15, -16, -17, -18, -2, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L1774699-1, -10, -12, -13, -14, -15, -16, -17, -18, -2, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1774699-1, -10, -12, -13, -14, -15, -16, -17, -18, -2, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1774699-1, -10, -12, -13, -14, -15, -16, -17, -18, -2, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Total	MS-B	L1774699-19
Matrix Spike	Selenium (Se)-Total	MS-B	L1774699-19
Matrix Spike	Strontium (Sr)-Total	MS-B	L1774699-19
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1774699-1, -10, -12, -13, -14, -15, -16, -17, -18, -2, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1774699-1, -10, -12, -13, -14, -15, -16, -17, -18, -2, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1774699-1, -10, -12, -13, -14, -15, -16, -17, -18, -2, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Total Inorganic Carbon	MS-B	L1774699-10, -12, -13, -14, -15, -8, -9
Matrix Spike	Silicon (Si)-Dissolved	MS-B	L1774699-1, -10, -12, -13, -14, -15, -16, -17, -18, -2, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1774699-1, -10, -12, -13, -14, -15, -16, -17, -18, -2, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Total Organic Carbon	MS-B	L1774699-12, -14, -16, -17, -18, -19, -4, -5, -6, -7, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1774699-1, -10, -12, -13, -14, -15, -16, -17, -18, -2, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L1774699-1, -10, -12, -13, -14, -15, -16, -17, -18, -2, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1774699-1, -10, -12, -13, -14, -15, -16, -17, -18, -2, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1774699-1, -10, -12, -13, -14, -15, -16, -17, -18, -2, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Antimony (Sb)-Dissolved	MS-B	L1774699-1, -10, -12, -13, -14, -15, -16, -17, -18, -2, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1774699-1, -10, -12, -13, -14, -15, -16, -17, -18, -2, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L1774699-1, -10, -12, -13, -14, -15, -16, -17, -18, -2, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1774699-1, -10, -12, -13, -14, -15, -16, -17, -18, -2, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1774699-1, -10, -12, -13, -14, -15, -16, -17, -18, -2, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Total Inorganic Carbon	MS-B	L1774699-16, -17, -18, -19
Matrix Spike	Arsenic (As)-Dissolved	MS-B	L1774699-1, -10, -12, -13, -14, -15, -16, -17, -18, -2, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1774699-1, -10, -12, -13, -14, -15, -16, -17, -18, -2, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L1774699-1, -10, -12, -13, -14, -15, -16, -17, -18, -2, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Molybdenum (Mo)-Dissolved	MS-B	L1774699-1, -10, -12, -13, -14, -15, -16, -17, -18, -2, -20, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1774699-1, -10, -12, -13, -14, -15, -16, -17, -18, -2, -20, -3, -4, -5, -6, -7, -8, -9
	Strontium (Sr)-Dissolved		L1774699-1, -10, -12, -13, -14, -15, -16, -17, -18, -2, -20,

Reference Information

	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike		MS-B	-3, -4, -5, -6, -7, -8, -9
Matrix Spike	Total Kjeldahl Nitrogen	MSTN	L1774699-19
Duplicate	Total Kjeldahl Nitrogen	TKND	L1774699-19

Qualifiers for Individual Parameters Listed:

Qualifier	Description
B	Method Blank exceeds ALS DQO. All associated sample results are at least 5 times greater than blank levels and are considered reliable.
DLA	Detection Limit adjusted for required dilution
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLM	Detection Limit Adjusted due to sample matrix effects (e.g. chemical interference, colour, turbidity).
HTP	Sample preparation or preservation hold time was exceeded.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
MSTN	TKN Matrix Spike recovery was low due to interference from high nitrate, which causes negative bias on TKN.
RRV	Reported Result Verified By Repeat Analysis
TKND	TKN duplication was poor due to interference from high nitrate, which causes negative bias on TKN.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity
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.			
BE-D-L-CCMS-VA	Water	Diss. Be (low) 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.			
BE-T-L-CCMS-VA	Water	Total Be (Low) 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.			
CARBONS-TIC-VA	Water	Total inorganic carbon by CO2 purge	APHA 5310B TOTAL ORGANIC CARBON (TOC)
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".			
CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".			
CL-IC-N-WR	Water	Chloride in Water by IC	EPA 300.1 (mod)
Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.			
CN-FREE-CFA-VA	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-SCN-VA	Water	Thiocyanate by Colour	APHA 4500-CN CYANIDE
This analysis is carried out using procedures adapted from APHA Method 4500-CN- M "Thiocyanate" Thiocyanate is determined by the ferric nitrate colourimetric method.			
CN-T-CFA-VA	Water	Total Cyanide in water by CFA	ISO 14403:2002
This analysis is carried out using procedures adapted from ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by in-line UV digestion along with sample distillation and final determination by colourimetric analysis. Method Limitation: This method is susceptible to interference from thiocyanate (SCN). If SCN is present in the sample, there could be a positive interference with this method, but it would be less than 1% and could be as low as zero.			
CN-WAD-CFA-VA	Water	Weak Acid Diss. Cyanide in water by CFA	APHA 4500-CN CYANIDE
This analysis is carried out using procedures adapted from APHA Method 4500-CN I. "Weak Acid Dissociable Cyanide". Weak Acid Dissociable (WAD) cyanide is determined by in-line sample distillation with final determination by colourimetric analysis.			
EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

Reference Information

This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

F-IC-N-WR 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-VA Water Hardness APHA 2340B

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-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/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 or CVAFS.

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

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

IONBALANCE-VA Water Ion Balance Calculation APHA 1030E

Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

Ion Balance (%) = [Cation Sum-Anion Sum] / [Cation Sum+Anion Sum]

MET-D-CCMS-VA 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.

MET-DIS-LOW-ICP-VA Water Dissolved Metals in Water by ICPOES EPA 3005A/6010B

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). The procedure involves filtration (EPA Method 3005A) and analysis by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

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-TOT-LOW-ICP-VA Water Total Metals in Water by ICPOES EPA 3005A/6010B

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). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

NH3-F-VA Water Ammonia in Water by Fluorescence APHA 4500 NH3-NITROGEN (AMMONIA)

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-F-VA 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.

NO2-L-IC-N-WR 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.

NO3-L-IC-N-WR Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

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

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H "pH Value"

Reference Information

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

S-DIS-ICP-VA Water Dissolved Sulfur in Water by ICPOES EPA SW-846 3005A/6010B

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). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

Method Limitation: This method will not give total sulfur results for all samples. Sulfide or other volatile forms of sulfur that may be present in submitted samples, is often lost during the sampling, preservation and analysis process. The data reported as total and/or dissolved sulfur represents all non-volatile forms of sulfur present in a particular sample.

S-TOT-ICP-VA Water Total Sulfur in Water by ICPOES EPA SW-846 3005A/6010B

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). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

Method Limitation: This method will not give total sulfur results for all samples. Sulfide or other volatile forms of sulfur that may be present in submitted samples, is often lost during the sampling, preservation and analysis process. The data reported as total and/or dissolved sulfur represents all non-volatile forms of sulfur present in a particular sample.

SO4-IC-N-WR Water Sulfate in Water by IC EPA 300.1 (mod)

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

TKN-F-VA Water TKN in Water by Fluorescence APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

** 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
WR	ALS ENVIRONMENTAL - WHITEHORSE, YUKON, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

1 2

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

mg/kg - milligrams per kilogram based on dry weight of sample.

mg/kg wwt - milligrams per kilogram based on wet weight of sample.

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.

mg/L - milligrams per litre.

< - Less than.

D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).

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.



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Report To		Report For			w (Rush Turnaround Time (TAT) is not available for all tests)												
Company: Hemmera Environchem Inc.		Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input checked="" type="checkbox"/> EDD (DIGITAL)			R <input checked="" type="checkbox"/> Regular (Standard TAT if received by 3 pm - business days)												
Contact: Natasha Sandys		Quality Control (QC) Report with Report <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			P <input type="checkbox"/> Priority (2-4 bus. days if received by 3pm) 50% surcharge - contact ALS to confirm TAT												
Address: 230 - 2237 2nd Avenue Whitehorse, YT		Criteria on Report - provide details below if box checked			E <input type="checkbox"/> Emergency (1-2 bus. days if received by 3pm) 100% surcharge - contact ALS to confirm TAT												
Phone: 867-456-4865		Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX			E2 <input type="checkbox"/> Same day or weekend emergency - contact ALS to confirm TAT and surcharge												
		Email 1 or Fax nsandys@hemmera.com			Specify Date Required for E2, E or P:												
		Email 2 chris@elr.ca			Analysis Request												
Invoice To Same as Report To <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		Invoice Distribution			Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below												
Copy of Invoice with Report <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input checked="" type="checkbox"/> MAIL <input type="checkbox"/> FAX															
Company: Hemmera Environchem Inc.		Email 1 or Fax nsandys@hemmera.com															
Contact: Natasha Sandys		Email 2 chris@elr.ca															
Project Information		Oil and Gas Required Fields (client use)															
ALS Quote #: Q56042		Approver ID: [REDACTED] Cost Center: [REDACTED]															
Job #: 1343-005.27		GL Account: [REDACTED] Routing Code: [REDACTED]															
PO / AFE:		Activity Code: [REDACTED]															
LSD:		Location: [REDACTED]															
ALS Lab Work Order # (lab use only)		ALS Contact:			Sampler:			JC, MM, NB, KB									
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	Dissolved Metals, Hardness	Dissolved Mercury	Nitrate, Nitrite, Total Kjeldahl N (TKN)	Cl, F, Sulfate, conductivity, pH, alkalinity	Anion Sum, Cation Sum, Calcium/Anion Balance	Cyanide - Weak Acid Diss., Total, Free	Ammonia N (total), Total Organic Carbon	Thiocyanate (SCN)	Total Inorganic Carbon	Number of Containers	
	MW09-16			24-May-16	18:50	Water	R	R	R	R	R	R	R	R	R	7	
	MW09-18			25-May-16	8:45	Water	R	R	R	R	R	R	R	R	R	7	
	MW09-24			25-May-16	17:20	Water	R	R	R	R	R	R	R	R	R	7	
	GSI-HA-01A			25-May-16	10:25	Water	R	R	R	R	R	R	R	R	R	7	
	MW09-02			26-May-16	11:40	Water	R	R	R	R	R	R	R	R	R	7	
	MW09-03			26-May-16	12:40	Water	R	R	R	R	R	R	R	R	R	7	
	MW09-04			26-May-16	13:40	Water	R	R	R	R	R	R	R	R	R	7	
	MP09-05			26-May-16	8:20	Water	R	R	R	R	R	R	R	R	R	7	
	MW09-06			26-May-16	11:30	Water	R	R	R	R	R	R	R	R	R	7	
	MW09-23			26-May-16	10:10	Water	R	R	R	R	R	R	R	R	R	7	
	CH-P-13-03/50			26-May-16	15:10	Water		R	R	R	R					2	
	MP09-04			26-May-16	8:50	Water	R	R	R	R	R	R	R	R	R	7	
Drinking Water (DW) Samples¹ (client use)				Special Instructions / Specify Criteria to add on report (client Use)				SAMPLE CONDITION AS RECEIVED (lab use only)									
Are samples taken from a Regulated DW System? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No				- Please send ELR EQWin EDD file with regular results report.				Frozen <input type="checkbox"/> SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/>									
Are samples for human drinking water use? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No								Ice packs Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/>									
								Cooling Initiated <input type="checkbox"/>									
								INITIAL COOLER TEMPERATURES °C					FINAL COOLER TEMPERATURES °C				
								10.9 10.0 10.2									
SHIPMENT RELEASE (client use)				INITIAL SHIPMENT RECEPTION (lab use only)				FINAL SHIPMENT RECEPTION (lab use only)									
Released by: <i>GMMK</i>		Date: 27 May 16	Time: 11:45	Received by: <i>[Signature]</i>		Date: 27 May 16	Time: 11:45	Received by:			Date:			Time:			



L1774699-COFC

Report To		Report Format / D.					(Rush Turnaround Time (TAT) is not available for all tests)										
Company: Hemmera Environchem Inc.		Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input checked="" type="checkbox"/> EDD (DIGITAL)					R <input checked="" type="checkbox"/> Regular (Standard TAT if received by 3 pm - business days)										
Contact: Natasha Sandys		Quality Control (QC) Report with Report <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No					P <input type="checkbox"/> Priority (2-4 bus. days if received by 3pm) 50% surcharge - contact ALS to confirm TAT										
Address: 230 - 2237 2nd Avenue Whitehorse, YT		<input type="checkbox"/> Criteria on Report - provide details below if box checked					E <input type="checkbox"/> Emergency (1-2 bus. days if received by 3pm) 100% surcharge - contact ALS to confirm TAT										
Phone: 867-456-4865		Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX					E2 <input type="checkbox"/> Same day or weekend emergency - contact ALS to confirm TAT and surcharge										
		Email 1 or Fax nsandys@hemmera.com					Specify Date Required for E2, E or P:										
		Email 2 chris@elr.ca					Analysis Request										
Invoice To		Invoice Distribution					Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below										
Same as Report To <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		Select Invoice Distribution: <input checked="" type="checkbox"/> EMAIL <input checked="" type="checkbox"/> MAIL <input type="checkbox"/> FAX					F/P F/P										
Copy of Invoice with Report <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Email 1 or Fax nsandys@hemmera.com					P P P										
Company: Hemmera Environchem Inc.		Email 2 chris@elr.ca					Dissolved Metals, Hardness										
Contact: Natasha Sandys		Project Information					Dissolved Mercury										
		Oil and Gas Required Fields (client use)					Nitrate, Nitrite, Total Kjeldahl N (TKN)										
ALS Quote #: Q56042		Approver ID: [REDACTED] Cost Center: [REDACTED]					Cl, F1, Sulfate, conductivity, pH, alkalinity										
Job #: 1343-005.27		GL Account: [REDACTED] Routing Code: [REDACTED]					Anion Sum, Cation Sum, Cation/Anion Balance										
PO / AFE:		Activity Code: [REDACTED]					Cyanide - Weak Acid Diss., Total, Free										
LSD:		Location: [REDACTED]					Ammonia N (total), Total Organic Carbon										
ALS Lab Work Order # (lab use only)		ALS Contact:					Thiocyanate (SCN)										
		Sampler: JC, MM, NB, KB					Total Inorganic Carbon										
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			
[REDACTED]		MW09-08			26-May-16	9:45	Water	R	R	R	R	R	R	R	R	R	7
[REDACTED]		Dup-1			25-May-16	17:20	Water	R	R	R	R	R	R	R	R	R	7
[REDACTED]		Dup-2			26-May-16	8:20	Water	R	R	R	R	R	R	R	R	R	7
[REDACTED]		FB-1			24-May-16	16:50	Water	R	R	R	R	R	R	R	R	R	7
[REDACTED]		FB-2			25-May-16	18:10	Water	R	R	R	R	R	R	R	R	R	7
[REDACTED]		FB-3			26-May-16	17:00	Water	R	R	R	R	R	R	R	R	R	7
[REDACTED]		Travel Blank - 1			26-May-16	-	Water	R	R	R	R	R	R	R	R	R	9
[REDACTED]		CH-P-13-03/50			25-May-16	17:20	Water	R									1
[REDACTED]							Water										
[REDACTED]							Water										
[REDACTED]							Water										
[REDACTED]							Water										
[REDACTED]							Water										
Drinking Water (DW) Samples ¹ (client use)		Special Instructions / Specify Criteria to add on report (client use)					SAMPLE CONDITION AS RECEIVED (lab use only)										
Are samples taken from a Regulated DW System? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No		Please send ELR EQWin EDD file with regular results report.					Frozen <input type="checkbox"/> SIF Observations Yes <input type="checkbox"/> No <input type="checkbox"/>										
Are samples for human drinking water use? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No							Ice packs Yes <input type="checkbox"/> No <input type="checkbox"/> Custody seal intact Yes <input type="checkbox"/> No <input type="checkbox"/>										
							Cooling Initiated <input type="checkbox"/>										
							INITIAL COOLER TEMPERATURES °C					FINAL COOLER TEMPERATURES °C					
												4.3 4.6					
SHIPMENT RELEASE (client use)		INITIAL SHIPMENT RECEPTION (lab use only)					FINAL SHIPMENT RECEPTION (lab use only)										
Released by:		Date: 27 May 16		Time:		Received by: Shawn		Date: May 28		Time: 1235		Received by:		Date:		Time:	

Short Holding Time
Rush Processing



HEMMERA ENVIROCHEM INC.
ATTN: Natasha Sandys
230 - 2237 2nd Avenue
Whitehorse YK Y1A 0K7

Date Received: 30-MAY-16
Report Date: 15-JUL-16 13:27 (MT)
Version: FINAL REV. 3

Client Phone: 867-456-4865

Certificate of Analysis

Lab Work Order #: L1775300
Project P.O. #: NOT SUBMITTED
Job Reference: 1343-005.27
C of C Numbers: 1
Legal Site Desc:

Comments:

15-JUL-2016 This report replaces the previous version and includes a corrected TKN value for the Travel Blank sample.

Brent Mack, B.Sc.
Account Manager

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ALS CANADA LTD Part of the ALS Group A Campbell Brothers Limited Company

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID						
	L1775300-1 Water 27-MAY-16 12:20 GSI-PC-03B		L1775300-2 Water 26-MAY-16 12:45 MP09-14		L1775300-3 Water 27-MAY-16 11:50 MP09-08	L1775300-4 Water 25-MAY-16 14:10 GSI-HA-04A	
	L1775300-5 Water 27-MAY-16 08:10 GSI-HA-04A						
Grouping	Analyte						
WATER							
Physical Tests	Conductivity (uS/cm)	3920		726		347	
	Hardness (as CaCO3) (mg/L)	2790	144	413	262		
	pH (pH)	8.12		7.53		7.59	
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	900		225		136	
	Ammonia, Total (as N) (mg/L)			0.0318			
	Chloride (Cl) (mg/L)	<10 ^{DLDS}		<0.50		<0.50	
	Fluoride (F) (mg/L)	<0.40 ^{DLDS}		0.077		0.097	
	Nitrate (as N) (mg/L)	<0.10 ^{DLDS}		<0.0050		0.0059	
	Nitrite (as N) (mg/L)	<0.020 ^{DLDS}		<0.0010		<0.0010	
	Total Kjeldahl Nitrogen (mg/L)			0.233			
	Sulfate (SO4) (mg/L)	2030		172		68.3	
	Anion Sum (meq/L)	60.3		8.08			
	Cation Sum (meq/L)	62.0		8.65			
	Cation - Anion Balance (%)	1.3		3.4			
	Cyanides	Cyanide, Weak Acid Diss (mg/L)	<0.0050		<0.0050		<0.0050
		Cyanide, Total (mg/L)	<0.0050		<0.0050		<0.0050
Thiocyanate (SCN) (mg/L)				<0.50			
Cyanide, Free (mg/L)		<0.0050		<0.0050		<0.0050	
Organic / Inorganic Carbon	Total Inorganic Carbon (mg/L)			60.4			
	Total Organic Carbon (mg/L)			5.99			
Total Metals	Aluminum (Al)-Total (mg/L)						
	Antimony (Sb)-Total (mg/L)						
	Arsenic (As)-Total (mg/L)						
	Barium (Ba)-Total (mg/L)						
	Beryllium (Be)-Total (mg/L)						
	Bismuth (Bi)-Total (mg/L)						
	Boron (B)-Total (mg/L)						
	Cadmium (Cd)-Total (mg/L)						
	Calcium (Ca)-Total (mg/L)						
	Chromium (Cr)-Total (mg/L)						
	Cobalt (Co)-Total (mg/L)						
	Copper (Cu)-Total (mg/L)						
	Iron (Fe)-Total (mg/L)						
	Lead (Pb)-Total (mg/L)						
	Lithium (Li)-Total (mg/L)						
	Magnesium (Mg)-Total (mg/L)						

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID	L1775300-6 Water 27-MAY-16 16:10 GSI-HA-04A	L1775300-7 Water 27-MAY-16 10:10 MW09-22	L1775300-8 Water 27-MAY-16 16:25 MW09-22	L1775300-9 Water 27-MAY-16 12:50 DUP-3	L1775300-10 Water 27-MAY-16 10:10 FB-4
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (uS/cm)			937	728	<2.0
	Hardness (as CaCO3) (mg/L)		471		414	<0.50
	pH (pH)			7.03	7.45	5.41
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)			165	225	<1.0
	Ammonia, Total (as N) (mg/L)	0.0641	0.702		0.0345	<0.0050
	Chloride (Cl) (mg/L)			<1.0 ^{DLDS}	0.75	<0.50
	Fluoride (F) (mg/L)			0.046	0.088	<0.020
	Nitrate (as N) (mg/L)			0.330	<0.0050	<0.0050
	Nitrite (as N) (mg/L)			0.0188	<0.0010	<0.0010
	Total Kjeldahl Nitrogen (mg/L)	1.38	2.45		0.265	<0.050
	Sulfate (SO4) (mg/L)			343	172	<0.30
	Anion Sum (meq/L)				8.10	<0.10
	Cation Sum (meq/L)				8.66	<0.10
	Cation - Anion Balance (%)				3.3	0.0
Cyanides	Cyanide, Weak Acid Diss (mg/L)		<0.0050		<0.0050	<0.0050
	Cyanide, Total (mg/L)		0.0177		<0.0050	<0.0050
	Thiocyanate (SCN) (mg/L)	<0.50	<0.50		<0.50	<0.50
	Cyanide, Free (mg/L)		<0.0050		<0.0050	<0.0050
Organic / Inorganic Carbon	Total Inorganic Carbon (mg/L)	30.8		59.2	61.3	<0.50
	Total Organic Carbon (mg/L)	18.0	18.5		6.18	<0.50
Total Metals	Aluminum (Al)-Total (mg/L)					
	Antimony (Sb)-Total (mg/L)					
	Arsenic (As)-Total (mg/L)					
	Barium (Ba)-Total (mg/L)					
	Beryllium (Be)-Total (mg/L)					
	Bismuth (Bi)-Total (mg/L)					
	Boron (B)-Total (mg/L)					
	Cadmium (Cd)-Total (mg/L)					
	Calcium (Ca)-Total (mg/L)					
	Chromium (Cr)-Total (mg/L)					
	Cobalt (Co)-Total (mg/L)					
	Copper (Cu)-Total (mg/L)					
	Iron (Fe)-Total (mg/L)					
	Lead (Pb)-Total (mg/L)					
	Lithium (Li)-Total (mg/L)					
	Magnesium (Mg)-Total (mg/L)					

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID	L1775300-11 Water 27-MAY-16 TRAVEL BLANK			
Grouping	Analyte				
WATER					
Physical Tests	Conductivity (uS/cm)	<2.0			
	Hardness (as CaCO3) (mg/L)	<0.50			
	pH (pH)	5.47			
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	<1.0			
	Ammonia, Total (as N) (mg/L)	<0.0050			
	Chloride (Cl) (mg/L)	<0.50			
	Fluoride (F) (mg/L)	<0.020			
	Nitrate (as N) (mg/L)	<0.0050			
	Nitrite (as N) (mg/L)	<0.0010			
	Total Kjeldahl Nitrogen (mg/L)	<0.050			
	Sulfate (SO4) (mg/L)	<0.30			
	Anion Sum (meq/L)	<0.10			
	Cation Sum (meq/L)	<0.10			
	Cation - Anion Balance (%)	0.0			
Cyanides	Cyanide, Weak Acid Diss (mg/L)	<0.0050			
	Cyanide, Total (mg/L)	<0.0050			
	Thiocyanate (SCN) (mg/L)	<0.50			
	Cyanide, Free (mg/L)	<0.0050			
Organic / Inorganic Carbon	Total Inorganic Carbon (mg/L)	<0.50			
	Total Organic Carbon (mg/L)	<0.50			
Total Metals	Aluminum (Al)-Total (mg/L)	<0.0030			
	Antimony (Sb)-Total (mg/L)	<0.00010			
	Arsenic (As)-Total (mg/L)	<0.00010			
	Barium (Ba)-Total (mg/L)	<0.000050			
	Beryllium (Be)-Total (mg/L)	<0.000020			
	Bismuth (Bi)-Total (mg/L)	<0.000050			
	Boron (B)-Total (mg/L)	<0.010			
	Cadmium (Cd)-Total (mg/L)	<0.0000050			
	Calcium (Ca)-Total (mg/L)	<0.050			
	Chromium (Cr)-Total (mg/L)	<0.00010			
	Cobalt (Co)-Total (mg/L)	<0.00010			
	Copper (Cu)-Total (mg/L)	<0.00050			
	Iron (Fe)-Total (mg/L)	<0.010			
	Lead (Pb)-Total (mg/L)	<0.000050			
	Lithium (Li)-Total (mg/L)	<0.0010			
	Magnesium (Mg)-Total (mg/L)	<0.10			

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L1775300-1	L1775300-2	L1775300-3	L1775300-4	L1775300-5
		Description	Water	Water	Water	Water	Water
		Sampled Date	27-MAY-16	26-MAY-16	27-MAY-16	25-MAY-16	27-MAY-16
		Sampled Time	12:20	12:45	11:50	14:10	08:10
		Client ID	GSI-PC-03B	MP09-14	MP09-08	GSI-HA-04A	GSI-HA-04A
Grouping	Analyte						
WATER							
Total Metals	Manganese (Mn)-Total (mg/L)						
	Mercury (Hg)-Total (mg/L)						
	Molybdenum (Mo)-Total (mg/L)						
	Nickel (Ni)-Total (mg/L)						
	Phosphorus (P)-Total (mg/L)						
	Potassium (K)-Total (mg/L)						
	Selenium (Se)-Total (mg/L)						
	Silicon (Si)-Total (mg/L)						
	Silver (Ag)-Total (mg/L)						
	Sodium (Na)-Total (mg/L)						
	Strontium (Sr)-Total (mg/L)						
	Sulfur (S)-Total (mg/L)						
	Thallium (Tl)-Total (mg/L)						
	Tin (Sn)-Total (mg/L)						
	Titanium (Ti)-Total (mg/L)						
	Uranium (U)-Total (mg/L)						
	Vanadium (V)-Total (mg/L)						
	Zinc (Zn)-Total (mg/L)						
	Zirconium (Zr)-Total (mg/L)						
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD			FIELD	FIELD	
	Dissolved Metals Filtration Location	FIELD		FIELD	FIELD	FIELD	
	Aluminum (Al)-Dissolved (mg/L)	0.0315	0.0021	0.0046	0.0232		
	Antimony (Sb)-Dissolved (mg/L)	0.00296	0.00481	<0.00010	0.00090		
	Arsenic (As)-Dissolved (mg/L)	0.0874	0.809	0.0148	0.0249		
	Barium (Ba)-Dissolved (mg/L)	0.126	0.0237	0.0446	0.0531		
	Beryllium (Be)-Dissolved (mg/L)	<0.000040 ^{DLA}	<0.000020	<0.000020	<0.000020		
	Bismuth (Bi)-Dissolved (mg/L)	<0.00010 ^{DLA}	<0.000050	<0.000050	<0.000050		
	Boron (B)-Dissolved (mg/L)	0.036	0.020	<0.010	<0.010		
	Cadmium (Cd)-Dissolved (mg/L)	0.000135	0.0000467	<0.0000050	0.0000330		
	Calcium (Ca)-Dissolved (mg/L)	125	44.7	114	67.0		
	Chromium (Cr)-Dissolved (mg/L)	0.0290	0.00015	<0.00010	0.00114		
	Cobalt (Co)-Dissolved (mg/L)	0.00579	0.00040	0.00065	0.00025		
	Copper (Cu)-Dissolved (mg/L)	0.00541	0.00043	<0.00020	0.00164		
	Iron (Fe)-Dissolved (mg/L)	7.28	0.600	1.11	1.80		
	Lead (Pb)-Dissolved (mg/L)	0.00080	0.000650	<0.000050	0.000315		
	Lithium (Li)-Dissolved (mg/L)	0.0469	0.0022	0.0036	0.0020		
	Magnesium (Mg)-Dissolved (mg/L)	603	7.83	30.9	23.1		

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID	L1775300-6 Water 27-MAY-16 16:10 GSI-HA-04A	L1775300-7 Water 27-MAY-16 10:10 MW09-22	L1775300-8 Water 27-MAY-16 16:25 MW09-22	L1775300-9 Water 27-MAY-16 12:50 DUP-3	L1775300-10 Water 27-MAY-16 10:10 FB-4
Grouping	Analyte					
WATER						
Total Metals	Manganese (Mn)-Total (mg/L)					
	Mercury (Hg)-Total (mg/L)					
	Molybdenum (Mo)-Total (mg/L)					
	Nickel (Ni)-Total (mg/L)					
	Phosphorus (P)-Total (mg/L)					
	Potassium (K)-Total (mg/L)					
	Selenium (Se)-Total (mg/L)					
	Silicon (Si)-Total (mg/L)					
	Silver (Ag)-Total (mg/L)					
	Sodium (Na)-Total (mg/L)					
	Strontium (Sr)-Total (mg/L)					
	Sulfur (S)-Total (mg/L)					
	Thallium (Tl)-Total (mg/L)					
	Tin (Sn)-Total (mg/L)					
	Titanium (Ti)-Total (mg/L)					
	Uranium (U)-Total (mg/L)					
	Vanadium (V)-Total (mg/L)					
	Zinc (Zn)-Total (mg/L)					
	Zirconium (Zr)-Total (mg/L)					
Dissolved Metals	Dissolved Mercury Filtration Location		FIELD		FIELD	FIELD
	Dissolved Metals Filtration Location		FIELD		FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)		0.0275		0.0051	<0.0010
	Antimony (Sb)-Dissolved (mg/L)		0.00031		<0.00010	<0.00010
	Arsenic (As)-Dissolved (mg/L)		0.00206		0.0152	<0.00010
	Barium (Ba)-Dissolved (mg/L)		0.0829		0.0434	<0.000050
	Beryllium (Be)-Dissolved (mg/L)		<0.000020		<0.000020	<0.000020
	Bismuth (Bi)-Dissolved (mg/L)		<0.000050		<0.000050	<0.000050
	Boron (B)-Dissolved (mg/L)		0.029		<0.010	<0.010
	Cadmium (Cd)-Dissolved (mg/L)		0.0000550		<0.0000050	<0.0000050
	Calcium (Ca)-Dissolved (mg/L)		167		115	<0.050
	Chromium (Cr)-Dissolved (mg/L)		0.00047		<0.00010	<0.00010
	Cobalt (Co)-Dissolved (mg/L)		0.00884		0.00066	<0.00010
	Copper (Cu)-Dissolved (mg/L)		0.00348		<0.00020	<0.00020
	Iron (Fe)-Dissolved (mg/L)		0.936		1.11	<0.010
	Lead (Pb)-Dissolved (mg/L)		0.000081		<0.000050	<0.000050
	Lithium (Li)-Dissolved (mg/L)		<0.0010		0.0034	<0.0010
	Magnesium (Mg)-Dissolved (mg/L)		13.0		30.9	<0.10

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID	L1775300-11 Water 27-MAY-16 TRAVEL BLANK			
Grouping	Analyte				
WATER					
Total Metals	Manganese (Mn)-Total (mg/L)	<0.00010			
	Mercury (Hg)-Total (mg/L)	<0.0000050			
	Molybdenum (Mo)-Total (mg/L)	<0.000050			
	Nickel (Ni)-Total (mg/L)	<0.00050			
	Phosphorus (P)-Total (mg/L)	<0.050			
	Potassium (K)-Total (mg/L)	<0.10			
	Selenium (Se)-Total (mg/L)	<0.000050			
	Silicon (Si)-Total (mg/L)	<0.050			
	Silver (Ag)-Total (mg/L)	<0.000010			
	Sodium (Na)-Total (mg/L)	<0.050			
	Strontium (Sr)-Total (mg/L)	<0.00020			
	Sulfur (S)-Total (mg/L)	<0.50			
	Thallium (Tl)-Total (mg/L)	<0.000010			
	Tin (Sn)-Total (mg/L)	<0.00010			
	Titanium (Ti)-Total (mg/L)	<0.00030			
	Uranium (U)-Total (mg/L)	<0.000010			
	Vanadium (V)-Total (mg/L)	<0.00050			
	Zinc (Zn)-Total (mg/L)	<0.0030			
	Zirconium (Zr)-Total (mg/L)	<0.00030			
Dissolved Metals	Dissolved Mercury Filtration Location				
	Dissolved Metals Filtration Location				
	Aluminum (Al)-Dissolved (mg/L)				
	Antimony (Sb)-Dissolved (mg/L)				
	Arsenic (As)-Dissolved (mg/L)				
	Barium (Ba)-Dissolved (mg/L)				
	Beryllium (Be)-Dissolved (mg/L)				
	Bismuth (Bi)-Dissolved (mg/L)				
	Boron (B)-Dissolved (mg/L)				
	Cadmium (Cd)-Dissolved (mg/L)				
	Calcium (Ca)-Dissolved (mg/L)				
	Chromium (Cr)-Dissolved (mg/L)				
	Cobalt (Co)-Dissolved (mg/L)				
	Copper (Cu)-Dissolved (mg/L)				
	Iron (Fe)-Dissolved (mg/L)				
	Lead (Pb)-Dissolved (mg/L)				
	Lithium (Li)-Dissolved (mg/L)				
	Magnesium (Mg)-Dissolved (mg/L)				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L1775300-1	L1775300-2	L1775300-3	L1775300-4	L1775300-5
		Description	Water	Water	Water	Water	Water
		Sampled Date	27-MAY-16	26-MAY-16	27-MAY-16	25-MAY-16	27-MAY-16
		Sampled Time	12:20	12:45	11:50	14:10	08:10
		Client ID	GSI-PC-03B	MP09-14	MP09-08	GSI-HA-04A	GSI-HA-04A
Grouping	Analyte						
WATER							
Dissolved Metals	Manganese (Mn)-Dissolved (mg/L)		2.10	0.115	0.804	1.24	
	Mercury (Hg)-Dissolved (mg/L)		<0.0000050		<0.0000050	<0.0000050	
	Molybdenum (Mo)-Dissolved (mg/L)		0.0153	0.000727	0.000406	0.000770	
	Nickel (Ni)-Dissolved (mg/L)		0.0743	0.00523	<0.00050	0.00172	
	Phosphorus (P)-Dissolved (mg/L)		<0.050	<0.050	<0.050	<0.050	
	Potassium (K)-Dissolved (mg/L)		24.6	9.49	1.12	2.24	
	Selenium (Se)-Dissolved (mg/L)		0.00039	<0.000050	0.000100	0.000061	
	Silicon (Si)-Dissolved (mg/L)		8.84	0.932	7.39	4.66	
	Silver (Ag)-Dissolved (mg/L)		<0.000020 ^{DLA}	<0.000010	<0.000010	<0.000010	
	Sodium (Na)-Dissolved (mg/L)		117	4.80	6.32	2.79	
	Strontium (Sr)-Dissolved (mg/L)		2.18	0.158	1.15	0.165	
	Sulfur (S)-Dissolved (mg/L)		629	31.4	59.6	38.9	
	Thallium (Tl)-Dissolved (mg/L)		<0.000020 ^{DLA}	<0.000010	<0.000010	<0.000010	
	Tin (Sn)-Dissolved (mg/L)		0.00025	<0.00010	<0.00010	<0.00010	
	Titanium (Ti)-Dissolved (mg/L)		0.00336	<0.00030	<0.00030	0.00095	
	Uranium (U)-Dissolved (mg/L)		0.0239	0.000129	0.00246	0.000367	
	Vanadium (V)-Dissolved (mg/L)		0.0033	<0.00050	<0.00050	0.00084	
	Zinc (Zn)-Dissolved (mg/L)		0.0376	0.0059	0.0026	0.0037	
	Zirconium (Zr)-Dissolved (mg/L)		0.00114	<0.00030	<0.00030	<0.00030	

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L1775300-6	L1775300-7	L1775300-8	L1775300-9	L1775300-10
		Description	Water	Water	Water	Water	Water
		Sampled Date	27-MAY-16	27-MAY-16	27-MAY-16	27-MAY-16	27-MAY-16
		Sampled Time	16:10	10:10	16:25	12:50	10:10
		Client ID	GSI-HA-04A	MW09-22	MW09-22	DUP-3	FB-4
Grouping	Analyte						
WATER							
Dissolved Metals	Manganese (Mn)-Dissolved (mg/L)			3.49		0.810	<0.00010
	Mercury (Hg)-Dissolved (mg/L)			<0.0000050		<0.0000050	<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)			0.000195		0.000382	<0.000050
	Nickel (Ni)-Dissolved (mg/L)			0.00127		<0.00050	<0.00050
	Phosphorus (P)-Dissolved (mg/L)			<0.050		<0.050	<0.050
	Potassium (K)-Dissolved (mg/L)			3.01		1.14	<0.10
	Selenium (Se)-Dissolved (mg/L)			0.000148		0.000084	<0.000050
	Silicon (Si)-Dissolved (mg/L)			4.35		7.40	<0.050
	Silver (Ag)-Dissolved (mg/L)			0.000019		<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)			22.5		6.31	<0.050
	Strontium (Sr)-Dissolved (mg/L)			0.448		1.12	<0.00020
	Sulfur (S)-Dissolved (mg/L)			108		59.7	<0.50
	Thallium (Tl)-Dissolved (mg/L)			<0.000010		<0.000010	<0.000010
	Tin (Sn)-Dissolved (mg/L)			<0.00010		<0.00010	<0.00010
	Titanium (Ti)-Dissolved (mg/L)			0.00069		<0.00030	<0.00030
	Uranium (U)-Dissolved (mg/L)			0.000684		0.00241	<0.000010
	Vanadium (V)-Dissolved (mg/L)			0.00053		<0.00050	<0.00050
	Zinc (Zn)-Dissolved (mg/L)			0.0020		<0.0010	<0.0010
	Zirconium (Zr)-Dissolved (mg/L)			0.00031		<0.00030	<0.00030

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID Description Sampled Date Sampled Time Client ID				
	L1775300-11 Water 27-MAY-16 TRAVEL BLANK				
Grouping	Analyte				
WATER					
Dissolved Metals	Manganese (Mn)-Dissolved (mg/L) Mercury (Hg)-Dissolved (mg/L) Molybdenum (Mo)-Dissolved (mg/L) Nickel (Ni)-Dissolved (mg/L) Phosphorus (P)-Dissolved (mg/L) Potassium (K)-Dissolved (mg/L) Selenium (Se)-Dissolved (mg/L) Silicon (Si)-Dissolved (mg/L) Silver (Ag)-Dissolved (mg/L) Sodium (Na)-Dissolved (mg/L) Strontium (Sr)-Dissolved (mg/L) Sulfur (S)-Dissolved (mg/L) Thallium (Tl)-Dissolved (mg/L) Tin (Sn)-Dissolved (mg/L) Titanium (Ti)-Dissolved (mg/L) Uranium (U)-Dissolved (mg/L) Vanadium (V)-Dissolved (mg/L) Zinc (Zn)-Dissolved (mg/L) Zirconium (Zr)-Dissolved (mg/L)				

* Please refer to the Reference Information section for an explanation of any qualifiers detected.

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Alkalinity, Total (as CaCO ₃)	B	L1775300-1, -10, -11, -3, -5, -8, -9
Method Blank	Alkalinity, Total (as CaCO ₃)	B	L1775300-1, -10, -11, -3, -5, -8, -9
Method Blank	Chromium (Cr)-Total	MB-LOR	L1775300-11
Matrix Spike	Total Inorganic Carbon	MS-B	L1775300-3, -6, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1775300-1, -10, -2, -3, -4, -7, -9
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L1775300-1, -10, -2, -3, -4, -7, -9
Matrix Spike	Molybdenum (Mo)-Dissolved	MS-B	L1775300-1, -10, -2, -3, -4, -7, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1775300-1, -10, -2, -3, -4, -7, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1775300-1, -10, -2, -3, -4, -7, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1775300-1, -10, -2, -3, -4, -7, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1775300-1, -10, -2, -3, -4, -7, -9
Matrix Spike	Total Inorganic Carbon	MS-B	L1775300-10, -11
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1775300-1, -10, -2, -3, -4, -7, -9
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L1775300-1, -10, -2, -3, -4, -7, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1775300-1, -10, -2, -3, -4, -7, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1775300-1, -10, -2, -3, -4, -7, -9
Matrix Spike	Silicon (Si)-Dissolved	MS-B	L1775300-1, -10, -2, -3, -4, -7, -9
Matrix Spike	Sulfur (S)-Dissolved	MS-B	L1775300-1, -10, -2, -3, -4, -7, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1775300-1, -10, -2, -3, -4, -7, -9
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L1775300-1, -10, -2, -3, -4, -7, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1775300-1, -10, -2, -3, -4, -7, -9
Matrix Spike	Total Kjeldahl Nitrogen	MSTN	L1775300-11
Duplicate	Total Kjeldahl Nitrogen	TKND	L1775300-11

Qualifiers for Individual Parameters Listed:

Qualifier	Description
B	Method Blank exceeds ALS DQO. All associated sample results are at least 5 times greater than blank levels and are considered reliable.
DLA	Detection Limit adjusted for required dilution
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
MB-LOR	Method Blank exceeds ALS DQO. Limits of Reporting have been adjusted for samples with positive hits below 5x blank level.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
MSTN	TKN Matrix Spike recovery was low due to interference from high nitrate, which causes negative bias on TKN.
TKND	TKN duplication was poor due to interference from high nitrate, which causes negative bias on TKN.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity
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.			
BE-D-L-CCMS-VA	Water	Diss. Be (low) 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.			
BE-T-L-CCMS-VA	Water	Total Be (Low) 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.			
CARBONS-TIC-VA	Water	Total inorganic carbon by CO ₂ purge	APHA 5310B TOTAL ORGANIC CARBON (TOC)
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".			
CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

Reference Information

This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".

CL-IC-N-WR Water Chloride in Water by IC EPA 300.1 (mod)
 Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

CN-FREE-CFA-VA 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-SCN-VA Water Thiocyanate by Colour APHA 4500-CN CYANIDE
 This analysis is carried out using procedures adapted from APHA Method 4500-CN- M "Thiocyanate" Thiocyanate is determined by the ferric nitrate colourimetric method.

CN-T-CFA-VA Water Total Cyanide in water by CFA ISO 14403:2002
 This analysis is carried out using procedures adapted from ISO Method 14403:2002 "Determination of Total Cyanide using Flow Analysis (FIA and CFA)". Total or strong acid dissociable (SAD) cyanide is determined by in-line UV digestion along with sample distillation and final determination by colourimetric analysis. Method Limitation: This method is susceptible to interference from thiocyanate (SCN). If SCN is present in the sample, there could be a positive interference with this method, but it would be less than 1% and could be as low as zero.

CN-WAD-CFA-VA Water Weak Acid Diss. Cyanide in water by CFA APHA 4500-CN CYANIDE
 This analysis is carried out using procedures adapted from APHA Method 4500-CN I. "Weak Acid Dissociable Cyanide". Weak Acid Dissociable (WAD) cyanide is determined by in-line sample distillation with final determination by colourimetric analysis.

EC-PCT-VA Water Conductivity (Automated) APHA 2510 Auto. Conduc.
 This analysis is carried out using procedures adapted from APHA Method 2510 "Conductivity". Conductivity is determined using a conductivity electrode.

F-IC-N-WR 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-VA Water Hardness APHA 2340B
 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-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/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 or CVAFS.

HG-T-CVAA-VA Water Total Mercury in Water by CVAAS or CVAFS EPA 1631E (mod)
 Water samples undergo a cold-oxidation using bromine monochloride prior to reduction with stannous chloride, and analyzed by CVAAS or CVAFS.

IONBALANCE-VA Water Ion Balance Calculation APHA 1030E
 Cation Sum, Anion Sum, and Ion Balance (as % difference) are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Because all aqueous solutions are electrically neutral, the calculated ion balance (% difference of cations minus anions) should be near-zero.

Cation and Anion Sums are the total meq/L concentration of major cations and anions. Dissolved species are used where available. Minor ions are included where data is present. Ion Balance is calculated as:

$$\text{Ion Balance (\%)} = \frac{[\text{Cation Sum} - \text{Anion Sum}]}{[\text{Cation Sum} + \text{Anion Sum}]}$$

MET-D-CCMS-VA 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.

MET-DIS-LOW-ICP-VA Water Dissolved Metals in Water by ICPOES EPA 3005A/6010B
 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). The procedure involves filtration (EPA Method 3005A) and analysis by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

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-TOT-LOW-ICP-VA Water Total Metals in Water by ICPOES EPA 3005A/6010B

Reference Information

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). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

NH3-F-VA Water Ammonia in Water by Fluorescence APHA 4500 NH3-NITROGEN (AMMONIA)

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-F-VA 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.

NO2-L-IC-N-WR 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.

NO3-L-IC-N-WR Water Nitrate in Water by IC (Low Level) EPA 300.1 (mod)

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

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H "pH Value"

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

PH-PCT-VA Water pH by Meter (Automated) APHA 4500-H pH Value

This analysis is carried out using procedures adapted from APHA Method 4500-H "pH Value". The pH is determined in the laboratory using a pH electrode

It is recommended that this analysis be conducted in the field.

S-DIS-ICP-VA Water Dissolved Sulfur in Water by ICPOES EPA SW-846 3005A/6010B

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). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

Method Limitation: This method will not give total sulfur results for all samples. Sulfide or other volatile forms of sulfur that may be present in submitted samples, is often lost during the sampling, preservation and analysis process. The data reported as total and/or dissolved sulfur represents all non-volatile forms of sulfur present in a particular sample.

S-TOT-ICP-VA Water Total Sulfur in Water by ICPOES EPA SW-846 3005A/6010B

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). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

Method Limitation: This method will not give total sulfur results for all samples. Sulfide or other volatile forms of sulfur that may be present in submitted samples, is often lost during the sampling, preservation and analysis process. The data reported as total and/or dissolved sulfur represents all non-volatile forms of sulfur present in a particular sample.

SO4-IC-N-WR Water Sulfate in Water by IC EPA 300.1 (mod)

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

TKN-F-VA Water TKN in Water by Fluorescence APHA 4500-NORG D.

This analysis is carried out using procedures adapted from APHA Method 4500-Norg D. "Block Digestion and Flow Injection Analysis". Total Kjeldahl Nitrogen is determined using block digestion followed by Flow-injection analysis with fluorescence detection.

** 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
WR	ALS ENVIRONMENTAL - WHITEHORSE, YUKON, CANADA

Reference Information

VA

ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

1

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

mg/kg - milligrams per kilogram based on dry weight of sample.

mg/kg wwt - milligrams per kilogram based on wet weight of sample.

mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.

mg/L - milligrams per litre.

< - Less than.

D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).

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.

APPENDIX D
Response to Client Comments

Response to Comments from Draft Report Version (as Received July, 2016)

Comment No.	Page	Comment	Response
1	4	I think some of the wells in this Area are actually Pony Creek – may just need to add this in the “AREA” column.	The table has been corrected with the addition of a grouping of the Pony Creek wells.
2	10	And these measurements are reported on?	Text has been updated to provide a more clear explanation
3	21	Was this resolved after the draft was issued? Update if necessary.	Yes, the laboratory discovered that there had been a process error that resulted in Nitrite and TKN detections. These were corrected and the data was re-issued. The final report data is correct.