Mount Nansen March 2015
Groundwater Monitoring and Sampling

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June 2015

HEMMERA

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1.0 INTRODUCTION

Hemmera Envirochem Inc. ("Hemmera") 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 in March of 2015. This report summarizes the activities conducted, the field conditions encountered, and the *in-situ* and laboratory analytical results for the program.

1.1 SITE LOCATION

The Mount Nansen Site (the 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 March 2015 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

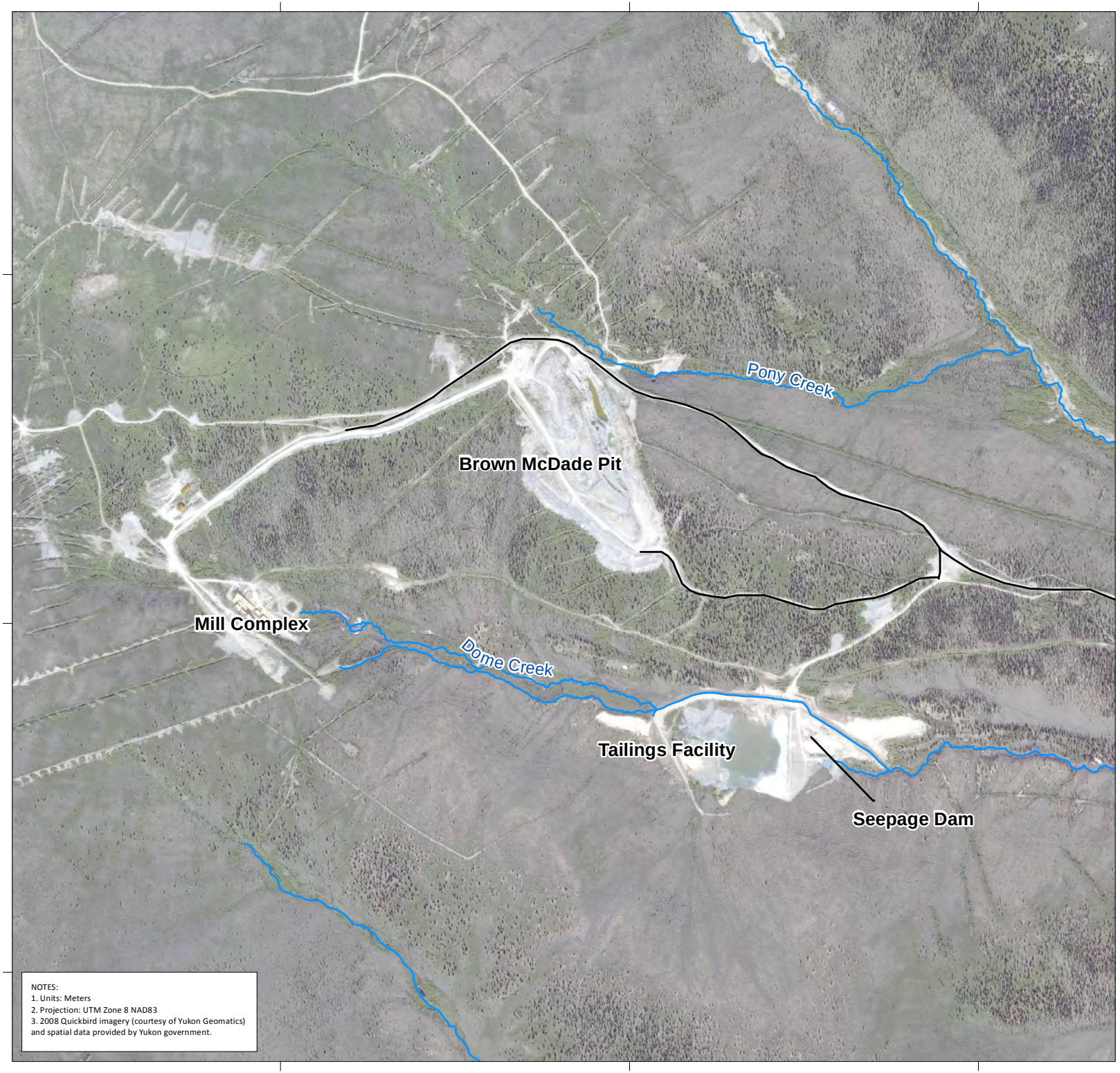
The scope of work for this program included the coordination and execution of the winter groundwater monitoring and sampling, analysis of groundwater samples, and the presentation of results in a report. This report provides a summary of the monitoring and sampling activities, a description of methodologies, field *in-situ* and laboratory analytical results including a comparison to applicable guidelines, 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.

Groundwater sampling at the Site was conducted over a three (3) day period, between March 18 and 20, 2015. Sampling was conducted by a team of four (4) field staff from Hemmera/ELR (Rusto Martinka, Tara Jackle, Aaron Nicholson, and Jonathan Lowey). A total of 61 groundwater wells were included in the March sampling event (**Table 1-1**). Four (4) groundwater wells included in previous sampling events were excluded from the March sampling program; one (1) due to previously reported damage (CH-P-13-03/10), one (1) due to a previously reported blockage (CH-P-13-04/35), and two (2) that were previously reported as destroyed (MP09-01 and GSI-PC-01-B). These four (4) wells are still listed in the program summary table for consistent reporting purposes (**Table 1-1**). Two (2) of the 61 event groundwater wells that had previously been reported as damaged (MW09-01) or dry/damaged (CH-P-13-02/10) were included in the March sampling event (there was still a potential for successful sampling despite damage).

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**, below.

1.3 SAMPLE SITES

The groundwater wells included in the March 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, the tailings pond and seepage pond/dam (26 wells), the Brown McDade Pit (10 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 (8 wells). **Table 1-1** provides the location, status, and sample recovery for groundwater wells included in the March sampling program. The well locations are also illustrated in **Figures 1-2** and **1-3**. Photographs of each sample site are included in **Appendix A**.



Mount Nansen Site
March 2015 Groundwater Monitoring Program

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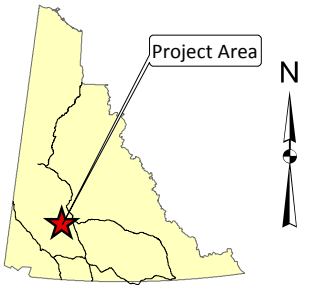
Legend

Watercourses



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Meters

June 2, 2015

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ELR Project: 15-196

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[1,2]	Sample Collected	QA/QC Sample Collected
		Easting	Northing			
Dome Creek	GSI-DC-01B	387675	6881124	Dry	-	-
	GSI-DC-02B	387879	6881129	Direct Sampled[1]	✓	-
	GSI-DC-03B	388107	6881079	Frozen[2]	-	-
	GSI-DC-05B	388725	6880836	Frozen[2]	-	-
	GSI-DC-06B	389788	6880567	Frozen[2]	-	-
	GSI-DC-07B	390065	6880641	Frozen[2]	-	-
	GSI-DC-08-B	390311	6880583	Frozen[2]	-	-
	GSI-DC-09-B	390614	6880494	Frozen[2]	-	-
	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	65881130	Direct Sampled[1]	✓	-
	GSI-HA-05A	387898	6881125	Frozen	-	-
	MW09-16	387992	6881094	Frozen	-	-
	MW09-17	388075	6880970	Dry	-	-
	MW09-18	388054	6880986	Good	✓	Field Blank
	MW09-19	388051	6881016	Good	✓	Duplicate
Brown McDade Pit	CH-P-13-01/10	388657	6881116	Frozen	-	-
	CH-P-13-03/10	389145	6881105	Damaged[3]	-	-
	CH-P-13-03/50	389143	6881110	Insufficient Volume	-	-
	CH-P-13-04/10	389138	6881472	Frozen	-	-
	CH-P-13-04/35	389138	6881472	Blocked[3]	-	-
	CH-P-13-05/50	388954	6881466	Good	✓	Duplicate
	GLL07-01	388851	6881783	Frozen	-	-
	GLL07-02	389069	6881703	Dry	-	-
	GLL07-03	388959	6881477	Dry	-	-
	MW09-13	389006	6881664	Frozen	-	-
	MW09-14	389008	6881669	Frozen	-	-
	MW09-15	388920	6881727	Frozen	-	-
	CH-P-13-02/10	388924	6881014	Dry/Damaged[4]	-	-
Pony Creek	GSI-PC-01-B	N/A	N/A	Destroyed[3]	-	-
	GSI-PC-02-B	388907	6881786	Frozen	-	-
	GSI-PC-03-B	389256	6881706	Frozen[2]	-	-
	GSI-PC-04-B	389586	6881656	Frozen	-	-
	GSI-PC-05-B	389713	6881661	Frozen	-	-
	MP09-01	N/A	N/A	Destroyed[3]	-	-
	MP09-02	388867	6881816	Frozen[2]	-	-
	MP09-03	388956	6881739	Frozen	-	-
	MP09-08	389160	6881718	Frozen	-	-

Area	Well Name	UTM (Zone 08N)		Status[1,2]	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	Frozen	-	-
	MP09-05	389548	6880590	Frozen	-	-
	MP09-09	389240	6880681	Dry	-	-
	MP09-10	389241	6880684	Frozen	-	-
	MP09-11	389220	6880619	Frozen	-	-
	MP09-12	389220	6880619	Frozen	-	-
	MP09-14	389138	6880722	Frozen	-	-
	MW09-01	389396	6880563	Damaged[4]	-	-
	MW09-02	389393	6880562	Good	✓	-
	MW09-03	389411	6880555	Not Located[2]	-	-
	MW09-04	389420	6880557	Not Located[2]	-	-
	MW09-05	389413	6880656	Dry	-	-
	MW09-06	389411	6880653	Good	✓	-
	MW09-07	389322	6880699	Dry	-	-
	MW09-08	389620	6880576	Frozen	-	-
	MW09-11	389037	6880711	Dry	-	-
	MW09-20	389592	6880586	Dry	-	-
	MW09-21	389536	6880577	Frozen	-	-
	MW09-22	389495	6880549	Insufficient Volume	-	-
	MW09-23	389459	6880553	Damaged (New)[5]	✓	-
	MW09-24	389561	6880624	Good	✓	Field Blank
	W14103083BH03	389132	6880730	Frozen	-	-

Notes:

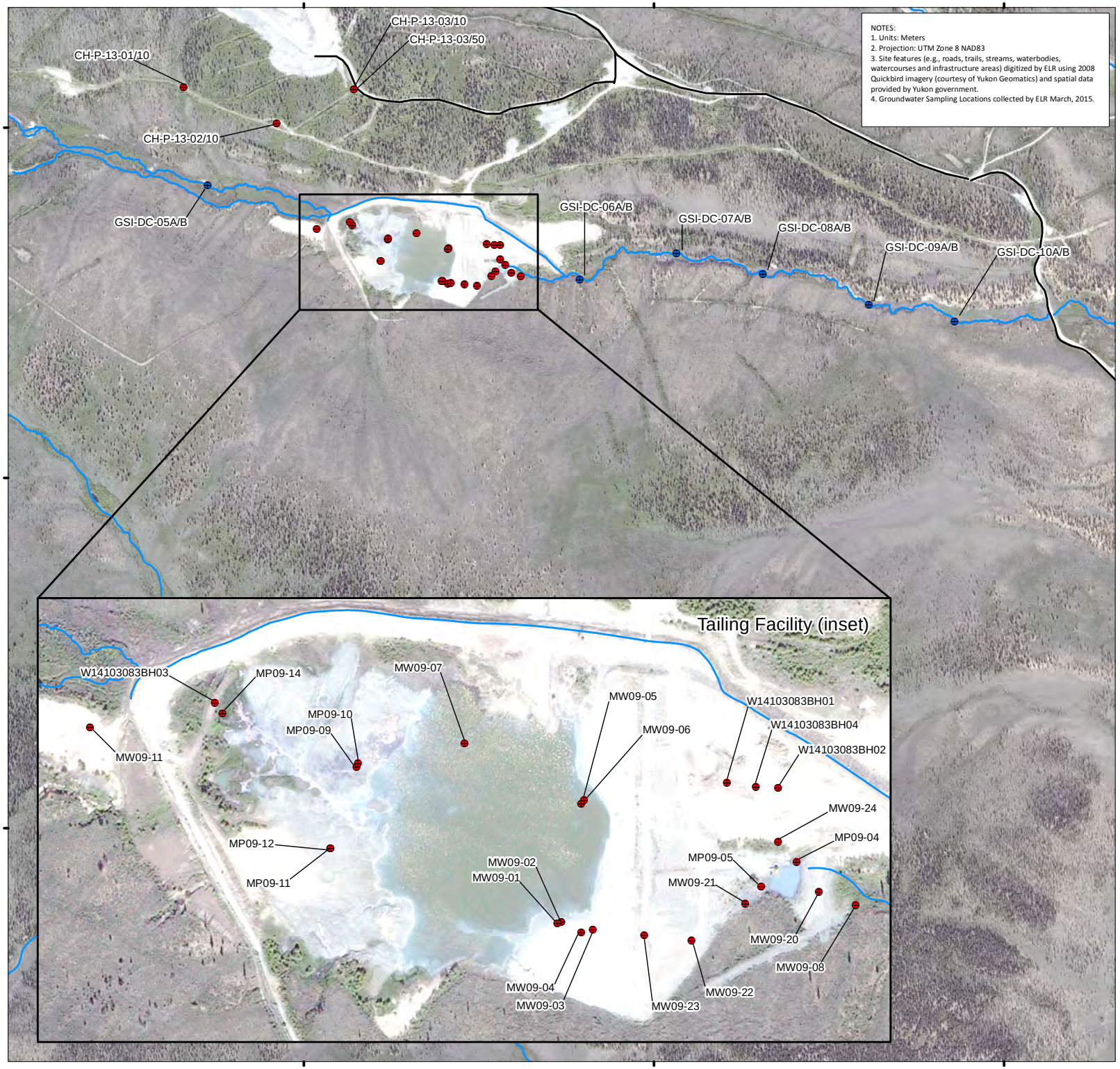
[1] Direct sampling was completed at sample stations where insufficient volume had been encountered during the June 2014 groundwater sampling. This insufficient volume limited standard purging and sampling methodologies.

[2] Sample site was buried under ice or snow and was therefore not visually inspected. UTM provided from fall 2014 sampling event.

[3] Damaged, destroyed, or blocked wells that were excluded from the March 2015 sampling event. These wells have been listed in the summary table but were not listed in the scope of work and are not further discussed in this report.

[4] Groundwater wells previously reported as damaged (MW09-01) or dry/damaged (CH-P-13-02/10) but included in the March sampling event.

[5] Newly reported damage. Sample site MW09-23 was found damaged in the field during the March 2015 sampling event.



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Legend

- Drive Point
- Monitoring Well
- Watercourses

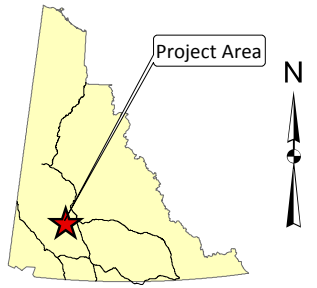

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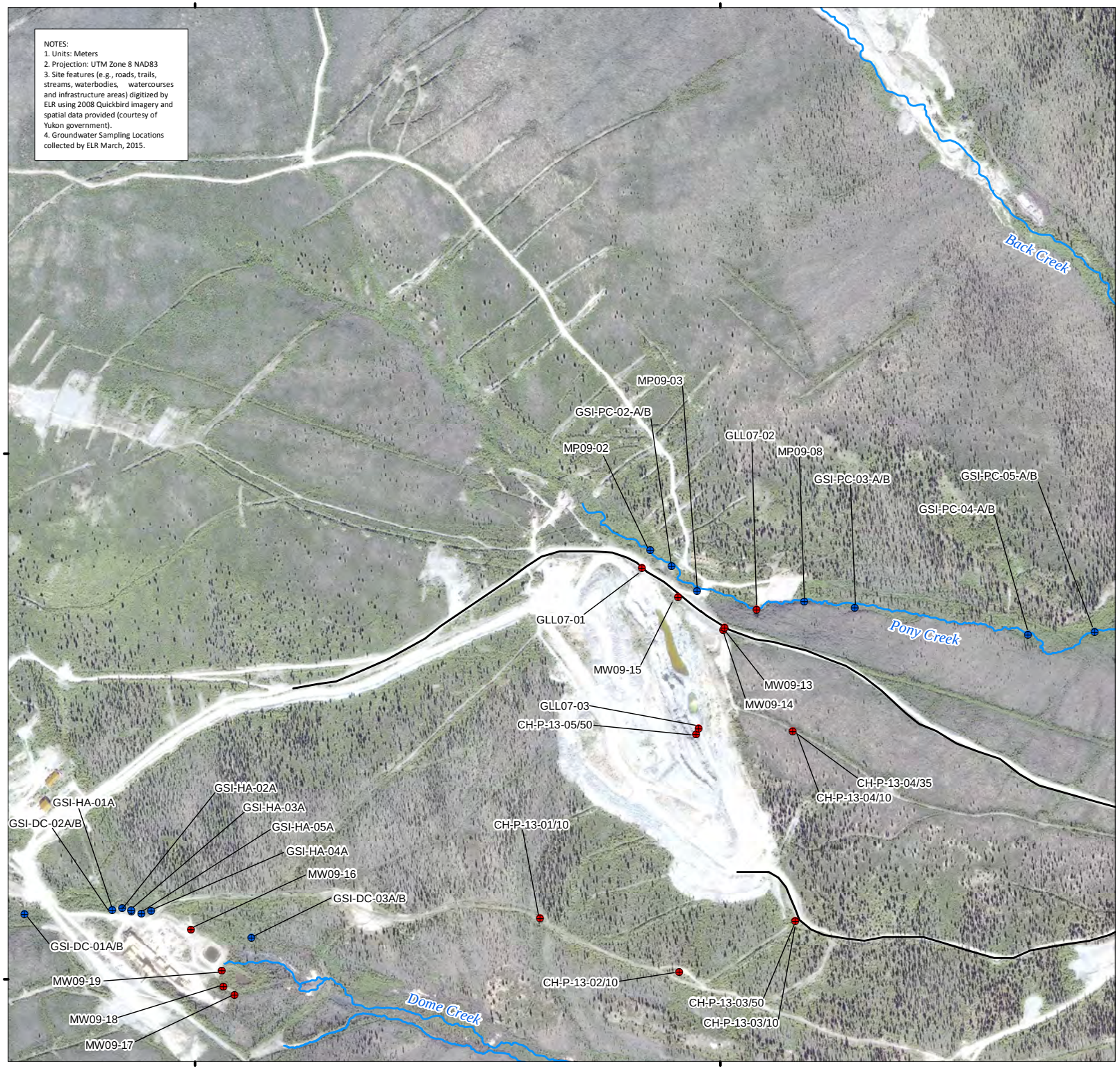
FIGURE 1-2

Groundwater Sampling Locations
Dome Creek and Tailings Facility



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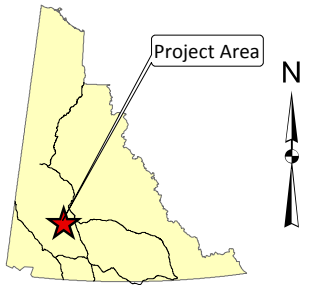

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ELR Project: 15-196

FIGURE 1-3

Groundwater Sampling Locations
Mill Complex and Brown McDade Pit

2.0 METHODOLOGY

2.1 PROTOCOLS

Groundwater purging, monitoring and sampling conducted by Hemmera/ELR was in accordance with the Groundwater Sampling Standard Operating Procedures included in the document *Scope of Work: Groundwater Sampling Program – Mount Nansen Site 2014*. 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).

2.2 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 Heron Water Tape (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 two (2) techniques: 1) manual purging using high density polyethylene (HDPE) Waterra tubing and footvalve, or 2) GeoPump peristaltic pump with HDPE tubing. 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 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 standing well volumes of water had been purged.

Groundwater turbidity measured in Nephelometric Turbidity Units (NTU) was also measured prior to sampling (described below in **Section 2.3**) 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; this information is presented in **Table 3-1**.

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%

2.3 DIRECT SAMPLING

During previous events a select number of groundwater wells were found to have an insufficient volume to sample, based on having a limited standing water volume or recharge rate (based on criteria established at that time; Hemmera, 2014a). While these criteria allowed for clear field decisions by the crew, it limited the number of wells that were sampled during the event. An alternate sampling strategy was established by AAM's consultant (AMEC) in order to obtain samples from low producing wells. This approach was followed during the March 2015 sampling event. At all of the wells identified as having insufficient volume in June of 2014, Hemmera/ELR direct sampled the well (prior to purging or collecting field parameter measurements), after which time field parameter measurements were collected if possible. Additionally, a priority ranking system for sample collection was established by AAM's consultant (AMEC) and employed in the field (as summarized in **Table 2-2**). This ranking system was used to ensure that samples for higher priority parameters were collected at each well if limited recharge or volume was encountered. Further samples were also collected following recharge by re-visiting wells, where possible.

In addition to the priority ranking order, Hemmera/ELR also considered the minimum sample volumes required for laboratory procedures (provided to Hemmera/ELR by ALS Laboratories). Where well volume was limited, minimum volumes were collected to maximize the number of program parameters collected.

2.4 FIELD PARAMETERS

Hemmera/ELR measured *in-situ* water quality parameters using YSI Professional Plus field meters, Lamotte 2020we turbidity meters, and Hach DR 890 Portable Colorimeters. Flow-through cells were used with the YSI Professional Plus meters to minimize field parameter variability. The *in-situ* groundwater quality parameters recorded at each sample station included; water temperature (^{o}C), specific conductivity (µs/cm), conductivity (µs/cm), oxidation/reduction potential (ORP; mv), pH (pH units), sulphide (mg/l), dissolved oxygen (mg/l), and turbidity (NTU).

During purging, field parameters were monitored at 5 minute intervals, or at volume related intervals (e.g., every 500 mL) in the case of wells with slow recharge. A final set of measurements was recorded at the conclusion of purging.

2.5 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 was the analytical subcontractor chosen for this project, and a summary of the sample bottle set (including parameters analysed and preservation techniques) is provided in **Table 2-2**.

In addition to the analytical parameters provided to Hemmera/ELR in the SOW, a separate bottle for dissolved alkalinity was added to each bottle set during this event, to test whether acid or alkaline-generating solids may be affecting alkalinity results. This inclusion was in response to a recommendation made by Hemmera/ELR in the October 2014 program report (Hemmera, 2014b).

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	1 L (plastic)	General Chemistry	250 ml	-	-
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	Preserved	NaOH
4	250 ml (glass amber)	Ammonia (NH3)	120 ml	Preserved	H_2SO_4
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	Preserved	HNO_3
6	120 ml (plastic)	Sulphide	100 ml	Preserved	Zinc Acetate, capped and mixed, then NaOH
7	250 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	Field Filtered	-

2.6 DATA ANALYSIS

Groundwater analytical results were compared to the Canadian Council of Ministers of the Environment (CCME) Water Quality Guidelines for the Protection of Freshwater Aquatic Life (FAL; CCME, 2014). All relevant CCME FAL guidelines are presented in **Table A**.

2.7 QUALITY ASSURANCE AND QUALITY CONTROL

2.7.1 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 was 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, and disposable syringes. Field staff wore 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/or calibrated before each 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.

2.7.2 Analytical QA/QC

Analytical QA/QC measures were included in the winter sampling program as outlined in the scope of work and as per standard industry practice. This included the collection field duplicates and field blanks, and the use of travel blanks. Duplicate samples were collected at a ratio of 20% of the regular samples (2 duplicates were collected in relation to 10 samples), and a field blank was collected for each day field sampling was conducted (a total of 3 field blanks were collected). Two travel blanks accompanied the analytical supplies and samples from the lab to the field and back to the lab again (1 for each shipment).

The variation between sample and duplicate values 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 potential error that has affected the precision of sampling or analysis. RPD was calculated according to the following formula:

$$\%RPD = \left(\frac{\left(\frac{x_1 - x_2}{x_1 + x_2} \right)}{2} \right) x\ 100$$

RPD is 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

Summary tables of the laboratory analytical results are presented in **Table A** of this report, including a comparison of results to CCME FAL guidelines. A summary of the QA/QC sampling results is also attached as **Table B**, including analytical data for duplicates, field blanks, and travel blanks. Laboratory analytical reports are provided as **Appendix C**.

3.1 GROUNDWATER SAMPLING SUMMARY

Groundwater sampling was completed between March 18 and 20, 2015. Weather conditions varied throughout the time of sampling with ambient air temperature ranging from -5 to 5°C. As agreed to with AAM, four (4) groundwater wells, previously included in the scope of work (and previous sampling events), were excluded from the March sampling program; one (1) due to previously reported damage (CH-P-13-03/10), one (1) due to a previously reported blockage (CH-P-13-04/35), and two (2) that had previously been reported as destroyed (MP09-01 and GSI-PC-01-B). Two (2) of the remaining 61 groundwater wells in the program had previously been reported as damaged (MW09-01) or dry/damaged (CH-P-13-02/10), but were included in the March sampling event.

Of the 61 wells specified for the March 2015 sampling event, 51 were located and assessed during the March program. The other ten (10) wells were buried beneath ice or snow and were therefore not assessed. Of the 51 wells located, ten (10) wells were sampled; seven (7) using purging and sample methods as per the program protocols, and three (3) sampled directly without purging according to the sample priority ranking. In all three (3) of the direct sampled wells, volumes were insufficient to collect a full sample set. Similarly, in one (1) of the ten (10) properly purged and sampled wells (MW09-06), low well volumes limited collection of a complete bottle set. **Table 3-1** provides a summary of sample success.

Of the 41 wells assessed but not sampled during the program, 28 wells were frozen, nine (9) wells were dry, two (2) wells had insufficient volume for sampling, one (1) well was reported as damaged, and one (1) well was reported as both dry and damaged and could not be sampled. Despite not collecting water quality samples these wells were still assessed and water/ice depth, well depth, and headspace gas measurements were collected where possible. Headspace gas measurements were obtained from 29 of these 41 wells (as specified in **Table 3-2**), but restricted at the other 11 by ice accumulation or site specific well conditions. 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 Samples Collected During March 2015 Sampling Program

Well Name	Dissolved Metals	Dissolved Mercury	Physical Parameters	Anions/ Nutrients	Cyanide	Ammonia	Thiocyanate	Sulphide	Total Inorganic Carbon	Dissolved Alkalinity
Priority	**1a**	**1b**	**2**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
GSI-DC-02B	✓	✓	✓	✓	-	-	-	-	-	-
GSI-HA-01A	✓	✓	-	-	-	-	-	-	-	-
GSI-HA-04A	✓	✓	-	-	-	-	-	-	-	-
MW09-18	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
MW09-19	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CH-P-13-05/50	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
MW09-02	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
MW09-06	✓	✓	✓	✓	✓	✓	✓	✓	✓	-
MW09-23	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
MW09-24	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

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 March 2015 Sampling Program

Area	Location ID	Sample Date	Stick up Height (m)	Depth To Water (m)[1]	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[2] (3WV/PS/DS)	Draw Down (m)	pH	Temperature (ºC)	Conductivity (µS/cm)	Specific Conductivity (µS/cm)	ORP (mV)	Dissolved Oxygen (mg/L)	Dissolved Sulphide (mg/L)	Methane (%LEL)	Oxygen (%)	Carbon Dioxide (ppm)	Field Turbidity (NTU)	Method Used	Well Diameter (inches)[6]
Dome Creek	GSI-DC-01A	18/03/2015	0.74	Dry	0.873	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.4	0	-	-	1 DP
	GSI-DC-01B	18/03/2015	0.70	Dry	1.609	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.5	0	-	-	1 DP
	GSI-DC-02A	18/03/2015	0.91	Dry	2.002	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	19.4	0	-	-	1 DP
	GSI-DC-02B	18/03/2015	0.76	2.735	3.852	0.56	-	-	-	-	-	DS	-	-	-	-	-	-	-	-	0	20.3	0	-	-	1 DP
	GSI-DC-03A	20/03/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	GSI-DC-03B	20/03/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	GSI-DC-05A	20/03/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	GSI-DC-05B	20/03/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	GSI-DC-06A	19/03/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	GSI-DC-06B	19/03/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	GSI-DC-07A	19/03/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	GSI-DC-07B	19/03/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	GSI-DC-08-A	19/03/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	GSI-DC-08-B	19/03/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	GSI-DC-09A	19/03/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	GSI-DC-09-B	19/03/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	GSI-DC-10A	19/03/2015	0.22	0.995	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.0	0	-	-	½ DP
	GSI-DC-10-B	19/03/2015	0.17	0.750	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.0	0	-	-	1 DP
Mill Complex	GSI-HA-01A	18/03/2015	1.14	2.872	3.110	0.12	-	-	-	-	-	DS	-	-	-	-	-	-	-	-	0	21.4	0	-	-	1 DP
	GSI-HA-02A	18/03/2015	1.49	2.283	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.3	0	-	-	1 DP
	GSI-HA-03A	18/03/2015	0.80	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.2	0	-	-	1 DP
	GSI-HA-04A	18/03/2015	0.57	1.909	2.188	0.14	-	-	-	-	-	DS	-	-	-	-	-	-	-	-	0	20.1	0	-	Peristaltic	1 DP
	GSI-HA-05A[3]	18/03/2015	0.47	-	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.1	0	-	-	-
	MW09-16	20/03/2015	1.21	1.755	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.4	0	-	-	-
	MW09-17	20/03/2015	0.97	Dry	5.710	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	9.5	0	-	-	2
	MW09-18	20/03/2015	0.87	5.131	7.778	5.30	7	14:32	16:02	1:30	0.08	PS	0.01	6.89	0.2	1530	2936	35.1	1.97	0.15	0	19.8	0	4.2	Peristaltic	2
	MW09-19	20/03/2015	0.97	3.062	5.883	5.60	7	13:01	13:35	0:34	0.21	PS	0.60	6.59	0.9	1158	2149	-64.2	1.12	0.05	0	20.0	0	7.1	Peristaltic	2
Brown McDade Pit	CH-P-13-01/10	20/03/2015	0.49	6.452	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.3	0	-	-	1 ½
	CH-P-13-03/10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	CH-P-13-03/50	19/03/2015	0.54	49.355	50.490	1.70	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	19.9	0	-	-	1 ½
	CH-P-13-04/10	19/03/2015	0.55	6.240	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.4	0	-	-	2
	CH-P-13-04/35	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Area	Location ID	Sample Date	Stick up Height (m)	Depth To Water (m)[1]	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[2] (3WV/PS/DS)	Draw Down (m)	pH	Temperature (°C)	Conductivity (µS/cm)	Specific Conductivity (µS/cm)	ORP (mV)	Dissolved Oxygen (mg/L)	Dissolved Sulphide (mg/L)	Methane (%LEL)	Oxygen (%)	Carbon Dioxide (ppm)	Field Turbidity (NTU)	Method Used	Well Diameter (inches)[6]
Brown McDade Pit	CH-P-13-05/50	20/03/2015	0.78	29.050	49.830	22.86	40	11:40	12:38	0:58	0.69	PS	0.35	6.54	1.4	1566	2857	90.4	2.36	0.94	0	20.1	0	48.9	Waterra	1 ½
	GLL07-01	18/03/2015	0.80	13.815	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.1	0	-	-	2
	GLL07-02	18/03/2015	1.30	Dry	7.200	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	19.8	0	-	-	6
	GLL07-03	19/03/2015	1.09	Dry	11.602	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.0	0	-	-	2
	MW09-13	18/03/2015	0.76	9.025	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	19.9	0	-	-	-
	MW09-14	18/03/2015	0.74	4.990	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.0	0	-	-	2
	MW09-15	18/03/2015	0.81	14.073	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.0	0	-	-	2
	CH-P-13-02/10[7]	19/03/2015	0.60	Dry	8.140	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	19.8	0	-	-	1 ½
Pony Creek	GSI-PC-01-A	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	GSI-PC-01-B	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	GSI-PC-02-A	18/03/2015	0.55	0.854	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.0	0	-	-	1 DP
	GSI-PC-02-B	18/03/2015	0.53	0.887	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	19.9	0	-	-	1 DP
	GSI-PC-03-A	19/03/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	GSI-PC-03-B	19/03/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	GSI-PC-04-A	19/03/2015	0.57	0.940	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.3	0	-	-	½ DP
	GSI-PC-04-B	19/03/2015	0.58	0.984	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.3	0	-	-	½ DP
	GSI-PC-05-A	19/03/2015	0.80	2.003	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.0	0	-	-	½ DP
	GSI-PC-05-B	19/03/2015	0.81	3.715	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.1	0	-	-	½ DP
	MP09-01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MP09-02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MP09-03	18/03/2015	0.73	0.694	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.1	0	-	-	½ DP
	MP09-08	18/03/2015	0.86	0.505	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.0	0	-	-	½ DP
Seepage Dam	W14103083BH01[4]	19/03/2015	0.62	6.549	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
	W14103083BH02[4]	19/03/2015	0.74	6.780	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
	W14103083BH04[4]	19/03/2015	0.75	6.677	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
Tailings Facility	MP09-04	19/03/2015	1.21	1.182	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.1	0	-	-	1 ½
	MP09-05	19/03/2015	0.39	0.667	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.1	0	-	-	1 ½
	MP09-09	20/03/2015	2.21	Dry	5.610	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.4	0	-	-	1 ¼
	MP09-10	20/03/2015	1.96	2.493	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.4	0	-	-	1 ¼
	MP09-11	20/03/2015	1.72	1.745	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.4	0	-	-	1 ¼
	MP09-12	20/03/2015	1.67	1.758	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.4	0	-	-	1 ¼
	MP09-14[3]	20/03/2015	0.76	-	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.0	0	-	-	½ DP
	MW09-01[7]	19/03/2015	0.79	6.420	9.085	2.93	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.4	0	-	-	1 ½

Area	Location ID	Sample Date	Stick up Height (m)	Depth To Water (m)[1]	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[2] (3WV/PS/DS)	Draw Down (m)	pH	Temperature (°C)	Conductivity (µS/cm)	Specific Conductivity (µS/cm)	ORP (mV)	Dissolved Oxygen (mg/L)	Dissolved Sulphide (mg/L)	Methane (%LEL)	Oxygen (%)	Carbon Dioxide (ppm)	Field Turbidity (NTU)	Method Used	Well Diameter (inches)[6]
Tailings Facility	MW09-02	19/03/2015	0.66	3.431	4.705	2.55	4	14:51	15:15	0:24	0.17	PS	0.74	7.29	2.3	1732	3066	-130.0	0.90	0.02	0	20.4	0	9.7	Peristaltic	2
	MW09-03	20/03/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW09-04	20/03/2015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW09-05	19/03/2015	0.83	Dry	7.560	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	15.4	0	-	-	2
	MW09-06	19/03/2015	1.45	4.091	6.040	3.90	5	9:46	10:10	0:24	0.21	PS	1.48	7.51	1.9	1105	1984	209.0	2.60	0.34	0	19.9	0	47.0	Peristaltic	2
	MW09-07	20/03/2015	1.32	Dry	3.393	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	18.9	0	-	-	2
	MW09-08	19/03/2015	1.09	1.150	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.1	0	-	-	2
	MW09-11	20/03/2015	0.81	Dry	4.915	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.1	0	-	-	2
	MW09-20	19/03/2015	0.80	Dry	3.672	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20	0	-	-	2
	MW09-21	19/03/2015	0.43	1.472	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.1	0	-	-	2
	MW09-22	19/03/2015	0.89	4.024	5.252	2.46	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.5	0	-	-	2
	MW09-23[5]	19/03/2015	0.14	12.124	15.772	7.30	7	-[8]	16:20	-	-	-[9]	0.04	7.4	1.9	800	1450	17.5	3.80	1.22	0	20.4	0	>4000	Waterra	2
	MW09-24	19/03/2015	0.62	9.114	11.193	4.16	15	12:40	13:05	-	0.60	PS	0.20	7.13	0.7	420	995	76.9	7.98	0.23	0	20.1	0	21.7	Bailer	2
	W14103083BH03	20/03/2015	0.70	1.514	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.1	0	-	-	2

Notes: To maximize the sample return for analytical analysis, field parameters were not collected at direct sampled wells.

1 Depth to Water (DTW) values for frozen or damaged wells indicates depth to ice or blockage

2 3WV = Three well volumes purged prior to sample collection, PS = field parameters stabilized prior to sample collection, and DS = sample collected directly without purging.

3 Tubing frozen in well, depth-to-ice could not be measured.

4 Head space gases were not measured at these sites. Well was not sealed properly and thermistors and associated wiring prevented in-situ data collection.

5 Field meter was not functioning sufficiently to collect in-situ parameters at the time of sampling. MW09-23 was re-visited the following day to collect the reported field parameters. Turbidity was out of range of the instrument (>4000 NTU).

6 DP refers to Drive Point.

7 Sampling was attempted at these locations, although both wells previously reported as damaged (MW09-01) or damaged/dry (CH-P-13-02/10). Well CH-P-13-02/10 is damaged but still can be sampled, and was found to be dry during the program. Well MW09-01 was found to have tailings present in the well (excessive fine grain material) that resulted in a consistency that could not be sampled.

8 Purge start time was not recorded in the field.

9 Field meter was not functioning correctly at the time of sampling to collect in-situ parameters and therefore no purging criteria was reached.

* Shaded rows indicate monitoring stations where analytical samples were collected.

3.2 ANALYTICAL RESULTS

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

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

3.2.1 Dome Creek

Groundwater along Dome Creek was sampled between March 18 and March 20, 2015. Samples were obtained from one (1) of the nine (9) drive-point piezometers located within this area identified for the sampling program. Sample site GSI-DC-01B was found dry during the time of sampling. Sample site GSI-DC-10B was found frozen during the time of sampling. Sample sites GSI-DC-03B, GSI-DC-05B, GSI-DC-06B, GSI-DC-07B, GSI-DC-08B and GSI-DC-09-B were frozen underneath a large accumulation ice/overflow. These six (6) sample sites were not visually inspected and therefore no monitoring measurements are provided. Sample site GSI-DC-02B was sampled directly without purging. A summary of the samples collected is provided in **Table 3-1**.

Concentrations of dissolved iron exceeded the CCME FAL guidelines at sample location GSI-DC-02B. Groundwater field parameters were not measured at Dome Creek sample sites due to the occurrence of low volume and frozen wells.

The measurement of in-situ headspace vapours was made difficult at the Dome Creek sample sites due to dedicated sampling tubing being present in these small diameter wells. There was no space in the well head to sample vapours until dedicated sampling equipment was removed, after which time well head gases may have dispersed. All drive-point piezometers located within this area are properly sealed with PVC caps. Secondary wells (B wells) are improperly sealed with a plastic bag and elastic.

3.2.2 Mill Complex

Groundwater in the Mill Complex Area was sampled on March 18 and March 20, 2015. Samples were obtained from four (4) of the nine (9) wells identified in this area. Sample sites GSI-HA-02A, GSI-HA-03A, GSI-HA-05A, and MW09-16 were found frozen during the time of sampling. Sample site MW09-17 was found dry during the time of sampling. Drive-points GSI-HA-01A and GSI-HA-04A were sampled directly without purging. A summary of the samples collected is provided in **Table 3-1**.

Field dissolved oxygen concentrations were less than the CCME FAL guideline for all measurements collected in this area. Concentrations of dissolved arsenic and iron exceeded the CCME FAL guidelines at one or more sample locations in Mill Complex area.

Monitoring wells MW09-18 and MW09-16 have vents installed on the side of the PVC stand pipe, which could have influenced *in-situ* gas concentrations.

Where measured, groundwater turbidity of all samples collected within this area was less than 50 NTU (**Table 3-2**).

3.2.3 Brown McDade Pit

Groundwater wells in the Brown McDade Pit area were sampled between March 18 and March 20, 2015. Samples were obtained from one (1) of the 11 sample sites located within this area (CH-P-13-05/50). Six (6) wells were frozen during the time of sampling (CH-P-13-01/10, CH-P-13-04/10, GLL07-01, MW09-13, MW09-14, and MW09-15), three (3) wells (GLL07-02, GLL07-03, and CH-P-13-02/10) were either dry or dry and damaged, and one well (CH-P-13-03/50) had insufficient volume to collect a sample. A summary of the samples collected is provided in **Table 3-1**.

The field dissolved oxygen concentration was less than the CCME FAL guidelines for the one measurement collected in this area. Concentrations of dissolved cadmium, copper, iron, and zinc exceeded the CCME FAL guidelines at this sample location (CH-P-13-05/50).

Monitoring wells CH-P-13-04/10, CH-P-13-05/50, GLL07-01, GLL07-02, GLL07-03, and MW09-13 had either vents installed on the side of the PVC stand pipe or were missing a proper seal, which could have influenced *in-situ* gas concentrations.

CH-P-13-02/10 was found dry during the time of sampling. Bentonite was found present at the bottom of the well during previous sampling events and therefore the well status has been listed as dry/damaged throughout the report. This well should be redeveloped in a future program but requires a larger quantity of standing water to complete the task.

Where measured, groundwater turbidity collected within this area was less than 50 NTU (**Table 3-2**).

3.2.4 Pony Creek

Groundwater wells along Pony Creek were monitored between March 18 and March 20, 2015. No samples were obtained from any of the seven (7) sample sites in this area during the sampling event. All seven (7) wells were found frozen during the time of sampling (GSI-PC-02B, GSI-PC-03B, GSI-PC-04B, GSI-PC-05B, MP09-02, MP09-03, and MP09-08). Sample sites GSI-PC-03-B and MP09-02 were frozen beneath a large accumulation of overflow, and were not visually inspected.

Monitoring wells MP09-08 and MP09-03 were missing a proper seal, which could have influenced *in-situ* gas concentrations.

3.2.5 Seepage Dam

Groundwater wells in the Seepage Dam area were monitored on March 19, 2015. No samples were obtained from any of the three (3) sample sites in this area during the sampling event. All three (3) wells (W14103083BH01, W14103083BH02 and W14103083BH04) were found frozen during the time of sampling.

Monitoring wells located in the Seepage Dam area were not properly sealed, which could influence *in-situ* gas concentrations in future sampling events. Instrument wires installed in the well head prevented *in-situ* gas measurements at these sites.

3.2.6 Tailings Facility

Groundwater wells in the Tailings Facility area were sampled between March 19 and March 20, 2015. Samples were obtained from four (4) of the 21 sample sites located in this area (MW09-02, MW09-06, MW09-23, and MW09-24).

Nine (9) wells were found frozen during the time of sampling (MP09-04, MP09-05, MP09-10, MP09-11, MP09-12, MP09-14, MW09-08, MW09-21, and W14103083BH03), five (5) were dry (MP09-09, MW09-05, MW09-07, MW09-11 and MW09-20), two (2) were buried beneath snow and ice and were therefore not located (MW09-03 and MW09-04), one (1) had insufficient volume to sample (MW09-22), and one (1) was damaged and could not be sampled (MW09-01). A summary of the samples collected is provided in **Table 3-1**.

Although well MW09-23 was successfully sampled, Hemmera/ELR noted that the well had been damaged since the October 2014 sampling event. The well appears to have been buckled at an angle during earthworks on the tailings dam, and can only be sampled using waterra tubing. This well as therefore added to those listed as damaged at the site.

Where measured, field dissolved oxygen readings were less than the CCME FAL guideline at sample sites in the Brown McDade Pit area. Concentrations of dissolved arsenic, cadmium, copper, iron, and zinc exceeded the CCME FAL guidelines at one or more sample location in this area. Field dissolved oxygen concentrations were less than the CCME FAL guideline at all sample sites located within this area. Concentrations of fluoride and ammonia, exceeded the CCME FAL guidelines in at least one sample station.

Monitoring wells MP09-09, MP09-10, MP09-11, MP09-12, MP09-14, MW09-01, MW09-07, MW09-08, MW09-20, MW09-22, MW09-23, and W14103083BH03 had either vents installed on the side of the PVC stand pipe or were missing a proper cap/seal, which could have influenced *in-situ* gas concentrations.

MW09-01 could not be sampled due to an excessive quantity of tailings present in the groundwater. This presence of tailing may indicate the well screen has been damaged or compromised. If this is the case, repairing the well may not be possible and the location may need to be reinstalled.

The measured groundwater turbidity at sample site MW09-23 was out of range of instrument (greater than 4000 NTU) and represented extremely turbid groundwater. Although groundwater samples were obtained from this location, the well was found damaged (as noted above), and it is not known whether this damage may have resulted in the increased turbidity. Field turbidity had been measured at 102 NTU during the October 2014 sampling event. The transducer installed at this location is also in poor condition (wires frayed) and should be replaced before the instrument is lost down the well. All other samples collected within this area had turbidity measurements of less than 50 NTU (**Table 3-2**).

3.3 QUALITY ASSURANCE AND QUALITY CONTROL RESULTS

Two (2) duplicate groundwater samples were collected during the fall sampling event. Two (2) travel blanks were provided by the laboratory and accompanied the samples throughout the sampling program. One (1) field blank was prepared on site for each day of sampling (3 field blanks in total). Detailed results of QA/QC sampling are provided in **Table B**, including RPD values for all duplicate and sample pairs collected.

3.3.1 Field and Travel Blanks

The majority of field blank and travel blank analytical results were reported as less than the RDL, indicating minimal evidence of contamination during the sampling or transportation process.

A detectable concentration of ammonia was recorded in both travel blanks (0.0167 mg/L and 0.0118 mg/L mg/L), and a detectable concentration of potassium was also recorded in two (2) of three (3) field blanks (FB-1 and FB-2; 0.16 mg/L and 0.14 mg/L). The program analytical supplier (ALS) indicated that the detection of low levels of ammonia should not be considered an indication of contamination as low concentrations of ammonia are occasionally found in travel blanks that are prepared too early in advance of the field program. ALS is currently investigating the reasoning for these observed spikes in ammonia.

The detection of potassium in field blank samples is not an occurrence that has been observed during past programs, and may suggest some potential contamination sourced from the environment. Potassium was present in nearly all non-QAQC samples collected during the March sampling program, ranging from 92.8 mg/L and 1.98 mg/L, with the highest concentrations of potassium were observed in samples collected from the tailings area. While elevated potassium concentrations in travel blanks suggests that this element may have been sourced from airborne or other environmental influences, the absence of other elements in the field blanks suggests that there should be no overall influence on the key program parameters.

3.3.2 Field Duplicates

3.3.2.1 MW09-19 and DUP-1

Duplicate and duplicate pair analytical results were reported within an acceptable range of variability (less than 20%) for all analysed parameters, indicating that there was no evidence of contamination during the sampling process.

3.3.2.2 CH-P-13-05/50 and DUP-2

Duplicate and duplicate pair analytical results were reported within an acceptable range of variability (less than 20%) for all analysed parameters, indicating that there was no evidence of contamination during the sampling process.

3.3.3 Quality Assurance and Quality Control Summary

Results for the QA/QC analytical program show minimal evidence of contamination during the sampling, transportation, and laboratory testing process. Overall, across two collected field duplicates, all RPD values were within an acceptable range of variability (less than 20%). Among three field blanks collected in the program, low concentrations of potassium were detected in two (2) field blanks. Finally, low concentrations of ammonia were detection in both travel blanks collected in the program. Overall, these results are considered to represent a sound QA/QC program. Despite detected potassium concentrations in travel blanks, the results suggest overall acceptable practices during field collection and transportation.

3.4 ANALYTICAL TEST OF FILTERED ALKALINITY

Filtered alkalinity samples were collected to test whether acid or alkaline-generating solids maybe affecting alkalinity results. Filtered and non-filtered alkalinity were both assessed from six (6) sample locations (MW09-18, MW09-19, CH-P-13-05/50, MW09-02, MW09-23, and MW09-24) during the March 2015 program, and analyzed for all QA/QC samples (duplicates, field blanks, and travel blanks). The four (4) other wells sampled did not have sufficient groundwater to collect filtered alkalinity (**Table 3-1**). A summary of filtered and unfiltered alkalinity results is provided in **Table 3-3**.

Table 3-3 Comparison of Alkalinity and Filtered Alkalinity Results

Well Name	Non-Filtered Alkalinity	Filtered Alkalinity	RPD
	mg/L	mg/L	%
MW09-18	491	626	*24.2*
MW09-19	483	482	*0.2*
DUP-1 (MW09-19)	472	487	*3.1*
CH-P-13-05/50	94.7	95.1	*0.4*
DUP-2 (CH-P-13-05/50)	96.4	97.6	*1.2*
MW09-02	40.9	43.8	*6.8*
MW09-23	365	380	*4.0*
MW09-24	189	190	*0.5*
FB-1	<2.0	<2.0	*nc*
FB-2	<2.0	<2.0	*nc*
Travel Blank 1	<2.0	<2.0	*nc*
Travel Blank 1	<2.0	<2.0	*nc*

Note: nc = not calculated. RPD is not calculated if either the sample or the field duplicate concentration is less than five times the detection limit.

Of the eight (8) samples above RDL, seven (7) show that filtered alkalinity samples were slightly more alkaline than unfiltered samples. This occurrence was most obvious at sample site MW09-18, where an RPD of 24.2 percent was found between filtered and unfiltered samples.

4.0 RECOMMENDATIONS

Hemmera/ELR has prepared the following recommendations based on the observations and results of the March 2015 groundwater sampling program.

1. Damaged or degraded wells should be repaired. Damaged or destroyed wells were excluded from the March 2015 sampling event, although sampling was attempted at two wells listed as damaged during earlier sampling events (as specified by AAM). One additional damaged well was noted during the March sampling event (MW09-23).

   Damaged or degraded wells noted during the March 2015 sampling event include the following, MW09-01, CH-P-13-02/10, and MW09-23.

   MW09-01 could not be sampled due to an excessive quantity of tailings present in the groundwater. This presence of tailing may indicate the well screen has been damaged or compromised. If this is the case, repairing the well may not be possible and the location may need to be reinstalled.

   CH-P-13-02/10 was found dry during the time of sampling. Bentonite was found present at the bottom of the well during previous sampling events and therefore the well status has been listed as dry/damaged throughout the report. This well should be redeveloped in a future program but requires a larger quantity of standing water to complete the task.

   Sample site MW09-23 was found damaged in the field (the PVC is bent at the surface), presumably due to grading. The transducer installed at this location is also in poor condition (wires frayed) and should be replaced before the instrument is lost down the well. Although samples were obtained from this location, the well still requires repairs.

2. Monitoring wells should be fitted for the measurement of in-situ headspace vapour. This would include installing PVC caps or J-plugs on each well, and blocking vents currently installed on the side of some of the PVC wells. Wells which are not properly fitted for in-situ headspace vapour monitoring include; MW09-18, MW09-16, CH-P-13-04/10, CH-P-13-05/50, GLL07-01, GLL07-02, GLL07-03, MW09-13, MP09-08, MP09-03, W14103083BH01, W14103083BH02, W14103083BH04, MP09-09, MP09-10, MP09-11, MP09-12, MP09-14, MW09-01, MW09-07, MW09-08, MW09-20, MW09-22, MW09-23, and W14103083BH03.

3. Due to the accumulation of ice/overflow on Dome Creek and Pony Creek, many of the drive-point piezometers installed in these areas were buried and could not be located at the time of sampling (**Table 1-1**). During future monitoring events, drive-points located in these areas should be well flagged in anticipation of winter ice accumulation.

4. At certain drive-point sample locations (**Table 1-1**) tubing was found frozen in the well, and therefore depth-to-ice could not be measured. If future winter monitoring events are anticipated, tubing should be removed from the drive-point wells following the fall sampling event. This will allow for depth-to-ice measurements during winter sampling.

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

ASTM Standard D4448-01. 2013. Standard Guide for Sampling Groundwater Monitoring Wells. ASTM International, West Conshohocken, PA, 2013, www.astm.org.

ASTM Standard D6452-99 2012 Guide for Purging Methods for Wells used for Groundwater Quality Investigations. ASTM International, West Conshohocken, PA, 2012, www.astm.org.

Canadian Council of Ministers of the Environment (CCME). 2014. Canadian Water Quality Guidelines for the Protection of Aquatic Life. Accessed online at http://st-ts.ccme.ca/, July 2014.

Hemmera Envirochem and Ecological Logistics & Research Ltd. (Hemmera). 2014a. Mount Nansen June Groundwater and Sampling Program. Report prepared for Yukon Government Assessment and Abandon Mines Branch.

Hemmera Envirochem and Ecological Logistics & Research Ltd. (Hemmera). 2014b. Mount Nansen October Groundwater and Sampling Program. Report prepared for Yukon Government Assessment and Abandon Mines Branch.

Rice, E.W., Baird, R.B., Eaton, A.D., and Clesceri, L.S. 2006. Standard Methods for the Examination of Water and Wastewater. 22nd Edition. American Water Works Association.

Yukon Government. 2011. Protocol for the Contaminated Sites Regulation under the Environment Act. Protocol No.7: Groundwater Monitoring Well Installation, Sampling and Decommissioning. Prepared pursuant to Part 6 – Administration, Section 21, Contaminated Sites Regulations, OIC 2002/171.

7.0 STATEMENT OF LIMITATIONS

This report was prepared by Hemmera Envirochem Inc. ("Hemmera"), based on fieldwork conducted by Hemmera, for the sole benefit and exclusive use of the Yukon Government. The material in it reflects Hemmera's best judgment in light of the information available to it at the time of preparing this Report. Any use that a third party makes of this Report, or any reliance on or decision made based on it, is the responsibility of such third parties. Hemmera accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions taken based on this Report.

Hemmera has performed the work as described above and made the findings and conclusions set out in this Report in a manner consistent with the level of care and skill normally exercised by members of the environmental science profession practicing under similar conditions at the time the work was performed.

This Report represents a reasonable review of the information available to Hemmera within the established Scope, work schedule and budgetary constraints. It is possible that the levels of contamination or hazardous materials may vary across the Site, and hence currently unrecognised contamination or potentially hazardous materials may exist at the Site. No warranty, expressed or implied, is given concerning the presence or level of contamination on the Site, except as specifically noted in this Report. The conclusions and recommendations contained in this Report are based upon applicable legislation existing at the time the Report was drafted. Any changes in the legislation may alter the conclusions and/or recommendations contained in the Report. Regulatory implications discussed in this Report were based on the applicable legislation existing at the time this Report was written.

In preparing this Report, Hemmera has relied in good faith on information provided by others as noted in this Report, and has assumed that the information provided by those individuals is both factual and accurate. Hemmera accepts no responsibility for any deficiency, misstatement or inaccuracy in this Report resulting from the information provided by those individuals.

The liability of Hemmera to the Yukon Government shall be limited to injury or loss caused by the negligent acts of Hemmera. The total aggregate liability of Hemmera related to this agreement shall not exceed the lesser of the actual damages incurred, or the total fee of Hemmera for services rendered on this project.

TABLES

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

		Site Location:	Dome Creek	Mill Complex				Brown McDade Pit	Tailings			
		Sample Location:	GSI-DC-02B	GSI-HA-01A	GSI-HA-04A	MW09-18	MW09-19	CH-P-13-05/50	MW09-02	MW09-06	MW09-23	MW09-24
		Sample ID:	GSI-DC-02B	GSI-HA-01A	GSI-HA-04A	MW09-18	MW09-19	CH-P-13-05-/50	MW09-02	MW09-06	MW09-23	MW09-24
		Date Sampled:	18/03/2015	18/03/2015	18/03/2015	20/03/2015	20/03/2015	20/03/2015	19/03/2015	19/03/2015	19/03/2015	19/03/2015
		Job Number:	L1589940	L1589940	L1589940	L1590448	L1590448	L1590448	L1589940	L1589940	L1589940	L1589940
		Well Status:	Direct Sampled	Direct Sampled	Direct Sampled	Good	Good	Good	Good	Good	Good	Good
Parameter	**Units**	CCME FAL [3,4]										
Field Tests												
Field Dissolved Oxygen	mg/L	9.5 [5]	-	-	-	**1.97**	**1.12**	**2.36**	**0.90**	**2.60**	**3.80**	**7.98**
Field Temperature	°C	-	-	-	-	0.2	0.9	1.4	2.3	1.9	1.9	0.7
Field pH	pH Units	6.5-9 [6]	-	-	-	6.89	6.59	6.54	7.29	7.51	7.40	7.13
Field Conductance	µS/cm	-	-	-	-	1530	1158	1566	1732	1105	800	420
Field Conductance, Specific	µS/cm	-	-	-	-	2936	2149	2857	3066	1984	1450	995
Field Redox, Relative to SHE	mV	-	-	-	-	35.1	-64.2	90.4	-130	209	17.5	76.9
Field Turbidity	NTU	-	-	-	-	4.2	7.1	48.9	9.7	47.0	-	21.7
Physical Tests												
Conductivity (uS/cm)	µS/cm	-	1010	-	-	2770	2010	2720	2820	1910	1260	979
Hardness, Total (CaCO3)	mg/L	-	632	657	647	2060	1300	1910	1580	1310	618	620
pH	pH Units	-	8.1	-	-	7.57	7.29	6.58	6.49	7.81	7.33	7.38
Anions and Nutrients												
Alkalinity, Total (CaCO3)	mg/L	-	295	-	-	491	483	94.7	40.9	119	365	189
Filtered Alkalinity	mg/L	-	-	-	-	626	482	95.1	43.8	-	380	190
Ammonia (N)	mg/L	Varies [7]	-	-	-	0.0339	6.88	0.0381	**14.4**	0.733	3.79	0.0113
Chloride	mg/L	-	<1.000	-	-	<5.000	<5.000	<5.000	<10.000	<2.500	<2.500	<1.000
Fluoride	mg/L	0.12	0.066	-	-	<0.200	<0.200	<0.200	**0.75**	**0.26**	**0.16**	<0.040
Nitrate	mg/L	13	0.778	-	-	<0.050	<0.050	<0.050	0.5	0.192	<0.025	3.28
Nitrite	mg/L	0.06	0.0102	-	-	<0.010	<0.010	<0.010	0.023	0.0138	0.0058	<0.002
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	0.14	7.47	0.149	15.7	1.16	5.73	0.378
Sulfate (SO4)	mg/L	-	337	-	-	1570	909	1880	2020	1190	428	387
Sulfide	mg/L	-	-	-	-	<0.020	0.134	<0.020	<0.020	<0.020	0.023	<0.020
Anion Sum	mEq/L	-	13	-	-	42.5	28.6	41.1	43	27.1	16.2	12.1
Cation Sum	mEq/L	-	13.1	-	-	42	29.3	41.5	42.1	27.7	15.3	12.8
Cation - Anion Balance	%	-	0.4	-	-	-0.6	1.2	0.5	-1	1	-3	3.1
Cyanides												
Cyanide, WAD	mg/L	-	-	-	-	<0.005	<0.005	<0.005	0.0053	<0.005	<0.005	<0.005
Cyanide, Total	mg/L	-	-	-	-	<0.005	<0.005	<0.005	0.169	<0.005	0.0376	0.0117
Thiocyanate (SCN)	mg/L	-	-	-	-	<0.5	0.68	<0.5	1.28	<0.5	<0.5	<0.5
Cyanide, Free	mg/L	0.005	-	-	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Organic/Inorganic Carbon												
Total Inorganic Carbon	mg/L	-	-	-	-	104	103	14.8	3.81	21.6	76.6	37.1
Total Organic Carbon	mg/L	-	-	-	-	2.62	22.2	2.37	5.71	7.27	25.6	8.74

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

		Site Location:	Dome Creek	Mill Complex				Brown McDade Pit	Tailings			
		Sample Location:	GSI-DC-02B	GSI-HA-01A	GSI-HA-04A	MW09-18	MW09-19	CH-P-13-05/50	MW09-02	MW09-06	MW09-23	MW09-24
		Sample ID:	GSI-DC-02B	GSI-HA-01A	GSI-HA-04A	MW09-18	MW09-19	CH-P-13-05-/50	MW09-02	MW09-06	MW09-23	MW09-24
		Date Sampled:	18/03/2015	18/03/2015	18/03/2015	20/03/2015	20/03/2015	20/03/2015	19/03/2015	19/03/2015	19/03/2015	19/03/2015
		Job Number:	L1589940	L1589940	L1589940	L1590448	L1590448	L1590448	L1589940	L1589940	L1589940	L1589940
		Well Status:	Direct Sampled	Direct Sampled	Direct Sampled	Good	Good	Good	Good	Good	Good	Good
Parameter	**Units**	CCME FAL [3,4]										
Dissolved Metals												
Aluminum	mg/L	Varies [8]	0.0017	0.0038	0.0042	<0.002	0.0134	0.0649	<0.005	0.002	0.0182	0.0012
Antimony	mg/L	-	0.00051	0.00047	0.00141	0.00041	0.00046	<0.0005	0.00508	0.213	0.00032	0.00018
Arsenic	mg/L	0.005	0.00298	**0.0147**	**0.00517**	**0.0556**	**0.125**	0.00444	**19.2**	**0.197**	**0.0168**	0.00165
Barium	mg/L	-	0.103	0.175	0.116	0.0094	0.052	0.00627	0.00896	0.00762	0.0375	0.205
Beryllium	mg/L	-	<0.0001	<0.0001	<0.0001	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	<0.0002	<0.0001
Bismuth	mg/L	-	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.0025	<0.0025	<0.001	<0.001	<0.0005
Boron	mg/L	1.5	<0.01	<0.01	<0.01	<0.02	0.13	<0.05	0.058	0.116	0.169	0.015
Cadmium	mg/L	Varies [9]	0.000059	<0.00001	0.000017	0.00005	<0.00002	**0.33**	**0.000707**	**0.00557**	0.000025	0.000058
Calcium	mg/L	-	166	172	166	369	302	453	487	443	159	169
Chromium	mg/L	0.001 [10]	0.00017	0.00015	<0.0001	<0.0002	0.00041	<0.0005	<0.0005	<0.0002	0.00022	0.00031
Cobalt	mg/L	-	0.00169	0.00018	0.0004	0.0003	0.00306	0.0398	0.0115	0.00151	0.0192	0.00053
Copper	mg/L	Varies [11]	0.00208	0.00128	0.00046	<0.0004	<0.0004	**0.055**	<0.001	**0.0067**	<0.0004	**0.00769**
Iron	mg/L	0.3	**0.331**	**4**	**1.55**	0.037	**24.4**	**11.3**	**46.7**	<0.01	**5.83**	0.01
Lead	mg/L	Varies [12]	0.000078	0.000085	0.000056	<0.0001	<0.0001	0.00451	<0.00025	0.00045	<0.0001	<0.00005
Lithium	mg/L	-	0.00262	0.00686	0.00491	0.0216	0.0081	0.0379	0.0284	0.0089	<0.001	0.0012
Magnesium	mg/L	-	52.8	55.5	56.4	277	133	188	87.8	50.4	53.8	48.3
Manganese	mg/L	-	2.85	0.206	0.321	0.848	9.2	37.5	35.2	6.31	11.2	0.000515
Mercury	mg/L	0.000026	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Molybdenum	mg/L	0.073	0.00487	0.000739	0.000531	0.00011	0.00013	0.0004	0.00515	0.00564	0.00375	0.000203
Nickel	mg/L	Varies [13]	0.0152	0.00423	0.00155	<0.001	0.0012	0.0143	0.003	0.0023	0.0015	<0.0005
Phosphorus	mg/L	-	<0.050	<0.050	<0.050	<0.050	0.207	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium	mg/L	-	3.67	3.66	2.95	7.61	9.21	5	92.8	15.4	7.28	1.98
Selenium	mg/L	0.001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	<0.0002	0.00048
Silicon	mg/L	-	6.25	6.09	5.12	5.35	11	7.2	6.61	6.81	4.98	6.12
Silver	mg/L	0.0001	<0.00001	<0.00001	<0.00001	<0.00002	<0.00002	<0.00005	<0.00005	0.000029	<0.00002	<0.00001
Sodium	mg/L	-	5.54	5.76	4.65	13.1	20.6	8.37	77.1	17.4	40.1	9.09
Strontium	mg/L	-	0.353	0.385	0.399	1.08	1.04	0.567	0.998	0.696	0.392	0.686
Sulfur	mg/L	-	114	132	145	525	311	658	632	404	129	139
Thallium	mg/L	0.0008	<0.00001	<0.00001	<0.00001	0.000257	<0.00002	0.00052	0.000238	0.00036	<0.00002	<0.00001
Tin	mg/L	-	<0.0001	<0.0001	<0.0001	<0.0002	<0.0002	<0.0005	<0.0005	<0.0002	<0.0002	<0.0001
Titanium	mg/L	-	<0.01	<0.01	<0.01	<0.02	<0.02	<0.05	<0.05	<0.02	<0.02	<0.01
Uranium	mg/L	0.015	0.000625	0.00008	0.000615	0.00779	0.000291	0.000695	0.00038	0.00159	0.00182	0.00324
Vanadium	mg/L	-	<0.001	<0.001	<0.001	<0.002	<0.002	<0.005	<0.005	<0.002	<0.002	<0.001
Zinc	mg/L	0.03	0.0077	0.0057	0.0043	0.0031	<0.002	**31.7**	**0.299**	**0.0939**	0.0051	0.0014

Table B: QA/QC Analytical Data

		Sample Location:	MW09-19			CH-P-13-05/50			GSI-HA-03A	MW09-24	MW09-18	N/A	
		Sample ID:	MW09-19	DUP-1	RPD (%)[14]	CH-P-13-05-/50	DUP-2	RPD (%)[14]	FB-1	FB-2	FB-3	TRAVEL BLANK	TRAVEL BLANK
		Date Sampled:	20/03/2015	20/03/2015		20/03/2015	20/03/2015		18/03/2015	19/03/2015	20/03/2015	20/03/2015	23/03/2015
		Job Number:	L1590448	L1590448		L1590448	L1590448		L1589940	L1589940	L1590448	L1589940	L1590448
		Well Status:	Good	Good		Good	Good		-	-	-	-	-
Parameter	**Units**	**CCME FAL** [3,4]											
Field Tests													
Field Dissolved Oxygen	mg/L	9.5 [5]	**1.12**	**1.12**	-	**2.36**	**2.36**	-	-	-	-	-	-
Field Temperature	°C	-	0.9	0.9	-	1.4	1.4	-	-	-	-	-	-
Field pH	pH Units	6.5-9 [6]	6.59	6.59	-	6.54	6.54	-	-	-	-	-	-
Field Conductance	µS/cm	-	1158	1158	-	1566	1566	-	-	-	-	-	-
Field Conductance, Specific	µS/cm	-	2149	2149	-	2857	2857	-	-	-	-	-	-
Field Redox, Relative to SHE	mV	-	-64.2	-64.2	-	90.4	90.4	-	-	-	-	-	-
Field Turbidity	NTU	-	7.1	7.1	-	48.9	48.9	-	-	-	-	-	-
Physical Tests													
Conductivity (uS/cm)	µS/cm	-	2010	1910	*5.1*	2720	2710	*0.4*	<2.0	<2.0	<2.0	<2.0	<2.0
Hardness, Total (CaCO3)	mg/L	-	1300	1330	*2.3*	1910	1920	*0.5*	<0.500	<0.500	<0.500	<0.500	<0.500
pH	pH Units	-	7.29	7.11	*2.5*	6.58	6.56	*0.3*	5.45	5.98	5.87	5.23	5.45
Anions and Nutrients													
Alkalinity, Total (CaCO3)	mg/L	-	483	472	*2.3*	94.7	96.4	*1.8*	<2.000	<2.000	<2.000	<2.000	<2.000
Filtered Alkalinity	mg/L	-	482	487	*1.0*	95.1	97.6	*2.6*	<2.000	<2.000	<2.000		
Ammonia (N)	mg/L	Varies [7]	6.88	6.75	*1.9*	0.0381	0.0377	*1.1*	<0.005	<0.005	<0.005	0.0167	0.0118
Chloride	mg/L	-	<5.000	<2.500	*nc*	<5.000	<5.000	*nc*	<0.500	<0.500	<0.500	<0.500	<0.500
Fluoride	mg/L	0.12	<0.200	<0.100	*nc*	<0.200	**0.2**	*nc*	<0.020	<0.020	<0.020	<0.020	<0.020
Nitrate	mg/L	13	<0.050	<0.025	*nc*	<0.050	<0.050	*nc*	<0.005	<0.005	<0.005	<0.005	<0.005
Nitrite	mg/L	0.06	<0.010	<0.005	*nc*	<0.010	<0.010	*nc*	<0.001	<0.001	<0.001	<0.001	<0.001
Total Kjeldahl Nitrogen	mg/L	-	7.47	7.48	*0.1*	0.149	0.157	*nc*	<0.050	<0.050	<0.050	<0.050	<0.050
Sulfate (SO4)	mg/L	-	909	882	*3.0*	1880	1880	*0.0*	<0.300	<0.300	<0.300	<0.300	<0.300
Sulfide	mg/L	-	0.134	0.132	*1.5*	<0.020	<0.020	*nc*	<0.020	<0.020	<0.020	<0.020	<0.020
Anion Sum	mEq/L	-	28.6	27.8	-	41.1	41	-	<0.10	<0.10	<0.10	<0.10	<0.10
Cation Sum	mEq/L	-	29.3	29.9	-	41.5	41.8	-	<0.10	<0.10	<0.10	<0.10	<0.10
Cation - Anion Balance	%	-	1.2	3.6	-	0.5	0.9	-	0	0	0	0	0
Cyanides													
Cyanide, WAD	mg/L	-	<0.005	<0.005	*nc*	<0.005	<0.005	*nc*	<0.005	<0.005	<0.005	<0.005	<0.005
Cyanide, Total	mg/L	-	<0.005	<0.005	*nc*	<0.005	<0.005	*nc*	<0.005	<0.005	<0.005	<0.005	<0.005
Thiocyanate (SCN)	mg/L	-	0.68	0.66	*nc*	<0.5	<0.5	*nc*	<0.5	<0.5	<0.5	<0.5	<0.5
Cyanide, Free	mg/L	0.005	<0.005	<0.005	*nc*	<0.005	<0.005	*nc*	<0.005	<0.005	<0.005	<0.005	<0.005
Organic/Inorganic Carbon													
Total Inorganic Carbon	mg/L	-	103	101	*2.0*	14.8	13.4	*9.9*	<0.500	<0.500	<0.500	<0.500	<0.500
Total Organic Carbon	mg/L	-	22.2	21.7	*2.3*	2.37	2.44	*nc*	<0.500	<0.500	<0.500	<0.500	<0.500

Table B: QA/QC Analytical Data

		Sample Location:	MW09-19			CH-P-13-05/50			GSI-HA-03A	MW09-24	MW09-18	N/A	
		Sample ID:	MW09-19	DUP-1	RPD (%)[14]	CH-P-13-05-/50	DUP-2	RPD (%)[14]	FB-1	FB-2	FB-3	TRAVEL BLANK	TRAVEL BLANK
		Date Sampled:	20/03/2015	20/03/2015		20/03/2015	20/03/2015		18/03/2015	19/03/2015	20/03/2015	20/03/2015	23/03/2015
		Job Number:	L1590448	L1590448		L1590448	L1590448		L1589940	L1589940	L1590448	L1589940	L1590448
		Well Status:	Good	Good		Good	Good		-	-	-	-	-
Parameter	**Units**	**CCME FAL [3,4]**											
Dissolved Metals													
Aluminum	mg/L	Varies [8]	0.0134	0.0127	*5.4*	0.0649	0.0573	*12.4*	<0.001	<0.001	<0.001	-	-
Antimony	mg/L	-	0.00046	0.00048	*nc*	<0.0005	<0.0005	*nc*	<0.0001	<0.0001	<0.0001	-	-
Arsenic	mg/L	0.005	**0.125**	**0.131**	*4.7*	0.00444	0.00455	*2.4*	<0.0001	<0.0001	<0.0001	-	-
Barium	mg/L	-	0.052	0.0542	*4.1*	0.00627	0.00639	*1.9*	<0.00005	<0.00005	<0.00005	-	-
Beryllium	mg/L	-	<0.0002	<0.0002	*nc*	<0.0005	<0.0005	*nc*	<0.0001	<0.0001	<0.0001	-	-
Bismuth	mg/L	-	<0.001	<0.001	*nc*	<0.0025	<0.0025	*nc*	<0.0005	<0.0005	<0.0005	-	-
Boron	mg/L	1.5	0.13	0.127	*2.3*	<0.05	<0.05	*nc*	<0.01	<0.01	<0.01	-	-
Cadmium	mg/L	Varies [9]	<0.00002	<0.00002	*nc*	**0.33**	**0.349**	*5.6*	<0.00001	<0.00001	<0.00001	-	-
Calcium	mg/L	-	302	309	*2.3*	453	460	*1.5*	<0.05	<0.05	<0.05	-	-
Chromium	mg/L	0.001 [10]	0.00041	0.00035	*nc*	<0.0005	<0.0005	*nc*	<0.0001	<0.0001	<0.0001	-	-
Cobalt	mg/L	-	0.00306	0.00303	*1.0*	0.0398	0.0402	*1.0*	<0.0001	<0.0001	<0.0001	-	-
Copper	mg/L	Varies [11]	<0.0004	<0.0004	*nc*	**0.055**	**0.0555**	*0.9*	<0.0002	<0.0002	<0.0002	-	-
Iron	mg/L	0.3	**24.4**	**25.2**	*3.2*	**11.3**	**11.6**	*2.6*	<0.01	<0.01	<0.01	-	-
Lead	mg/L	Varies [12]	<0.0001	<0.0001	*nc*	0.00451	0.00456	*1.1*	<0.00005	<0.00005	<0.00005	-	-
Lithium	mg/L	-	0.0081	0.0069	*16.0*	0.0379	0.0368	*2.9*	<0.0005	<0.0005	<0.0005	-	-
Magnesium	mg/L	-	133	136	*2.2*	188	187	*0.5*	<0.1	<0.1	<0.1	-	-
Manganese	mg/L	-	9.2	9.24	*0.4*	37.5	37.5	*0.0*	<0.00005	<0.00005	<0.00005	-	-
Mercury	mg/L	0.000026	<0.00001	<0.00001	*nc*	<0.00001	<0.00001	*nc*	<0.00001	<0.00001	<0.00001	-	-
Molybdenum	mg/L	0.073	0.00013	0.00014	*nc*	0.0004	0.00042	*nc*	<0.00005	<0.00005	<0.00005	-	-
Nickel	mg/L	Varies [13]	0.0012	0.0015	*nc*	0.0143	0.0142	*0.7*	<0.0005	<0.0005	<0.0005	-	-
Phosphorus	mg/L	-	0.207	0.211	*nc*	<0.050	<0.050	*nc*	<0.050	<0.050	<0.050	-	-
Potassium	mg/L	-	9.21	9.85	*6.7*	5	5.15	*3.0*	0.16	0.14	<0.1	-	-
Selenium	mg/L	0.001	<0.0002	<0.0002	*nc*	<0.0005	<0.0005	*nc*	<0.0001	<0.0001	<0.0001	-	-
Silicon	mg/L	-	11	11.4	*3.6*	7.2	7.34	*1.9*	<0.05	<0.05	<0.05	-	-
Silver	mg/L	0.0001	<0.00002	<0.00002	*nc*	<0.00005	<0.00005	*nc*	<0.00001	<0.00001	<0.00001	-	-
Sodium	mg/L	-	20.6	20.4	*1.0*	8.37	8.31	*0.7*	<0.05	<0.05	<0.05	-	-
Strontium	mg/L	-	1.04	1.1	*5.6*	0.567	0.578	*1.9*	<0.0002	<0.0002	<0.0002	-	-
Sulfur	mg/L	-	311	313	*0.6*	658	645	*2.0*	<0.500	<0.500	<0.500	-	-
Thallium	mg/L	0.0008	<0.00002	<0.00002	*nc*	0.00052	0.000543	*4.3*	<0.00001	<0.00001	<0.00001	-	-
Tin	mg/L	-	<0.0002	<0.0002	*nc*	<0.0005	<0.0005	*nc*	<0.0001	<0.0001	<0.0001	-	-
Titanium	mg/L	-	<0.02	<0.02	*nc*	<0.05	<0.05	*nc*	<0.01	<0.01	<0.01	-	-
Uranium	mg/L	0.015	0.000291	0.000296	*1.7*	0.000695	0.000709	*2.0*	<0.00001	<0.00001	<0.00001	-	-
Vanadium	mg/L	-	<0.002	<0.002	*nc*	<0.005	<0.005	*nc*	<0.001	<0.001	<0.001	-	-
Zinc	mg/L	0.03	<0.002	<0.002	*nc*	**31.7**	**31.8**	*0.3*	<0.001	<0.001	<0.001	-	-

Table B: QA/QC Analytical Data

		Sample Location:	MW09-19			CH-P-13-05/50			GSI-HA-03A	MW09-24	MW09-18	N/A	
		Sample ID:	MW09-19	DUP-1	RPD (%)[14]	CH-P-13-05-/50	DUP-2	RPD (%)[14]	FB-1	FB-2	FB-3	TRAVEL BLANK	TRAVEL BLANK
		Date Sampled:	20/03/2015	20/03/2015		20/03/2015	20/03/2015		18/03/2015	19/03/2015	20/03/2015	20/03/2015	23/03/2015
		Job Number:	L1590448	L1590448		L1590448	L1590448		L1589940	L1589940	L1590448	L1589940	L1590448
		Well Status:	Good	Good		Good	Good		-	-	-	-	-
Parameter	**Units**	**CCME FAL [3,4]**											
Total Metals													
Aluminum	mg/L	Varies [8]	-	-	-	-	-	-	-	-	-	<0.003	<0.003
Antimony	mg/L	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.0001
Arsenic	mg/L	0.005	-	-	-	-	-	-	-	-	-	<0.0001	<0.0001
Barium	mg/L	-	-	-	-	-	-	-	-	-	-	<0.00005	<0.00005
Beryllium	mg/L	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.0001
Bismuth	mg/L	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.0005
Boron	mg/L	1.5	-	-	-	-	-	-	-	-	-	<0.01	<0.01
Cadmium	mg/L	Varies [9]	-	-	-	-	-	-	-	-	-	<0.00001	<0.00001
Calcium	mg/L	-	-	-	-	-	-	-	-	-	-	<0.05	<0.05
Chromium	mg/L	0.001 [10]	-	-	-	-	-	-	-	-	-	0.00025	<0.0001
Cobalt	mg/L	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.0001
Copper	mg/L	Varies [11]	-	-	-	-	-	-	-	-	-	<0.0005	<0.0005
Iron	mg/L	0.3	-	-	-	-	-	-	-	-	-	<0.01	<0.01
Lead	mg/L	Varies [12]	-	-	-	-	-	-	-	-	-	<0.00005	<0.00005
Lithium	mg/L	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.0005
Magnesium	mg/L	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1
Manganese	mg/L	-	-	-	-	-	-	-	-	-	-	<0.00005	<0.00005
Mercury	mg/L	0.000026	-	-	-	-	-	-	-	-	-	<0.00001	<0.00001
Molybdenum	mg/L	0.073	-	-	-	-	-	-	-	-	-	<0.00005	<0.00005
Nickel	mg/L	Varies [13]	-	-	-	-	-	-	-	-	-	<0.0005	<0.0005
Phosphorus	mg/L	-	-	-	-	-	-	-	-	-	-	<0.050	<0.050
Potassium	mg/L	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1
Selenium	mg/L	0.001	-	-	-	-	-	-	-	-	-	<0.0001	<0.0001
Silicon	mg/L	-	-	-	-	-	-	-	-	-	-	<0.05	<0.05
Silver	mg/L	0.0001	-	-	-	-	-	-	-	-	-	<0.00001	<0.00001
Sodium	mg/L	-	-	-	-	-	-	-	-	-	-	<0.05	<0.05
Strontium	mg/L	-	-	-	-	-	-	-	-	-	-	<0.0002	<0.0002
Sulfur	mg/L	-	-	-	-	-	-	-	-	-	-	<0.500	<0.500
Thallium	mg/L	0.0008	-	-	-	-	-	-	-	-	-	<0.00001	<0.00001
Tin	mg/L	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.0001
Titanium	mg/L	-	-	-	-	-	-	-	-	-	-	<0.01	<0.01
Uranium	mg/L	0.015	-	-	-	-	-	-	-	-	-	<0.00001	<0.00001
Vanadium	mg/L	-	-	-	-	-	-	-	-	-	-	<0.001	<0.001
Zinc	mg/L	0.03	-	-	-	-	-	-	-	-	-	<0.003	<0.003

Notes

(1) CCME guideline exceedences shaded with dark grey. Light grey shading denotes reportable detection limit in exceedence of CCME Guideline. 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) Guideline note: Lowest acceptable dissolved oxygen concentration for cold-water biota, early life stages

(6) CCME FAL stipulates pH not < 6.5 and not > 9

(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.

(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:

0.00	if	H<17
0.00004 - 0.00037	if	H>=17 and H<=280 as follows; CWQG (µg/L) = 10{0.83(log[hardness]) – 2.46 }
0.00	if	H>280

(10) Chromium CCME FAL guidelines are expressed in chromium, hexavalent (CrVI). All laboratory data is expressed in total chromium. Total chromium values over 0.001 mg/l are flagged as exceedences.

(11) 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 (µg/L) = 0.2 * e{0.8545[ln(hardness)]-1.465}
0.004	if	H>180

(12) Lead varies with Hardness in mg/L as follows for CCME FAL:

0.001	if	H<60
.001 - 0.00	if	H>=60 and H<=180 as follows; CWQG (µg/L)= e{1.273[ln(hardness)]-4.705}
0.007	if	H>180

(13) Nickel varies with Hardness in mg/L as follows for CCME FAL:

0.025	if	H<60
025 - 0.15	if	H>=60 and H<=180 as follows; CWQG (µg/L) = e{0.76[ln(hardness)]+1.06}
0.15	if	H>180

(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.

Bold 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 March 18, 2015.

Photo 2: View of drive point wells GSI-DC-02A and GSI-DC-02B. Photo taken on March 18, 2015.

Photo 3: General location of drive point wells GSI-DC-03A and GSI-DC-03B. Photo taken on March 20, 2015. Drive point wells are frozen beneath accumulated of ice.

Photo 4: General location of drive point wells GSI-DC-05A and GSI-DC-05B. Photo taken on March 20, 2015. Drive point wells are frozen beneath accumulated ice.

Photo 5: Location of drive point wells GSI-DC-06A and GSI-DC-06B. Photo taken on March 19, 2015. Drive point wells are frozen beneath accumulated ice.

Photo 6: General location of drive point wells GSI-DC-07A and GSI-DC-07B. Photo taken on March 19, 2015. Drive point wells are frozen beneath accumulated ice.

Photo 7: General location of drive point wells GSI-DC-08A and GSI-DC-08B. Photo taken on March 19, 2015. Drive point wells are frozen beneath accumulated ice.

Photo 8: General location of drive point wells GSI-DC-09A and GSI-DC-09B. Photo taken on March 19, 2015. Drive point wells are frozen beneath accumulated ice.

Photo 9: View of drive point wells GSI-DC-10A and GSI-DC-10B. Photo taken on March 19, 2015.

Photo 10: View of drive point well GSI-HA-01A. Photo taken on March 18, 2015.

Photo 11: View of drive point well GSI-HA-02A. Photo taken on March 18, 2015.

Photo 12: View of drive point well GSI-HA-03A. Photo taken on March 18, 2015.

Photo 13: View of drive point well GSI-HA-04A. Photo taken on March 18, 2015.

Photo 14: View of drive point well GSI-HA-05A. Photo taken on March 18, 2015.

Photo 15: View of well MW09-15. Photo taken on March 18, 2015.

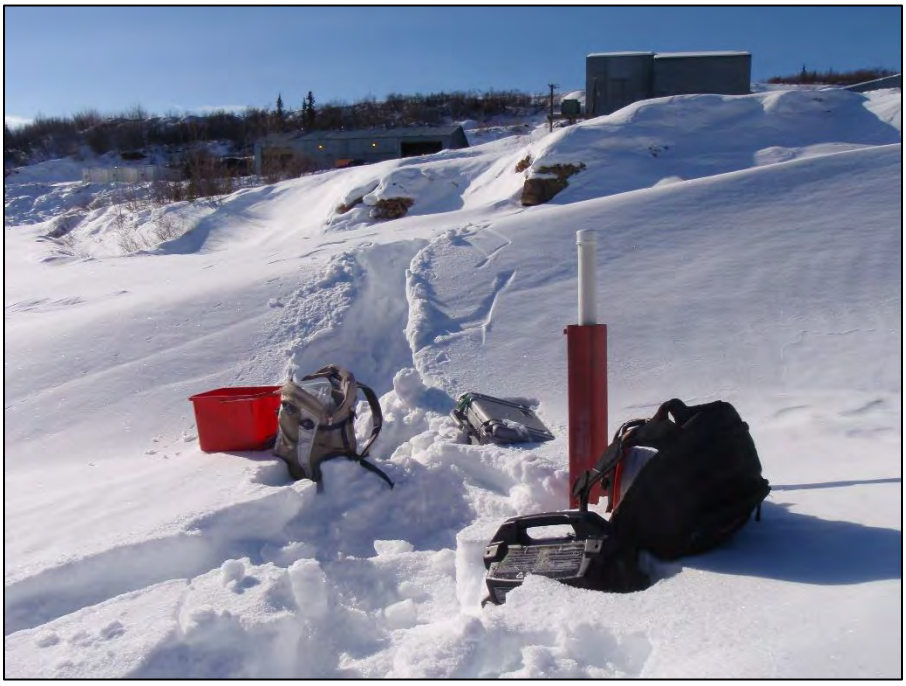


Photo 16: View of well MW09-16. Photo taken on March 20, 2015.

Photo 17: View of well MW09-17. Photo taken on March 20, 2015.

Photo 18: View of well MW09-18. Photo taken on March 18, 2015.

Photo 19: View of well MW09-19. Photo taken on March 20, 2015.

Photo 20: View of well CH-P-13-01/10. Photo taken on March 20, 2015.

Photo 21: View of well CH-P-13-03/50. Photo taken on March 19, 2015.

Photo 22: View of well CH-P-13-04/10. Photo taken on March 19, 2015.

Photo 23: View of well CH-P-13-05/50. Photo taken on March 20, 2015.

Photo 24: View of well GLL07-01. Photo taken on March 18, 2015.

Photo 25: View of well GLL07-02. Photo taken on March 18, 2015.

Photo 26: View of well GLL07-03. Photo taken on March 19, 2015.

Photo 27: View of well MW09-13. Photo taken on March 18, 2015.

Photo 28: View of well MW09-14. Photo taken on March 18, 2015.

Photo 29: View of well GSI-PC-02A and GSI-PC-02B. Photo taken on March 18, 2015.

Photo 30: General location of well GSI-PC-03A and GSI-PC-03B. Photo taken on March19, 2015. Drive point wells are frozen beneath accumulated ice.

Photo 31: View of wells GSI-PC-04A and GSI-PC-04B. Photo taken on March 19, 2015.

Photo 32: View of wells GSI-PC-05A and GSI-PC-05B. Photo taken on March 19, 2015.

Photo 33: General location of well MP09-02. Photo taken on March 19, 2015. Well is frozen beneath accumulated ice.

Photo 34: View of well MP09-03. Photo taken on March 18, 2015.

Photo 35: View of well MP09-08. Photo taken on March 18, 2015.

Photo 36: View of well W14103083BH01. Photo taken on March 19, 2015.

Photo 37: View of well W14103083BH02. Photo taken on March 19, 2015.

Photo 38: View of well W14103083BH04. Photo taken on March 19, 2015.

Photo 39: View of well MP09-04. Photo taken on March 19, 2015.

Photo 40: View of well MP09-05. Photo taken on March 19, 2015.

Photo 41: View of wells MP09-09 and MP09-10. Photo taken on March 20, 2015.

Photo 42: View of wells MP09-11 and MP09-12. Photo taken on March 20, 2015.

Photo 43: View of well MP09-14. Photo taken on March 20, 2015.

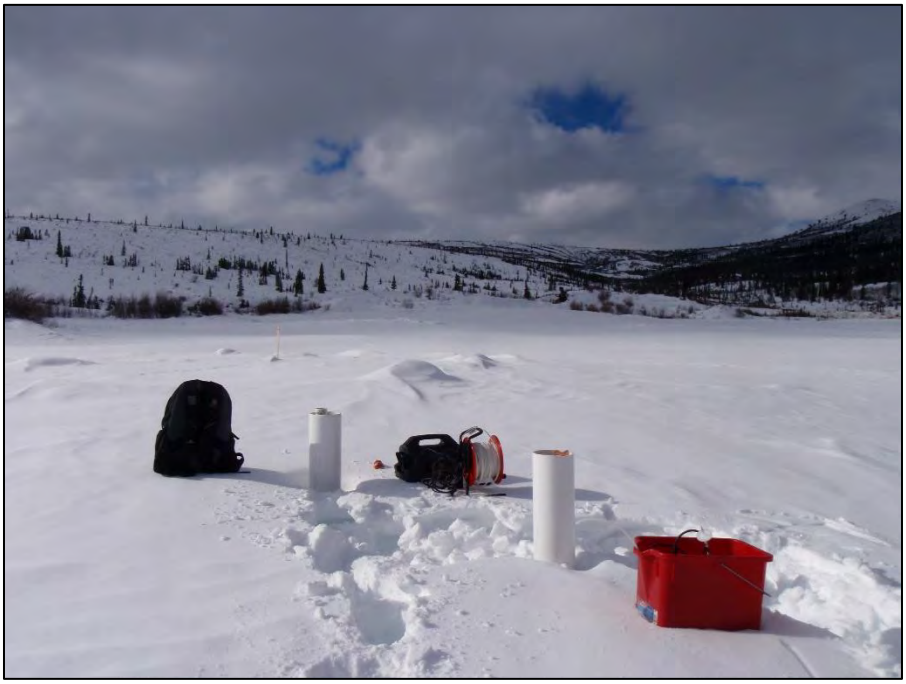


Photo 44: View of wells MW09-01 and MW09-02. Photo taken on March 19, 2015.

Photo 45: General location of wells MW09-03 and MW09-04. Photo taken on March 20, 2015. Both wells are buried beneath accumulated snow.

Photo 46: View of wells MW09-05 and MW09-06. Photo taken on March 19, 2015.

Photo 47: View of well MW09-07. Photo taken on March 20, 2015.

Photo 48: View of well MW09-08. Photo taken on March 19, 2015.

Photo 49: View of well MW09-11. Photo taken on March 20, 2015.

Photo 50: View of well MW09-20. Photo taken on March 19, 2015.

Photo 51: View of well MW09-21. Photo taken on March 19, 2015.

Photo 52: View of well MW09-22. Photo taken on March 19, 2015.

Photo 53: View of well MW09-23. Photo taken on March 19, 2015.

Photo 54: View of well MW09-24. Photo taken on March 19, 2015.

Photo 55: View of well W14103083BH03. Photo taken on March 20, 2015.

Photo 56: View of well CH-P-13-02/10. Photo taken on March 19, 2015.

APPENDIX B
Field Forms

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GSI-DC-01A	**Project Number:**	1343-005.06	**Date:**	18 March 2015
Approximate Date Drilled:		**Client:**	GY - AAM	**Sampler:**	RM TJ
Piezometer Diameter / Screen Length:	1" DP	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	sunny 3°C
Field Blank Collected	☐ Yes Name _____	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☐ Good ☐ Bad

Purge Method

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift
	Frozen				

Initial Depth to Water (m):	DRY	**Purge Start Time:**				**Purge End Time:**							
Depth to Bottom (m):	0.873	**Time (___) minute interval:**											
Submerged Tubing Depth (m):	—	**Depth to water (m)**											
Well Stick-up Height (m):	0.745	**Temperature (°C)**											
Estimated Water Volume (L):	—	**pH**											
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Cond. (µs/cm)**											
		Specific Cond. (µs/cm)											
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**Redox (mV)**											
		DO (mg/L)											
2" casing has 0.16 USgal/ft or 2.032 l/m		**Appearance & Odour (Clear, Silty, HC odours, etc.)**											
1" casing has 0.04 USgal/ft or 0.508 l/m		**Only for final readings**	**Sulphide (mg/L)**										
8" sand pack has 0.73 USgal/ft or 9.271 l/m			**Turbidity (NTU)**										
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Total Purge Volume:**											

NOT SAMPLED DRY frozen

Sample Method

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis							

HEMMERA

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

UTM Location: Zn: 08V Easting: 387677 Northing: 6881124

Photo No.: 100-0001, -0002, -0003

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	Ø
Oxygen (O2)	%	20.4
Carbon Dioxide (C02)	PPM	Ø

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: _____.

General Notes (Condition of well or other features):

No change

- Previous DTB: 0.81m.

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GSI-DC-01B	**Project Number:**	1343-005.06	**Date:**	18 March 2015
Approximate Date Drilled:		**Client:**	GY - AAM	**Sampler:**	RM TJ
Piezometer Diameter / Screen Length:	1" DP	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	sunny 3°C
Field Blank Collected	☐ Yes Name:_____	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☐ Good ☐ Bad

Purge Method					
Waterra	**Peristaltic**	**Disp. Bailer**	**Steel Bailer**	**Centrif. Pump**	**Air Lift**

Initial Depth to Water (m):	Dry	**Purge Start Time:**				**Purge End Time:**					
Depth to Bottom (m):	1.609	**Time (___) minute interval:**									
Submerged Tubing Depth (m):	—	**Depth to water (m)**									
Well Stick-up Height (m):	0.705	**Temperature (°C)**									
Estimated Water Volume (L):	—	**pH**									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Cond. (µs/cm)**									
		Specific Cond. (µs/cm)									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**Redox (mV)**									
		DO (mg/L)									
2" casing has 0.16 USgal/ft or 2.032 l/m		**Appearance & Odour (Clear, Silty, HC odours, etc.)**									
1" casing has 0.04 USgal/ft or 0.508 l/m		**Only for final readings** **Sulphide (mg/L)**									
8" sand pack has 0.73 USgal/ft or 9.271 l/m		**Turbidity (NTU)**									
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Total Purge Volume:**									

NOT SAMPLED Dry

Sample Method							
	Waterra	**Peristaltic**	**Disp. Bailer**	**Steel Bailer**	**Centrif. Pump**	**Air Lift**	**Other**
Analysis							

?dry or frozen

HEMMERA

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

UTM Location: Zn: 08V Easting: 387677 Northing: 6881124

Photo No.: 100-0001, -0002, -0003

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	Ø
Oxygen (O2)	%	20.5
Carbon Dioxide (C02)	PPM	Ø

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: _____.

General Notes (Condition of well or other features):

No change

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GSI-DC-02B	**Project Number:**	1343-005.06	**Date:**	18 March 2015
Approximate Date Drilled:		**Client:**	GY - AAM	**Sampler:**	RM TJ
Piezometer Diameter / Screen Length:	1" DP	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	cloudy 0°C
Field Blank Collected	☐ Yes Name _____	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☐ Good ☑ Bad

Purge Method N/A

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift

Initial Depth to Water (m):	2.735	**Purge Start Time:**				**Purge End Time:**					
Depth to Bottom (m):	3.852	**Time (___) minute interval:**									
Submerged Tubing Depth (m):	3.852	**Depth to water (m)**									
Well Stick-up Height (m):	0.765	**Temperature (°C)**									
Estimated Water Volume (L):	0.56	**pH**									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Cond. (µs/cm)**			DIRECT SAMPLE						
		Specific Cond. (µs/cm)									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**Redox (mV)**									
		DO (mg/L)									
2" casing has 0.16 USgal/ft or 2.032 l/m		**Appearance & Odour (Clear, Silty, HC odours, etc.)**									
1" casing has 0.04 USgal/ft or 0.508 l/m		**Only for final readings**	**Sulphide (mg/L)**								
8" sand pack has 0.73 USgal/ft or 9.271 l/m			**Turbidity (NTU)**								
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Total Purge Volume:**									

Sample Method

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis		/					

HEMMERA

Sample Site (Con't): GS1-DC-02B

UTM Location: Zn: 08V Easting: 0387838 Northing: 6881128

Photo No.: 100 - 0004 , -0005

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.3
Carbon Dioxide (C02)	PPM	0

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: _____.

General Notes (Condition of well or other features):

- turbit sample

* 3 bottles

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals ✓	100 ml	☑ Field Filtered	☑ HNO_3	100	16:50
1b	40 ml (glass)	Dissolved Mercury ✓	15 mL	☑ Field Filtered	☑ HCL	20	
2	1 L (plastic)	General Chemistry ✓	200 ml	-	-	200	
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GSI-HA-01A	**Project Number:**	1343-005.06	**Date:**	18 Mar 2015
Approximate Date Drilled:		**Client:**	GY - AAM	**Sampler:**	RM & TJ
Piezometer Diameter / Screen Length:	DP 1"	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Partial cloud 0°C
Field Blank Collected	☐ Yes Name _____	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☐ Good ☒ Bad

Purge Method N/A

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift

Initial Depth to Water (m):	2.872	**Purge Start Time:**			**Purge End Time:**				
Depth to Bottom (m):	3.110	**Time (___) minute interval:**							
Submerged Tubing Depth (m):	3.110	**Depth to water (m)**							
Well Stick-up Height (m):	1.140 (snow)	**Temperature (°C)**							
Estimated Water Volume (L):	0.12	**pH**							
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Cond. (µs/cm)**			DIRECT SAMPLE				
		Specific Cond. (µs/cm)							
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**Redox (mV)**							
		DO (mg/L)							
2" casing has 0.16 USgal/ft or 2.032 l/m		**Appearance & Odour (Clear, Silty, HC odours, etc.)**							
1" casing has 0.04 USgal/ft or 0.508 l/m		**Only for final readings**	**Sulphide (mg/L)**						
8" sand pack has 0.73 USgal/ft or 9.271 l/m			**Turbidity (NTU)**						
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Total Purge Volume:**							

Sample Method

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis		✓					

HEMMERA

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

UTM Location: Zn: 08V Easting: 387844 Northing: 6881133

Photo No.: 100-0006, -0007

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	Ø
Oxygen (O2)	%	21.4
Carbon Dioxide (C02)	PPM	Ø

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: _____.

General Notes (Condition of well or other features):

~~No change~~,
- new tubing, old tubing frozen

* 2 bottles

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☑ Field Filtered	☑ HNO_3	100	16:30
1b	40 ml (glass)	Dissolved Mercury	15 mL	☑ Field Filtered	☑ HCL	15	
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GSI-DC-02A	**Project Number:**	1343-005.06	**Date:**	18 March 15
Approximate Date Drilled:		**Client:**	GY - AAM	**Sampler:**	RM TJ
Piezometer Diameter / Screen Length:	1" DP	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	cloudy 0°C
Field Blank Collected	☐ Yes Name _____	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☐ Good ☐ Bad

Purge Method

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift
	Flow				

Initial Depth to Water (m):	DRY!	**Purge Start Time:**				**Purge End Time:**					
Depth to Bottom (m):	2.002	**Time (___) minute interval:**									
Submerged Tubing Depth (m):	—	**Depth to water (m)**									
Well Stick-up Height (m):	0.912	**Temperature (°C)**									
Estimated Water Volume (L):	—	**pH**									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Cond. (µs/cm)**									
		Specific Cond. (µs/cm)									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**Redox (mV)**									
		DO (mg/L)									
2" casing has 0.16 USgal/ft or 2.032 l/m		**Appearance & Odour (Clear, Silty, HC odours, etc.)**									
1" casing has 0.04 USgal/ft or 0.508 l/m		**Only for final readings**	**Sulphide (mg/L)**								
8" sand pack has 0.73 USgal/ft or 9.271 l/m			**Turbidity (NTU)**								
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Total Purge Volume:**									

NOT SAMPLED DRY Flow

Sample Method

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis							

HEMMERA

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

UTM Location: Zn: 08V Easting: 0387838 Northing: 6881128

Photo No.: 100 - 0004 , - 0005

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	Ø
Oxygen (O2)	%	19.4
Carbon Dioxide (C02)	PPM	Ø

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: _____.

General Notes (Condition of well or other features):

No change

Previous DTB: 1.92 m.

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MP09-03	**Project Number:**	1343-005.06	**Date:**	2015/03/18
Approximate Date Drilled:	unknown.	**Client:**	GY - AAM	**Sampler:**	AN, JL
Piezometer Diameter / Screen Length:	1" / unknown.	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	overcast/ sunny ~2°C
Field Blank Collected	☐ Yes Name _____	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☐ Good ☐ Bad

Purge Method

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift

Initial Depth to ~~Water~~ (m): ICE	0.699	**Purge Start Time:**		**Purge End Time:**	
Depth to Bottom (m):		**Time (___) minute interval:**			
Submerged Tubing Depth (m):		**Depth to water (m)**			
Well Stick-up Height (m):	0.727	**Temperature (°C)**			
Estimated Water Volume (L):		**pH**			
ICE to top of well.		**Cond. (µs/cm)**			
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Specific Cond. (µs/cm)**			
		Redox (mV)			
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**DO (mg/L)**			
		Appearance & Odour (Clear, Silty, HC odours, etc.)			
2" casing has 0.16 USgal/ft or 2.032 l/m		**Only for final readings**	**Sulphide (mg/L)**		
1" casing has 0.04 USgal/ft or 0.508 l/m			**Turbidity (NTU)**		
8" sand pack has 0.73 USgal/ft or 9.271 l/m		**Total Purge Volume:**			
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m					

FROZEN

Sample Method

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis							

HEMMERA

Sample Site (Con't): MP09-03 Way pt. collected on AN GPS.

UTM Location: Zn: 08 **Easting:** 0388959 **Northing:** 6881740

Photo No.: 17-19 (camera 8010)

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.1
Carbon Dioxide (C02)	PPM	0

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

Seal Replaced: ☐ J-Plug ☐ PVC Cap ☐ Not required ☑ Other not replaced no 1" caps.

Well properly sealed for gas monitoring: ☐ Yes ☑ No Details: no cap or plug.

General Notes (Condition of well or other features):

-Pre. existing waterra tubing found in well.

-Tubing was pulled out of well, ice found within tubing.

-DP frozen solid.

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

& GSI-PC-02-A

Sample Site:	GSI-PC-02-B	**Project Number:**	1343-005.06	**Date:**	2015/03/18
Approximate Date Drilled:	unknown	**Client:**	GY - AAM	**Sampler:**	AN, JL
Piezometer Diameter / Screen Length:	1" / unknown	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Overcast ~2°C.
Field Blank Collected	☐ Yes Name ____	**Duplicate Collected:**	☐ Yes Name ____	**Recovery:**	☐ Good ☐ Bad

Purge Method

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift

Initial Depth to ~~Water~~ (m): ICE	0.887	**Purge Start Time:**					**Purge End Time:**				
Depth to Bottom (m):	–	**Time (___) minute interval:**									
Submerged Tubing Depth (m):	–	**Depth to water (m)**									
Well Stick-up Height (m):	0.526	**Temperature (°C)**									
Estimated Water Volume (L):	–	**pH**									
ice to top of well.		**Cond. (µs/cm)**									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Specific Cond. (µs/cm)**									
		Redox (mV)									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**DO (mg/L)**									
		Appearance & Odour (Clear, Silty, HC odours, etc.)									
2" casing has 0.16 USgal/ft or 2.032 l/m		**Only for final readings**	**Sulphide (mg/L)**								
1" casing has 0.04 USgal/ft or 0.508 l/m			**Turbidity (NTU)**								
8" sand pack has 0.73 USgal/ft or 9.271 l/m		**Total Purge Volume:**									
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m											

FROZEN

Sample Method

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis							

HEMMERA

Sample Site (Con't): GSI-PC-02-B Way pt. collected on AN GPS.

UTM Location: Zn: 08 **Easting:** 0388909 **Northing:** 6881785

Photo No.: 11-13 (camera 8010)

Well Head Space Gases:

	Units	Values A	Values B
Methane (CH4)	%LEL	0	0
Oxygen (O2)	%	20.0	19.9
Carbon Dioxide (C02)	PPM	0	0

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: Well A - sealed with zip lock bag.

General Notes (Condition of well or other features):

No tubing found in DPs (both A & B).

GSI-PC-02-A

Depth to ice = 0.854 m

Ice to top of well = 0.551 m (ie. stick up).

Both DPs frozen solid in ice.

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GLL07-01	**Project Number:**	1343-005.06	**Date:**	2015/03/18
Approximate Date Drilled:	unknown	**Client:**	GY - AAM	**Sampler:**	AN, JTL
Piezometer Diameter / Screen Length:	2" / unknown	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Overcast ~0°C
Field Blank Collected	☐ Yes Name _____	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☐ Good ☐ Bad

Purge Method

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift
ICE					

Initial Depth to Water (m):	13.815 m	**Purge Start Time:**				**Purge End Time:**					
Depth to Bottom (m):		**Time (___) minute interval:**									
Submerged Tubing Depth (m):		**Depth to water (m)**									
Well Stick-up Height (m):	0.801	**Temperature (°C)**									
Estimated Water Volume (L):		**pH**									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Cond. (µs/cm)**									
		Specific Cond. (µs/cm)									
		Redox (mV)									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**DO (mg/L)**									
		Appearance & Odour (Clear, Silty, HC odours, etc.)									
2" casing has 0.16 USgal/ft or 2.032 l/m 1" casing has 0.04 USgal/ft or 0.508 l/m 8" sand pack has 0.73 USgal/ft or 9.271 l/m 6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Only for final readings**	**Sulphide (mg/L)**								
			Turbidity (NTU)								
		Total Purge Volume:									

FROZEN

Sample Method

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis							

HEMMERA

Sample Site (Con't): GLL07-01 Way pt. collected on AN GPS.

UTM Location: Zn: 08 **Easting:** 0388852 **Northing:** 6881738

Photo No.: 2-4 (Camera 8010).

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.1
Carbon Dioxide (C02)	PPM	0

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 down side of PVC.

General Notes (Condition of well or other features):

Metal well casing.
located 2m from MN access Rd.
Well in good condition.

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09 - 14	**Project Number:**	1343-005.06	**Date:**	2015/03/18
Approximate Date Drilled:	unknown	**Client:**	GY - AAM	**Sampler:**	AN, JL
Piezometer Diameter / Screen Length:	2" / unknown	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Overcast ~2°C.
Field Blank Collected	☐ Yes Name _____	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☐ Good ☐ Bad

Purge Method

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift

Initial Depth to ~~Water~~ (m): ICE	4.99	**Purge Start Time:**				**Purge End Time:**					
Depth to Bottom (m):		**Time (___) minute interval:**									
Submerged Tubing Depth (m):		**Depth to water (m)**									
Well Stick-up Height (m):	0.738	**Temperature (°C)**									
Estimated Water Volume (L):		**pH**									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume (DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume 2" casing has 0.16 USgal/ft or 2.032 l/m 1" casing has 0.04 USgal/ft or 0.508 l/m 8" sand pack has 0.73 USgal/ft or 9.271 l/m 6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Cond. (µs/cm)**									
		Specific Cond. (µs/cm)									
		Redox (mV)									
		DO (mg/L)									
		Appearance & Odour (Clear, Silty, HC odours, etc.)									
		Only for final readings	**Sulphide (mg/L)**								
			Turbidity (NTU)								
		Total Purge Volume:									

FROZEN

Sample Method

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis							

HEMMERA

Sample Site (Con't): MW09-14 Way pt. collected on AN GPS.

UTM Location: Zn: 08 Easting: 0389008 Northing: 6881662

Photo No.: 11-13 (Camera 8010)

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.0
Carbon Dioxide (C02)	PPM	0

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: small slit at top of PVC. Covered w electric tape.

General Notes (Condition of well or other features):

Metal well casing.
Well in good condition.
Well has pre-existing waterra tubing.
Tubing frozen in well.
No water detected on top of ice.
Well located 2m off MN access Road.

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09-15	**Project Number:**	1343-005.06	**Date:**	Mar 18, 2015
Approximate Date Drilled:	unknown	**Client:**	GY - AAM	**Sampler:**	AN & JL
Piezometer Diameter / Screen Length:	2" / unknown	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Overcast -2°C
Field Blank Collected	☐ Yes Name _____	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☐ Good ☐ Bad

Purge Method

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift

Initial Depth to Water (m):	13.98	**Purge Start Time:**				**Purge End Time:**					
Depth to ~~Bottom~~ (m): ICE.	14.073	**Time (___) minute interval:**									
Submerged Tubing Depth (m):		**Depth to water (m)**									
Well Stick-up Height (m):	0.8089	**Temperature (°C)**									
Estimated Water Volume (L):	0.186	**pH**									
		Cond. (µs/cm)									
		Specific Cond. (µs/cm)									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Redox (mV)**									
		DO (mg/L)									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**Appearance & Odour (Clear, Silty, HC odours, etc.)**									
2" casing has 0.16 USgal/ft or 2.032 l/m		**Only for final readings**	**Sulphide (mg/L)**								
1" casing has 0.04 USgal/ft or 0.508 l/m			**Turbidity (NTU)**								
8" sand pack has 0.73 USgal/ft or 9.271 l/m		**Total Purge Volume:**									
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m											

FROZEN

Sample Method

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis							

HEMMERA

Sample Site (Con't): MW09-15 Way pt. collected on AN GPS.

UTM Location: Zn: 08 **Easting:** 0388920 **Northing:** 6881723

Photo No.: 5-7 (Camera 8010)

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.0
Carbon Dioxide (C02)	PPM	0

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: once cap replaced.

General Notes (Condition of well or other features): -No tubing in well.
Metal well casing.
2m from MN access Rd.
Well in good condition.
Solinst transducer found in well.
Well frozen w a few mm of slush/water on top of ice blockage.
Previous DTB was 37.9 m. listed in SOW.

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GS1-14A-03A	**Project Number:**	1343-005.06	**Date:**	18 Mar 2015
Approximate Date Drilled:		**Client:**	GY - AAM	**Sampler:**	RM / TS
Piezometer Diameter / Screen Length:	1" SP	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	cloudy 0°C
Field Blank Collected	☒ Yes Name FB-1	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☐ Good ☐ Bad

Purge Method

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift

Initial Depth to Water (m):	—	**Purge Start Time:**				**Purge End Time:**					
Depth to Bottom (m):	—	**Time (___) minute interval:**									
Submerged Tubing Depth (m):	—	**Depth to water (m)**									
Well Stick-up Height (m):	0.8	**Temperature (°C)**									
Estimated Water Volume (L):	—	**pH**									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Cond. (µs/cm)**									
		Specific Cond. (µs/cm)									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**Redox (mV)**									
		DO (mg/L)									
2" casing has 0.16 USgal/ft or 2.032 l/m		**Appearance & Odour (Clear, Silty, HC odours, etc.)**									
1" casing has 0.04 USgal/ft or 0.508 l/m		**Only for final readings**	**Sulphide (mg/L)**								
8" sand pack has 0.73 USgal/ft or 9.271 l/m			**Turbidity (NTU)**								
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Total Purge Volume:**									

NOT SAMPLED FROZEN

Sample Method

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis							

HEMMERA

Sample Site (Con't): GS1-HA-03A

UTM Location: Zn: 08V Easting: 387883 Northing: 6881129

Photo No.: 100-0010, -0011

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	Ø
Oxygen (O2)	%	20.2
Carbon Dioxide (C02)	PPM	Ø

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: _____.

General Notes (Condition of well or other features):

- peristaltic tubing frozen in well
  - ↳ can't remove tubing
- couldn't measure depth to ice due to peristaltic tubing

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	FB - 1	**Project Number:**	1343-005.06	**Date:**	18 Mar 2015
Approximate Date Drilled:	-	**Client:**	GY - AAM	**Sampler:**	RM MS
Piezometer Diameter / Screen Length:	-	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	
Field Blank Collected	☐ Yes Name _____	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☐ Good ☐ Bad

Purge Method

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift

Initial Depth to Water (m):		**Purge Start Time:**			**Purge End Time:**						
Depth to Bottom (m):		**Time (___) minute interval:**									
Submerged Tubing Depth (m):		**Depth to water (m)**									
Well Stick-up Height (m):		**Temperature (°C)**									
Estimated Water Volume (L):		**pH**									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Cond. (µs/cm)**									
		Specific Cond. (µs/cm)									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**Redox (mV)**									
		DO (mg/L)									
2" casing has 0.16 USgal/ft or 2.032 l/m		**Appearance & Odour (Clear, Silty, HC odours, etc.)**									
1" casing has 0.04 USgal/ft or 0.508 l/m		**Only for final readings**	**Sulphide (mg/L)**								
8" sand pack has 0.73 USgal/ft or 9.271 l/m			**Turbidity (NTU)**								
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Total Purge Volume:**									

FIELD BLANK

Sample Method

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis							

HEMMERA

Sample Site (Con't): FB-1

UTM Location: Zn: 08V Easting: 387883 Northing: 6881129

Photo No.:

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	
Oxygen (O2)	%	
Carbon Dioxide (C02)	PPM	

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: _____.

General Notes (Condition of well or other features):

Field Blank
- collect next to GSI-HA-03A

BATCH: 03 OCT 2014

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a ✓	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3		17:00
1b ✓	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2 ✓	1 L (plastic)	General Chemistry	200 ml	-	-		
3 ✓	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4 ✓	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5 ✓	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6 ✓	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7 ✓	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8 ✓	120 ml (plastic)	Dissolved Alkalinity	100 ml	☑ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GSI-HA-02A	**Project Number:**	1343-005.06	**Date:**	18 Mar 2015
Approximate Date Drilled:		**Client:**	GY - AAM	**Sampler:**	RM & TD
Piezometer Diameter / Screen Length:	DP	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Partial Cloud 0°c
Field Blank Collected	☐ Yes Name _____	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☐ Good ☐ Bad

Purge Method N/A

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift

Initial Depth to Water (m):	FROZEN	**Purge Start Time:**				**Purge End Time:**					
Depth to Bottom (m):	2.28	**Time (___) minute interval:**									
Submerged Tubing Depth (m):	—	**Depth to water (m)**									
Well Stick-up Height (m):		**Temperature (°C)**									
Estimated Water Volume (L):	—	**pH**									
		Cond. (µs/cm)									
		Specific Cond. (µs/cm)									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Redox (mV)**									
		DO (mg/L)									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**Appearance & Odour (Clear, Silty, HC odours, etc.)**									
2" casing has 0.16 USgal/ft or 2.032 l/m		**Only for final readings**	**Sulphide (mg/L)**								
1" casing has 0.04 USgal/ft or 0.508 l/m			**Turbidity (NTU)**								
8" sand pack has 0.73 USgal/ft or 9.271 l/m		**Total Purge Volume:**									
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m											

NOT SAMPLED FROZEN.

Sample Method N/A

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis							

Frozen

HEMMERA

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

UTM Location: Zn: 08V Easting: 387864 Northing: 6881131

Photo No.: 100-0008, -0009

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.3
Carbon Dioxide (C02)	PPM	0

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: _____.

General Notes (Condition of well or other features):

- No change
- Potentially frozen
- difficulty replacing peristaltic tubing

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09 - 13	**Project Number:**	1343-005.06	**Date:**	2015/03/18
Approximate Date Drilled:	unknown	**Client:**	GY - AAM	**Sampler:**	AN, JL
Piezometer Diameter / Screen Length:	2" / unknown	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Overcast ~2°C
Field Blank Collected	☐ Yes Name _____	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☐ Good ☐ Bad

Purge Method

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift

Initial Depth to ~~Water~~ (m): ICE	9.025	**Purge Start Time:**				**Purge End Time:**					
Depth to Bottom (m):		**Time (___) minute interval:**									
Submerged Tubing Depth (m):		**Depth to water (m)**									
Well Stick-up Height (m):	0.756	**Temperature (°C)**									
Estimated Water Volume (L):		**pH**									
		Cond. (µs/cm)									
		Specific Cond. (µs/cm)									
		Redox (mV)									
		DO (mg/L)									
		Appearance & Odour (Clear, Silty, HC odours, etc.)									
		Only for final readings	**Sulphide (mg/L)**								
			Turbidity (NTU)								
		Total Purge Volume:									

FROZEN

(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume

(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume

2" casing has 0.16 USgal/ft or 2.032 l/m
1" casing has 0.04 USgal/ft or 0.508 l/m
8" sand pack has 0.73 USgal/ft or 9.271 l/m
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m

Sample Method

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis							

HEMMERA

Sample Site (Con't): MW09-13 Way pt. collected on AN GPS.

UTM Location: Zn: 08 **Easting:** 0389007 **Northing:** 6881662

Photo No.: 8-10 (Camera 8010)

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	19.9
Carbon Dioxide (C02)	PPM	0

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 down side of PVC, extend past well cap.

General Notes (Condition of well or other features):

- Metal well casing. well in good condition.
- Well does not have pre-existing tubing.
- Small amount of water detected on top of ice.
- Previous DTB was 36 m. listed in SOW.

Located 2m off MN Rd. access.

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MP09-08	**Project Number:**	1343-005.06	**Date:**	2015/03/18
Approximate Date Drilled:	unknown	**Client:**	GY - AAM	**Sampler:**	AN, JL
Piezometer Diameter / Screen Length:	1" / unknown	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	clear skies ~3°C
Field Blank Collected	☐ Yes Name _____	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☐ Good ☐ Bad

Purge Method

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift

Initial Depth to Water (m): ICE	0.505	**Purge Start Time:**				**Purge End Time:**					
Depth to Bottom (m):		**Time (___) minute interval:**									
Submerged Tubing Depth (m):		**Depth to water (m)**									
Well Stick-up Height (m):	0.861	**Temperature (°C)**									
Estimated Water Volume (L):		**pH**									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Cond. (µs/cm)**									
		Specific Cond. (µs/cm)									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**Redox (mV)**									
		DO (mg/L)									
2" casing has 0.16 USgal/ft or 2.032 l/m		**Appearance & Odour (Clear, Silty, HC odours, etc.)**									
1" casing has 0.04 USgal/ft or 0.508 l/m		**Only for final readings**	**Sulphide (mg/L)**								
8" sand pack has 0.73 USgal/ft or 9.271 l/m			**Turbidity (NTU)**								
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Total Purge Volume:**									

FROZEN

Sample Method

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis							

HEMMERA

Sample Site (Con't): MP09-08 Way pt. collected on AN GPS.

UTM Location: Zn: 08 Easting: 0389160 Northing: 6881715

Photo No.: 23-25 (camera 8010)

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.0
Carbon Dioxide (C02)	PPM	0

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

Seal Replaced: ☐ J-Plug ☐ PVC Cap ☐ Not required ☑ Other no 1" caps.

Well properly sealed for gas monitoring: ☐ Yes ☑ No Details: no cap/plug.

General Notes (Condition of well or other features):

- 5/8 waterra found in well. No peri. tubing.
- Waterra inner tubing, not used for sampling, see photos.
- No sound of water flowing in creek.
- DP frozen solid.

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GSI-HA-04A	**Project Number:**	1343-005.06	**Date:**	18 Mar 15
Approximate Date Drilled:		**Client:**	GY - AAM	**Sampler:**	RM KS
Piezometer Diameter / Screen Length:	1" DP	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	clear 0°C
Field Blank Collected	☐ Yes Name _____	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☐ Good ☑ Bad

Purge Method

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift

Initial Depth to Water (m):	1.909	**Purge Start Time:**				**Purge End Time:**					
Depth to Bottom (m):	2.188	**Time (___) minute interval:**									
Submerged Tubing Depth (m):	2.188	**Depth to water (m)**									
Well Stick-up Height (m):	0.575	**Temperature (°C)**									
Estimated Water Volume (L):	0.14	**pH**									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Cond. (µs/cm)**		DIRECT SAMPLE							
		Specific Cond. (µs/cm)									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**Redox (mV)**									
		DO (mg/L)									
2" casing has 0.16 USgal/ft or 2.032 l/m		**Appearance & Odour (Clear, Silty, HC odours, etc.)**									
1" casing has 0.04 USgal/ft or 0.508 l/m		**Only for final readings**	**Sulphide (mg/L)**								
8" sand pack has 0.73 USgal/ft or 9.271 l/m			**Turbidity (NTU)**								
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Total Purge Volume:**									

Sample Method

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis		✓					

HEMMERA

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

UTM Location: Zn: 08V Easting: 387919 Northing: 6881129

Photo No.: 100-0014, -0015

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	Ø
Oxygen (O2)	%	20.1
Carbon Dioxide (C02)	PPM	Ø

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: _____.

General Notes (Condition of well or other features):

- New tubing
- muddy sample, very turbid

*2 bottles

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a ✓	120 ml (plastic)	Dissolved Metals	100 ml	☑ Field Filtered	☐ HNO_3	100	17:55
1b ✓	40 ml (glass)	Dissolved Mercury	15 mL	☑ Field Filtered	☐ HCL	~~15~~	
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GSI-HA-05A	**Project Number:**	1343-005.06	**Date:**	18 Mar 2015
Approximate Date Drilled:		**Client:**	GY - AAM	**Sampler:**	RM / TD
Piezometer Diameter / Screen Length:	1" DP	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Clear 0°C
Field Blank Collected	☐ Yes Name _____	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☐ Good ☐ Bad

Purge Method N/A

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift

Initial Depth to Water (m):	–	**Purge Start Time:**				**Purge End Time:**					
Depth to Bottom (m):	–	**Time (___) minute interval:**									
Submerged Tubing Depth (m):	———	**Depth to water (m)**									
Well Stick-up Height (m):	0.47 (ICE)	**Temperature (°C)**									
Estimated Water Volume (L):	–	**pH**									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Cond. (µs/cm)**									
		Specific Cond. (µs/cm)									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**Redox (mV)**									
		DO (mg/L)									
2" casing has 0.16 USgal/ft or 2.032 l/m		**Appearance & Odour (Clear, Silty, HC odours, etc.)**				NOT SAMPLED FROZEN					
1" casing has 0.04 USgal/ft or 0.508 l/m		**Only for final readings**	**Sulphide (mg/L)**								
8" sand pack has 0.73 USgal/ft or 9.271 l/m			**Turbidity (NTU)**								
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Total Purge Volume:**									

Sample Method N/A

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis							

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GLL07-02	**Project Number:**	1343-005.06	**Date:**	2015/03/18
Approximate Date Drilled:	unknown	**Client:**	GY - AAM	**Sampler:**	AN, JL
Piezometer Diameter / Screen Length:	15.5 cm / unknown	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Clear skies ~3°C
Field Blank Collected	☐ Yes Name _____	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☐ Good ☐ Bad

Purge Method

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift

Initial Depth to Water (m):	DRY	**Purge Start Time:**				**Purge End Time:**					
Depth to Bottom (m):	7.20	**Time (___) minute interval:**									
Submerged Tubing Depth (m):		**Depth to water (m)**									
Well Stick-up Height (m):	1.305	**Temperature (°C)**									
Estimated Water Volume (L):		**pH**									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Cond. (µs/cm)**									
		Specific Cond. (µs/cm)									
		Redox (mV)									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**DO (mg/L)**									
		Appearance & Odour (Clear, Silty, HC odours, etc.)									
2" casing has 0.16 USgal/ft or 2.032 l/m		**Only for final readings**	**Sulphide (mg/L)**								
1" casing has 0.04 USgal/ft or 0.508 l/m			**Turbidity (NTU)**								
8" sand pack has 0.73 USgal/ft or 9.271 l/m		**Total Purge Volume:**									
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m											

DRY

Sample Method

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis							

HEMMERA

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

UTM Location: Zn: 08V Easting: 387900 Northing: 6881124

Photo No.: 100-0012, -0013

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	Ø
Oxygen (O2)	%	20.1
Carbon Dioxide (C02)	PPM	Ø

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: _____.

General Notes (Condition of well or other features):

tubing frozen in well, can't remove

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

Sample Site (Con't): GLL07-02 Waypt. collected on AN GPS.

UTM Location: Zn: 08 **Easting:** 0389070 **Northing:** 6881699

Photo No.: 20-22 (Camera 8010)

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	19.8
Carbon Dioxide (C02)	PPM	0

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

Seal Replaced: ☐ J-Plug ☐ PVC Cap ☐ Not required ☑ Other no PVC in well.

Well properly sealed for gas monitoring: ☐ Yes ☑ No Details: only metal lid on well casing.

General Notes (Condition of well or other features):

- Large metal (15.5 cm) well casing.
- No PVC within casing.
- No water detected in well.
- Tip of IFM had both ice and silt after measuring DTB.
- Previous DTB recorded as 5.8 m.
  ↑ Compared to 7.2 m found this event.

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MP09-02	**Project Number:**	1343-005.06	**Date:**	2015/03/19
Approximate Date Drilled:	unknown	**Client:**	GY - AAM	**Sampler:**	AN, JL
Piezometer Diameter / Screen Length:	1" / unknown.	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Overcast ~2°C
Field Blank Collected	☐ Yes Name _____	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☐ Good ☐ Bad

Purge Method

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift

Initial Depth to Water (m):		**Purge Start Time:**					**Purge End Time:**				
Depth to Bottom (m):		**Time (___) minute interval:**									
Submerged Tubing Depth (m):		**Depth to water (m)**									
Well Stick-up Height (m):		**Temperature (°C)**									
Estimated Water Volume (L):		**pH**									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Cond. (µs/cm)**									
		Specific Cond. (µs/cm)									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**Redox (mV)**									
		DO (mg/L)									
2" casing has 0.16 USgal/ft or 2.032 l/m		**Appearance & Odour (Clear, Silty, HC odours, etc.)**									
1" casing has 0.04 USgal/ft or 0.508 l/m		**Only for final readings**	**Sulphide (mg/L)**								
8" sand pack has 0.73 USgal/ft or 9.271 l/m			**Turbidity (NTU)**								
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Total Purge Volume:**									

(UNDER ICE) FROZEN

Sample Method

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis							

HEMMERA

Sample Site (Con't): MP09-02 Way pt. collected on AN GPS.

UTM Location: Zn: 08 **Easting:** 0388867 **Northing:** 6881810

Photo No.: 26-28 (Camera 8010)

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	
Oxygen (O2)	%	
Carbon Dioxide (C02)	PPM	

Well Head Seal: ☐ J-Plug ☐ PVC Cap ☐ Not Sealed ☐ Other N/A.

Seal Replaced: ☐ J-Plug ☐ PVC Cap ☐ Not required ☐ Other N/A.

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

General Notes (Condition of well or other features):

Well frozen underneath. ice.
DP not visable.
DP located with pin finder.
Tubing found frozen in ice at location.

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

19 March 16:30 @ 12.080m

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09-23	**Project Number:**	1343-005.06	**Date:**	19 Mar 2015
Approximate Date Drilled:		**Client:**	GY - AAM	**Sampler:**	RM/TS
Piezometer Diameter / Screen Length:	2" PVC	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	clear -2°C
Field Blank Collected	☐ Yes Name _____	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☑ Good ☐ Bad

Purge Method

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift
X					

Initial Depth to Water (m):	12.124	**Purge Start Time:**					**Purge End Time:**	0912				
Depth to Bottom (m):	15.772	**Time (___) minute interval:**					1620					
Submerged Tubing Depth (m):		**Depth to water (m)**					12.080					
Well Stick-up Height (m):	0.14	**Temperature (°C)**					1.9					
Estimated Water Volume (L):	7.296	**pH**					7.40					
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Cond. (µs/cm)**					800					
		Specific Cond. (µs/cm)					1450					
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**Redox (mV)**					17.5					
		DO (mg/L)					3.80					
2" casing has 0.16 USgal/ft or 2.032 l/m		**Appearance & Odour (Clear, Silty, HC odours, etc.)**	silty/ sulfur odour				silty & turbid					
1" casing has 0.04 USgal/ft or 0.508 l/m		**Only for final readings** **Sulphide (mg/L)**					1.22					
8" sand pack has 0.73 USgal/ft or 9.271 l/m		**Only for final readings** **Turbidity (NTU)**					>measurable					
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Total Purge Volume:**	7L									

Sample Method

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis	X						

HEMMERA

Sample Site (Con't): MW09-23

UTM Location: Zn: 08V Easting: 389460 Northing: 6880556

Photo No.: 100-0016, -0018, -0019

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	⌀
Oxygen (O2)	%	20.4
Carbon Dioxide (C02)	PPM	⌀

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: cut PVC

General Notes (Condition of well or other features):

- well PVC is bent at the surface
- turbid sample was collected
- transducer cable needs replacement

* 9 bottles

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3	Full	16:20
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-	↓	
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-	Full	

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09-02	**Project Number:**	1343-005.06	**Date:**	19 Mar 2015
Approximate Date Drilled:		**Client:**	GY - AAM	**Sampler:**	TS / RM
Piezometer Diameter / Screen Length:	2" PVC	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Cloudy 1°C
Field Blank Collected	☐ Yes Name ____	**Duplicate Collected:**	☐ Yes Name ____	**Recovery:**	☐ Good ☐ Bad

Purge Method

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift
	✓				

Initial Depth to Water (m):	3.431	**Purge Start Time:**	1451			**Purge End Time:**				
Depth to Bottom (m):	4.705	**Time (5) minute interval:**	1455	1500	1505	1510	1515			
Submerged Tubing Depth (m):		**Depth to water (m)**	3.68	4.08	4.23	4.29	4.32			
Well Stick-up Height (m):	0.66	**Temperature (°C)**	—	—	—	2.3	2.3			
Estimated Water Volume (L):	2.548	**pH**				7.33	7.29			
		Cond. (µs/cm)				1730	1732			
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Specific Cond. (µs/cm)**				3066	3066			
		Redox (mV)				-132	-130			
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**DO (mg/L)**				1.0	0.9			
		Appearance & Odour (Clear, Silty, HC odours, etc.)	clear no odour →				→			
2" casing has 0.16 USgal/ft or 2.032 l/m		**Only for final readings** — **Sulphide (mg/L)**					0.02			
1" casing has 0.04 USgal/ft or 0.508 l/m		**Only for final readings** — **Turbidity (NTU)**					9.7			
8" sand pack has 0.73 USgal/ft or 9.271 l/m		**Total Purge Volume:** (L)	0.5	1.5	2	3	4 Final depth @ 4.530			4.42
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m										

Sample Method

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis		✓					

HEMMERA

Sample Site (Con't): MW09-02

UTM Location: Zn: 08V Easting: 389395 Northing: 6880556

Photo No.: 100-0042, -0043

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	Ø
Oxygen (O2)	%	20.4
Carbon Dioxide (C02)	PPM	Ø

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: _____

General Notes (Condition of well or other features):

- replaced tubing

* 9 bottles

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a ✓	120 ml (plastic)	Dissolved Metals	100 ml	☑ Field Filtered	☑ HNO_3	100	Sampled @ 1530
1b ✓	40 ml (glass)	Dissolved Mercury	15 mL	☑ Field Filtered	☑ HCL	40	
2	1 L (plastic)	General Chemistry	200 ml	-	-	750	
3 ✓	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☑ NaOH	100	
4 ✓	250 ml (glass)	Ammonia (NH3)	120 ml	-	☑ H_2SO_4	250	
5 ✓	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☑ HNO_3	100	
6 ✓	120 ml (plastic)	Sulphide	100 ml	-	☑ Zinc Acetate, capped and mixed, then NaOH	120	
7 ✓	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-	230	
8 ✓	120 ml (plastic)	Dissolved Alkalinity	100 ml	☑ Field Filtered	-	100	

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09-24	**Project Number:**	1343-005.06	**Date:**	19 Mar 2015
Approximate Date Drilled:		**Client:**	GY - AAM	**Sampler:**	TS / RM
Piezometer Diameter / Screen Length:	2" PVC	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	cloudy 0°C
Field Blank Collected	☑ Yes Name FB2	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☑ Good ☐ Bad

Purge Method

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift
		✓			

Initial Depth to Water (m):	9.114	**Purge Start Time:**	1240			**Purge End Time:**				
Depth to Bottom (m):	11.193	**Time (___) minute interval:**	1240							
Submerged Tubing Depth (m):	–	**Depth to water (m)**								
Well Stick-up Height (m):	0.62	**Temperature (°C)**		0.9	0.7	0.7	0.7			
Estimated Water Volume (L):	4.16	**pH**		13.01	>13	>13	>13			
		Cond. (µs/cm)		146	269	553	420			
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Specific Cond. (µs/cm)**		260	539	1030	995			
		Redox (mV)		93.2	76.0	78.0	76.9			
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**DO (mg/L)**		8.76	8.01	8.02	7.98			
		Appearance & Odour (Clear, Silty, HC odours, etc.)		some turbidity			→			
2" casing has 0.16 USgal/ft or 2.032 l/m		**Only for final readings**	**Sulphide (mg/L)**				0.23			
1" casing has 0.04 USgal/ft or 0.508 l/m			**Turbidity (NTU)**				21.7			
8" sand pack has 0.73 USgal/ft or 9.271 l/m		**Total Purge Volume:**		4	6	10	15L			
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m										

Sample Method

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis			✓				

HEMMERA

Sample Site (Con't): MW09-24

UTM Location: Zn: 08V Easting: 389560 Northing: 6880623

Photo No.: 100 - 00321 - 0033

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	Ø
Oxygen (O2)	%	20.1
Carbon Dioxide (C02)	PPM	Ø

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: _____.

General Notes (Condition of well or other features):

Dry

*9 bottles

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a ✓	120 ml (plastic)	Dissolved Metals ✓	100 ml	☑ Field Filtered	☑ HNO_3	120	Sample @ 1305
1b ✓	40 ml (glass)	Dissolved Mercury ✓	15 mL	☑ Field Filtered	☑ HCL	40	
2 ✓	1 L (plastic)	General Chemistry	200 ml	-	-	750	
3 ✓	145 ml (plastic)	Cyanide (total, free, weak acid dissociable) ✓	100 ml	-	☑ NaOH	145	
4 ✓	250 ml (glass)	Ammonia (NH_3) ✓	120 ml	-	☑ H_2SO_4	250	
5 ✓	120 ml (plastic)	Thiocyanate (SCN) ✓	50 ml	-	☑ HNO_3	120	
6 ✓	120 ml (plastic)	Sulphide ✓	100 ml	-	☑ Zinc Acetate, capped and mixed, then NaOH	120	
7 ✓	250 ml (glass amber)	Total Inorganic Carbon ✓	100 ml	-	-	250	
8 ✓	120 ml (plastic)	Dissolved Alkalinity ✓	100 ml	☑ Field Filtered	-	120	

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	CH-P-13-02/10	**Project Number:**	1343-005.06	**Date:**	19 Mar 2015
Approximate Date Drilled:		**Client:**	GY - AAM	**Sampler:**	RM/D
Piezometer Diameter / Screen Length:	1.5" PVC	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Cloudy 8.0 °C
Field Blank Collected	☐ Yes Name _____	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☐ Good ☐ Bad

Purge Method N/A

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift

Initial Depth to Water (m):	DRY	**Purge Start Time:**					**Purge End Time:**				
Depth to Bottom (m):	8.140	**Time (___) minute interval:**									
Submerged Tubing Depth (m):	—	**Depth to water (m)**									
Well Stick-up Height (m):	0.60	**Temperature (°C)**									
Estimated Water Volume (L):	—	**pH**									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Cond. (µs/cm)**									
		Specific Cond. (µs/cm)									
		Redox (mV)									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**DO (mg/L)**									
		Appearance & Odour (Clear, Silty, HC odours, etc.)	NOT SAMPLED DRY								
2" casing has 0.16 USgal/ft or 2.032 l/m		**Only for final readings** **Sulphide (mg/L)**									
1" casing has 0.04 USgal/ft or 0.508 l/m											
8" sand pack has 0.73 USgal/ft or 9.271 l/m		**Only for final readings** **Turbidity (NTU)**									
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Total Purge Volume:**									

Sample Method N/A

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis							

HEMMERA

Sample Site (Con't): CH-P-13-02

UTM Location: Zn: 08V **Easting:** 388922 **Northing:** 6881013

Photo No.: 100-0044, -0045

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	~~0~~
Oxygen (O2)	%	19.8
Carbon Dioxide (C02)	PPM	~~0~~

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: _____.

General Notes (Condition of well or other features):

* Add to map

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GSI-PC-03-A/B	**Project Number:**	1343-005.06	**Date:**	2015/03/19
Approximate Date Drilled:	unknown	**Client:**	GY - AAM	**Sampler:**	AN, JL
Piezometer Diameter / Screen Length:	1" / unknown	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	overcast ~ -3°C
Field Blank Collected	☐ Yes Name ____	**Duplicate Collected:**	☐ Yes Name ____	**Recovery:**	☐ Good ☐ Bad

Purge Method

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift

Initial Depth to Water (m):		**Purge Start Time:**				**Purge End Time:**					
Depth to Bottom (m):		**Time (___) minute interval:**									
Submerged Tubing Depth (m):		**Depth to water (m)**									
Well Stick-up Height (m):		**Temperature (°C)**									
Estimated Water Volume (L):		**pH**									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Cond. (µs/cm)**									
		Specific Cond. (µs/cm)									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**Redox (mV)**									
		DO (mg/L)									
2" casing has 0.16 USgal/ft or 2.032 l/m		**Appearance & Odour (Clear, Silty, HC odours, etc.)**									
1" casing has 0.04 USgal/ft or 0.508 l/m		**Only for final readings**	**Sulphide (mg/L)**								
8" sand pack has 0.73 USgal/ft or 9.271 l/m			**Turbidity (NTU)**								
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Total Purge Volume:**									

Not Located

Sample Method

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis							

HEMMERA

Sample Site (Con't): GSI-PC-03-A/B Way pt. not collected.

UTM Location: Zn: Easting: Northing:

Photo No.: 29-31 (Camera 5010)

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	
Oxygen (O2)	%	
Carbon Dioxide (C02)	PPM	

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: _____.

General Notes (Condition of well or other features):

Visited UTM provided in SOW. Thick solid ice developed on creek at location. Searched area with pin finder. DP not located with pin finder. Most likely frozen underneath thick ice accumulation.

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	651-DC-10-A/B	**Project Number:**	1343-005.06	**Date:**	2015/03/19
Approximate Date Drilled:	unknown	**Client:**	GY - AAM	**Sampler:**	AN, JL
Piezometer Diameter / Screen Length:	1" / unknown	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	overcast ~0°C
Field Blank Collected	☐ Yes Name _____	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☐ Good ☐ Bad

Purge Method

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift

Initial Depth to Water (m):	0.70	**Purge Start Time:**			**Purge End Time:**						
Depth to ~~Bottom~~ (m): ICE	0.75	**Time (___) minute interval:**									
Submerged Tubing Depth (m):		**Depth to water (m)**									
Well Stick-up Height (m):	0.17	**Temperature (°C)**									
Estimated Water Volume (L):	~0.05	**pH**									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Cond. (µs/cm)**									
		Specific Cond. (µs/cm)									
		Redox (mV)									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**DO (mg/L)**									
		Appearance & Odour (Clear, Silty, HC odours, etc.)									
2" casing has 0.16 USgal/ft or 2.032 l/m		**Only for final readings**	**Sulphide (mg/L)**								
1" casing has 0.04 USgal/ft or 0.508 l/m			**Turbidity (NTU)**								
8" sand pack has 0.73 USgal/ft or 9.271 l/m		**Total Purge Volume:**									
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m											

FROZEN

Sample Method

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis							

HEMMERA

Sample Site (Con't): GSI-DC-10-A/B Way pt. collected on AN GPS.

UTM Location: Zn: 08 **Easting:** 0390862 **Northing:** 6880448

Photo No.: 60-62 (Camera 8010)

Well Head Space Gases:

	Units	A	B
Methane (CH4)	%LEL	0	0
Oxygen (O2)	%	20.0	20.0
Carbon Dioxide (C02)	PPM	0	0

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: (A) sealed with ziplock bag.

General Notes (Condition of well or other features):

GSI-DC-10-A

Depth to ice: 0.995 m

Stick up from ice: 0.22 m

Peri. tubing found in (B) well.

Tubing was frozen in well and could not be removed.

5mm of standing water measured on top of ice.

* Get j-plug for well A

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GSI-DC-08-A/B	**Project Number:**	1343-005.06	**Date:**	2015/03/19
Approximate Date Drilled:	unknown	**Client:**	GY - AAM	**Sampler:**	AN, JL
Piezometer Diameter / Screen Length:	1" / unknown	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Overcast ~2°C
Field Blank Collected	☐ Yes Name _____	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☐ Good ☐ Bad

Purge Method

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift

Initial Depth to Water (m):		**Purge Start Time:**			**Purge End Time:**						
Depth to Bottom (m):		**Time (___) minute interval:**									
Submerged Tubing Depth (m):		**Depth to water (m)**									
Well Stick-up Height (m):		**Temperature (°C)**									
Estimated Water Volume (L):		**pH**									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Cond. (µs/cm)**									
		Specific Cond. (µs/cm)									
		Redox (mV)									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**DO (mg/L)**									
		Appearance & Odour (Clear, Silty, HC odours, etc.)									
2" casing has 0.16 USgal/ft or 2.032 l/m		**Only for final readings**	**Sulphide (mg/L)**								
1" casing has 0.04 USgal/ft or 0.508 l/m			**Turbidity (NTU)**								
8" sand pack has 0.73 USgal/ft or 9.271 l/m		**Total Purge Volume:**									
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m											

Not Located

Sample Method

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis							

HEMMERA

Sample Site (Con't): GSI-DC-08-A/B No way pt. collected

UTM Location: Zn: **Easting:** **Northing:**

Photo No.: 54-56 (Camera 800).

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	
Oxygen (O2)	%	
Carbon Dioxide (C02)	PPM	

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: _____.

General Notes (Condition of well or other features):

Visited UTM listed in the SOW. DP's not located, swept area with pin finder, not able to detect. Large accumulation of overflow on Upper Dome creek. DP's most likely buried under ice.
Sites should be well flagged in spring in anticipation of ice accumulation.

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GSI-DC-07-A/B	**Project Number:**	1343-005.06	**Date:**	2015/03/19
Approximate Date Drilled:	unknown	**Client:**	GY - AAM	**Sampler:**	AN, JL
Piezometer Diameter / Screen Length:	1" / unknown	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Overcast ~2°C
Field Blank Collected	☐ Yes Name _____	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☐ Good ☐ Bad

Purge Method

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift

Initial Depth to Water (m):		**Purge Start Time:**					**Purge End Time:**				
Depth to Bottom (m):		**Time (___) minute interval:**									
Submerged Tubing Depth (m):		**Depth to water (m)**									
Well Stick-up Height (m):		**Temperature (°C)**									
Estimated Water Volume (L):		**pH**									
		Cond. (µs/cm)									
		Specific Cond. (µs/cm)									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Redox (mV)**									
		DO (mg/L)									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**Appearance & Odour (Clear, Silty, HC odours, etc.)**									
2" casing has 0.16 USgal/ft or 2.032 l/m		**Only for final readings**	**Sulphide (mg/L)**								
1" casing has 0.04 USgal/ft or 0.508 l/m			**Turbidity (NTU)**								
8" sand pack has 0.73 USgal/ft or 9.271 l/m		**Total Purge Volume:**									
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m											

Not Located

Sample Method

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis							

HEMMERA

Sample Site (Con't): GSI-DC-07-A/B Way pt. not collected

UTM Location: Zn: **Easting:** **Northing:**

Photo No.: 51-53 (Camera 8010)

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	
Oxygen (O2)	%	
Carbon Dioxide (C02)	PPM	

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: _____.

General Notes (Condition of well or other features):

Visited UTM listed in the SOW. Large amount of overflow accumulated on upper Donna crk. Attempted to locate DP using pin finder, unable to detect. DP's assumed to be buried in accumulated ice.

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GSI-DC-06-A/B	**Project Number:**	1343-005.06	**Date:**	2015/03/19
Approximate Date Drilled:	unknown.	**Client:**	GY - AAM	**Sampler:**	AN, JL
Piezometer Diameter / Screen Length:	1" / unknown	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Overcast ~ 2°C
Field Blank Collected	☐ Yes Name _____	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☐ Good ☐ Bad

Purge Method

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift

Initial Depth to Water (m):		**Purge Start Time:**			**Purge End Time:**						
Depth to Bottom (m):		**Time (___) minute interval:**									
Submerged Tubing Depth (m):		**Depth to water (m)**									
Well Stick-up Height (m):		**Temperature (°C)**									
Estimated Water Volume (L):		**pH**									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Cond. (µs/cm)**									
		Specific Cond. (µs/cm)									
		Redox (mV)									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**DO (mg/L)**									
		Appearance & Odour (Clear, Silty, HC odours, etc.)									
2" casing has 0.16 USgal/ft or 2.032 l/m		**Only for final readings**	**Sulphide (mg/L)**								
1" casing has 0.04 USgal/ft or 0.508 l/m			**Turbidity (NTU)**								
8" sand pack has 0.73 USgal/ft or 9.271 l/m		**Total Purge Volume:**									
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m											

Not located

Sample Method

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis							

HEMMERA

Sample Site (Con't): GSI-DC-06-A/B Way pt. not collected

UTM Location: Zn: **Easting:** **Northing:**

Photo No.: 48-50 (camera 8010)

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	
Oxygen (O2)	%	
Carbon Dioxide (C02)	PPM	

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: _____.

General Notes (Condition of well or other features):

Visited UTM location provided in SOW. Large accumulations of over flow observed in upper Dome Creek. DP was not located with Pinfinder. Presumed to be buried under over flow. *See photos. Location around sign "Upper Dome".

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09-06	**Project Number:**	1343-005.06	**Date:**	19 Mar 2015
Approximate Date Drilled:		**Client:**	GY - AAM	**Sampler:**	TS/RM
Piezometer Diameter / Screen Length:	2" PVC	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	-2°C Partial cloud
Field Blank Collected	☐ Yes Name _____	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☐ Good ☐ Bad

Purge Method

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift
	X				

Initial Depth to Water (m):	4.091	**Purge Start Time:**	9:46			**Purge End Time:**					
Depth to Bottom (m):	6.040	**Time (5) minute interval:**	9:50	9:55	1000	1005	1010			
Submerged Tubing Depth (m):	5.70	**Depth to water (m)**	4.64	4.95	5.19	5.40	5.57			
Well Stick-up Height (m):	1.45	**Temperature (°C)**	2.2	2.2	2.0	1.9	1.9			
Estimated Water Volume (L):	3.90	**pH**	7.66	7.51	7.54	7.55	7.51			
		Cond. (µs/cm)	[illegible]1117		1105	1080	1105			
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Specific Cond. (µs/cm)**	1982	1981	1971	1945	1984			
		Redox (mV) (ORP)	214.7	213.0	210.0	210	209			
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**DO (mg/L)**	2.26	1.66	1.94	2.50	2.60			
		Appearance & Odour (Clear, Silty, HC odours, etc.)	clear no odour	→	→	→	→	*final reading not logged		
2" casing has 0.16 USgal/ft or 2.032 l/m		**Only for final readings** Sulphide (mg/L)					034			
1" casing has 0.04 USgal/ft or 0.508 l/m		**Only for final readings** Turbidity (NTU)					47			
8" sand pack has 0.73 USgal/ft or 9.271 l/m		**Total Purge Volume:**	1.5	3	4	4	5			
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m										

Sample Method

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis		X					

HEMMERA

Sample Site (Con't): MW09-06

UTM Location: Zn: 08V Easting: 389414 Northing: 6880655

Photo No.: 100-0020, -0021

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	Ø
Oxygen (O2)	%	19.9
Carbon Dioxide (C02)	PPM	Ø

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: _____.

General Notes (Condition of well or other features):

Didn't log final YSI reading for well went dry

*8 bottles total

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☑ Field Filtered	☑ HNO_3	120	Sampled @1030
1b	40 ml (glass)	Dissolved Mercury	15 mL	☑ Field Filtered	☑ HCL	40	
2	1 L (plastic)	General Chemistry	200 ml	-	-	500	
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☑ NaOH	145	
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☑ H_2SO_4	250	
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☑ HNO_3	120	
6	120 ml (plastic)	Sulphide	100 ml	-	☑ Zinc Acetate, capped and mixed, then NaOH	120	
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-	250	
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09-05	**Project Number:**	1343-005.06	**Date:**	19 Mar 2015
Approximate Date Drilled:		**Client:**	GY - AAM	**Sampler:**	TP/RM
Piezometer Diameter / Screen Length:	2" PVC	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	-2°C Partial cloud
Field Blank Collected	☐ Yes Name _____	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☐ Good ☐ Bad

Purge Method N/A

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift

Initial Depth to Water (m):	DRY	**Purge Start Time:**					**Purge End Time:**				
Depth to Bottom (m):	7.560	**Time (___) minute interval:**									
Submerged Tubing Depth (m):	—	**Depth to water (m)**									
Well Stick-up Height (m):	0.83	**Temperature (°C)**									
Estimated Water Volume (L):	—	**pH**									
		Cond. (µs/cm)									
		Specific Cond. (µs/cm)									
		Redox (mV)									
		DO (mg/L)									
		Appearance & Odour (Clear, Silty, HC odours, etc.)									
		Only for final readings **Sulphide (mg/L)**									
		Only for final readings **Turbidity (NTU)**									
		Total Purge Volume:									

NOT SAMPLED DRY

(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume

(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume

2" casing has 0.16 USgal/ft or 2.032 l/m
1" casing has 0.04 USgal/ft or 0.508 l/m
8" sand pack has 0.73 USgal/ft or 9.271 l/m
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m

Sample Method N/A

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis							

HEMMERA

Sample Site (Con't): MW09-05

UTM Location: Zn: 08V Easting: 389412 Northing: 6880654

Photo No.: 100-0020, -0021

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	Ø
Oxygen (O2)	%	15.4
Carbon Dioxide (C02)	PPM	Ø

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: _____.

General Notes (Condition of well or other features):

- tailings at bottom of well

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09-22	**Project Number:**	1343-005.06	**Date:**	19 Mar 2015
Approximate Date Drilled:		**Client:**	GY - AAM	**Sampler:**	TD/RM
Piezometer Diameter / Screen Length:	2" PVC	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	cloudy, low wind -2°C
Field Blank Collected	☐ Yes Name _____	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☐ Good ☑ Bad

Purge Method

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift

Initial Depth to Water (m):	4.024	**Purge Start Time:**			**Purge End Time:**						
Depth to Bottom (m):	5.252	**Time (—) minute interval:**									
Submerged Tubing Depth (m):	–	**Depth to water (m)**									
Well Stick-up Height (m):	0.89	**Temperature (°C)**									
Estimated Water Volume (L):	2.456	**pH**									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Cond. (µs/cm)**									
		Specific Cond. (µs/cm)									
		Redox (mV)									
		DO (mg/L)									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**Appearance & Odour (Clear, Silty, HC odours, etc.)**									
2" casing has 0.16 USgal/ft or 2.032 l/m		**Only for final readings**	**Sulphide (mg/L)**								
1" casing has 0.04 USgal/ft or 0.508 l/m			**Turbidity (NTU)**								
8" sand pack has 0.73 USgal/ft or 9.271 l/m		**Total Purge Volume:**									
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m											

NOT SAMPLED

Insufficient well volume

Sample Method

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis							

HEMMERA

Sample Site (Con't): MW09-22

UTM Location: Zn: 08V Easting: 389495 Northing: 6880549

Photo No.: 100-0022, -0023

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	Ø
Oxygen (O2)	%	20.5
Carbon Dioxide (C02)	PPM	Ø

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: PVC cut

General Notes (Condition of well or other features):

- insufficient well volume despite >1m well volume, unable to draw out water
- Replaced tubing (6 m)
- ice at the tip of water level tape

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GSI-PC-05-A/B	**Project Number:**	1343-005.06	**Date:**	2015/03/19
Approximate Date Drilled:	unknown	**Client:**	GY - AAM	**Sampler:**	AN, JL.
Piezometer Diameter / Screen Length:	1" / unknown	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Overcast
Field Blank Collected	☐ Yes Name _____	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☐ Good ☐ Bad

Purge Method

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift

Initial Depth to ~~Water~~ (m): ICE	3.715	**Purge Start Time:**			**Purge End Time:**						
Depth to Bottom (m):		**Time (___) minute interval:**									
Submerged Tubing Depth (m):		**Depth to water (m)**									
Well Stick-up Height (m):	0.810	**Temperature (°C)**									
Estimated Water Volume (L):		**pH**									
ice to top of well.		**Cond. (µs/cm)**									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Specific Cond. (µs/cm)**									
		Redox (mV)									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**DO (mg/L)**									
		Appearance & Odour (Clear, Silty, HC odours, etc.)									
2" casing has 0.16 USgal/ft or 2.032 l/m		**Only for final readings**	**Sulphide (mg/L)**								
1" casing has 0.04 USgal/ft or 0.508 l/m			**Turbidity (NTU)**								
8" sand pack has 0.73 USgal/ft or 9.271 l/m		**Total Purge Volume:**									
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m											

FROZEN

Sample Method

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis							

note: could be dry.

HEMMERA

Sample Site (Con't): GSI-PC-05-A/B Way pt. collected on AN GPS.

UTM Location: Zn: 08 **Easting:** 0389712 **Northing:** 6881660

Photo No.: 35-37 (Camera 9010)

Well Head Space Gases:

	Units	Values A	Values B
Methane (CH4)	%LEL	0	0
Oxygen (O2)	%	20.0	20.1
Carbon Dioxide (C02)	PPM	0	0

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: Well (A) sealed with zip lock bag.

General Notes (Condition of well or other features):

GSI-PC-05-A

Stick up from ice: 0.796 m

Depth to ICE: 2.003 m

Pre-existing tubing (micro waterra) found within well. (B)

*get plug for well A

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GSI-PC-04-A/B	**Project Number:**	1343-005.06	**Date:**	2015/03/19
Approximate Date Drilled:	unknown.	**Client:**	GY - AAM	**Sampler:**	AN, JL.
Piezometer Diameter / Screen Length:	1" / unknown.	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Overcast ~ -5°C.
Field Blank Collected	☐ Yes Name _____	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☐ Good ☐ Bad

Purge Method

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift

Initial Depth to ~~Water~~ (m): ICE	0.984	**Purge Start Time:**					**Purge End Time:**				
Depth to Bottom (m):		**Time (___) minute interval:**									
Submerged Tubing Depth (m):		**Depth to water (m)**									
Well Stick-up Height (m):	0.582	**Temperature (°C)**									
Estimated Water Volume (L):		**pH**									
ICE to top of well		**Cond. (µs/cm)**									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Specific Cond. (µs/cm)**									
		Redox (mV)									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**DO (mg/L)**									
		Appearance & Odour (Clear, Silty, HC odours, etc.)									
2" casing has 0.16 USgal/ft or 2.032 l/m		**Only for final readings**	**Sulphide (mg/L)**								
1" casing has 0.04 USgal/ft or 0.508 l/m			**Turbidity (NTU)**								
8" sand pack has 0.73 USgal/ft or 9.271 l/m		**Total Purge Volume:**									
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m											

FROZEN

Sample Method

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis							

HEMMERA

Sample Site (Con't): GS1-PC-04-A/B Way pt. collected on AN GPS.

UTM Location: Zn: 08 **Easting:** 0389585 **Northing:** 6881656

Photo No.: 32-34 (Camera 8010)

Well Head Space Gases:

	Units	Values A	Values B
Methane (CH4)	%LEL	0	0
Oxygen (O2)	%	20.3	20.3
Carbon Dioxide (C02)	PPM	0	0

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: Well A sealed with ziplock bag.

General Notes (Condition of well or other features):

GS1-PC-04-A

Depth to ICE: 0.940 m

Stick up above ICE: 0.570 m

Tubing (micro waterra) found in well (B).

Tubing frozen in DP.

Tubing is slightly damaged, requires replacement next event.

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	FB-2	**Project Number:**	1343-005.06	**Date:**	19 Mar 2015
Approximate Date Drilled:	–	**Client:**	GY - AAM	**Sampler:**	TS/RM
Piezometer Diameter / Screen Length:	–	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Cloudy 0°C
Field Blank Collected	☐ Yes Name _____	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☐ Good ☐ Bad

Purge Method

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift

Initial Depth to Water (m):	–	**Purge Start Time:**			**Purge End Time:**						
Depth to Bottom (m):	–	**Time (___) minute interval:**									
Submerged Tubing Depth (m):	–	**Depth to water (m)**									
Well Stick-up Height (m):	–	**Temperature (°C)**									
Estimated Water Volume (L):	–	**pH**									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Cond. (µs/cm)**									
		Specific Cond. (µs/cm)									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**Redox (mV)**									
		DO (mg/L)									
2" casing has 0.16 USgal/ft or 2.032 l/m		**Appearance & Odour (Clear, Silty, HC odours, etc.)**									
1" casing has 0.04 USgal/ft or 0.508 l/m		**Only for final readings**	**Sulphide (mg/L)**								
8" sand pack has 0.73 USgal/ft or 9.271 l/m			**Turbidity (NTU)**								
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Total Purge Volume:**									

FIELD BLANK

Sample Method

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis							

HEMMERA

Sample Site (Con't): FD-2

UTM Location: Zn: N/A Easting: Northing:

Photo No.: N/A

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	
Oxygen (O2)	%	
Carbon Dioxide (C02)	PPM	

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: _____.

General Notes (Condition of well or other features):

Batch: 12-MAR-15

collected @ MW09-24

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☑ Field Filtered	☑ HNO_3	full	18:00
1b	40 ml (glass)	Dissolved Mercury	15 mL	☑ Field Filtered	☑ HCL	↓	
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☑ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☑ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☑ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☑ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☑ Field Filtered	-	↓	

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	CH-P-13-03/50	**Project Number:**	1343-005.06	**Date:**	2015/03/19
Approximate Date Drilled:	unknown	**Client:**	GY - AAM	**Sampler:**	AN, JL
Piezometer Diameter / Screen Length:	1.5"/unknown	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Overcast ~-2°C
Field Blank Collected	☐ Yes Name _____	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☐ Good ☐ Bad

Purge Method

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift

Initial Depth to Water (m):	49.355	**Purge Start Time:**				**Purge End Time:**					
Depth to Bottom (m):	50.490	**Time (___) minute interval:**									
Submerged Tubing Depth (m):	N/A	**Depth to water (m)**									
Well Stick-up Height (m):	0.54	**Temperature (°C)**									
Estimated Water Volume (L):	1.7025	**pH**									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Cond. (µs/cm)**									
		Specific Cond. (µs/cm)									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**Redox (mV)**									
		DO (mg/L)									
2" casing has 0.16 USgal/ft or 2.032 l/m		**Appearance & Odour (Clear, Silty, HC odours, etc.)**									
1" casing has 0.04 USgal/ft or 0.508 l/m		**Only for final readings**	**Sulphide (mg/L)**								
8" sand pack has 0.73 USgal/ft or 9.271 l/m			**Turbidity (NTU)**								
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Total Purge Volume:**									

Insufficient Volume to Sample

Sample Method

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis			✓				

HEMMERA

Sample Site (Con't): CH-P-13-03/50 Way pt. collected on AN GPS.

UTM Location: Zn: 08 **Easting:** 0389142 **Northing:** 6881109

Photo No.: 38-40 (Camera 8010)

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	19.9
Carbon Dioxide (C02)	PPM	0

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: _____.

General Notes (Condition of well or other features):

Attempted to sample well using 0.5" bailer.
Bailer was not able to collect sample.
1.135 m of standing water measured in well.
Volume was insufficient.

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GLL07-03	**Project Number:**	1343-005.06	**Date:**	2015/03/19
Approximate Date Drilled:	unknown	**Client:**	GY - AAM	**Sampler:**	AN, GL.
Piezometer Diameter / Screen Length:	2"/unknown	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	overcast ~ -3°C
Field Blank Collected	☐ Yes Name ____	**Duplicate Collected:**	☐ Yes Name ____	**Recovery:**	☐ Good ☐ Bad

Purge Method					
Waterra	**Peristaltic**	**Disp. Bailer**	**Steel Bailer**	**Centrif. Pump**	**Air Lift**

Initial Depth to Water (m):	DRY	**Purge Start Time:**				**Purge End Time:**					
Depth to Bottom (m):	11.602	**Time (___) minute interval:**									
Submerged Tubing Depth (m):		**Depth to water (m)**									
Well Stick-up Height (m):	1.09	**Temperature (°C)**									
Estimated Water Volume (L):		**pH**									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Cond. (µs/cm)**									
		Specific Cond. (µs/cm)									
		Redox (mV)									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**DO (mg/L)**									
		Appearance & Odour (Clear, Silty, HC odours, etc.)									
2" casing has 0.16 USgal/ft or 2.032 l/m		**Only for final readings**	**Sulphide (mg/L)**								
1" casing has 0.04 USgal/ft or 0.508 l/m			**Turbidity (NTU)**								
8" sand pack has 0.73 USgal/ft or 9.271 l/m		**Total Purge Volume:**									
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m											

DRY

Sample Method							
	Waterra	**Peristaltic**	**Disp. Bailer**	**Steel Bailer**	**Centrif. Pump**	**Air Lift**	**Other**
Analysis							

HEMMERA

Sample Site (Con't): GLL07-03 Way pt. collected on AN. GPS.

UTM Location: Zn: 08 **Easting:** 0388959 **Northing:** 6881474

Photo No.: 41 - 43 (Camera 8010).

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.0
Carbon Dioxide (C02)	PPM	0

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 extend below well cap.

General Notes (Condition of well or other features):

Pre existing waterra tubing (5/8") found in well.

Data logger found tied to well casing hinge. (Baro logger)

Metal well stick up.

Transducer hanging down in well.

PVC sticks up above top of casing. Casing does not close properly.

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09-20	**Project Number:**	1343-005.06	**Date:**	19 Mar 2015
Approximate Date Drilled:		**Client:**	GY - AAM	**Sampler:**	TS / RM
Piezometer Diameter / Screen Length:	2" PVC	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	cloudy 0°C
Field Blank Collected	☐ Yes Name _____	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☐ Good ☐ Bad

Purge Method P/S

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift

Initial Depth to Water (m):	3.672 ± ? (Dry ~~Ice~~)	**Purge Start Time:**			**Purge End Time:**						
Depth to Bottom (m):		**Time (___) minute interval:**									
Submerged Tubing Depth (m):	—	**Depth to water (m)**									
Well Stick-up Height (m):	0.80	**Temperature (°C)**									
Estimated Water Volume (L):	—	**pH**									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume (DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume 2" casing has 0.16 USgal/ft or 2.032 l/m 1" casing has 0.04 USgal/ft or 0.508 l/m 8" sand pack has 0.73 USgal/ft or 9.271 l/m 6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Cond. (µs/cm)**									
		Specific Cond. (µs/cm)									
		Redox (mV)									
		DO (mg/L)									
		Appearance & Odour (Clear, Silty, HC odours, etc.)			NOT SAMPLED Dry						
		Only for final readings	**Sulphide (mg/L)**								
			Turbidity (NTU)								
		Total Purge Volume:									

Sample Method P/S

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis							

HEMMERA

Sample Site (Con't): MW09-20

UTM Location: Zn: 08V Easting: 389590 Northing: 6880582

Photo No.: 100_0034, -0035

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.0
Carbon Dioxide (C02)	PPM	0

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: cut in well.

General Notes (Condition of well or other features):

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09-08	**Project Number:**	1343-005.06	**Date:**	19 Mar 2015
Approximate Date Drilled:		**Client:**	GY - AAM	**Sampler:**	KM ITS
Piezometer Diameter / Screen Length:	2" PVC	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	cloudy 0°C
Field Blank Collected	☐ Yes Name _____	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☐ Good ☐ Bad

Purge Method N/A

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift

Initial Depth to Water (m):	1.150 (ice)	**Purge Start Time:**				**Purge End Time:**				
Depth to Bottom (m):	–	**Time (___) minute interval:**								
Submerged Tubing Depth (m):	–	**Depth to water (m)**								
Well Stick-up Height (m):	1.09	**Temperature (°C)**								
Estimated Water Volume (L):	–	**pH**								
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Cond. (µs/cm)**								
		Specific Cond. (µs/cm)								
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**Redox (mV)**								
		DO (mg/L)								
2" casing has 0.16 USgal/ft or 2.032 l/m		**Appearance & Odour (Clear, Silty, HC odours, etc.)**								
1" casing has 0.04 USgal/ft or 0.508 l/m		**Only for final readings**	**Sulphide (mg/L)**							
8" sand pack has 0.73 USgal/ft or 9.271 l/m			**Turbidity (NTU)**							
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Total Purge Volume:**								

NOT SAMPLED FROZEN

Sample Method N/A

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis							

HEMMERA

Sample Site (Con't): MW09-08

UTM Location: Zn: 08V Easting: 389618 Northing: 6880577

Photo No.: 100-0030, -0031

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.1
Carbon Dioxide (C02)	PPM	0

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: well cut.

General Notes (Condition of well or other features):

-Dome cr. flowing next to well

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	W14103083BH04	**Project Number:**	1343-005.06	**Date:**	19 Mar 2015
Approximate Date Drilled:		**Client:**	GY - AAM	**Sampler:**	TJ / RM
Piezometer Diameter / Screen Length:	2" PVC	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Partial Cloud 0°C
Field Blank Collected	☐ Yes Name _____	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☐ Good ☐ Bad

Purge Method N/A

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift

Initial Depth to Water (m):	6.677 (ice)	**Purge Start Time:**			**Purge End Time:**						
Depth to Bottom (m):	—	**Time (___) minute interval:**									
Submerged Tubing Depth (m):	—	**Depth to water (m)**									
Well Stick-up Height (m):	0.75	**Temperature (°C)**									
Estimated Water Volume (L):	—	**pH**									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Cond. (µs/cm)**									
		Specific Cond. (µs/cm)									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**Redox (mV)**									
		DO (mg/L)									
2" casing has 0.16 USgal/ft or 2.032 l/m		**Appearance & Odour (Clear, Silty, HC odours, etc.)**									
1" casing has 0.04 USgal/ft or 0.508 l/m		**Only for final readings** **Sulphide (mg/L)**									
8" sand pack has 0.73 USgal/ft or 9.271 l/m		**Only for final readings** **Turbidity (NTU)**									
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Total Purge Volume:**									

NOT SAMPLED FROZEN

Sample Method N/A

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis							

HEMMERA

Sample Site (Con't): W1410308 3BH04

UTM Location: Zn: 08V **Easting:** 389543 **Northing:** 6880664

Photo No.: 100 - 0038, -0039

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	—
Oxygen (O2)	%	—
Carbon Dioxide (C02)	PPM	—

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: open.

General Notes (Condition of well or other features):

Not sealed
↳ instrument wires blocking well

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	WI4103083BH02	**Project Number:**	1343-005.06	**Date:**	19 Mar 2015
Approximate Date Drilled:		**Client:**	GY - AAM	**Sampler:**	TS/RM
Piezometer Diameter / Screen Length:	2" PVC	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Partial Cloud 0°C
Field Blank Collected	☐ Yes Name _____	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☐ Good ☐ Bad

Purge Method N/A

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift

Initial Depth to Water (m):	6.780 (ice)	**Purge Start Time:**			**Purge End Time:**						
Depth to Bottom (m):	—	**Time (___) minute interval:**									
Submerged Tubing Depth (m):	—	**Depth to water (m)**									
Well Stick-up Height (m):	0.74	**Temperature (°C)**									
Estimated Water Volume (L):	—	**pH**									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Cond. (µs/cm)**									
		Specific Cond. (µs/cm)									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**Redox (mV)**									
		DO (mg/L)									
2" casing has 0.16 USgal/ft or 2.032 l/m		**Appearance & Odour (Clear, Silty, HC odours, etc.)**	NOT SAMPLED FROZEN								
1" casing has 0.04 USgal/ft or 0.508 l/m		**Only for final readings**	**Sulphide (mg/L)**								
8" sand pack has 0.73 USgal/ft or 9.271 l/m			**Turbidity (NTU)**								
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Total Purge Volume:**									

Sample Method N/A

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis							

HEMMERA

Sample Site (Con't): W14103083BH02

UTM Location: Zn: 08V **Easting:** 389562 **Northing:** 6880664

Photo No.: 100-0036, -0037

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	—
Oxygen (O2)	%	—
Carbon Dioxide (C02)	PPM	—

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: open.

General Notes (Condition of well or other features):

Not sealed - instrument wire blocking well

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MP09-04	**Project Number:**	1343-005.06	**Date:**	19 Mar 2015
Approximate Date Drilled:		**Client:**	GY - AAM	**Sampler:**	KM/TD
Piezometer Diameter / Screen Length:	1.5" PVC	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	cloudy -2°C
Field Blank Collected	☐ Yes Name _____	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☐ Good ☐ Bad

Purge Method N/A

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift

Initial Depth to Water (m):	1.182 (ice)	**Purge Start Time:**			**Purge End Time:**						
Depth to Bottom (m):	–	**Time (___) minute interval:**									
Submerged Tubing Depth (m):	–	**Depth to water (m)**									
Well Stick-up Height (m):	1.21	**Temperature (°C)**									
Estimated Water Volume (L):	–	**pH**									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Cond. (µs/cm)**									
		Specific Cond. (µs/cm)									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**Redox (mV)**									
		DO (mg/L)									
2" casing has 0.16 USgal/ft or 2.032 l/m 1" casing has 0.04 USgal/ft or 0.508 l/m 8" sand pack has 0.73 USgal/ft or 9.271 l/m 6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Appearance & Odour (Clear, Silty, HC odours, etc.)**									
		Only for final readings	**Sulphide (mg/L)**								
			Turbidity (NTU)								
		Total Purge Volume:									

NOT SAMPLED / FROZEN

Sample Method N/A

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis							

HEMMERA

Sample Site (Con't): MP09-04

UTM Location: Zn: 08V Easting: 389575 Northing: 6880609

Photo No.: 100-0028, -0029

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.1
Carbon Dioxide (C02)	PPM	0

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: _____

General Notes (Condition of well or other features):

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	CH-P-13-04/10	**Project Number:**	1343-005.06	**Date:**	2015/03/19
Approximate Date Drilled:	unknown	**Client:**	GY - AAM	**Sampler:**	AN, JL
Piezometer Diameter / Screen Length:	2" / unknown	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Overcast ~-1°C
Field Blank Collected	☐ Yes Name ____	**Duplicate Collected:**	☐ Yes Name ____	**Recovery:**	☐ Good ☐ Bad

Purge Method

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift

Initial Depth to ~~Water~~ (m): ICE	6.24	**Purge Start Time:**			**Purge End Time:**							
Depth to Bottom (m):		**Time (___) minute interval:**										
Submerged Tubing Depth (m):		**Depth to water (m)**										
Well Stick-up Height (m):	0.55	**Temperature (°C)**										
Estimated Water Volume (L):		**pH**										
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Cond. (µs/cm)**										
		Specific Cond. (µs/cm)										
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**Redox (mV)**										
		DO (mg/L)										
2" casing has 0.16 USgal/ft or 2.032 l/m		**Appearance & Odour (Clear, Silty, HC odours, etc.)**										
1" casing has 0.04 USgal/ft or 0.508 l/m		**Only for final readings**	**Sulphide (mg/L)**									
8" sand pack has 0.73 USgal/ft or 9.271 l/m			**Turbidity (NTU)**									
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Total Purge Volume:**										

FROZEN

Sample Method

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis							

HEMMERA

Sample Site (Con't): CH-P-13-04/10 Way pt. collected on AN GPS.

UTM Location: Zn: 08 Easting: 0389136 Northing: 6881471

Photo No.: 44-46 (Camera 8010).

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.4
Carbon Dioxide (C02)	PPM	0

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 side of PVC extend down past cap.

General Notes (Condition of well or other features):

Metal well casing.
Well in good condition.
Peri. tubing found in well.
Tubing was removed to measure DTW. Small amount of water detected by IFM ~2m. on top of obstruction @ 6.24 m depth. Presumed to be ice.

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GSI-DC-09-A/B	**Project Number:**	1343-005.06	**Date:**	2015/03/19
Approximate Date Drilled:	unknown	**Client:**	GY - AAM	**Sampler:**	AN, JL
Piezometer Diameter / Screen Length:	1" / unknown	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Overcast ~2°C
Field Blank Collected	☐ Yes Name _____	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☐ Good ☐ Bad

Purge Method

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift

Initial Depth to Water (m):		**Purge Start Time:**			**Purge End Time:**						
Depth to Bottom (m):		**Time (___) minute interval:**									
Submerged Tubing Depth (m):		**Depth to water (m)**									
Well Stick-up Height (m):		**Temperature (°C)**									
Estimated Water Volume (L):		**pH**									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Cond. (µs/cm)**									
		Specific Cond. (µs/cm)									
		Redox (mV)									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**DO (mg/L)**									
		Appearance & Odour (Clear, Silty, HC odours, etc.)									
2" casing has 0.16 USgal/ft or 2.032 l/m		**Only for final readings**	**Sulphide (mg/L)**								
1" casing has 0.04 USgal/ft or 0.508 l/m			**Turbidity (NTU)**								
8" sand pack has 0.73 USgal/ft or 9.271 l/m		**Total Purge Volume:**									
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m											

Not Located

Sample Method

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis							

HEMMERA

Sample Site (Con't): 651-DC-09-A/B Wayp. not collected

UTM Location: Zn: **Easting:** **Northing:**

Photo No.: 57, 58, 59

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	
Oxygen (O2)	%	
Carbon Dioxide (C02)	PPM	

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: _____.

General Notes (Condition of well or other features):

Visited UTM listed in SOW.
Well not found @ location.
Large accumulation overflow.
Wells buried under ice.
Location should be properly flagged in the spring in anticipation for accumulation of over flow.
Searched area with pinfinder, did not detect.

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09-01	**Project Number:**	1343-005.06	**Date:**	19 Mar 2015
Approximate Date Drilled:		**Client:**	GY - AAM	**Sampler:**	TS/RM
Piezometer Diameter / Screen Length:	1.5" PVC	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	cloudy 1°C
Field Blank Collected	☐ Yes Name _____	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☐ Good ☐ Bad

Purge Method N/A

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift

Initial Depth to Water (m):	6.420	**Purge Start Time:**			**Purge End Time:**					
Depth to Bottom (m):	9.085	**Time (___) minute interval:**								
Submerged Tubing Depth (m):	–	**Depth to water (m)**								
Well Stick-up Height (m):	0.79	**Temperature (°C)**								
Estimated Water Volume (L):	2.932	**pH**								
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Cond. (µs/cm)**								
		Specific Cond. (µs/cm)								
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**Redox (mV)**								
		DO (mg/L)								
2" casing has 0.16 USgal/ft or 2.032 l/m		**Appearance & Odour (Clear, Silty, HC odours, etc.)**								
1" casing has 0.04 USgal/ft or 0.508 l/m		**Only for final readings**	**Sulphide (mg/L)**							
8" sand pack has 0.73 USgal/ft or 9.271 l/m			**Turbidity (NTU)**							
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Total Purge Volume:**								

NOT SAMPLED (tailings)

Sample Method N/A

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis							

HEMMERA

Sample Site (Con't): MW09-01

UTM Location: Zn: 08V Easting: 389394 Northing: 6880555

Photo No.: 100 - 0042, - 0043

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	Ø
Oxygen (O2)	%	20.4
Carbon Dioxide (C02)	PPM	Ø

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: cut on PVC

General Notes (Condition of well or other features):
- sludge (viscous)
- excessive sediment load (tailings)
↳ unable to sample

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09-21	**Project Number:**	1343-005.06	**Date:**	19 Mar 2015
Approximate Date Drilled:		**Client:**	GY - AAM	**Sampler:**	TS RM
Piezometer Diameter / Screen Length:	2" PVC	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	cloudy -2 °C
Field Blank Collected	☐ Yes Name _____	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☐ Good ☐ Bad

Purge Method N/A

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift

Initial Depth to Water (m):	1.472 (ice)	**Purge Start Time:**			**Purge End Time:**						
Depth to Bottom (m):	–	**Time (___) minute interval:**									
Submerged Tubing Depth (m):	–	**Depth to water (m)**									
Well Stick-up Height (m):	0.43 (ice)	**Temperature (°C)**									
Estimated Water Volume (L):	–	**pH**									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Cond. (µs/cm)**									
		Specific Cond. (µs/cm)									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**Redox (mV)**									
		DO (mg/L)									
2" casing has 0.16 USgal/ft or 2.032 l/m		**Appearance & Odour (Clear, Silty, HC odours, etc.)**									
1" casing has 0.04 USgal/ft or 0.508 l/m		**Only for final readings**	**Sulphide (mg/L)**								
8" sand pack has 0.73 USgal/ft or 9.271 l/m			**Turbidity (NTU)**								
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Total Purge Volume:**									

NOT SAMPLED FROZEN

Sample Method N/A

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis							

HEMMERA

Sample Site (Con't): MW09-21

UTM Location: Zn: 08V Easting: 389534 Northing: 6880576

Photo No.: 100-0026, -0027

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	Ø
Oxygen (O2)	%	20.1
Carbon Dioxide (C02)	PPM	Ø

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: _____.

General Notes (Condition of well or other features):

-well surrounded by ice

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MP09-05	**Project Number:**	1343-005.06	**Date:**	19 Mar 2015
Approximate Date Drilled:		**Client:**	GY - AAM	**Sampler:**	JS/RM
Piezometer Diameter / Screen Length:	1.5" PVC	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	cloudy, low wind -20C
Field Blank Collected	☐ Yes Name _____	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☐ Good ☐ Bad

Purge Method N/A

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift

Initial Depth to Water (m):	ICE 0.667	**Purge Start Time:**				**Purge End Time:**					
Depth to Bottom (m):	—	**Time (___) minute interval:**									
Submerged Tubing Depth (m):	—	**Depth to water (m)**									
Well Stick-up Height (m):	(ICE) 0.39	**Temperature (°C)**									
Estimated Water Volume (L):	—	**pH**									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Cond. (µs/cm)**			NOT SAMPLED FROZEN						
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**Specific Cond. (µs/cm)**									
2" casing has 0.16 USgal/ft or 2.032 l/m		**Redox (mV)**									
1" casing has 0.04 USgal/ft or 0.508 l/m		**DO (mg/L)**									
8" sand pack has 0.73 USgal/ft or 9.271 l/m		**Appearance & Odour (Clear, Silty, HC odours, etc.)**									
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Only for final readings**	**Sulphide (mg/L)**								
			Turbidity (NTU)								
		Total Purge Volume:									

Sample Method N/A

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis							

HEMMERA

Sample Site (Con't): MP09-05

UTM Location: Zn: 08V Easting: 389548 Northing: 6880591

Photo No.: 100-0024, -0025

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	Ø
Oxygen (O2)	%	20.1
Carbon Dioxide (C02)	PPM	Ø

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: _____.

General Notes (Condition of well or other features):

-well surround by ice (pond?)

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	WH1030836H01	**Project Number:**	1343-005.06	**Date:**	19 Mar 2015
Approximate Date Drilled:		**Client:**	GY - AAM	**Sampler:**	RH/TS
Piezometer Diameter / Screen Length:	2" PVC	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	cloudy 0°C
Field Blank Collected	☐ Yes Name _____	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☐ Good ☐ Bad

Purge Method N/A

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift

Initial Depth to Water (m):	6.549	**Purge Start Time:**				**Purge End Time:**					
Depth to Bottom (m):	—	**Time (___) minute interval:**									
Submerged Tubing Depth (m):	—	**Depth to water (m)**									
Well Stick-up Height (m):	0.62	**Temperature (°C)**									
Estimated Water Volume (L):	—	**pH**									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Cond. (µs/cm)**									
		Specific Cond. (µs/cm)									
		Redox (mV)									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**DO (mg/L)**									
		Appearance & Odour (Clear, Silty, HC odours, etc.)									
2" casing has 0.16 USgal/ft or 2.032 l/m		**Only for final readings**	**Sulphide (mg/L)**								
1" casing has 0.04 USgal/ft or 0.508 l/m			**Turbidity (NTU)**								
8" sand pack has 0.73 USgal/ft or 9.271 l/m		**Total Purge Volume:**									
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m											

NOT SAMPLED FROZEN

Sample Method N/A

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis							

HEMMERA

Sample Site (Con't): W1410308 3BH01

UTM Location: Zn: 08V **Easting:** 389521 **Northing:** 6880667

Photo No.: 100 - 0040, 0041

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	—
Oxygen (O2)	%	—
Carbon Dioxide (C02)	PPM	—

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: open.

General Notes (Condition of well or other features):

Not sealed
↳ Instrument wires blocking well

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	FD-3	**Project Number:**	1343-005.06	**Date:**	20 Mar 2015
Approximate Date Drilled:		**Client:**	GY - AAM	**Sampler:**	TJ RM
Piezometer Diameter / Screen Length:		**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	cloudy -3°C
Field Blank Collected	☐ Yes Name _____	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☐ Good ☐ Bad

Purge Method					
Waterra	**Peristaltic**	**Disp. Bailer**	**Steel Bailer**	**Centrif. Pump**	**Air Lift**

Initial Depth to Water (m):		**Purge Start Time:**				**Purge End Time:**					
Depth to Bottom (m):		**Time (___) minute interval:**									
Submerged Tubing Depth (m):		**Depth to water (m)**									
Well Stick-up Height (m):		**Temperature (°C)**									
Estimated Water Volume (L):		**pH**									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Cond. (µs/cm)**									
		Specific Cond. (µs/cm)									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**Redox (mV)**									
		DO (mg/L)									
2" casing has 0.16 USgal/ft or 2.032 l/m		**Appearance & Odour (Clear, Silty, HC odours, etc.)**									
1" casing has 0.04 USgal/ft or 0.508 l/m		**Only for final readings**	**Sulphide (mg/L)**								
8" sand pack has 0.73 USgal/ft or 9.271 l/m			**Turbidity (NTU)**								
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Total Purge Volume:**									

FIELD BLANK

Sample Method							
	Waterra	**Peristaltic**	**Disp. Bailer**	**Steel Bailer**	**Centrif. Pump**	**Air Lift**	**Other**
Analysis							

HEMMERA

Sample Site (Con't): FB-3

UTM Location: Zn: Easting: Northing:

Photo No.:

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	
Oxygen (O2)	%	
Carbon Dioxide (C02)	PPM	

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: _____.

General Notes (Condition of well or other features):

FB-3 taken at MW09-18

*9 bottles

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2	1 L (plastic)	General Chemistry	250 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	60 ml	-	☐ NaOH		
4	250 ml (glass)	NH3	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate	100 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8[2]	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
9	120 ml (plastic)	Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	CH-P-13-05/50	**Project Number:**	1343-005.06	**Date:**	Mar 20, 2015
Approximate Date Drilled:	unknown	**Client:**	GY - AAM	**Sampler:**	AN, JL
Piezometer Diameter / Screen Length:	1.5" / unknown	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Overcast -5°C
Field Blank Collected	☐ Yes Name _____	**Duplicate Collected:**	☑ Yes Name DUP-2	**Recovery:**	☑ Good ☐ Bad

Purge Method

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift
✓					

Initial Depth to Water (m):	29.05	**Purge Start Time:**	11:40			**Purge End Time:**	12:38				
Depth to Bottom (m):	49.83	**Time (5) minute interval:**	11:45	12:06	12:11	12:16	12:20	12:26	12:31	12:38	
Submerged Tubing Depth (m):	~47.	**Depth to water (m)**	29.10	29.11	29.32	29.29	29.30	29.37	29.39	29.40	
Well Stick-up Height (m):	0.78	**Temperature (°C)**	2.2	1.6	1.3	1.3	1.3	1.3	1.3	1.4	
Estimated Water Volume (L):	22.86	**pH**	6.54	6.77	6.62	6.92	6.68	6.62	6.61	6.54	
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume (DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume 2" casing has 0.16 USgal/ft or 2.032 l/m 1" casing has 0.04 USgal/ft or 0.508 l/m 8" sand pack has 0.73 USgal/ft or 9.271 l/m 6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Cond. (µs/cm)**	1555	1540	1554	1578	1569	1559	1558	1566	
		Specific Cond. (µs/cm)	2754	2789	2812	2882	2881	2834	2836	2857	
		Redox (mV)	117.9	102.7	98.3	90.3	83.1	88.6	91.4	90.4	
		DO (mg/L)	4.09	4.54	1.95	2.32	2.03	2.15	2.04	2.36	
		Appearance & Odour (Clear, Silty, HC odours, etc.)	light brown grey.	Same.	Same	brown/ light.	Same.	Same	Same.	Same	
		Only for final readings — **Sulphide (mg/L)**								0.94	
		Only for final readings — **Turbidity (NTU)**								48.9	
		Total Purge Volume: 2 L/v	5	10	15	20	25	30	35	40	

Sample Method

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis	✓						

HEMMERA

Sample Site (Con't): CH-P-13-05/50 Way pt. collected on AN GPS

UTM Location: Zn: 08 **Easting:** 0388955 **Northing:** 6881468

Photo No.: 74-76 (Camera 8010)

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.1
Carbon Dioxide (C02)	PPM	0

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

Seal Replaced: ☐ J-Plug ☐ PVC Cap ☐ Not required ☑ Other 10 1.5" caps.

Well properly sealed for gas monitoring: ☐ Yes ☑ No Details: _____.

General Notes (Condition of well or other features):

Tubing in well does not reach bottom. Tubing should be replaced. Did not have 50m length to replace. 2015/03/19

Water was frozen throughout tubing length. Tubing was brought inside bunkhouse over night to de-thaw.

Well was purged and sampled on 2015/03/20.

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☑ Field Filtered	☑ HNO_3	120	
1b	40 ml (glass)	Dissolved Mercury	15 mL	☑ Field Filtered	☑ HCL	40	
2	1 L (plastic)	General Chemistry	200 ml	-	-	1000	
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☑ NaOH	145	
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☑ H_2SO_4	250	
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☑ HNO_3	120	
6	120 ml (plastic)	Sulphide	100 ml	-	☑ Zinc Acetate, capped and mixed, then NaOH	120	
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-	250	
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☑ Field Filtered	-	120	

Sampled @ 12:40

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09-19	**Project Number:**	1343-005 06	**Date:**	Mar 20, 2015
Approximate Date Drilled:		**Client:**	GY - AAM	**Sampler:**	RM TJ
Piezometer Diameter / Screen Length:	2" PVC	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Sunny 0°C
Field Blank Collected	☐ Yes Name	**Duplicate Collected:**	☒ Yes Name DUP-1	**Recovery:**	☐ Good ☐ Bad

Purge Method

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift
	✓				

Initial Depth to Water (m):	3.062	**Purge Start Time:**	13:01			**Purge End Time:**	13:35		
Depth to Bottom (m):	5.883	Time (5) minute interval:	13:05	13:10	13:15	13:20	13:25	13:30	
Submerged Tubing Depth (m):	/	Depth to water (m)	3.34	3.56	3.65	3.66	3.66	3.66	
Well Stick-up Height (m):	0.97	Temperature (°C)	0.7		0.9	0.9	0.9	0.9	
Estimated Water Volume (L):	~ 5.6	pH	—		—	—	—	6.59	
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		Cond. (µs/cm)	1162		1144	1155	1160	1158	
		Specific Cond. (µs/cm)	2170		2123	2146	2149	2149	
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		Redox (mV)	-41.7		-51.9	-62.1	-65.2	-69.2	
		DO (mg/L)	37.7		12.1	1.26	1.08	1.12	
2" casing has 0.16 USgal/ft or 2.032 l/m		Appearance & Odour (Clear, Silty, HC odours, etc.)						Some sulfur like odour	
1" casing has 0.04 USgal/ft or 0.508 l/m		Only for final readings: Sulphide (mg/L)						0.05	
8" sand pack has 0.73 USgal/ft or 9.271 l/m		Only for final readings: Turbidity (NTU)						7.1	
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Total Purge Volume:**	1 L	3	4	5	6	7	

Visible not visible, screen

Sample Method

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis		✓					

HEMMERA

Sample Site (Con't): MW09-19

UTM Location: Zn: 08V Easting: 388051 Northing: 6491015

Photo No.: 100-0075-to 100-0076

Well Head Space Gases

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.0
Carbon Dioxide (C02)	PPM	0

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: _____

General Notes (Condition of well or other features):

Dup 1 collected

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☑ Field Filtered	☑ HNO_3	120	
1b	40 ml (glass)	Dissolved Mercury	15 mL	☑ Field Filtered	☑ HCL	40	
2	1 L (plastic)	General Chemistry	200 ml	-	-	1000	
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☑ NaOH	145	
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☑ H_2SO_4	250	
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☑ HNO_3	120	
6	120 ml (plastic)	Sulphide	100 ml	-	☑ Zinc Acetate, capped and mixed, then NaOH	120	
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-	250	
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☑ Field Filtered	-	120	

Sampled @ 13:45

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09-18	**Project Number:**	1343-005.06	**Date:**	Mar 20, 2015
Approximate Date Drilled:		**Client:**	GY - AAM	**Sampler:**	RM TJ
Piezometer Diameter / Screen Length:		**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Sunny 0C
Field Blank Collected	☑ Yes Name FB-3	**Duplicate Collected:**	☐ Yes Name	**Recovery:**	☐ Good ☐ Bad

Purge Method

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift
	✓				

Initial Depth to Water (m):	5.131	**Purge Start Time:**	14:32			**Purge End Time:**	16:03		
Depth to Bottom (m):	7.778	Time (___) minute interval:	14:37	14:44	14:55	16:02			
Submerged Tubing Depth (m):	/	Depth to water (m)	5.14	5.14	5.14	5.14			
Well Stick-up Height (m):	0.87	Temperature (°C)	0.4	0.2	0.2	0.2			
Estimated Water Volume (L):	5.3	pH	6.96	6.90	6.89	6.89			
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		Cond. (µs/cm)	1584	1551	1524	1530			
		Specific Cond. (µs/cm)	3007	2947	2939	2936			
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		Redox (mV)	26.8	31.0	35.0	35.1			
		DO (mg/L)	0.88	1.20	2.0	1.97			
2" casing has 0.16 USgal/ft or 2.032 l/m		Appearance & Odour (Clear, Silty, HC odours, etc.)				No odour			
1" casing has 0.04 USgal/ft or 0.508 l/m		**Only for final readings** Sulphide (mg/L)				0.15			
8" sand pack has 0.73 USgal/ft or 9.271 l/m		**Only for final readings** Turbidity (NTU)				4.19			
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Total Purge Volume (L)**	1	3	5	7			

Sample Method

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis		✓					

HEMMERA

Sample Site (Con't): MW09-18

UTM Location: Zn: 08 V Easting: 388055 Northing: 6980983

Photo No.: [redacted]s FI 27 - 78

Well Head Space Gases.

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	19.8
Carbon Dioxide (C02)	PPM	0

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: Good

General Notes (Condition of well or other features):

FB-3 matrix batch

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☑ Field Filtered	☑ HNO_3	120	
1b	40 ml (glass)	Dissolved Mercury	15 mL	☑ Field Filtered	☐ HCL	40	
2	1 L (plastic)	General Chemistry	200 ml	-	-	1000	
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☑ NaOH	145	
4	250 ml (glass)	Ammonia (NH_3)	120 ml	-	☑ H_2SO_4	250	
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☑ HNO_3	120	
6	120 ml (plastic)	Sulphide	100 ml	-	☑ Zinc Acetate, capped and mixed, then NaOH	120	
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-	250	
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☑ Field Filtered	-	120	

Sampled @ 16:10

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	Trip Blank	**Project Number:**	1343-005.06	**Date:**	3 Mar 15
Approximate Date Drilled:	ALS	**Client:**	GY - AAM	**Sampler:**	TS / RM
Piezometer Diameter / Screen Length:		**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	
Field Blank Collected	☐ Yes Name _____	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☐ Good ☐ Bad

Purge Method

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift

Initial Depth to Water (m):		**Purge Start Time:**					**Purge End Time:**				
Depth to Bottom (m):		**Time (___) minute interval:**									
Submerged Tubing Depth (m):		**Depth to water (m)**									
Well Stick-up Height (m):		**Temperature (°C)**									
Estimated Water Volume (L):		**pH**									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Cond. (µs/cm)**									
		Specific Cond. (µs/cm)									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**Redox (mV)**									
		DO (mg/L)									
2" casing has 0.16 USgal/ft or 2.032 l/m		**Appearance & Odour (Clear, Silty, HC odours, etc.)**									
1" casing has 0.04 USgal/ft or 0.508 l/m		**Only for final readings**	**Sulphide (mg/L)**								
8" sand pack has 0.73 USgal/ft or 9.271 l/m			**Turbidity (NTU)**								
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Total Purge Volume:**									

TRIP BLANK

Sample Method

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis							

Batch 17-Feb-15
ALS - SRS

HEMMERA

Sample Site (Con't): TRIP BLANK

UTM Location: Zn: Easting: Northing:

Photo No.:

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	
Oxygen (O2)	%	
Carbon Dioxide (C02)	PPM	

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: _____.

General Notes (Condition of well or other features):

TRIP BLANK March 19 2015

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09-11	**Project Number:**	1343-005.06	**Date:**	2015/03/20
Approximate Date Drilled:	unknown	**Client:**	GY - AAM	**Sampler:**	AN, JL
Piezometer Diameter / Screen Length:	2" / unknown	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	clear skies ~2°C
Field Blank Collected	☐ Yes Name _____	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☐ Good ☐ Bad

Purge Method

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift

Initial Depth to Water (m):	DRY	**Purge Start Time:**					**Purge End Time:**				
Depth to Bottom (m):	4.915	**Time (___) minute interval:**									
Submerged Tubing Depth (m):		**Depth to water (m)**									
Well Stick-up Height (m):	0.806	**Temperature (°C)**									
Estimated Water Volume (L):		**pH**									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Cond. (µs/cm)**									
		Specific Cond. (µs/cm)									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**Redox (mV)**									
		DO (mg/L)									
2" casing has 0.16 USgal/ft or 2.032 l/m		**Appearance & Odour (Clear, Silty, HC odours, etc.)**									
1" casing has 0.04 USgal/ft or 0.508 l/m		**Only for final readings**	**Sulphide (mg/L)**								
8" sand pack has 0.73 USgal/ft or 9.271 l/m			**Turbidity (NTU)**								
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Total Purge Volume:**									

Sample Method

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis							

HEMMERA

Sample Site (Con't): MW09-11 Way pt. collected on AN GPS

UTM Location: Zn: 08 Easting: 0389039 Northing: 6880711

Photo No.: 65-67 (Camera 8010)

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.1
Carbon Dioxide (C02)	PPM	0

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 side of PVC covered by well cap.

General Notes (Condition of well or other features):

Metal well casing. good condition
Plastic bailer found in well.

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	WI41030833BH03	**Project Number:**	1343-005.06	**Date:**	2015/03/20
Approximate Date Drilled:	unknown	**Client:**	GY - AAM	**Sampler:**	AN, JL
Piezometer Diameter / Screen Length:	2" / unknown	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Overcast ~2°C
Field Blank Collected	☐ Yes Name _____	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☐ Good ☐ Bad

Purge Method

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift

Initial Depth to Water (m): ICE	1.514	**Purge Start Time:**			**Purge End Time:**						
Depth to Bottom (m):		**Time (___) minute interval:**									
Submerged Tubing Depth (m):		**Depth to water (m)**									
Well Stick-up Height (m):	0.70	**Temperature (°C)**									
Estimated Water Volume (L):		**pH**									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Cond. (µs/cm)**									
		Specific Cond. (µs/cm)									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**Redox (mV)**									
		DO (mg/L)									
2" casing has 0.16 USgal/ft or 2.032 l/m		**Appearance & Odour (Clear, Silty, HC odours, etc.)**									
1" casing has 0.04 USgal/ft or 0.508 l/m		**Only for final readings**	**Sulphide (mg/L)**								
8" sand pack has 0.73 USgal/ft or 9.271 l/m			**Turbidity (NTU)**								
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Total Purge Volume:**									

FROZEN

Sample Method

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis							

HEMMERA

Sample Site (Con't): W14103083BH03 Way pt. collected on AN GPS.

UTM Location: Zn: 08 **Easting:** 0389132 **Northing:** 6880731

Photo No.: 68 - 70 (Camera 8010).

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.1
Carbon Dioxide (C02)	PPM	0

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

Seal Replaced: ☐ J-Plug ☐ PVC Cap ☐ Not required ☑ Other not replaced.

Well properly sealed for gas monitoring: ☐ Yes ☑ No Details: did not have plug that would fit.

General Notes (Condition of well or other features):

Metal well casing. good condition.
Peri. tubing found in well
Tubing frozen in place.
Well not properly labeled. added
flagging tape with label.
UTM matches SOW.

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MP09-14	**Project Number:**	1343-005.06	**Date:**	2015/08/20
Approximate Date Drilled:	unknown	**Client:**	GY - AAM	**Sampler:**	AN, JL
Piezometer Diameter / Screen Length:	1"/unknown	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Overcast ~ -2°C
Field Blank Collected	☐ Yes Name _____	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☐ Good ☐ Bad

Purge Method

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift

Initial Depth to Water (m):		**Purge Start Time:**					**Purge End Time:**				
Depth to Bottom (m):		**Time (___) minute interval:**									
Submerged Tubing Depth (m):		**Depth to water (m)**									
Well Stick-up Height (m):	0.76	**Temperature (°C)**									
Estimated Water Volume (L):		**pH**									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Cond. (µs/cm)**									
		Specific Cond. (µs/cm)									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**Redox (mV)**									
		DO (mg/L)									
2" casing has 0.16 USgal/ft or 2.032 l/m		**Appearance & Odour (Clear, Silty, HC odours, etc.)**									
1" casing has 0.04 USgal/ft or 0.508 l/m		**Only for final readings**	**Sulphide (mg/L)**								
8" sand pack has 0.73 USgal/ft or 9.271 l/m			**Turbidity (NTU)**								
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Total Purge Volume:**									

FROZEN

Sample Method

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis							

HEMMERA

Sample Site (Con't): MP09-14 way pt. collected on AN GPS.

UTM Location: Zn: 08 **Easting:** 0389140 **Northing:** 6880720

Photo No.: 71-73 (Camera 8010)

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.0
Carbon Dioxide (C02)	PPM	0

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

Seal Replaced: ☐ J-Plug ☐ PVC Cap ☐ Not required ☑ Other not replaced

Well properly sealed for gas monitoring: ☐ Yes ☑ No Details: do not have seal that would fit.

General Notes (Condition of well or other features):

Metal DP stick up with inner waterra tubing and pre existing peri. tubing installed for sampling. Tubing frozen in place. Could not measure depth to ice. Water level meter could not fit with frozen tubing.

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09-17	**Project Number:**	1343-005.06	**Date:**	2015/03/20
Approximate Date Drilled:	unknown.	**Client:**	GY - AAM	**Sampler:**	AN, JL
Piezometer Diameter / Screen Length:	2" / unknown	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	clear skies ~2°C.
Field Blank Collected	☐ Yes Name _____	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☐ Good ☐ Bad

Purge Method					
Waterra	**Peristaltic**	**Disp. Bailer**	**Steel Bailer**	**Centrif. Pump**	**Air Lift**

Initial Depth to Water (m):	DRY	**Purge Start Time:**			**Purge End Time:**						
Depth to Bottom (m):	5.71	**Time (___) minute interval:**									
Submerged Tubing Depth (m):		**Depth to water (m)**									
Well Stick-up Height (m):	0.968	**Temperature (°C)**									
Estimated Water Volume (L):		**pH**									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Cond. (µs/cm)**									
		Specific Cond. (µs/cm)									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**Redox (mV)**									
		DO (mg/L)									
2" casing has 0.16 USgal/ft or 2.032 l/m		**Appearance & Odour (Clear, Silty, HC odours, etc.)**									
1" casing has 0.04 USgal/ft or 0.508 l/m		**Only for final readings**	**Sulphide (mg/L)**								
8" sand pack has 0.73 USgal/ft or 9.271 l/m			**Turbidity (NTU)**								
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Total Purge Volume:**									

Sample Method							
	Waterra	**Peristaltic**	**Disp. Bailer**	**Steel Bailer**	**Centrif. Pump**	**Air Lift**	**Other**
Analysis							

HEMMERA

Sample Site (Con't): MW09-17 Way pt. collected on AN GPS.

UTM Location: Zn: 08 **Easting:** 0388075 **Northing:** 6880970

Photo No.: 77-79 (Camera 8010).

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	9.5
Carbon Dioxide (C02)	PPM	0

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: _____

General Notes (Condition of well or other features):

Metal well casing.
PVC well sticks up above top of well casing. Casing does not close properly.
Silt found on end of IFM after measuring DTB.

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09-16	**Project Number:**	1343-005.06	**Date:**	Mar 20, 2015
Approximate Date Drilled:		**Client:**	GY - AAM	**Sampler:**	RM TJ
Piezometer Diameter / Screen Length:		**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Sunny 0°C
Field Blank Collected	☐ Yes Name ____	**Duplicate Collected:**	☐ Yes Name ____	**Recovery:**	☐ Good ☐ Bad

Purge Method

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift

Initial Depth to ~~Water~~ (m):	1.755 (Ice)	**Purge Start Time:**			**Purge End Time:**					
Depth to Bottom (m):	/	Time (___) minute interval:								
Submerged Tubing Depth (m):	/	Depth to water (m)								
Well Stick-up Height (m):	1.21	Temperature (°C)								
Estimated Water Volume (L):	/	pH								
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		Cond. (µs/cm)								
		Specific Cond. (µs/cm)								
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		Redox (mV)								
		DO (mg/L)								
2" casing has 0.16 USgal/ft or 2.032 l/m		Appearance & Odour (Clear, Silty, HC odours, etc.)								
1" casing has 0.04 USgal/ft or 0.508 l/m		**Only for final readings**	Sulphide (mg/L)							
8" sand pack has 0.73 USgal/ft or 9.271 l/m			Turbidity (NTU)							
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Total Purge Volume:**								

FROZEN

Sample Method

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis							

HEMMERA

Sample Site (Con't): MW09-16

UTM Location: Zn: 08V Easting: 387990 Northing: 6881093

Photo No.: 100-0073, -0074

Well Head Space Gases

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.4
Carbon Dioxide (C02)	PPM	0

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: Cuts in PVC

General Notes (Condition of well or other features):

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09-03	**Project Number:**	1343-005.06	**Date:**	20 Mar 2015
Approximate Date Drilled:		**Client:**	GY - AAM	**Sampler:**	TS RM
Piezometer Diameter / Screen Length:	2" PVC	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	clear -5°C
Field Blank Collected	☐ Yes Name _____	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☐ Good ☐ Bad

Purge Method

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift

Initial Depth to Water (m):		**Purge Start Time:**				**Purge End Time:**						
Depth to Bottom (m):		**Time (___) minute interval:**										
Submerged Tubing Depth (m):		**Depth to water (m)**										
Well Stick-up Height (m):		**Temperature (°C)**										
Estimated Water Volume (L):		**pH**										
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Cond. (µs/cm)**										
		Specific Cond. (µs/cm)										
		Redox (mV)										
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**DO (mg/L)**										
		Appearance & Odour (Clear, Silty, HC odours, etc.)										
2" casing has 0.16 USgal/ft or 2.032 l/m		**Only for final readings**	**Sulphide (mg/L)**									
1" casing has 0.04 USgal/ft or 0.508 l/m			**Turbidity (NTU)**									
8" sand pack has 0.73 USgal/ft or 9.271 l/m		**Total Purge Volume:**										
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m												

NOT LOCATED

Sample Method

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis							

HEMMERA

Sample Site (Con't): MW09-03

UTM Location: Zn: 08V **Easting:** 389421 **Northing:** 6880556

Photo No.: 100-0046, -0047

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	
Oxygen (O2)	%	
Carbon Dioxide (C02)	PPM	

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: _____.

General Notes (Condition of well or other features):

- buried under snow
- could not locate w/ pinfinder
* well casing & cap are plastic (OCT '14)
- UTM from proc. field data

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MP09-12	**Project Number:**	1343-005.06	**Date:**	20 Mar 2015
Approximate Date Drilled:		**Client:**	GY - AAM	**Sampler:**	TS RM
Piezometer Diameter / Screen Length:	2" PVC	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Partial cloud -5°C
Field Blank Collected	☐ Yes Name _____	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☐ Good ☐ Bad

Purge Method

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift

Initial Depth to Water (m):	1.758 (ice)	**Purge Start Time:**			**Purge End Time:**						
Depth to Bottom (m):	–	**Time (___) minute interval:**									
Submerged Tubing Depth (m):	–	**Depth to water (m)**									
Well Stick-up Height (m):	1.67	**Temperature (°C)**									
Estimated Water Volume (L):	–	**pH**									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Cond. (µs/cm)**									
		Specific Cond. (µs/cm)									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**Redox (mV)**									
		DO (mg/L)									
2" casing has 0.16 USgal/ft or 2.032 l/m 1" casing has 0.04 USgal/ft or 0.508 l/m 8" sand pack has 0.73 USgal/ft or 9.271 l/m 6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Appearance & Odour (Clear, Silty, HC odours, etc.)**									
		Only for final readings	**Sulphide (mg/L)**								
			Turbidity (NTU)								
		Total Purge Volume:									

NOT SAMPLED FROZEN

Sample Method

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis							

HEMMERA

Sample Site (Con't): MP09-12

UTM Location: Zn: 08V Easting: 389220 Northing: 6880613

Photo No.: 100-0057, -0058

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.4
Carbon Dioxide (C02)	PPM	0

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: PVC cut.

General Notes (Condition of well or other features):

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MP09-11	**Project Number:**	1343-005.06	**Date:**	20 Mar 2015
Approximate Date Drilled:		**Client:**	GY - AAM	**Sampler:**	TS RM
Piezometer Diameter / Screen Length:	2" PVC	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Partial cloud -5°C
Field Blank Collected	☐ Yes Name _____	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☐ Good ☐ Bad

Purge Method

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift

Initial Depth to Water (m):	1.745 (ice)	**Purge Start Time:**				**Purge End Time:**						
Depth to Bottom (m):	—	**Time (___) minute interval:**										
Submerged Tubing Depth (m):	—	**Depth to water (m)**										
Well Stick-up Height (m):	1.72	**Temperature (°C)**										
Estimated Water Volume (L):	—	**pH**										
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Cond. (µs/cm)**										
		Specific Cond. (µs/cm)										
		Redox (mV)										
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**DO (mg/L)**										
		Appearance & Odour (Clear, Silty, HC odours, etc.)										
2" casing has 0.16 USgal/ft or 2.032 l/m		**Only for final readings**	**Sulphide (mg/L)**									
1" casing has 0.04 USgal/ft or 0.508 l/m			**Turbidity (NTU)**									
8" sand pack has 0.73 USgal/ft or 9.271 l/m		**Total Purge Volume:**										
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m												

NOT SAMPLED
FROZEN

Sample Method

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis							

HEMMERA

Sample Site (Con't): MP09-11

UTM Location: Zn: 08V Easting: 389219 Northing: 6880613

Photo No.: 100-0057, -0058

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.4
Carbon Dioxide (C02)	PPM	0

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: PVC cut

General Notes (Condition of well or other features):

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GSI-DC-05B	**Project Number:**	1343-005.06	**Date:**	20 March 2015
Approximate Date Drilled:		**Client:**	GY - AAM	**Sampler:**	TJ RM
Piezometer Diameter / Screen Length:	1" DP	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	sunny 0°C
Field Blank Collected	☐ Yes Name _____	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☐ Good ☐ Bad

Purge Method N/A

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift

Initial Depth to Water (m):		**Purge Start Time:**					**Purge End Time:**				
Depth to Bottom (m):		**Time (___) minute interval:**									
Submerged Tubing Depth (m):		**Depth to water (m)**									
Well Stick-up Height (m):		**Temperature (°C)**									
Estimated Water Volume (L):		**pH**									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Cond. (µs/cm)**									
		Specific Cond. (µs/cm)									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**Redox (mV)**									
		DO (mg/L)									
2" casing has 0.16 USgal/ft or 2.032 l/m		**Appearance & Odour (Clear, Silty, HC odours, etc.)**									
1" casing has 0.04 USgal/ft or 0.508 l/m		**Only for final readings**	**Sulphide (mg/L)**								
8" sand pack has 0.73 USgal/ft or 9.271 l/m			**Turbidity (NTU)**								
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Total Purge Volume:**									

NOT LOCATED under Dome Cr. Frozen

Sample Method N/A

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis							

HEMMERA

Sample Site (Con't): GSI-DC-05B

UTM Location: Zn: 08V **Easting:** 388724 **Northing:** 6880835

Photo No.: 100-0050, -0051, -0052

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	
Oxygen (O2)	%	
Carbon Dioxide (C02)	PPM	

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: _____.

General Notes (Condition of well or other features):

-not located, iced over

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GSI-DC-05A	**Project Number:**	1343-005.06	**Date:**	20 March 2015
Approximate Date Drilled:		**Client:**	GY - AAM	**Sampler:**	RM TJ
Piezometer Diameter / Screen Length:	1" DP	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Sunny 0°C
Field Blank Collected	☐ Yes Name _____	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☐ Good ☐ Bad

Purge Method n/a

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift

Initial Depth to Water (m):		**Purge Start Time:**				**Purge End Time:**					
Depth to Bottom (m):		**Time (___) minute interval:**									
Submerged Tubing Depth (m):		**Depth to water (m)**									
Well Stick-up Height (m):		**Temperature (°C)**									
Estimated Water Volume (L):		**pH**									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Cond. (µs/cm)**									
		Specific Cond. (µs/cm)									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**Redox (mV)**									
		DO (mg/L)									
2" casing has 0.16 USgal/ft or 2.032 l/m		**Appearance & Odour (Clear, Silty, HC odours, etc.)**									
1" casing has 0.04 USgal/ft or 0.508 l/m		**Only for final readings**	**Sulphide (mg/L)**								
8" sand pack has 0.73 USgal/ft or 9.271 l/m			**Turbidity (NTU)**								
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Total Purge Volume:**									

NOT LOCATED Dup Cr Frozen Under

Sample Method n/a

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis							

HEMMERA

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

UTM Location: Zn: 08V Easting: 388724 Northing: 6880835

Photo No.: 100-0050, -0051, -0052

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	
Oxygen (O2)	%	
Carbon Dioxide (C02)	PPM	

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: _____.

General Notes (Condition of well or other features):

- not located, ~~off~~ iced over

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2	1 L (plastic)	General Chemistry	250 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	60 ml	-	☐ NaOH		
4	250 ml (glass)	NH3	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate	100 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8[2]	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
9	120 ml (plastic)	Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GSI-DC-03B	**Project Number:**	1343-005.06	**Date:**	20 Mar 2015
Approximate Date Drilled:		**Client:**	GY - AAM	**Sampler:**	TS RM
Piezometer Diameter / Screen Length:	1" DP	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	cloudy -3°C
Field Blank Collected	☐ Yes Name _____	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☐ Good ☐ Bad

Purge Method

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift

Initial Depth to Water (m):		**Purge Start Time:**					**Purge End Time:**				
Depth to Bottom (m):		**Time (___) minute interval:**									
Submerged Tubing Depth (m):		**Depth to water (m)**									
Well Stick-up Height (m):		**Temperature (°C)**									
Estimated Water Volume (L):		**pH**									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Cond. (µs/cm)**									
		Specific Cond. (µs/cm)									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**Redox (mV)**									
		DO (mg/L)									
2" casing has 0.16 USgal/ft or 2.032 l/m		**Appearance & Odour (Clear, Silty, HC odours, etc.)**									
1" casing has 0.04 USgal/ft or 0.508 l/m		**Only for final readings**	**Sulphide (mg/L)**								
8" sand pack has 0.73 USgal/ft or 9.271 l/m			**Turbidity (NTU)**								
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Total Purge Volume:**									

NOT LOCATED - Abandoned?

Sample Method

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis							

HEMMERA

Sample Site (Con't): GSI-DC-03B

UTM Location: Zn: 08V **Easting:** 388103 **Northing:** 6881082

Photo No.: 100-0070, -0071, -0072

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	
Oxygen (O2)	%	
Carbon Dioxide (C02)	PPM	

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: _____.

General Notes (Condition of well or other features):

-well "glaciated" over (frozen GW seeps)

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09-10	**Project Number:**	1343-005.06	**Date:**	20 Mar 2015
Approximate Date Drilled:		**Client:**	GY - AAM	**Sampler:**	TS RM
Piezometer Diameter / Screen Length:	2" PVC	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Partial cloud -5°C
Field Blank Collected	☐ Yes Name _____	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☐ Good ☐ Bad

Purge Method

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift

Initial Depth to Water (m):	2.493 (ice)	**Purge Start Time:**			**Purge End Time:**							
Depth to Bottom (m):	–	**Time (___) minute interval:**										
Submerged Tubing Depth (m):	–	**Depth to water (m)**										
Well Stick-up Height (m):	1.96	**Temperature (°C)**										
Estimated Water Volume (L):	–	**pH**										
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Cond. (µs/cm)**										
		Specific Cond. (µs/cm)										
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**Redox (mV)**										
		DO (mg/L)										
2" casing has 0.16 USgal/ft or 2.032 l/m		**Appearance & Odour (Clear, Silty, HC odours, etc.)**										
1" casing has 0.04 USgal/ft or 0.508 l/m		**Only for final readings**	**Sulphide (mg/L)**									
8" sand pack has 0.73 USgal/ft or 9.271 l/m			**Turbidity (NTU)**									
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Total Purge Volume:**										

NOT SAMPLED FROZEN

Sample Method

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis							

HEMMERA

Sample Site (Con't): MP09-10

UTM Location: Zn: 08V Easting: 389240 Northing: 6880682

Photo No.: 100-0055, -0056

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	Ø
Oxygen (O2)	%	20.4
Carbon Dioxide (C02)	PPM	Ø

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: well cut

General Notes (Condition of well or other features):

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MP09-09	**Project Number:**	1343-005.06	**Date:**	20 Mar 2015
Approximate Date Drilled:		**Client:**	GY - AAM	**Sampler:**	TS RM
Piezometer Diameter / Screen Length:	2" PVC	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Cloudy -5°C
Field Blank Collected	☐ Yes Name _____	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☐ Good ☐ Bad

Purge Method

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift

Initial Depth to Water (m):	DRY	**Purge Start Time:**				**Purge End Time:**					
Depth to Bottom (m):	5.610	**Time (___) minute interval:**									
Submerged Tubing Depth (m):	–	**Depth to water (m)**									
Well Stick-up Height (m):	2.21	**Temperature (°C)**									
Estimated Water Volume (L):	–	**pH**									
		Cond. (µs/cm)			NOT SAMPLED DRY						
		Specific Cond. (µs/cm)									
		Redox (mV)									
		DO (mg/L)									
		Appearance & Odour (Clear, Silty, HC odours, etc.)									
		Only for final readings	**Sulphide (mg/L)**								
			Turbidity (NTU)								
		Total Purge Volume:									

(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume

(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume

2" casing has 0.16 USgal/ft or 2.032 l/m
1" casing has 0.04 USgal/ft or 0.508 l/m
8" sand pack has 0.73 USgal/ft or 9.271 l/m
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m

Sample Method

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis							

HEMMERA

Sample Site (Con't): MP09-09

UTM Location: Zn: 08V **Easting:** 389238 **Northing:** 6880681

Photo No.: 100-0055, -0056

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.4
Carbon Dioxide (C02)	PPM	0

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: well cut.

General Notes (Condition of well or other features):

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09-07	**Project Number:**	1343-005.06	**Date:**	20 Mar 2015
Approximate Date Drilled:		**Client:**	GY - AAM	**Sampler:**	TD RM
Piezometer Diameter / Screen Length:	2" PVC	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Partial Cloud -5°C
Field Blank Collected	☐ Yes Name _____	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☐ Good ☐ Bad

Purge Method

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift

Initial Depth to Water (m):	DRY	**Purge Start Time:**				**Purge End Time:**					
Depth to Bottom (m):	3.393	**Time (___) minute interval:**									
Submerged Tubing Depth (m):		**Depth to water (m)**									
Well Stick-up Height (m):	1.32	**Temperature (°C)**									
Estimated Water Volume (L):		**pH**									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Cond. (µs/cm)**									
		Specific Cond. (µs/cm)									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**Redox (mV)**									
		DO (mg/L)									
2" casing has 0.16 USgal/ft or 2.032 l/m		**Appearance & Odour (Clear, Silty, HC odours, etc.)**									
1" casing has 0.04 USgal/ft or 0.508 l/m		**Only for final readings** **Sulphide (mg/L)**									
8" sand pack has 0.73 USgal/ft or 9.271 l/m		**Only for final readings** **Turbidity (NTU)**									
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Total Purge Volume:**									

NOT SAMPLED DRY

Sample Method

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis							

HEMMERA

Sample Site (Con't): MW19-07

UTM Location: Zn: 08V Easting: 389324 Northing: 6880698

Photo No.: 100-0053, -0054

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	Ø
Oxygen (O2)	%	18.9
Carbon Dioxide (C02)	PPM	Ø

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: PVC cut

General Notes (Condition of well or other features):

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09-04	**Project Number:**	1343-005.06	**Date:**	20 Mar 2015
Approximate Date Drilled:		**Client:**	GY - AAM	**Sampler:**	TS RM
Piezometer Diameter / Screen Length:	2" PVC	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	clear -5°C
Field Blank Collected	☐ Yes Name _____	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☐ Good ☐ Bad

Purge Method

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift

Initial Depth to Water (m):		**Purge Start Time:**			**Purge End Time:**						
Depth to Bottom (m):		**Time (___) minute interval:**									
Submerged Tubing Depth (m):		**Depth to water (m)**									
Well Stick-up Height (m):		**Temperature (°C)**									
Estimated Water Volume (L):		**pH**									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Cond. (µs/cm)**									
		Specific Cond. (µs/cm)									
		Redox (mV)									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**DO (mg/L)**									
		Appearance & Odour (Clear, Silty, HC odours, etc.)									
2" casing has 0.16 USgal/ft or 2.032 l/m		**Only for final readings**	**Sulphide (mg/L)**								
1" casing has 0.04 USgal/ft or 0.508 l/m			**Turbidity (NTU)**								
8" sand pack has 0.73 USgal/ft or 9.271 l/m		**Total Purge Volume:**									
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m											

NOT LOCATED

Sample Method

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis							

HEMMERA

Sample Site (Con't): MW09-04

UTM Location: Zn: 08V **Easting:** 389421 **Northing:** 6880558

Photo No.: 100 - 0046, - 0047

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	
Oxygen (O2)	%	
Carbon Dioxide (C02)	PPM	

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: _____.

General Notes (Condition of well or other features):

- buried under snow
- could not locate with Pin finder
* well casing & cap are plastic (OCT '14)
- UTM from prev. field data

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	CH-P-15-01/10	**Project Number:**	1343-005.06	**Date:**	20 March 2015
Approximate Date Drilled:		**Client:**	GY - AAM	**Sampler:**	RM TJ
Piezometer Diameter / Screen Length:	1.5" PVC	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	sunny 2°C
Field Blank Collected	☐ Yes Name _____	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☐ Good ☐ Bad

Purge Method N/A

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift

Initial Depth to Water (m):	6.452 (ice)	**Purge Start Time:**				**Purge End Time:**					
Depth to Bottom (m):	—	**Time (___) minute interval:**									
Submerged Tubing Depth (m):	—	**Depth to water (m)**									
Well Stick-up Height (m):	0.49	**Temperature (°C)**									
Estimated Water Volume (L):	—	**pH**									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Cond. (µs/cm)**									
		Specific Cond. (µs/cm)									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**Redox (mV)**									
		DO (mg/L)									
2" casing has 0.16 USgal/ft or 2.032 l/m		**Appearance & Odour (Clear, Silty, HC odours, etc.)**									
1" casing has 0.04 USgal/ft or 0.508 l/m		**Only for final readings**	**Sulphide (mg/L)**								
8" sand pack has 0.73 USgal/ft or 9.271 l/m			**Turbidity (NTU)**								
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Total Purge Volume:**									

NOT SAMPLED FROZEN

Sample Method N/A

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis							

HEMMERA

Sample Site (Con't): CH-P_13-01/10

UTM Location: Zn: 08V Easting: 388657 Northing: 6881119

Photo No.: 100_0048, -0049

Well Head Space Gases:

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.3
Carbon Dioxide (C02)	PPM	0

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: _____.

General Notes (Condition of well or other features):

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GSI-DC-03A	**Project Number:**	1343-005.06	**Date:**	20 Mar 2015
Approximate Date Drilled:		**Client:**	GY - AAM	**Sampler:**	TS RM
Piezometer Diameter / Screen Length:	1" DP	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	cloudy -3°C
Field Blank Collected	☐ Yes Name _____	**Duplicate Collected:**	☐ Yes Name _____	**Recovery:**	☐ Good ☐ Bad

Purge Method

Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift

Initial Depth to Water (m):		**Purge Start Time:**				**Purge End Time:**					
Depth to Bottom (m):		**Time (___) minute interval:**									
Submerged Tubing Depth (m):		**Depth to water (m)**									
Well Stick-up Height (m):		**Temperature (°C)**									
Estimated Water Volume (L):		**pH**									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume (DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume 2" casing has 0.16 USgal/ft or 2.032 l/m 1" casing has 0.04 USgal/ft or 0.508 l/m 8" sand pack has 0.73 USgal/ft or 9.271 l/m 6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Cond. (µs/cm)**									
		Specific Cond. (µs/cm)									
		Redox (mV)									
		DO (mg/L)									
		Appearance & Odour (Clear, Silty, HC odours, etc.)									
		Only for final readings	**Sulphide (mg/L)**								
			Turbidity (NTU)								
		Total Purge Volume:									

NOT LOCATED "Glaciated?"

Sample Method

	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Centrif. Pump	Air Lift	Other
Analysis							

HEMMERA

Sample Site (Con't): GS1-DC-03A

UTM Location: Zn: 08V **Easting:** 388103 **Northing:** 6881082

Photo No.: 100-0070, -0071 -0072

Well Head Space Gases:

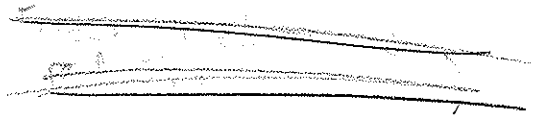
	Units	Values
Methane (CH4)	%LEL	
Oxygen (O2)	%	
Carbon Dioxide (C02)	PPM	

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: _____.

General Notes (Condition of well or other features):



- well "glaciated" over (frozen GW seeps)

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment ☒	Preservative Added ☒	Volume Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☐ HNO_3		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH		
4	250 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, capped and mixed, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

APPENDIX C
Laboratory Reports

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

Date Received: 20-MAR-15
Report Date: 08-APR-15 11:59 (MT)
Version: FINAL REV. 2

Client Phone: 867-456-4865

Certificate of Analysis

Lab Work Order #: L1589940

Project P.O. #: NOT SUBMITTED
Job Reference: 1343-005.07
C of C Numbers: 1
Legal Site Desc:

Comments:

8-APR-2015 This report replaces the previous version and contains a requested change to the Job#.

Brent Mack, B.Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1589940-1 Water 19-MAR-15 13:05 MW09-24	L1589940-2 Water 19-MAR-15 13:05 MW09-24 FILTERED ALK	L1589940-3 Water 19-MAR-15 10:30 MW09-06	L1589940-4 Water 19-MAR-15 15:30 MW09-02	L1589940-5 Water 19-MAR-15 15:30 MW09-02 FILTERED ALK
WATER						
Physical Tests	Conductivity (uS/cm)	979		1910	2820	
	Hardness (as CaCO3) (mg/L)	620		1310	1580	
	pH (pH)	7.38		7.81	6.49	
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	189	190	119	40.9	43.8
	Ammonia, Total (as N) (mg/L)	0.0113		0.733	14.4	
	Chloride (Cl) (mg/L)	<1.0 DLA		<2.5 DLA	<10 DLA	
	Fluoride (F) (mg/L)	<0.040 DLA		0.26	0.75	
	Nitrate (as N) (mg/L)	3.28		0.192	0.50	
	Nitrite (as N) (mg/L)	<0.0020 DLA		0.0138	0.023	
	Total Kjeldahl Nitrogen (mg/L)	0.378		1.16	15.7	
	Sulfate (SO4) (mg/L)	387		1190	2020	
	Sulphide as S (mg/L)	<0.020		<0.020	<0.020	
	Anion Sum (meq/L)	12.1		27.1	43.0	
	Cation Sum (meq/L)	12.8		27.7	42.1	
	Cation - Anion Balance (%)	3.1		1.0	-1.0	
Cyanides	Cyanide, Weak Acid Diss (mg/L)	<0.0050		<0.0050	0.0053	
	Cyanide, Total (mg/L)	0.0117		<0.0050	0.169	
	Thiocyanate (SCN) (mg/L)	<0.50		<0.50	1.28	
	Cyanide, Free (mg/L)	<0.0050		<0.0050	<0.0050	
Organic / Inorganic Carbon	Total Inorganic Carbon (mg/L)	37.1		21.6	3.81 RRA	
	Total Organic Carbon (mg/L)	8.74		7.27	5.71	
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)					

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1589940-6	L1589940-7	L1589940-8	L1589940-9	L1589940-10
	Description	Water	Water	Water	Water	Water
	Sampled Date	19-MAR-15	19-MAR-15	18-MAR-15	18-MAR-15	18-MAR-15
	Sampled Time	16:20	16:20	16:50	17:55	16:30
	Client ID	MW09-23	MW09-23 FILTERED ALK	GSI-DC-02B	GSI-HA-04A	GSI-HA-01A
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	1260		1010		
	Hardness (as CaCO3) (mg/L)	618		632	647	657
	pH (pH)	7.33		8.10		
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	365	380	295		
	Ammonia, Total (as N) (mg/L)	3.79				
	Chloride (Cl) (mg/L)	<2.5 DLA		<1.0 DLA		
	Fluoride (F) (mg/L)	0.16		0.066		
	Nitrate (as N) (mg/L)	<0.025 DLA		0.778		
	Nitrite (as N) (mg/L)	0.0058		0.0102		
	Total Kjeldahl Nitrogen (mg/L)	5.73				
	Sulfate (SO4) (mg/L)	428		337		
	Sulphide as S (mg/L)	0.023				
	Anion Sum (meq/L)	16.2		13.0		
	Cation Sum (meq/L)	15.3		13.1		
	Cation - Anion Balance (%)	-3.0		0.4		
Cyanides	Cyanide, Weak Acid Diss (mg/L)	<0.0050				
	Cyanide, Total (mg/L)	0.0376				
	Thiocyanate (SCN) (mg/L)	<0.50				
	Cyanide, Free (mg/L)	<0.0050				
Organic / Inorganic Carbon	Total Inorganic Carbon (mg/L)	76.6				
	Total Organic Carbon (mg/L)	25.6				
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)					

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1589940-11 Water 18-MAR-15 17:00 FB-1	L1589940-12 Water 18-MAR-15 17:00 FB-1 FILTERED ALK	L1589940-13 Water 19-MAR-15 18:00 FB-2	L1589940-14 Water 19-MAR-15 18:00 FB-2 FILTERED ALK	L1589940-15 Water 20-MAR-15 TRIP BLANK
WATER						
Physical Tests	Conductivity (uS/cm)	<2.0		<2.0		<2.0
	Hardness (as CaCO3) (mg/L)	<0.50		<0.50		<0.50
	pH (pH)	5.45		5.98		5.23
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	<2.0	<2.0	<2.0	<2.0	<2.0
	Ammonia, Total (as N) (mg/L)	<0.0050		<0.0050		0.0167 RRV
	Chloride (Cl) (mg/L)	<0.50		<0.50		<0.50
	Fluoride (F) (mg/L)	<0.020		<0.020		<0.020
	Nitrate (as N) (mg/L)	<0.0050		<0.0050		<0.0050
	Nitrite (as N) (mg/L)	<0.0010		<0.0010		<0.0010
	Total Kjeldahl Nitrogen (mg/L)	<0.050		<0.050		<0.050
	Sulfate (SO4) (mg/L)	<0.30		<0.30		<0.30
	Sulphide as S (mg/L)	<0.020		<0.020		<0.020
	Anion Sum (meq/L)	<0.10		<0.10		<0.10
	Cation Sum (meq/L)	<0.10		<0.10		<0.10
	Cation - Anion Balance (%)	0.0		0.0		0.0
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		<0.50		<0.50
	Cyanide, Free (mg/L)	<0.0050		<0.0050		<0.0050
Organic / Inorganic Carbon	Total Inorganic Carbon (mg/L)	<0.50		<0.50		<0.50
	Total Organic Carbon (mg/L)	<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)					<0.00010
	Bismuth (Bi)-Total (mg/L)					<0.00050
	Boron (B)-Total (mg/L)					<0.010
	Cadmium (Cd)-Total (mg/L)					<0.000010
	Calcium (Ca)-Total (mg/L)					<0.050
	Chromium (Cr)-Total (mg/L)					0.00025
	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)					<0.00050

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1589940-1	L1589940-2	L1589940-3	L1589940-4	L1589940-5
	Description	Water	Water	Water	Water	Water
	Sampled Date	19-MAR-15	19-MAR-15	19-MAR-15	19-MAR-15	19-MAR-15
	Sampled Time	13:05	13:05	10:30	15:30	15:30
	Client ID	MW09-24	MW09-24 FILTERED ALK	MW09-06	MW09-02	MW09-02 FILTERED ALK
Grouping	**Analyte**					
WATER						
Total Metals	Magnesium (Mg)-Total (mg/L)					
	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)					
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD		FIELD	FIELD	
	Dissolved Metals Filtration Location	FIELD		FIELD	FIELD	
	Aluminum (Al)-Dissolved (mg/L)	0.0012		0.0020	<0.0050 DLA	
	Antimony (Sb)-Dissolved (mg/L)	0.00018		0.213	0.00508	
	Arsenic (As)-Dissolved (mg/L)	0.00165		0.197	19.2	
	Barium (Ba)-Dissolved (mg/L)	0.205		0.00762	0.00896	
	Beryllium (Be)-Dissolved (mg/L)	<0.00010		<0.00020 DLA	<0.00050 DLA	
	Bismuth (Bi)-Dissolved (mg/L)	<0.00050		<0.0010 DLA	<0.0025 DLA	
	Boron (B)-Dissolved (mg/L)	0.015		0.116	0.058	
	Cadmium (Cd)-Dissolved (mg/L)	0.000058		0.00557	0.000707	
	Calcium (Ca)-Dissolved (mg/L)	169		443	487	
	Chromium (Cr)-Dissolved (mg/L)	0.00031		<0.00020 DLA	<0.00050 DLA	
	Cobalt (Co)-Dissolved (mg/L)	0.00053		0.00151	0.0115	
	Copper (Cu)-Dissolved (mg/L)	0.00769		0.00670	<0.0010 DLA	
	Iron (Fe)-Dissolved (mg/L)	0.010		<0.010	46.7	
	Lead (Pb)-Dissolved (mg/L)	<0.000050		0.00045	<0.00025 DLA	
	Lithium (Li)-Dissolved (mg/L)	0.00120		0.0089	0.0284	
	Magnesium (Mg)-Dissolved (mg/L)	48.3		50.4	87.8	

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1589940-6 Water 19-MAR-15 16:20 MW09-23	L1589940-7 Water 19-MAR-15 16:20 MW09-23 FILTERED ALK	L1589940-8 Water 18-MAR-15 16:50 GSI-DC-02B	L1589940-9 Water 18-MAR-15 17:55 GSI-HA-04A	L1589940-10 Water 18-MAR-15 16:30 GSI-HA-01A
WATER						
Total Metals	Magnesium (Mg)-Total (mg/L)					
	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)					
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD		FIELD	FIELD	FIELD
	Dissolved Metals Filtration Location	FIELD		FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	0.0182		0.0017	0.0042	0.0038
	Antimony (Sb)-Dissolved (mg/L)	0.00032		0.00051	0.00141	0.00047
	Arsenic (As)-Dissolved (mg/L)	0.0168		0.00298	0.00517	0.0147
	Barium (Ba)-Dissolved (mg/L)	0.0375		0.103	0.116	0.175
	Beryllium (Be)-Dissolved (mg/L)	<0.00020 DLA		<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Dissolved (mg/L)	<0.0010 DLA		<0.00050	<0.00050	<0.00050
	Boron (B)-Dissolved (mg/L)	0.169		<0.010	<0.010	<0.010
	Cadmium (Cd)-Dissolved (mg/L)	0.000025		0.000059	0.000017	<0.000010
	Calcium (Ca)-Dissolved (mg/L)	159		166	166	172
	Chromium (Cr)-Dissolved (mg/L)	0.00022		0.00017	<0.00010	0.00015
	Cobalt (Co)-Dissolved (mg/L)	0.0192		0.00169	0.00040	0.00018
	Copper (Cu)-Dissolved (mg/L)	<0.00040 DLA		0.00208	0.00046	0.00128
	Iron (Fe)-Dissolved (mg/L)	5.83		0.331	1.55	4.00
	Lead (Pb)-Dissolved (mg/L)	<0.00010 DLA		0.000078	0.000056	0.000085
	Lithium (Li)-Dissolved (mg/L)	<0.0010 DLA		0.00262	0.00491	0.00686
	Magnesium (Mg)-Dissolved (mg/L)	53.8		52.8	56.4	55.5

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1589940-11 Water 18-MAR-15 17:00 FB-1	L1589940-12 Water 18-MAR-15 17:00 FB-1 FILTERED ALK	L1589940-13 Water 19-MAR-15 18:00 FB-2	L1589940-14 Water 19-MAR-15 18:00 FB-2 FILTERED ALK	L1589940-15 Water 20-MAR-15 TRIP BLANK
WATER						
Total Metals	Magnesium (Mg)-Total (mg/L)					<0.10
	Manganese (Mn)-Total (mg/L)					<0.000050
	Mercury (Hg)-Total (mg/L)					<0.000010
	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)					<0.00010
	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)					<0.010
	Uranium (U)-Total (mg/L)					<0.000010
	Vanadium (V)-Total (mg/L)					<0.0010
	Zinc (Zn)-Total (mg/L)					<0.0030
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD		FIELD		
	Dissolved Metals Filtration Location	FIELD		FIELD		
	Aluminum (Al)-Dissolved (mg/L)	<0.0010		<0.0010		
	Antimony (Sb)-Dissolved (mg/L)	<0.00010		<0.00010		
	Arsenic (As)-Dissolved (mg/L)	<0.00010		<0.00010		
	Barium (Ba)-Dissolved (mg/L)	<0.000050		<0.000050		
	Beryllium (Be)-Dissolved (mg/L)	<0.00010		<0.00010		
	Bismuth (Bi)-Dissolved (mg/L)	<0.00050		<0.00050		
	Boron (B)-Dissolved (mg/L)	<0.010		<0.010		
	Cadmium (Cd)-Dissolved (mg/L)	<0.000010		<0.000010		
	Calcium (Ca)-Dissolved (mg/L)	<0.050		<0.050		
	Chromium (Cr)-Dissolved (mg/L)	<0.00010		<0.00010		
	Cobalt (Co)-Dissolved (mg/L)	<0.00010		<0.00010		
	Copper (Cu)-Dissolved (mg/L)	<0.00020		<0.00020		
	Iron (Fe)-Dissolved (mg/L)	<0.010		<0.010		
	Lead (Pb)-Dissolved (mg/L)	<0.000050		<0.000050		
	Lithium (Li)-Dissolved (mg/L)	<0.00050		<0.00050		
	Magnesium (Mg)-Dissolved (mg/L)	<0.10		<0.10		

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1589940-1 Water 19-MAR-15 13:05 MW09-24	L1589940-2 Water 19-MAR-15 13:05 MW09-24 FILTERED ALK	L1589940-3 Water 19-MAR-15 10:30 MW09-06	L1589940-4 Water 19-MAR-15 15:30 MW09-02	L1589940-5 Water 19-MAR-15 15:30 MW09-02 FILTERED ALK
WATER						
Dissolved Metals	Manganese (Mn)-Dissolved (mg/L)	0.000515		6.31	35.2	
	Mercury (Hg)-Dissolved (mg/L)	<0.000010		<0.000010	<0.000010	
	Molybdenum (Mo)-Dissolved (mg/L)	0.000203		0.00564	0.00515	
	Nickel (Ni)-Dissolved (mg/L)	<0.00050		0.0023	0.0030	
	Phosphorus (P)-Dissolved (mg/L)	<0.050		<0.050	<0.050	
	Potassium (K)-Dissolved (mg/L)	1.98		15.4	92.8	
	Selenium (Se)-Dissolved (mg/L)	0.00048		<0.00020 DLA	<0.00050 DLA	
	Silicon (Si)-Dissolved (mg/L)	6.12		6.81	6.61	
	Silver (Ag)-Dissolved (mg/L)	<0.000010		0.000029	<0.000050 DLA	
	Sodium (Na)-Dissolved (mg/L)	9.09		17.4	77.1	
	Strontium (Sr)-Dissolved (mg/L)	0.686		0.696	0.998	
	Sulfur (S)-Dissolved (mg/L)	139		404	632	
	Thallium (Tl)-Dissolved (mg/L)	<0.000010		0.000360	0.000238	
	Tin (Sn)-Dissolved (mg/L)	<0.00010		<0.00020 DLA	<0.00050 DLA	
	Titanium (Ti)-Dissolved (mg/L)	<0.010		<0.020 DLA	<0.050 DLA	
	Uranium (U)-Dissolved (mg/L)	0.00324		0.00159	0.000380	
	Vanadium (V)-Dissolved (mg/L)	<0.0010		<0.0020 DLA	<0.0050 DLA	
	Zinc (Zn)-Dissolved (mg/L)	0.0014		0.0939	0.299	

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L1589940-6	L1589940-7	L1589940-8	L1589940-9	L1589940-10
Description	Water	Water	Water	Water	Water
Sampled Date	19-MAR-15	19-MAR-15	18-MAR-15	18-MAR-15	18-MAR-15
Sampled Time	16:20	16:20	16:50	17:55	16:30
Client ID	MW09-23	MW09-23 FILTERED ALK	GSI-DC-02B	GSI-HA-04A	GSI-HA-01A
Grouping / **Analyte**					
WATER					
Dissolved Metals					
Manganese (Mn)-Dissolved (mg/L)	11.2		2.85	0.321	0.206
Mercury (Hg)-Dissolved (mg/L)	<0.000010		<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved (mg/L)	0.00375		0.00487	0.000531	0.000739
Nickel (Ni)-Dissolved (mg/L)	0.0015		0.0152	0.00155	0.00423
Phosphorus (P)-Dissolved (mg/L)	<0.050		<0.050	<0.050	<0.050
Potassium (K)-Dissolved (mg/L)	7.28		3.67	2.95	3.66
Selenium (Se)-Dissolved (mg/L)	<0.00020 DLA		<0.00010	<0.00010	<0.00010
Silicon (Si)-Dissolved (mg/L)	4.98		6.25	5.12	6.09
Silver (Ag)-Dissolved (mg/L)	<0.000020 DLA		<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved (mg/L)	40.1		5.54	4.65	5.76
Strontium (Sr)-Dissolved (mg/L)	0.392		0.353	0.399	0.385
Sulfur (S)-Dissolved (mg/L)	129		114	145	132
Thallium (Tl)-Dissolved (mg/L)	<0.000020 DLA		<0.000010	<0.000010	<0.000010
Tin (Sn)-Dissolved (mg/L)	<0.00020 DLA		<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved (mg/L)	<0.020 DLA		<0.010	<0.010	<0.010
Uranium (U)-Dissolved (mg/L)	0.00182		0.000625	0.000615	0.000080
Vanadium (V)-Dissolved (mg/L)	<0.0020 DLA		<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved (mg/L)	0.0051		0.0077	0.0043	0.0057

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1589940-11 Water 18-MAR-15 17:00 FB-1	L1589940-12 Water 18-MAR-15 17:00 FB-1 FILTERED ALK	L1589940-13 Water 19-MAR-15 18:00 FB-2	L1589940-14 Water 19-MAR-15 18:00 FB-2 FILTERED ALK	L1589940-15 Water 20-MAR-15 TRIP BLANK
WATER						
Dissolved Metals	Manganese (Mn)-Dissolved (mg/L)	<0.000050		<0.000050		
	Mercury (Hg)-Dissolved (mg/L)	<0.000010		<0.000010		
	Molybdenum (Mo)-Dissolved (mg/L)	<0.000050		<0.000050		
	Nickel (Ni)-Dissolved (mg/L)	<0.00050		<0.00050		
	Phosphorus (P)-Dissolved (mg/L)	<0.050		<0.050		
	Potassium (K)-Dissolved (mg/L)	0.16		0.14		
	Selenium (Se)-Dissolved (mg/L)	<0.00010		<0.00010		
	Silicon (Si)-Dissolved (mg/L)	<0.050		<0.050		
	Silver (Ag)-Dissolved (mg/L)	<0.000010		<0.000010		
	Sodium (Na)-Dissolved (mg/L)	<0.050		<0.050		
	Strontium (Sr)-Dissolved (mg/L)	<0.00020		<0.00020		
	Sulfur (S)-Dissolved (mg/L)	<0.50		<0.50		
	Thallium (Tl)-Dissolved (mg/L)	<0.000010		<0.000010		
	Tin (Sn)-Dissolved (mg/L)	<0.00010		<0.00010		
	Titanium (Ti)-Dissolved (mg/L)	<0.010		<0.010		
	Uranium (U)-Dissolved (mg/L)	<0.000010		<0.000010		
	Vanadium (V)-Dissolved (mg/L)	<0.0010		<0.0010		
	Zinc (Zn)-Dissolved (mg/L)	<0.0010		<0.0010		

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

Reference Information

Qualifiers for Individual Samples Listed:

Sample Number	Client Sample ID	Qualifier	Description
L1589940-15	TRIP BLANK	LPMB	Lab-Preserved for Metals. Sample received with pH > 2 and preserved at the lab. Metals results may be biased low.

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Total Inorganic Carbon	MS-B	L1589940-1, -11, -13, -15, -3, -4, -6
Matrix Spike	Total Organic Carbon	MS-B	L1589940-1, -13, -15, -3, -4
Matrix Spike	Total Organic Carbon	MS-B	L1589940-11, -6
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1589940-1, -10, -11, -13, -3, -4, -6, -8, -9
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L1589940-1, -10, -11, -13, -3, -4, -6, -8, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1589940-1, -10, -11, -13, -3, -4, -6, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1589940-1, -10, -11, -13, -3, -4, -6, -8, -9
Matrix Spike	Aluminum (Al)-Total	MS-B	L1589940-15
Matrix Spike	Copper (Cu)-Total	MS-B	L1589940-15
Matrix Spike	Strontium (Sr)-Total	MS-B	L1589940-15

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLA	Detection Limit adjusted for required dilution
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRA	Reported Result Is The Average Of 2 Or More Analyses
RRV	Reported Result Verified By Repeat Analysis

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-COL-VA	Water	Alkalinity by Colourimetric (Automated)	EPA 310.2

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

ALK-PCT-VA	Water	Alkalinity by Auto. 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.

ALK-PCT-VA	Water	Alkalinity by Auto. 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.

CARBONS-TIC-VA	Water	Total inorganic carbon by CO2 purge	APHA 5310 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 5310 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

Reference Information

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-DIS-LOW-CVAFS-VA	Water	Dissolved Mercury in Water by CVAFS(Low)	EPA SW-846 3005A & EPA 245.7

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 filtration (EPA Method 3005A) and involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry or atomic absorption spectrophotometry (EPA Method 245.7).

HG-TOT-LOW-CVAFS-VA	Water	Total Mercury in Water by CVAFS(Low)	EPA 245.7

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 a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry or atomic absorption spectrophotometry (EPA Method 245.7).

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 3030 B&E / EPA SW-846 6020A

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using hotblock, or filtration (APHA 3030B&E). Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modified from EPA Method 6020A).

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	APHA 3030 B&E / EPA SW-846 6020A

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using hotblock, or filtration (APHA 3030B&E). Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modified from EPA Method 6020A).

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	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)

Reference Information

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.

S2-T-COL-VA	Water	Total Sulphide by Colorimetric	APHA 4500-S2 Sulphide

This analysis is carried out using procedures adapted from APHA Method 4500-S2 "Sulphide". Sulphide is determined using the methlyene blue colourimetric method.

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

Reference Information

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.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L1589940-COFC

COC Number: 1 -

Page 1 of 1

Report To		Report Format / Distribution		Select Service Level Below (Rush Turnaround Time (TAT) is not available for all tests)	
Company:	Hemmera Environchem Inc.	Select Report Format:	☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)	R	☑ Regular (Standard TAT if received by 3 pm - business days)
Contact:	Natasha Sandys	Quality Control (QC) Report with Report	☑ Yes ☐ No	P	☐ 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	☐ Emergency (1-2 bus. days if received by 3pm) 100% surcharge - contact ALS to confirm TAT
		Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX	E2	☐ Same day or weekend emergency - contact ALS to confirm TAT and surcharge
Phone:	867-335-3235	Email 1 or Fax	nsandys@hemmera.com, rmartinka@hemmera.com	Specify Date Required for E2,E or P:	
		Email 2	chris@elr.ca		

Invoice To		Invoice Distribution		Analysis Request
	Same as Report To ☑ Yes ☐ No	Select Invoice Distribution:	☑ EMAIL ☑ MAIL ☐ FAX	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below
	Copy of Invoice with Report ☐ Yes ☑ No	Email 1 or Fax	nsandys@hemmera.com	
Company:	Hemmera Environchem Inc.	Email 2	chris@elr.ca	
Contact:	Natasha Sandys			

Project Information		Oil and Gas Required Fields (client use)	
ALS Quote #:	Q45623	Approver ID:	Cost Center:
Job #:	1343-005.06	GL Account:	Routing Code:
PO / AFE:		Activity Code:	
LSD:		Location:	
ALS Lab Work Order # (lab use only)		ALS Contact:	Sampler: RM,TJ,AN,JL

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 (F/P)	Dissolved Mercury (F/P)	Nitrate, Nitrite, Total Kjeldahl N (TKN)	Cl, Fl, Sulfate, conductivity, pH, alkalinity	Anion Sum, Cation Sum,Cation/Anion Balan	Cyanide - Weak Acid Diss., Total, Free (P)	Ammonia N (total), Total Organic Carbon (P)	Thiocyanate (SCN) (P)	Sulphide as S (P)	Total Inorganic Carbon	Dissolved Alkalinity (F)			Number of Containers
	MW09-24	19-Mar-15	13:05	Water	R	R	R	R	R	R	R	R	R	R	R			9
	MW09-06	19-Mar-15	10:30	Water	R	R	R	R	R	R	R	R	R	R				8
	MW09-02	19-Mar-15	15:30	Water	R	R	R	R	R	R	R	R	R	R	R			9
	MW09-23	19-Mar-15	16:20	Water	R	R	R	R	R	R	R	R	R	R	R			9
	GSI-DC-02B	18-Mar-15	16:50	Water	R	R	R	R	R									3
	GSI-HA-04A	18-Mar-15	17:55	Water	R	R												2
	GSI-HA-01A	18-Mar-15	16:30	Water	R	R												2
	FB-1	18-Mar-15	17:00	Water	R	R	R	R	R	R	R	R	R	R	R			9
	FB-2	19-Mar-15	18:00	Water	R	R	R	R	R	R	R	R	R	R	R			9
	Trip Blank	-	-	Water	R	R	R	R	R	R	R	R	R	R	R			9

Short Holding Time

● *Rush Processing*

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report (client Use)
Are samples taken from a Regulated DW System? ☐ Yes ☑ No Are samples for human drinking water use? ☐ Yes ☑ No	- See attached parameter sheet for full parameter list. - note limited volume in General bottle for GSA-DC-02B

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen	☐	SIF Observations	Yes ☐	No ☐			
Ice packs	Yes ☐	No ☐	Custody seal Intact	Yes ☐	No ☐		
Cooling Initiated	☐						
INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
1.6	1.3			3°C			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Chris Jostheds	Date: Mar 20/15	Time: 09:30	Received by:	Date: 20-Mar-15	Time: 9:30	Received by: Shafee	Date: Mar. 23	Time: 950

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

NA 1M-0126e v09 Front/04 January 2014

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

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

Date Received: 23-MAR-15
Report Date: 08-APR-15 11:58 (MT)
Version: FINAL REV. 2

Client Phone: 867-456-4865

Certificate of Analysis

Lab Work Order #: L1590448

Project P.O. #: NOT SUBMITTED
Job Reference: 1343-005.07
C of C Numbers: 1
Legal Site Desc:

Comments:

8-APR-2015 This report replaces the previous version and contains a requested change to the Job#.

Brent Mack, B.Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1590448-1 Water 20-MAR-15 16:10 MW09-18	L1590448-2 Water 20-MAR-15 16:10 MW09-18 FILTERED ALK	L1590448-3 Water 20-MAR-15 13:45 MW09-19	L1590448-4 Water 20-MAR-15 13:45 MW09-19 FILTERED ALK	L1590448-5 Water 20-MAR-15 12:40 CH-P-13-05-/50
WATER						
Physical Tests	Conductivity (uS/cm)	2770		2010		2720
	Hardness (as CaCO3) (mg/L)	2060		1300		1910
	pH (pH)	7.57		7.29		6.58
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	491	626	483	482	94.7
	Ammonia, Total (as N) (mg/L)	0.0339		6.88		0.0381
	Chloride (Cl) (mg/L)	<5.0 DLA		<5.0 DLA		<5.0 DLA
	Fluoride (F) (mg/L)	<0.20 DLA		<0.20 DLA		<0.20 DLA
	Nitrate (as N) (mg/L)	<0.050 DLA		<0.050 DLA		<0.050 DLA
	Nitrite (as N) (mg/L)	<0.010 DLA		<0.010 DLA		<0.010 DLA
	Total Kjeldahl Nitrogen (mg/L)	0.140		7.47		0.149
	Sulfate (SO4) (mg/L)	1570		909		1880
	Sulphide as S (mg/L)	<0.020		0.134		<0.020
	Anion Sum (meq/L)	42.5		28.6		41.1
	Cation Sum (meq/L)	42.0		29.3		41.5
	Cation - Anion Balance (%)	-0.6		1.2		0.5
Cyanides	Cyanide, Weak Acid Diss (mg/L)	<0.0050		<0.0050		<0.0050 CNP
	Cyanide, Total (mg/L)	<0.0050		<0.0050		<0.0050 CNP
	Thiocyanate (SCN) (mg/L)	<0.50		0.68		<0.50
	Cyanide, Free (mg/L)	<0.0050		<0.0050		<0.0050 CNP
Organic / Inorganic Carbon	Total Inorganic Carbon (mg/L)	104		103		14.8
	Total Organic Carbon (mg/L)	2.62		22.2		2.37
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)					

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1590448-6	L1590448-7	L1590448-8	L1590448-9	L1590448-10
	Description	Water	Water	Water	Water	Water
	Sampled Date	20-MAR-15	20-MAR-15	20-MAR-15	20-MAR-15	20-MAR-15
	Sampled Time	12:40	13:45	13:45	12:40	12:40
	Client ID	CH-P-13-05-/50 FILTERED ALK	DUP-1	DUP-1 FILTERED ALK	DUP-2	DUP-2 FILTERED ALK
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)		1910		2710	
	Hardness (as CaCO3) (mg/L)		1330		1920	
	pH (pH)		7.11		6.56	
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	95.1	472	487	96.4	97.6
	Ammonia, Total (as N) (mg/L)		6.75		0.0377	
	Chloride (Cl) (mg/L)		<2.5 DLA		<5.0 DLA	
	Fluoride (F) (mg/L)		<0.10 DLA		0.20	
	Nitrate (as N) (mg/L)		<0.025 DLA		<0.050 DLA	
	Nitrite (as N) (mg/L)		<0.0050 DLA		<0.010 DLA	
	Total Kjeldahl Nitrogen (mg/L)		7.48		0.157	
	Sulfate (SO4) (mg/L)		882		1880	
	Sulphide as S (mg/L)		0.132		<0.020	
	Anion Sum (meq/L)		27.8		41.0	
	Cation Sum (meq/L)		29.9		41.8	
	Cation - Anion Balance (%)		3.6		0.9	
Cyanides	Cyanide, Weak Acid Diss (mg/L)		<0.0050		<0.0050 CNP	
	Cyanide, Total (mg/L)		<0.0050		<0.0050 CNP	
	Thiocyanate (SCN) (mg/L)		0.66		<0.50	
	Cyanide, Free (mg/L)		<0.0050		<0.0050 CNP	
Organic / Inorganic Carbon	Total Inorganic Carbon (mg/L)		101		13.4	
	Total Organic Carbon (mg/L)		21.7		2.44	
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)					

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1590448-11	L1590448-12	L1590448-13		
	Description	Water	Water	Water		
	Sampled Date	23-MAR-15	20-MAR-15	20-MAR-15		
	Sampled Time		16:10	16:10		
	Client ID	TRAVEL BLANK	FB-3	FB-3 FILTERED ALK		
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	<2.0	<2.0			
	Hardness (as CaCO3) (mg/L)	<0.50	<0.50			
	pH (pH)	5.45	5.87			
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	<2.0	<2.0	<2.0		
	Ammonia, Total (as N) (mg/L)	0.0118 RRV	<0.0050			
	Chloride (Cl) (mg/L)	<0.50	<0.50			
	Fluoride (F) (mg/L)	<0.020	<0.020			
	Nitrate (as N) (mg/L)	<0.0050	<0.0050			
	Nitrite (as N) (mg/L)	<0.0010	<0.0010			
	Total Kjeldahl Nitrogen (mg/L)	<0.050	<0.050			
	Sulfate (SO4) (mg/L)	<0.30	<0.30			
	Sulphide as S (mg/L)	<0.020	<0.020			
	Anion Sum (meq/L)	<0.10	<0.10			
	Cation Sum (meq/L)	<0.10	<0.10			
	Cation - Anion Balance (%)	0.0	0.0			
Cyanides	Cyanide, Weak Acid Diss (mg/L)	<0.0050	<0.0050			
	Cyanide, Total (mg/L)	<0.0050	<0.0050			
	Thiocyanate (SCN) (mg/L)	<0.50	<0.50			
	Cyanide, Free (mg/L)	<0.0050	<0.0050			
Organic / Inorganic Carbon	Total Inorganic Carbon (mg/L)	<0.50	<0.50			
	Total Organic Carbon (mg/L)	<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)	<0.00010				
	Bismuth (Bi)-Total (mg/L)	<0.00050				
	Boron (B)-Total (mg/L)	<0.010				
	Cadmium (Cd)-Total (mg/L)	<0.000010				
	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)	<0.00050				

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1590448-1 Water 20-MAR-15 16:10 MW09-18	L1590448-2 Water 20-MAR-15 16:10 MW09-18 FILTERED ALK	L1590448-3 Water 20-MAR-15 13:45 MW09-19	L1590448-4 Water 20-MAR-15 13:45 MW09-19 FILTERED ALK	L1590448-5 Water 20-MAR-15 12:40 CH-P-13-05-/50
WATER						
Total Metals	Magnesium (Mg)-Total (mg/L)					
	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)					
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD		FIELD		FIELD
	Dissolved Metals Filtration Location	FIELD		FIELD		FIELD
	Aluminum (Al)-Dissolved (mg/L)	<0.0020 DLA		0.0134		0.0649
	Antimony (Sb)-Dissolved (mg/L)	0.00041		0.00046		<0.00050 DLA
	Arsenic (As)-Dissolved (mg/L)	0.0556		0.125		0.00444
	Barium (Ba)-Dissolved (mg/L)	0.00940		0.0520		0.00627
	Beryllium (Be)-Dissolved (mg/L)	<0.00020 DLA		<0.00020 DLA		<0.00050 DLA
	Bismuth (Bi)-Dissolved (mg/L)	<0.0010 DLA		<0.0010 DLA		<0.0025 DLA
	Boron (B)-Dissolved (mg/L)	<0.020 DLA		0.130		<0.050 DLA
	Cadmium (Cd)-Dissolved (mg/L)	0.000050		<0.000020 DLA		0.330
	Calcium (Ca)-Dissolved (mg/L)	369		302		453
	Chromium (Cr)-Dissolved (mg/L)	<0.00020 DLA		0.00041		<0.00050 DLA
	Cobalt (Co)-Dissolved (mg/L)	0.00030		0.00306		0.0398
	Copper (Cu)-Dissolved (mg/L)	<0.00040 DLA		<0.00040 DLA		0.0550
	Iron (Fe)-Dissolved (mg/L)	0.037		24.4		11.3
	Lead (Pb)-Dissolved (mg/L)	<0.00010 DLA		<0.00010 DLA		0.00451
	Lithium (Li)-Dissolved (mg/L)	0.0216		0.0081		0.0379
	Magnesium (Mg)-Dissolved (mg/L)	277		133		188

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1590448-6 Water 20-MAR-15 12:40 CH-P-13-05-/50 FILTERED ALK	L1590448-7 Water 20-MAR-15 13:45 DUP-1	L1590448-8 Water 20-MAR-15 13:45 DUP-1 FILTERED ALK	L1590448-9 Water 20-MAR-15 12:40 DUP-2	L1590448-10 Water 20-MAR-15 12:40 DUP-2 FILTERED ALK
WATER						
Total Metals	Magnesium (Mg)-Total (mg/L)					
	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)					
Dissolved Metals	Dissolved Mercury Filtration Location		FIELD		FIELD	
	Dissolved Metals Filtration Location		FIELD		FIELD	
	Aluminum (Al)-Dissolved (mg/L)		0.0127		0.0573	
	Antimony (Sb)-Dissolved (mg/L)		0.00048		DLA <0.00050	
	Arsenic (As)-Dissolved (mg/L)		0.131		0.00455	
	Barium (Ba)-Dissolved (mg/L)		0.0542		0.00639	
	Beryllium (Be)-Dissolved (mg/L)		DLA <0.00020		DLA <0.00050	
	Bismuth (Bi)-Dissolved (mg/L)		DLA <0.0010		DLA <0.0025	
	Boron (B)-Dissolved (mg/L)		0.127		DLA <0.050	
	Cadmium (Cd)-Dissolved (mg/L)		DLA <0.000020		0.349	
	Calcium (Ca)-Dissolved (mg/L)		309		460	
	Chromium (Cr)-Dissolved (mg/L)		0.00035		DLA <0.00050	
	Cobalt (Co)-Dissolved (mg/L)		0.00303		0.0402	
	Copper (Cu)-Dissolved (mg/L)		DLA <0.00040		0.0555	
	Iron (Fe)-Dissolved (mg/L)		25.2		11.6	
	Lead (Pb)-Dissolved (mg/L)		DLA <0.00010		0.00456	
	Lithium (Li)-Dissolved (mg/L)		0.0069		0.0368	
	Magnesium (Mg)-Dissolved (mg/L)		136		187	

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1590448-11 Water 23-MAR-15 TRAVEL BLANK	L1590448-12 Water 20-MAR-15 16:10 FB-3	L1590448-13 Water 20-MAR-15 16:10 FB-3 FILTERED ALK		
WATER						
Total Metals	Magnesium (Mg)-Total (mg/L)	<0.10				
	Manganese (Mn)-Total (mg/L)	<0.000050				
	Mercury (Hg)-Total (mg/L)	<0.000010				
	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)	<0.00010				
	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)	<0.010				
	Uranium (U)-Total (mg/L)	<0.000010				
	Vanadium (V)-Total (mg/L)	<0.0010				
	Zinc (Zn)-Total (mg/L)	<0.0030				
Dissolved Metals	Dissolved Mercury Filtration Location		FIELD			
	Dissolved Metals Filtration Location		FIELD			
	Aluminum (Al)-Dissolved (mg/L)		<0.0010			
	Antimony (Sb)-Dissolved (mg/L)		<0.00010			
	Arsenic (As)-Dissolved (mg/L)		<0.00010			
	Barium (Ba)-Dissolved (mg/L)		<0.000050			
	Beryllium (Be)-Dissolved (mg/L)		<0.00010			
	Bismuth (Bi)-Dissolved (mg/L)		<0.00050			
	Boron (B)-Dissolved (mg/L)		<0.010			
	Cadmium (Cd)-Dissolved (mg/L)		<0.000010			
	Calcium (Ca)-Dissolved (mg/L)		<0.050			
	Chromium (Cr)-Dissolved (mg/L)		<0.00010			
	Cobalt (Co)-Dissolved (mg/L)		<0.00010			
	Copper (Cu)-Dissolved (mg/L)		<0.00020			
	Iron (Fe)-Dissolved (mg/L)		<0.010			
	Lead (Pb)-Dissolved (mg/L)		<0.000050			
	Lithium (Li)-Dissolved (mg/L)		<0.00050			
	Magnesium (Mg)-Dissolved (mg/L)		<0.10			

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1590448-1 Water 20-MAR-15 16:10 MW09-18	L1590448-2 Water 20-MAR-15 16:10 MW09-18 FILTERED ALK	L1590448-3 Water 20-MAR-15 13:45 MW09-19	L1590448-4 Water 20-MAR-15 13:45 MW09-19 FILTERED ALK	L1590448-5 Water 20-MAR-15 12:40 CH-P-13-05-/50
WATER						
Dissolved Metals	Manganese (Mn)-Dissolved (mg/L)	0.848		9.20		37.5
	Mercury (Hg)-Dissolved (mg/L)	<0.000010		<0.000010		<0.000010
	Molybdenum (Mo)-Dissolved (mg/L)	0.00011		0.00013		0.00040
	Nickel (Ni)-Dissolved (mg/L)	<0.0010 DLA		0.0012		0.0143
	Phosphorus (P)-Dissolved (mg/L)	<0.050		0.207		<0.050
	Potassium (K)-Dissolved (mg/L)	7.61		9.21		5.00
	Selenium (Se)-Dissolved (mg/L)	<0.00020 DLA		<0.00020 DLA		<0.00050 DLA
	Silicon (Si)-Dissolved (mg/L)	5.35		11.0		7.20
	Silver (Ag)-Dissolved (mg/L)	<0.000020 DLA		<0.000020 DLA		<0.000050 DLA
	Sodium (Na)-Dissolved (mg/L)	13.1		20.6		8.37
	Strontium (Sr)-Dissolved (mg/L)	1.08		1.04		0.567
	Sulfur (S)-Dissolved (mg/L)	525		311		658
	Thallium (Tl)-Dissolved (mg/L)	0.000257		<0.000020 DLA		0.000520
	Tin (Sn)-Dissolved (mg/L)	<0.00020 DLA		<0.00020 DLA		<0.00050 DLA
	Titanium (Ti)-Dissolved (mg/L)	<0.020 DLA		<0.020 DLA		<0.050 DLA
	Uranium (U)-Dissolved (mg/L)	0.00779		0.000291		0.000695
	Vanadium (V)-Dissolved (mg/L)	<0.0020 DLA		<0.0020 DLA		<0.0050 DLA
	Zinc (Zn)-Dissolved (mg/L)	0.0031		<0.0020 DLA		31.7

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1590448-6 Water 20-MAR-15 12:40 CH-P-13-05-/50 FILTERED ALK	L1590448-7 Water 20-MAR-15 13:45 DUP-1	L1590448-8 Water 20-MAR-15 13:45 DUP-1 FILTERED ALK	L1590448-9 Water 20-MAR-15 12:40 DUP-2	L1590448-10 Water 20-MAR-15 12:40 DUP-2 FILTERED ALK
WATER						
Dissolved Metals	Manganese (Mn)-Dissolved (mg/L)		9.24		37.5	
	Mercury (Hg)-Dissolved (mg/L)		<0.000010		<0.000010	
	Molybdenum (Mo)-Dissolved (mg/L)		0.00014		0.00042	
	Nickel (Ni)-Dissolved (mg/L)		0.0015		0.0142	
	Phosphorus (P)-Dissolved (mg/L)		0.211		<0.050	
	Potassium (K)-Dissolved (mg/L)		9.85		5.15	
	Selenium (Se)-Dissolved (mg/L)		<0.00020 DLA		<0.00050 DLA	
	Silicon (Si)-Dissolved (mg/L)		11.4		7.34	
	Silver (Ag)-Dissolved (mg/L)		<0.000020 DLA		<0.000050 DLA	
	Sodium (Na)-Dissolved (mg/L)		20.4		8.31	
	Strontium (Sr)-Dissolved (mg/L)		1.10		0.578	
	Sulfur (S)-Dissolved (mg/L)		313		645	
	Thallium (Tl)-Dissolved (mg/L)		<0.000020 DLA		0.000543	
	Tin (Sn)-Dissolved (mg/L)		<0.00020 DLA		<0.00050 DLA	
	Titanium (Ti)-Dissolved (mg/L)		<0.020 DLA		<0.050 DLA	
	Uranium (U)-Dissolved (mg/L)		0.000296		0.000709	
	Vanadium (V)-Dissolved (mg/L)		<0.0020 DLA		<0.0050 DLA	
	Zinc (Zn)-Dissolved (mg/L)		<0.0020 DLA		31.8	

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1590448-11	L1590448-12	L1590448-13		
	Description	Water	Water	Water		
	Sampled Date	23-MAR-15	20-MAR-15	20-MAR-15		
	Sampled Time		16:10	16:10		
	Client ID	TRAVEL BLANK	FB-3	FB-3 FILTERED ALK		
Grouping	**Analyte**					
WATER						
Dissolved Metals	Manganese (Mn)-Dissolved (mg/L)		<0.000050			
	Mercury (Hg)-Dissolved (mg/L)		<0.000010			
	Molybdenum (Mo)-Dissolved (mg/L)		<0.000050			
	Nickel (Ni)-Dissolved (mg/L)		<0.00050			
	Phosphorus (P)-Dissolved (mg/L)		<0.050			
	Potassium (K)-Dissolved (mg/L)		<0.10			
	Selenium (Se)-Dissolved (mg/L)		<0.00010			
	Silicon (Si)-Dissolved (mg/L)		<0.050			
	Silver (Ag)-Dissolved (mg/L)		<0.000010			
	Sodium (Na)-Dissolved (mg/L)		<0.050			
	Strontium (Sr)-Dissolved (mg/L)		<0.00020			
	Sulfur (S)-Dissolved (mg/L)		<0.50			
	Thallium (Tl)-Dissolved (mg/L)		<0.000010			
	Tin (Sn)-Dissolved (mg/L)		<0.00010			
	Titanium (Ti)-Dissolved (mg/L)		<0.010			
	Uranium (U)-Dissolved (mg/L)		<0.000010			
	Vanadium (V)-Dissolved (mg/L)		<0.0010			
	Zinc (Zn)-Dissolved (mg/L)		<0.0010			

* 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)
Matrix Spike	Silicon (Si)-Dissolved	MS-B	L1590448-1, -12, -3, -5, -7, -9
Matrix Spike	Sulfur (S)-Dissolved	MS-B	L1590448-1, -12, -3, -5, -7, -9
Matrix Spike	Molybdenum (Mo)-Dissolved	MS-B	L1590448-1, -12, -3, -5, -7, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1590448-1, -12, -3, -5, -7, -9
Matrix Spike	Total Organic Carbon	MS-B	L1590448-12, -5, -7, -9
Matrix Spike	Total Inorganic Carbon	MS-B	L1590448-1, -11, -12, -3, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1590448-1, -12, -3, -5, -7, -9
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L1590448-1, -12, -3, -5, -7, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1590448-1, -12, -3, -5, -7, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1590448-1, -12, -3, -5, -7, -9
Matrix Spike	Total Organic Carbon	MS-B	L1590448-1, -11, -3
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1590448-1, -12, -3, -5, -7, -9
Matrix Spike	Iron (Fe)-Dissolved	MS-B	L1590448-1, -12, -3, -5, -7, -9
Matrix Spike	Silicon (Si)-Dissolved	MS-B	L1590448-1, -12, -3, -5, -7, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1590448-1, -12, -3, -5, -7, -9
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L1590448-1, -12, -3, -5, -7, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1590448-1, -12, -3, -5, -7, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1590448-1, -12, -3, -5, -7, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1590448-1, -12, -3, -5, -7, -9
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L1590448-1, -12, -3, -5, -7, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1590448-1, -12, -3, -5, -7, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1590448-1, -12, -3, -5, -7, -9
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L1590448-1, -12, -3, -5, -7, -9
Matrix Spike	Total Kjeldahl Nitrogen	MSTN	L1590448-1, -12, -3, -5, -7, -9

Qualifiers for Individual Parameters Listed:

Qualifier	Description
CNP	Cyanide test sample appears to have been preserved, but pH was <10 at time of testing. Results may be biased low, particularly for Free CN species.
DLA	Detection Limit adjusted for required dilution
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

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-COL-VA	Water	Alkalinity by Colourimetric (Automated)	EPA 310.2

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

ALK-PCT-VA	Water	Alkalinity by Auto. 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.

ALK-PCT-VA	Water	Alkalinity by Auto. 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.

CARBONS-TIC-VA	Water	Total inorganic carbon by CO2 purge	APHA 5310 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 5310 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.

Reference Information

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-DIS-LOW-CVAFS-VA Water Dissolved Mercury in Water by CVAFS(Low) EPA SW-846 3005A & EPA 245.7

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 filtration (EPA Method 3005A) and involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry or atomic absorption spectrophotometry (EPA Method 245.7).

HG-TOT-LOW-CVAFS-VA Water Total Mercury in Water by CVAFS(Low) EPA 245.7

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 a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry or atomic absorption spectrophotometry (EPA Method 245.7).

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 3030 B&E / EPA SW-846 6020A

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using hotblock, or filtration (APHA 3030B&E). Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modified from EPA Method 6020A).

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 APHA 3030 B&E / EPA SW-846 6020A

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using hotblock, or filtration (APHA 3030B&E). Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modified from EPA Method 6020A).

Reference Information

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 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.

S2-T-COL-VA Water Total Sulphide by Colorimetric APHA 4500-S2 Sulphide

This analysis is carried out using procedures adapted from APHA Method 4500-S2 "Sulphide". Sulphide is determined using the methlyene blue colourimetric method.

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.

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L1590448-COFC

COC Number: 1 -

Page 1 of

Report To		Report Format / Distribution	Select Service Level Below (Rush Turnaround Time (TAT) is not available for all tests)
Company:	Hemmera Environchem Inc.	Select Report Format: ☑PDF ☑EXCEL ☐EDD (DIGITAL)	R ☑Regular (Standard TAT if received by 3 pm - business days)
Contact:	Natasha Sandys	Quality Control (QC) Report with Report ☑ Yes ☐ No	P ☐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 Select Distribution: ☑EMAIL ☐MAIL ☐FAX	E ☐Emergency (1-2 bus. days if received by 3pm) 100% surcharge - contact ALS to confirm TAT E2 ☐Same day or weekend emergency - contact ALS to confirm TAT and surcharge
Phone:	867-335-3235	Email 1 or Fax nsandys@hemmera.com, rmartinka@hemmera.com	Specify Date Required for E2,E or P:
		Email 2 chris@elr.ca	

Invoice To		Invoice Distribution	Analysis Request
	Same as Report To ☑ Yes ☐ No	Select Invoice Distribution: ☑EMAIL ☑MAIL ☐FAX	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below
	Copy of Invoice with Report ☐ Yes ☑ No	Email 1 or Fax nsandys@hemmera.com	
Company:	Hemmera Environchem Inc.	Email 2 chris@elr.ca	
Contact:	Natasha Sandys		

Project Information		Oil and Gas Required Fields (client use)	
ALS Quote #:	Q45623	Approver ID:	Cost Center:
Job #:	1343-005.06	GL Account:	Routing Code:
PO / AFE:		Activity Code:	
LSD:		Location:	

ALS Lab Work Order # (lab use only)

ALS Contact:

Sampler: RM,TJ,AN,JL

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, Fl, Sulfate, conductivity, pH, alkalinity	Anion Sum, Cation Sum, Cation/Anion Bala	Cyanide - Weak Acid Diss., Total, Free	Ammonia N (total), Total Organic Carbon	Thiocyanate (SCN)	Sulphide as S	Total Inorganic Carbon	Dissolved Alkalinity			Number of Containers
					F/P	F/P				P	P	P	P		F			
	MW09-18	20-Mar-15	16:10	Water	R	R	R	R	R	R	R	R	R	R	R			9
	MW09-19	20-Mar-15	13:45	Water	R	R	R	R	R	R	R	R	R	R	R			9
	CH-P-13-05-/50	20-Mar-15	12:40	Water	R	R	R	R	R	R	R	R	R	R	R			9
	DUP-1	20-Mar-15	13:45	Water	R	R	R	R	R	R	R	R	R	R	R			9
	DUP-2	20-Mar-15	12:40	Water	R	R	R	R	R	R	R	R	R	R	R			9
	Travel Blank	20-Mar-25		Water	R	R	R	R	R	R	R	R	R	R	R			9
	FB-3	20-Mar-25	16:10	Water	R	R	R	R	R	R	R	R	R	R	R			9

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

Are samples taken from a Regulated DW System? ☐ Yes ☑ No

Are samples for human drinking water use? ☐ Yes ☑ No

Special Instructions / Specify Criteria to add on report (client Use)

- See attached parameter sheet for full parameter list.

SAMPLE CONDITION AS RECEIVED (lab use only)

Frozen	☐			SIF Observations	Yes ☐	No ☐	
Ice packs	Yes ☐	No ☐		Custody seal intact	Yes ☐	No ☐	
Cooling Initiated	☐						

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
2.6	1.9				

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:
				23-MAR-15	9:35			

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

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

APPENDIX D

Response to Comments Received in Draft Report

Response to Comments Received in Draft Report (as Received May 7, 2015)

Comment No.	Page	Comment	Response
1	ii	This table was not labelled/titled	This has been adjusted
2	ii	This table was not labelled/titled	This has been adjusted
3	1	Not clear throughout document which wells were previously reported damaged and which were found to be damaged during March 2015 sampling event	Previously reported damaged wells have now been distinguished from newly reported damaged wells in Table 1-1. SOW lists 62 wells included in the March sampling event. This includes MP09-01 which was previously reported as destroyed. The document now reads 61 wells included in the March sampling event, with 4 wells excluded due to previously reported damage, blockage or destroyed.
4	5	Assume status is reported as good because sample was collected, but if this well requires repairs, condition should be noted in table	Status of well was changed to “damaged (new)” indicating the damage was first reported during the March field program.
5	5	For some of the damaged wells noted here, water level parameters and headspace gas concentrations were still measured and are discussed in this report	Two wells which were previously reported as damaged (MW09-01) or dry/damaged (CH-P-13-02/10) were included in the March sampling event. Headspace gas was measured at each of these locations and discussed within the report. Gas measurements for CH-P-13-03/10 and CH-P-13-04/35, excluded from the SOW due to previously reported damage or blockage, are not provided.
6	8	Does not align with reference in section 6.0, which is listed as Yukon Government, 2002.	Added reference specific to Protocol for the Contaminated Sites Regulation #7
7	12	See comment in Section 1.2 regarding clarification on damaged wells.	Wording has been revised to more accurately describe well status.
8	12	See comment in Section 1.2 regarding clarification on damaged wells. If measurements (i.e., water level parameters/headspace gas concentrations) were still possible, please note that in text.	Added summary information on wells where gas measurements were collected but groundwater samples were not obtained.
9	15	MW09-15 is noted as ‘Frozen” in Table 1-1?	MW09-15 was found frozen during the time of sampling. Previous DTB measurements were recorded as 37.9 m, DTB in March 2015 was recorded as 14.07 m. A few mm of standing water was recorded on top of the ice (this was the value listed in Table 3-2). That value has been removed to avoid confusion.
10	15	Not clear if this well is dry, damaged, or both.	CH-P-13-02/10 was found dry during the time of sampling. Bentonite was found present at the bottom of the well during previous sampling events and therefore the well status has been listed as dry/damaged throughout the report.

Comment No.	Page	Comment	Response
11	15	Frozen?	Yes. GSI-PC-02-B was recorded as frozen.
12	16	Not recorded? Criteria?	Purging criteria was not recorded for this well. Note has been added to Table 3-2.
13	16	Is this an accurate turbidity reading or is it contributed to the meter not functioning properly? Assumed erroneous because it's not recorded in Table A under field turbidity. Not noted in Section 3.2.6 or with respect to QA/QC. This is an extremely high value, should be spoken to somewhere in the report, whether erroneous or not.	Groundwater turbidity at sample site MW09-23 was out of range of instrument (>4000 NTU) and could not be properly quantified. This was a result of extremely turbid conditions and not a product of malfunctioning equipment. Although groundwater samples were obtained from this location, the well was found damaged in the field (the PVC is bent at the surface, presumably due to site grading). A note has been added to the results section indicating turbid conditions at this location.
14	17	Do the dark shaded cells (exceedences) account for hardness/pH adjusted guideline values for each site? By briefly looking at the data I have assumed yes; although could you clarify this in the text and/or in the table. It is just unclear if the formulas from the 'Page 6 of 6' of the tables has been applied or not. Instead of writing "varies" in the CCME column, could the range of adjusted values be provided instead?	Each of these hardness / pH dependent parameters has been checked against an adjusted guideline value for each site. Our agreed upon method with Josee previously was to note "varies" in the guideline column, but we would be open to other methods as well. I have revised the notes (#1) to indicated that each is compared against a site-specific standard value where relevant.
15	18	Specified here and in Table 1-1 as Frozen; but DTB and standing water measurements are recorded in Table 3-2?	MW09-15 was found frozen during the time of sampling. Previous DTB measurements were recorded as 37.9 m, DTB in March 2015 was recorded as 14.07 m. A few mm of standing water was recorded on top of the ice (this is the value listed in Table 3-2. This value has been removed to avoid confusion and the well has been marked as simply "frozen".
16	18	There was only one sample obtained from this area	Wording has been revised.
17	19	Six wells indicated as dry in Table 3-2. Not clear throughout report if CH-P-13-02/10 is dry or damaged?	Five (5) dry wells were found in the tailings facility area. CH-P-13-02/10 has been moved to section 3.2.3 (Brown McDade Pit). Status of CH-P-13-02/10 remains listed as dry/damaged.

Comment No.	Page	Comment	Response
18	19	Except for MW09-23, which was measured at >4,000 NTU in the field. If this was an erroneous measurement, consider removing from Table 3-2, with a note specifying as such. If value is to be considered an accurate measurement, needs to be discussed here.	Text in report has been revised.
19	19	Specify that it was still possible to collect a sample from this well	Text revised accordingly.
20	20	Were these data reviewed to determine potential sources of contamination or error?	ALS has indicated that this occurrence should not be considered an indication of contamination. Low concentrations of ammonia are occasionally found in travel blanks that are prepared too early in advance. Elevated potassium concentrations in travel blanks some potential contamination sourced from the environment. Details have been added to Section 3.3.1.
21	20	Please add clarity in terms of what this actually means; would like to see a sentence that speaks to why we have or don't have concerns with these results.	Details have been added to Section 3.3.1.
		See Comment Above	Details have been added to address this comment.
		For?	This sentence has been clarified.
22	22	Does this indicate damage, and is this why it is listed as such in Table 1-1?	Yes, CH-P-13-02/10 was found dry during the time of sampling. Bentonite was found present at the bottom of the well during previous sampling events and therefore the well status has been listed as dry/damaged throughout the report.