REPORT

Mount Nansen June 2015

Groundwater Monitoring and Sampling

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File: 1343-005.09
October 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 (the Site) in June, 2015. Hemmera/ELR's scope of work includes the monitoring of groundwater wells and collection of groundwater samples from a series of existing groundwater wells at the Site. This report summarizes the monitoring and sampling activities, a description of methodologies and field conditions encountered, a summary of field *in-situ* and laboratory analytical results including a comparison to applicable guidelines, a description of any observations or occurrences that may have influenced program results, and recommendations relating to sample procedures and monitoring well conditions. This report does not provide an interpretation of the results, nor does it provide recommendations relating to groundwater quality at the Site.

1.1 SITE LOCATION

The Mount Nansen Site (the Site) is located approximately 45 kilometres (km) west of the Village 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 June 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

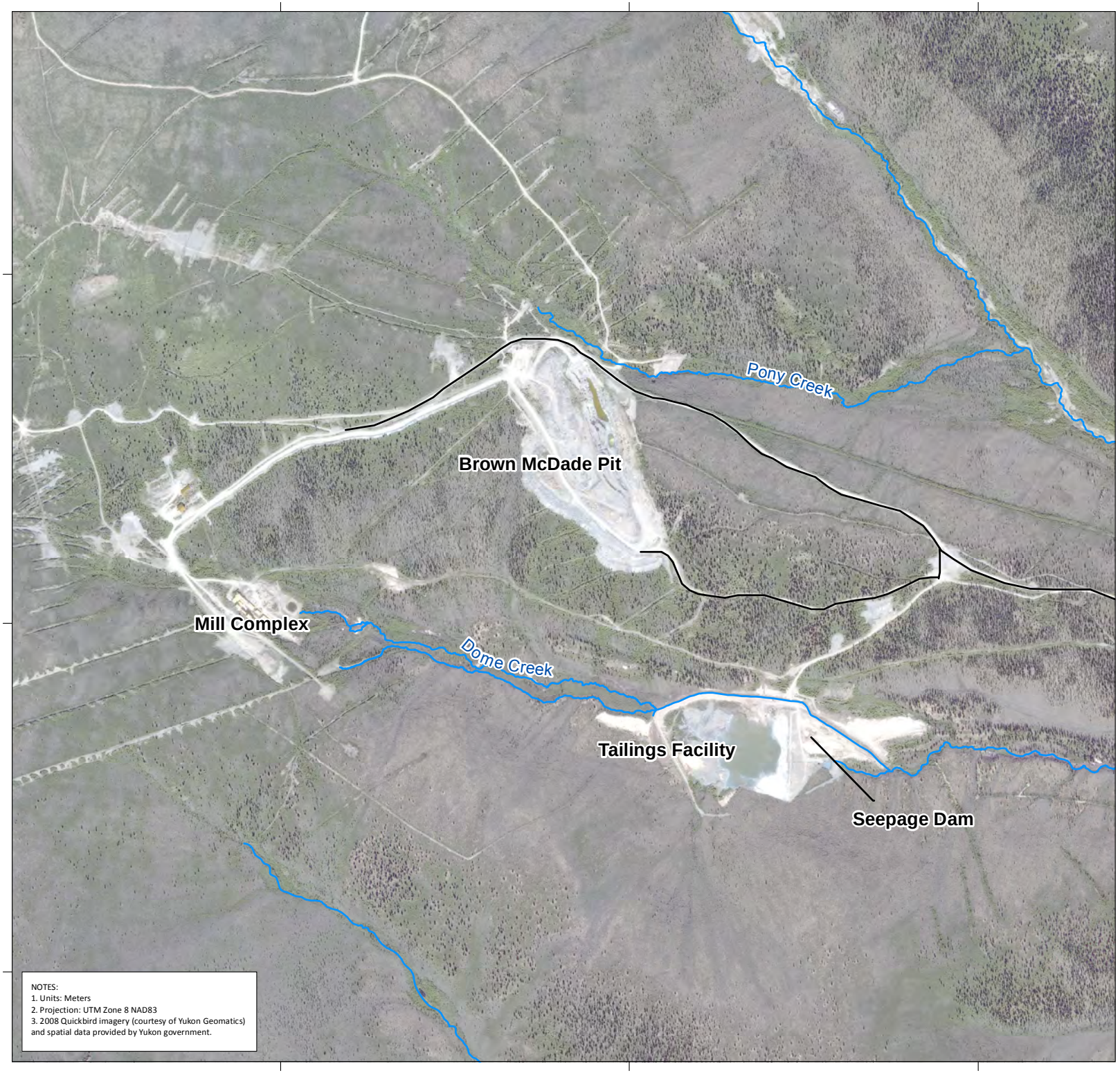
The scope of work for this program included the coordination and execution of the June groundwater monitoring and sampling, analysis of groundwater samples, and the presentation of results in a report.

Groundwater sampling at the Site was conducted over a four (4) day period, between June 1 and 4, 2015. Sampling was conducted by a team of four (4) qualified field staff from Hemmera/ELR (Rusto Martinka, Jarrod Coburne, Aaron Nicholson, and Michelle McKay). A total of 65 groundwater wells were included in the June sampling event (**Table 1-1**). It was not possible to sample two (2) of the groundwater wells listed in the scope of work as both wells were previously destroyed (MP09-01 and GSI-PC-01-B). Four (4) of the remaining 63 groundwater wells assessed were known to be difficult to sample, as noted during previous sampling events; two (2) were reported as damaged (CH-P-13-03/10 and MW09-01), one (1) reported as blocked (CH-P-13-04/35), and one (1) reported as dry and damaged (CH-P-13-02/10). Part of Hemmera/ELR's June 2015 scope of work was to further investigate these wells using a down-well camera.

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 June monitoring and sampling event were grouped into six (6) main areas of the Mount Nansen Site (**Table 1-1**). The majority of groundwater wells were located around existing infrastructure including the tailings facility, and seepage dam (25 wells), the Brown McDade Pit (13 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 (9 wells). **Table 1-1** provides the location, status, and sample recovery for groundwater wells included in the June sampling program. The well locations are also illustrated in **Figures 1-2** and **1-3**. Photographs of each sample site visited in June are included in **Appendix A**.



Mount Nansen Site
June 2015 Groundwater Monitoring Program

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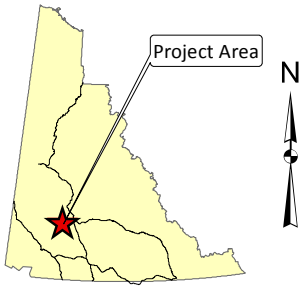
Legend

Watercourses



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250 125 0 250
Meters

October 8, 2015

Hemerra Project: 1343-005.09
ELR Project: 15-200.1

FIGURE 1-1
Site Location - Mount Nansen Site

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

Area	Well Name	UTM (Zone 08N)		Status[1,2]	Sample Collected	QA/QC Sample Collected
		Easting	Northing			
Dome Creek	GSI-DC-01B	387675	6881124	Dry	-	-
	GSI-DC-02B	387879	6881129	Frozen	-	-
	GSI-DC-03B	388107	6881079	Frozen	-	-
	GSI-DC-05B	388725	6880836	Frozen	-	-
	GSI-DC-06B	389788	6880567	Frozen	-	-
	GSI-DC-07B	390065	6880641	Frozen	-	-
	GSI-DC-08-B	390311	6880583	Frozen	-	-
	GSI-DC-09-B	390614	6880494	Frozen	-	-
	GSI-DC-10-B	390859	6880447	Frozen	-	-
Mill Complex	GSI-HA-01A	387842	6881132	Direct Sampled[1]	✓	-
	GSI-HA-02A	387861	6881135	Direct Sampled[1]	✓	-
	GSI-HA-03A	387878	6881131	Direct Sampled[1]	✓	-
	GSI-HA-04A	387916	6881130	Frozen	-	-
	GSI-HA-05A	387898	6881125	Direct Sampled[1]	✓	-
	MW09-16	387992	6881094	Good	✓	Duplicate
	MW09-17	388075	6880970	Good	✓	-
	MW09-18	388054	6880986	Good	✓	-
	MW09-19	388051	6881016	Good	✓	Field Blank
Brown McDade Pit	CH-P-13-01/10	388657	6881116	Frozen	-	-
	CH-P-13-03/10	389145	6881105	Frozen[2]	-	-
	CH-P-13-03/50	389143	6881110	Insufficient Volume	-	-
	CH-P-13-04/10	389138	6881472	Frozen	-	-
	CH-P-13-04/35	389138	6881472	Frozen[2]	-	-
	CH-P-13-05/50	388954	6881466	Good	✓	-
	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[2]	-	-
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	Direct Sampled[1]	✓	-
	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	-	-

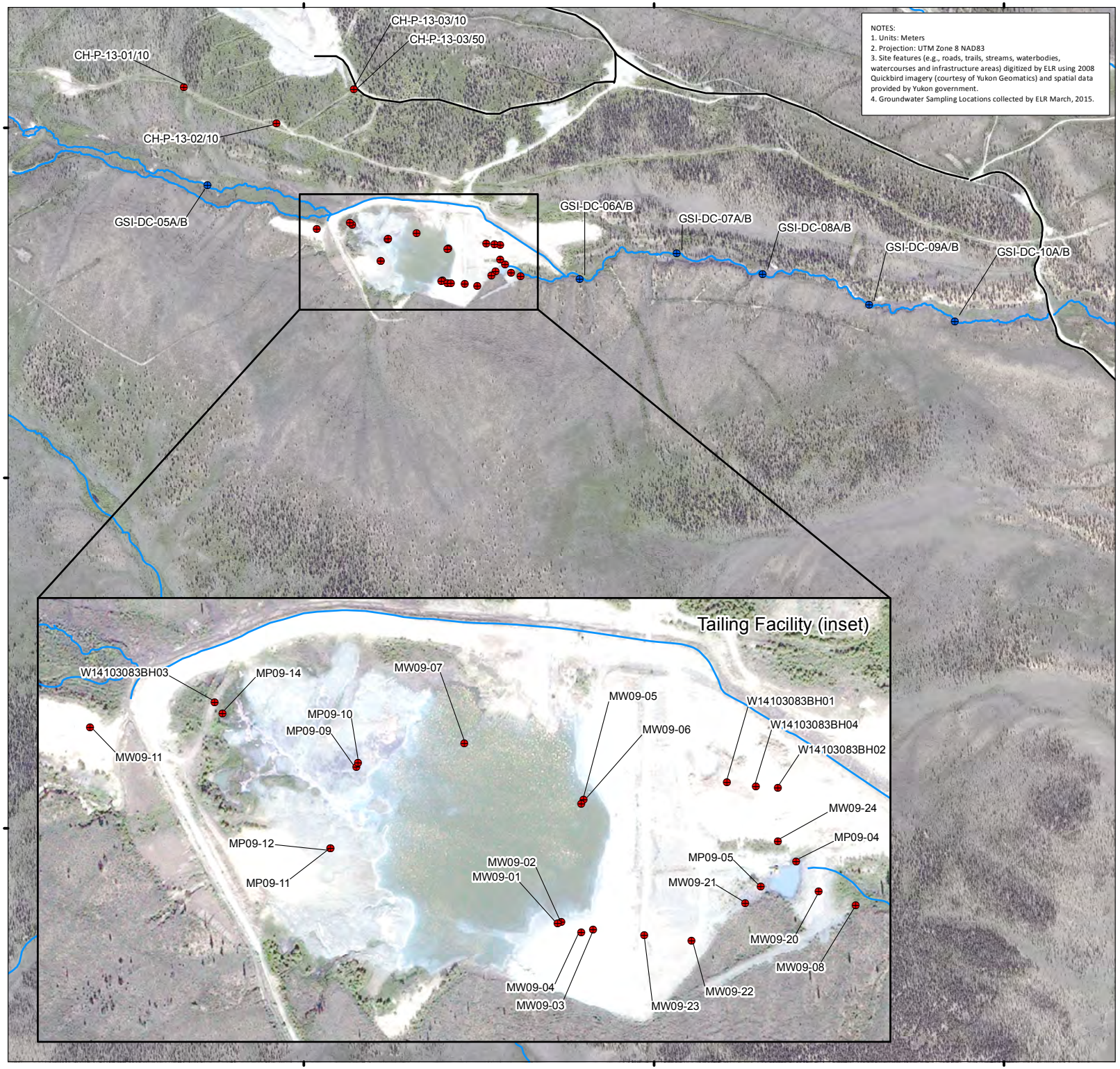
Area	Well Name	UTM (Zone 08N)		Status[1,2]	Sample Collected	QA/QC Sample Collected
		Easting	Northing			
Seepage Dam	W14103083BH01	389522	6880669	Frozen	-	-
	W14103083BH02	389561	6880665	Frozen	-	-
	W14103083BH04	389544	6880666	Frozen	-	-
Tailings Facility	MP09-04	389575	6880609	Frozen	-	-
	MP09-05	389548	6880590	Good	✓	Duplicate, Field Blank
	MP09-09	389240	6880681	Good	✓	-
	MP09-10	389241	6880684	Frozen	-	-
	MP09-11	389220	6880619	Good	✓	-
	MP09-12	389220	6880619	Frozen	-	-
	MP09-14	389138	6880722	Direct Sampled[1]	✓	-
	MW09-01	389396	6880563	Damaged[2]	✓	-
	MW09-02	389393	6880562	Good	✓	-
	MW09-03	389411	6880555	Good	✓	-
	MW09-04	389420	6880557	Good	✓	Duplicate, Field Blank
	MW09-05	389413	6880656	Dry	-	-
	MW09-06	389411	6880653	Good	✓	-
	MW09-07	389322	6880699	Dry	-	-
	MW09-08	389620	6880576	Good	✓	-
	MW09-11	389037	6880711	Dry	-	-
	MW09-20	389592	6880586	Dry	-	-
	MW09-21	389536	6880577	Frozen	-	-
	MW09-22	389495	6880549	Good	✓	Field Blank
	MW09-23	389459	6880553	Damaged	✓	-
	MW09-24	389561	6880624	Good	✓	-
	W14103083BH03	389132	6880730	Good	✓	-

Notes:

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

[2] Groundwater wells previously reported as damaged (MW09-01 and CH-P-13-03/10), dry/damaged (CH-P-13-02/10), or blocked (CH-P-13-04/35) were investigated during the June 2015 sampling event using a down well camera. Further information regarding the status of damaged wells is provided in **Section 3.2.**

[3] Destroyed wells are included in the scope of work and are therefore listed above in the summary table. These wells are not further discussed in this report.



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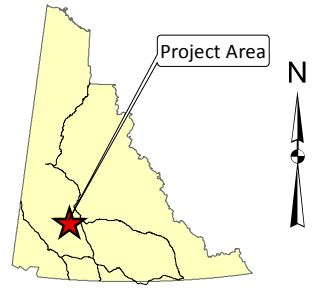
Legend

- Drive Point
- Monitoring Well
- Watercourses



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October 8, 2015

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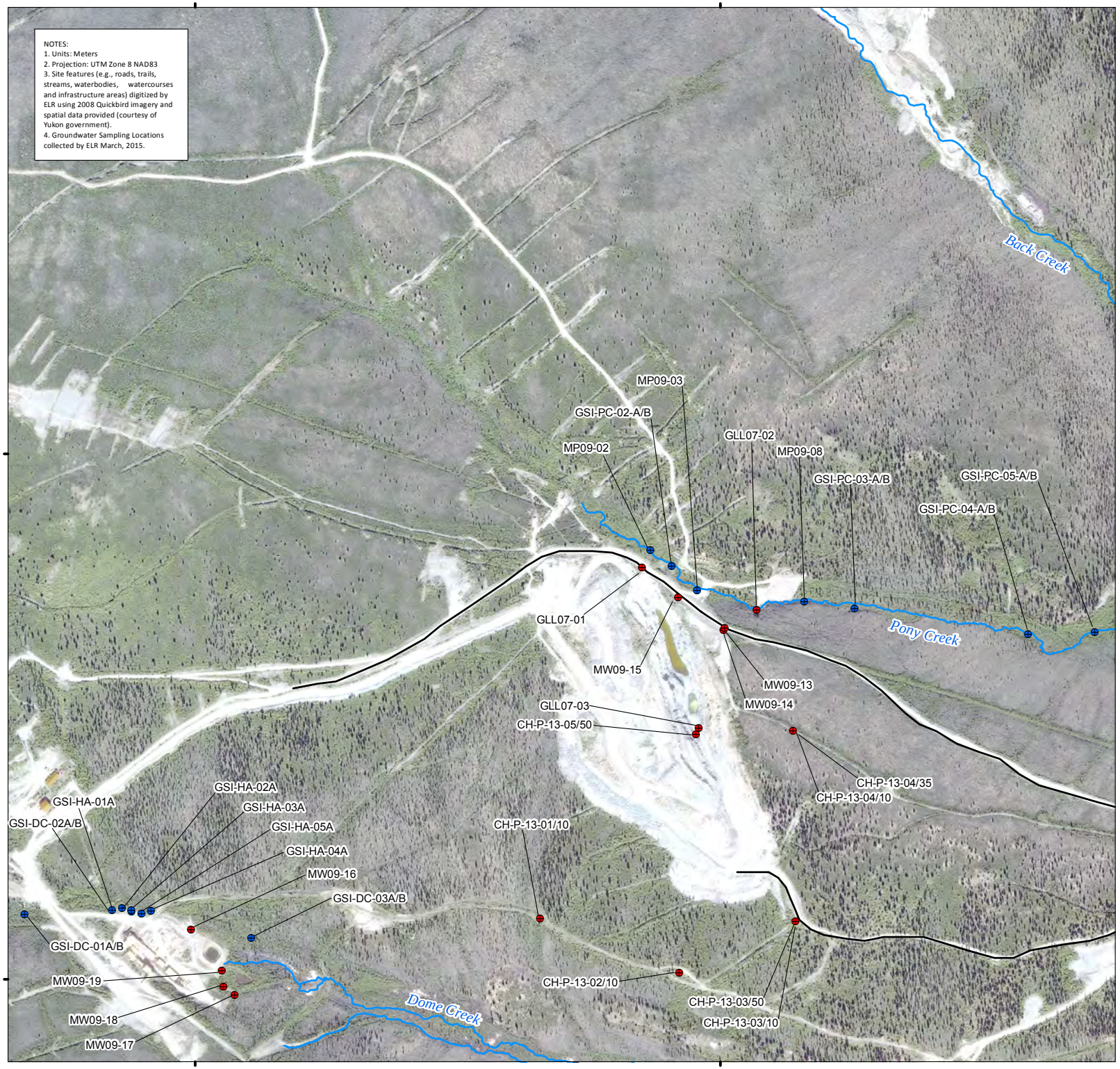
ELR Project: 15-200.1

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



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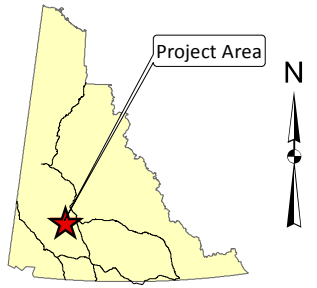

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October 8, 2015

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ELR Project: 15-200.1

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 were completed in accordance with the Groundwater Sampling Standard Operating Procedures included in the document *Scope of Work: Groundwater Sampling Program – Mount Nansen Site 2015*. 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 Solinst – Model 122 Interface Meter (for wells with diameter greater than 2.54 cm). DTB and DTW were measured from (in order of preference): 1) a black mark drawn on the top of the well; 2) the bottom of the most significant notch found on the top of the PVC if a mark was not present; or 3) a line that was drawn on the highest point of the well if no distinguishable point of measure was present. Stick-up height was measured from the lowest point on the bottom of the well casing to the highest point (or distinguishing mark) on the well. Water level meters were cleaned between each sample site using Alconox low-foaming phosphate-free detergent solution and deionized water.

Following initial inspection and measurements, groundwater wells were purged and sampled using dedicated equipment. Groundwater wells were purged and sampled using one of two (2) techniques: 1) manual purging using high density polyethylene (HDPE) Waterra tubing and a 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 2.4**) and was used as an indication of sample quality. Where possible, samples were not collected until turbidity was less than 50 NTU. Purge volumes and purge rates were measured using a graduated container and stop watch. All well measurements, purging details, and additional field notes were recorded on customized field forms in order to minimize the potential for field errors; this information is presented in **Table 3-2**.

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 of groundwater 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, which was followed during the June 2015 sampling event. At all of the wells previously identified as having insufficient volume of water, Hemmera/ELR direct sampled (analytical samples collected prior to purging or collecting field parameter measurements), after which time field parameter measurements were collected if possible. Additionally, a priority ranking order for analytical sample collection previously established by AAM's consultant (AMEC) was used when collected samples at directly sampled wells (as summarized in **Table 2-2**). This ranking system is used to ensure that samples for higher priority parameters were collected at each well if limited recharge or volume was encountered. Where sample collection was limited, Hemmera/ELR also re-visited wells where feasible to in an attempt to collect a more thorough sample set.

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 a YSI Professional Plus field meter or YSI 556 Handheld Multiparameter Instrument, Lamotte 2020we turbidity meters, and Hach DR 890 Portable Colorimeters. Flow-through cells were used with the YSI 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. The final set of in situ measurements were 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 dissolved alkalinity sample was added to each bottle set during this event. Field filtering was used to remove any acid or alkaline-generating solids that are not representative of an equilibrium condition (and that could have affected alkalinity results). Field filtered and unfiltered alkalinity results were then compared to test whether unfiltered results were representative (equivalent to filtered results). For this, a threshold of 20% Relative Percent Difference (RPD) was used, as described in **Section 2.8.2** below.

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	200 ml	-	-
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	120 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 DOWN WELL CAMERA INVESTIGATIONS

As agreed to with AAM, four (4) groundwater wells previously reported as damaged (MW09-01 and CH-P-13-03/10), dry/damaged (CH-P-13-02/10), or blocked (CH-P-13-04/35) were investigated during the June 2015 sampling event using a down-well camera. Wells five centimeters (5 cm) in diameter were investigated using an Insight Vision Digital Express D2 Sewer Camera. The camera had a built-in LED light ring that illuminated the pipe being inspected and allowed for recording of both video and digital imagery. Groundwater well CH-P-04/35 which had a narrower diameter of 3.8 cm was investigated using a smaller diameter illuminated camera with digital display. The results of these investigations are provided in **Section 3.2.**

2.7 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**.

2.8 QUALITY ASSURANCE AND QUALITY CONTROL

2.8.1 Field QA/QC

Several controls were used by Hemmera/ELR staff while in the field to ensure that sample integrity was maintained and that data were recorded completely and accurately. All equipment used during the sampling process was dedicated to individual wells, including HDPE tubing and Waterra footvalves, laboratory provided pre-cleaned sample bottles, disposable filters, 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.

2.8.2 Analytical QA/QC

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

The variation between sample and duplicate 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

A summary of laboratory analytical results is 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 presented in **Table B**, including analytical data for duplicates, field blanks, and travel blanks. Laboratory analytical reports are appended to this report (**Appendix C**).

3.1 GROUNDWATER SAMPLING SUMMARY

Groundwater sampling was completed between June 1 and 4, 2015. Weather conditions varied throughout the time of sampling with ambient air temperature ranging from 5 to 20°C.

Of the 65 wells specified for the June 2015 sampling event, 63 were located and assessed during the June program. The other two (2) groundwater wells listed in the scope of work that had previously been reported as destroyed, and not repairable, are not further discussed in this report (GSI-PC-01-B and MP09-01).

Of the 63 wells located, twenty-four (24) wells were sampled; eighteen (18) using purging and sample methods as per the program protocols, and six (6) sampled directly without purging according to the sample priority ranking. In five (5) of the six (6) direct sampled wells, volumes were insufficient to collect a full sample set. **Table 3-1** provides a summary of sample success.

Of the remaining 39 of 63 wells assessed but not sampled during the program, 30 wells were frozen, seven (7) wells were dry, one (1) well had insufficient volume for sampling, 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 all 39 of these wells (as specified in **Table 3-2**). 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 June 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-HA-01A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
GSI-HA-02A	✓	✓	-	-	-	-	-	-	-	-
GSI-HA-03A	✓	✓	-	-	-	-	-	-	-	-
GSI-HA-05A	✓	-	-	-	-	-	-	-	-	-
MW09-16	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
MW09-17	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
MW09-18	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
MW09-19	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
CH-P-13-05/50	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
GSI-PC-03B	✓	✓	✓	✓	✓	-	-	-	-	-
MP09-05	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
MP09-09	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
MP09-11	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
MP09-14	✓	✓	-	-	-	-	-	-	-	-
MW09-01	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
MW09-02	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
MW09-03	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
MW09-04	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
MW09-06	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
MW09-08	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
MW09-22	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
MW09-23	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
MW09-24	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
W14103083BH03	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

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 June 2015 Sampling Program

Area	Location ID	Sample Date	Stick up Height (m)	Depth To Water (m)	Depth to Bottom (m)	Standing Water Volume (L)	Volume Purged (L)	Purge Start Time	Purge End Time	Elapsed Purge Time	Purge Rate (l/min)	Criteria[1] (3WV/PS/DS)	Draw Down (m)	pH	Temperature (°C)	Conductivity (µS/cm)	Specific Conductivity (µS/cm)	ORP (mV)	Dissolved Oxygen (mg/L)	Dissolved Sulphide (mg/L)	Methane (%LEL)	Oxygen (%)	Carbon Dioxide (ppm)	Field Turbidity (NTU)	Method Used	Well Diameter (cm)[6]
Dome Creek	GSI-DC-01A	01/06/2015	0.92	Dry	1.306	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.6	570	-		1.3
	GSI-DC-01B	01/06/2015	0.94	Dry	1.611	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.6	0	-		1.3
	GSI-DC-02A	01/06/2015	0.86	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	650	-		1.3
	GSI-DC-02B	01/06/2015	0.94	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	540	-		1.3
	GSI-DC-03A	02/06/2015	0.05	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	600	-		1.3
	GSI-DC-03B	02/06/2015	0.12	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.5	950	-		1.3
	GSI-DC-05A	03/06/2015	0.64	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.6	480	-		1.3
	GSI-DC-05B	03/06/2015	0.113	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.6	1200	-		1.3
	GSI-DC-06A[2]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-		-
	GSI-DC-06B	04/06/2015	0.53	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.5	460	-		1.3
	GSI-DC-07A	04/06/2015	0.97	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	710	-		1.3
	GSI-DC-07B	04/06/2015	0.95	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.6	500	-		1.3
	GSI-DC-08A	04/06/2015	0.95	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.4	0	-		1.3
	GSI-DC-08B	04/06/2015	0.31	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.4	80	-		1.3
	GSI-DC-09A	04/06/2015	1.06	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.4	1060	-		1.3
	GSI-DC-09B	04/06/2015	-	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.4	510	-		1.3
	GSI-DC-10A	04/06/2015	1.06	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.5	0	-		1.3
	GSI-DC-10B	04/06/2015	0.98	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.4	0	-		1.3
Mill Complex	GSI-HA-01A	02/06/2015 13:50	1.20	2.391	3.121	0.090	-	-	-	-	-	DS	-	7.15	5.2	688	1106	-40.2	-	-	0	20.6	570	-	peristaltic	1.3
	GSI-HA-02A[3]	01/06/2015 15:30	0.26	1.891	2.409	0.007	-	-	-	-	-	DS	-	-	-	-	-	-	-	-	0	20.6	600	-	peristaltic	1.3
	GSI-HA-03A[3]	01/06/2015 16:15	0.97	0.942	1.355	0.007	-	-	-	-	-	DS	-	-	-	-	-	-	-	-	0	20.9	480	-	peristaltic	1.3
	GSI-HA-04A	01/06/2015	0.61	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.6	650	-		1.3
	GSI-HA-05A[3]	01/06/2015 16:45	1.03	1.015	1.481	0.006	-	-	-	-	-	DS	-	-	-	-	-	-	-	-	0	20.9	480	-	peristaltic	1.3
	MW09-16	01/06/2015 18:00	1.31	1.830	2.745	1.8	6.0	17:33	18:08	0:35	0.17	PS	0	6.75	5.0	1257	2036	128.7	0.05	0	0	19.5	3160	0.89	peristaltic	5.0
	MW09-17	02/06/2015 11:35	0.99	4.949	5.711	1.5	5.5	11:05	11:30	0:25	0.22	PS	0	6.92	1.2	1572	2884	84.0	0.86	0.07	0	8.0	320	0.02	peristaltic	5.0
	MW09-18	02/06/2015 10:10	0.88	4.598	7.799	6.4	7.0	9:32	10:07	0:35	0.20	PS	0.08	6.94	1.4	1495	2700	66.2	0.52	0.01	0	20.6	870	0.51	peristaltic	5.0
	MW09-19	02/06/2015 8:30	1.08	2.565	5.885	6.6	7.0	7:59	8:30	0:31	0.23	PS	0.60	6.77	0.7	1344	2507	-86.8	1.14	0.05	0	20.5	760	0.22	peristaltic	5.0

Area	Location ID	Sample Date	Stick up Height (m)	Depth To Water (m)	Depth to Bottom (m)	Standing Water Volume (L)	Volume Purged (L)	Purge Start Time	Purge End Time	Elapsed Purge Time	Purge Rate (l/min)	Criteria[1] (3WV/PS/DS)	Draw Down (m)	pH	Temperature (°C)	Conductivity (µS/cm)	Specific Conductivity (µS/cm)	ORP (mV)	Dissolved Oxygen (mg/L)	Dissolved Sulphide (mg/L)	Methane (%LEL)	Oxygen (%)	Carbon Dioxide (ppm)	Field Turbidity (NTU)	Method Used	Well Diameter (cm)[6]
Brown McDade Pit	CH-P-13-01/10	01/06/2015	0.52	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.4	0	-		3.8
	CH-P-13-03/10	01/06/2015	0.69	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.3	300	-		3.8
	CH-P-13-03/50	04/06/2015	0.58	50.224	50.600	0.191	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.1	0	-		2.5
	CH-P-13-04/10	01/06/2015	0.65	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.4	0	-		3.8
	CH-P-13-04/35	01/06/2015	0.70	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.4	0	-		2.5
	CH-P-13-05/50	02/06/2015 17:00	0.79	29.585	50.310	10.5	30.0	16:36	16:55	0:19	1.58	PS	-	6.19	2.9	1682	2912	121.6	3.17	1.77	0	20.4	0	118	waterra	2.5
	GLL07-01	01/06/2015	0.80	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.3	0	-		5.0
	GLL07-02	03/06/2015	1.37	Dry	7.094	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.4	0	-		15.2
	GLL07-03	01/06/2015	1.11	Dry	11.652	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	19.8	0	-		5.0
	MW09-13	01/06/2015	0.76	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.4	0	-		5.0
	MW09-14	01/06/2015	0.74	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.4	0	-		5.0
	MW09-15	01/06/2015	0.9	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.4	0	-		5
	CH-P-13-02/10	01/06/2015	0.63	Dry	8.202	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.4	0	-		3.8
Pony Creek	GSI-PC-02A	03/06/2015	0.9	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.3	0	-		1.3
	GSI-PC-02B	03/06/2015	0.905	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.3	0	-		1.3
	GSI-PC-03A	03/06/2015	0.93	1.131	1.354	0.028	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.2	0	-		1.3
	GSI-PC-03B	04/06/2015 17:41	0.95	1.008	2.798	0.227	-	-	-	-	-	DS	-	-	-	-	-	-	-	-	0	20.2	0	-	peristaltic	1.3
	GSI-PC-04A	03/06/2015	0.9	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.4	0	-		1.3
	GSI-PC-04B	03/06/2015	0.9	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.4	0	-		1.3
	GSI-PC-05A	03/06/2015	0.87	Dry	1.127	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.4	0	-		1.3
	GSI-PC-05B	03/06/2015	0.9	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	19.8	890	-		1.3
	MP09-02	03/06/2015	1.12	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.4	0	-		1.3
	MP09-03	03/06/2015	0.8	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.4	0	-		1.3
	MP09-08	03/06/2015	0.99	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.4	0	-		1.3
Seepage Dam	W14103083BH01	03/06/2015	0.635	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	620	-		5
	W14103083BH02	03/06/2015	0.79	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	460	-		5.0
	W14103083BH04	03/06/2015	0.795	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	840	-		5.0

Area	Location ID	Sample Date	Stick up Height (m)	Depth To Water (m)	Depth to Bottom (m)	Standing Water Volume (L)	Volume Purged (L)	Purge Start Time	Purge End Time	Elapsed Purge Time	Purge Rate (l/min)	Criteria[1] (3WV/PS/DS)	Draw Down (m)	pH	Temperature (°C)	Conductivity (µS/cm)	Specific Conductivity (µS/cm)	ORP (mV)	Dissolved Oxygen (mg/L)	Dissolved Sulphide (mg/L)	Methane (%LEL)	Oxygen (%)	Carbon Dioxide (ppm)	Field Turbidity (NTU)	Method Used	Well Diameter (cm)[6]
Tailings Facility	MP09-04	04/06/2015	1.205	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.6	620	-		3.8
	MP09-05	03/06/2015 17:45	1.114	1.437	1.670	1.3	4.5	17:23	17:43	0:20	0.23	PS	0.05	6.66	2.7	1361	2369	-46.9	0.07	0	0	20.9	500	1.87	peristaltic	3.8
	MP09-09	04/06/2015 8:05	2.451	3.591	5.634	4.1	5.0	11:00	11:36	0:36	0.14	PS	-	9.31	1.5	388	707	80.5	0.79	0.36	0	20.9	430	45.86	bailer	3.2
	MP09-10	02/06/2015	2.163	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	450	-		3.2
	MP09-11	04/06/2015 9:10	1.807	2.308	4.971	2.9	6.0	12:18	12:56	0:38	0.16	PS	-	7.65	1.4	454	818	-126.4	3.14	1.26	0	20.9	500	159.00	bailer	3.2
	MP09-12	02/06/2015	1.831	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	510	-		3.2
	MP09-14[4]	02/06/2015 14:50	0.96	1.089	1.609	0.3	-	-	-	-	-	DS	-	-	-	-	-	-	-	-	0	20.5	570	-	peristaltic	2.5
	MW09-01	03/06/2015 12:15	0.82	7.147	9.060	4.0	3.0	11:05	11:22	0:17	0.18	PS	-	7.13	4.8	1731	2821	-11.5	1.78	2.20	0	20.4	0	2643	bailer	3.8
	MW09-02	02/06/2015 10:20	0.7	3.137	4.715	3.2	5.75	9:46	10:18	0:32	0.18	PS	0.90	7.18	3.9	1753	2934	-87.3	0.48	0.02	0	20.4	0	5.29	peristaltic	5.0
	MW09-03	02/06/2015 15:10	0.42	6.924	9.93	6.0	7.0	14:27	15:00	0:33	0.21	PS	0.23	7.21	3.2	1557	2666	12.4	0.22	0.03	0	20.3	0	0.77	peristaltic	5.0
	MW09-04	02/06/2015 13:50	0.38	4.631	7.675	6.0	6.0	13:05	13:45	0:40	0.15	PS	1.10	8.03	4.3	1640	2706	32.7	0.29	0.07	0	20.3	0	2.43	peristaltic	5.0
	MW09-05	03/06/2015	1.097	Dry	7.552	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	9.6	6430	-		5.0
	MW09-06	03/06/2015 13:55	1.996	3.055	6.020	5.9	6.0	14:09	14:42	0:33	0.18	PS	0.26	7.44	5.7	1354	2135	108.6	0.05	0.09	0	20.5	700	18.41	peristaltic	5.0
	MW09-07	03/06/2015	1.359	Dry	3.404	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.4	810	-		5.0
	MW09-08	04/06/2015 13:10	1.113	1.281	3.897	5.2	9.8	12:12	13:02	0:50	0.20	PS	0.08	6.67	2.3	197	349	-96.0	0.06	0.02	0	20.9	730	2.14	peristaltic	5.0
	MW09-11	02/06/2015	0.825	Dry	4.910	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.5	1700	-		5.0
	MW09-20	04/06/2015	0.923	Dry	3.684	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	950	-		5.0
	MW09-21	03/06/2015	0.744	Frozen	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	460	-		5.0
	MW09-22[4]	04/06/2015 10:10	0.889	4.531	5.267	1.4	1.0	16:17	16:22	0:05	0.20	PS	-	6.25	3.4	991	1674	17.7	0.26	0.07	0	20.6	2350	12.60	peristaltic	5.0
	MW09-23[4]	04/06/2015 8:20	0.17	12.748	15.890	6.0	20.0	13:06	13:25	0:19	1.05	PS	-	6.90	0.9	1180	2189	-51.3	2.47	0.64	0	20.4	0	66.00	waterra	5.0
	MW09-24	04/06/2015 14:40	0.64	9.540	11.190	3.3	20.0	11:43	11:54	0:11	1.82	PS	-	7.03	0.7	499	933	121.1	8.27	0.04	0	20.4	200	7.06	bailer	5.0
	W14103083BH03	03/06/2015 8:45	0.75	1.621	-	0.5	5.0	8:23	8:58	0:35	0.14	PS	0.50	6.88	2.1	683	1215	66.7	5.15	0.05	0	20.9	530	2.18	peristaltic	5.0

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

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

[2] Field measurements for groundwater well GSI-DC-06A were not collected during the June 2015 sampling event.

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

[4] Samples were collected following a period of recharge, typically the day following the well dry. Drawdown is not recorded in this situation.

* 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 or underperforming wells, are also discussed.

In several instances, the reported laboratory reportable detection limits (RDL) for parameters exceeded applicable CCME FAL standards (lightly shaded values in **Table A**). In these cases, samples having elevated levels of certain parameters required laboratory dilution 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 greater than the applicable guideline have not been reported as CCME FAL exceedances.

3.2.1 Dome Creek

Groundwater wells along Dome Creek were monitored between June 2 and June 4, 2015. No samples were obtained from the nine (9) drive-point piezometers located in this area. Sample site GSI-DC-01B was found dry at the time of sampling. Sample sites GSI-DC-02B, GSI-DC-03B, GSI-DC-05B, GSI-DC-06B, GSI-DC-07B, GSI-DC-08B, GSI-DC-09-B and GSI-DC-10B were found frozen during the time of sampling. A summary of field measurements, including headspace gases, is provided in **Table 3-2**.

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. Deeper wells (B wells) are improperly sealed with a plastic bag and elastic band.

3.2.2 Mill Complex

Groundwater in the Mill Complex Area was sampled on June 1 and June 2, 2015. Samples were obtained from five (5) of the nine (9) wells identified in this area. Sample site GSI-HA-04A was found frozen at the time of sampling. Drive-points GSI-HA-01A, GSI-HA-02A, GSI-HA-03A, and GSI-HA-05A 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 fluoride, as well as dissolved arsenic, copper, iron and zinc 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 June 1 and June 4, 2015. Samples were obtained from one (1) of the 13 sample sites located within this area (CH-P-13-05/50). Eight (8) wells were frozen during the time of sampling (CH-P-13-01/10, CH-P-13-03/10, CH-P-13-04/10, CH-P-13-04/35, 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 and/or damaged, and one well (CH-P-13-03/50) had insufficient water 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. Field pH was also less than CCME FAL guidelines in this area. Concentrations of fluoride, as well as dissolved arsenic, copper, iron and zinc exceeded the CCME FAL guidelines at this sample location.

Groundwater at sample location CH-P-13-05/50 was extremely turbid (118 NTU) during the time of sampling (**Table 3-2**).

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 may have influenced *in-situ* gas concentrations.

CH-P-13-02/10 was found dry during the time of sampling. During previous sample events, bentonite was found present at the bottom of the well and therefore the well status had been listed as dry/damaged. The well was further investigated during the June 2015 sampling event using a camera. Camera footage obtained at this location confirmed the presence of bentonite and filter pack (filter sand) at the bottom of well. Bentonite was also observed seeping into the well from the top portion of the well screen. The bottom portion of well screen appears to be free of bentonite seepage, presumably due to presence of water (i.e. previous groundwater flow has cleaned/cleared the lower portion of the screen). Based on these observations, it appears as though the influx of bentonite into the well may be the result of improper well installation or movement of the well over time. The well may not be salvageable.

Sampling location CH-P-13-03/10 was also investigated using a camera during June 2015 sampling event. During a previous sampling program, the upper PVC stick-up of this well was observed as being detached from the casing, allowing sand/filter pack material to drain into the well. Camera footage obtained at this site has confirmed the presence of sand at the bottom of the well. Filter pack/sand was located inside monument, approximately 2 ft. up the side of the PVC. The well stick up was repaired in Fall 2014 using a primer and glue (designed for PVC) to re-secure the PVC stick up to the well casing, but it was not possible to clean out the sand pack material at that time.

Sampling location CH-P-13-04/35 was also investigated using a camera during June 2015 sampling event. This well had been recorded as “blocked” in previous sampling events. Camera investigations of the well confirmed that the blockage was ice. The status of CH-P-04/35 has been revised to “frozen”.

3.2.4 Pony Creek

Groundwater wells along Pony Creek were monitored between June 3 and June 4, 2015. Samples were obtained from one (1) of the seven (7) sample sites in this area during the sampling event. The six (6) remaining wells located within this area were found frozen during the time of sampling (GSI-PC-02B, GSI-PC-04B, GSI-PC-05B, MP09-02, MP09-03, and MP09-08).

Drive-point GSI-PC-03B was sampled directly without purging. Concentrations of dissolved arsenic, iron and uranium exceeded the CCME FAL guidelines at this sample location (GSI-PC-03B).

Monitoring wells MP09-08 and MP09-03 were not sealed properly, which may have influenced *in-situ* gas concentrations.

3.2.5 Seepage Dam

Groundwater wells in the Seepage Dam area were monitored on June 3, 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 frozen during the time of sampling.

Monitoring wells located in the Seepage Dam area were not properly sealed, which may 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 June 2 and June 4, 2015. Samples were obtained from 14 of the 22 sample sites located in this area (MP09-05, MP09-09, MP09-11, MP09-14, MW09-01, MW09-02, MW09-03, MW09-04, MW09-06, MW09-08, MW09-22, MW09-23, MW09-24, and W14103083BH03).

Four (4) wells were frozen during the time of sampling (MP09-04, MP09-10, MP09-12, and MW09-21), and four (4) were dry (MW09-05, MW09-07, MW09-11 and MW09-20). Of the 14 samples collected within this area, one (1; MP09-14) was collected directly without purging. A summary of the samples collected is provided in **Table 3-1**.

Where measured, field dissolved oxygen concentrations were less than the CCME FAL guideline at all sample sites located within this area. Both field and laboratory pH measurements were recorded both less than and greater than the CCME FAL guideline at one or more sample location within this area.

Concentrations of fluoride, total ammonia, nitrite, free cyanide, as well as dissolved arsenic, copper, iron, mercury, selenium, silver, thallium, and zinc exceeded the CCME FAL guidelines at one or more sample location in this area.

The measured groundwater turbidity at sample sites MP09-11 and MW09-01 was greater than the desired threshold of 50 NTU (159 NTU and 2643 NTU; **Table 3-2**).

Although samples were obtained from well MW09-01, groundwater at this location was extremely turbid during previous sampling events. This well was further investigated during the June 2015 sampling event using a down-well camera. Camera footage obtained at this location showed a significant quantity of tailings throughout the well casing. The well also had a large gash/opening at the top of PVC (i.e., the top portion of well stick-up). Tailings and water likely enter the well through this opening during periods of high water level. Although this well has a relatively high stick-up (0.82 m), the presence of tailings throughout the well casing suggests that surface water was entering the well through the top of the PVC.

Sample site MW09-23 has also been noted as damaged (Hemmera, 2015) during previous sampling events. The well appears to have been buckled at an angle during earthworks on the tailings dam, and could only be sampled using waterra tubing. The transducer installed at this location was also in poor condition (wires frayed). The wires on this instrument were replaced during the June 2015 sampling event.

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.

3.3 QUALITY ASSURANCE AND QUALITY CONTROL RESULTS

Three (3) 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 (4 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 travel blank analytical results were reported as less than the RDL, indicating minimal evidence of contamination during the transportation process (**Table B**)

A detectable concentration of ammonia was recorded in the travel blank included with the first sample shipment (0.0071 mg/L), and a detectable concentration of total organic carbon (TOC; 0.52 mg/L) was recorded in the travel blank included with the second shipment. 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. Detection of low levels of TOC is not considered adequate evidence to suggest sample contamination. All other parameters in both travel blanks were below RDL.

All field blank analytical results were reported as less than the RDL (**Table B**).

3.3.2 Field Duplicates

3.3.2.1 MW09-04 and DUP-1

Duplicate and duplicate pair analytical results show that all RPD values for samples MW09-04 and DUP-1 were below the 20% RPD threshold limit, suggesting no contamination or bias in sampling (**Table B**).

3.3.2.2 MW09-16 and DUP-2

Duplicate and duplicate pair analytical results show that all RPD values for samples MW09-16 and DUP-2 were below the 20% RPD threshold limit, suggesting no contamination or bias in sampling (**Table B**).

3.3.2.3 MP09-05 and DUP-4

Duplicate and duplicate pair analytical results show that all RPD values for samples MW09-05 and DUP-3 were below the 20% RPD threshold limit, suggesting no contamination or bias in sampling (**Table B**).

3.3.3 Quality Assurance and Quality Control Summary

Results for the QA/QC analytical program show minimal evidence of contamination or sampling bias during the transportation and field collection process. Overall, across four collected field blanks, all values were below RDL, indicating no contamination was incurred from the surrounding environment at these locations. The minimal positive results in the travel blanks did not suggest any type of contamination during transportation, and all sample and duplicate pair analytical results show an acceptable level of variability (RPD < 20%), suggesting that sound sampling and QA/QC practices were employed.

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 18 sample locations (**Table 3-3**) during the June 2015 program, and analyzed for all QA/QC samples (duplicates, field blanks, and travel blanks). The two (2) 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	%
GSI-HA-01A	257	242	*6.0*
MW09-16	224	221	*1.3*
DUP-2 (MW09-16)	240	-	*nc*
MW09-17	425	423	*0.5*
MW09-18	396	415	*4.7*
MW09-19	403	409	*1.5*
CH-P-13-05/50	76.8	71.0	*7.8*
GSI-PC-03B	935	-	*nc*
MP09-05	280	282	*0.7*
DUP-4 (MP09-05)	277	288	*3.9*
MP09-09	63.9	62.8	*1.7*
MP09-11	386	395	*2.3*
MW09-01	255	264	*3.5*
MW09-02	26.6	25.9	*2.7*
MW09-03	137	121	*12.4*
MW09-04	100	-	*nc*
DUP-1 (MW09-04)	97.0	96.3	*0.7*
MW09-06	182	185	*1.6*
MW09-08	125	130	*3.9*
MW09-22	70.6	117	***49.5***
MW09-23	336	349	*3.8*
MW09-24	280	282	*0.7*
W14103083BH03	378	376	*0.5*

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 23 samples above RDL, filtered and unfiltered alkalinity only varied significantly (i.e., RPD > 20%) at one (1) sample site (MW09-22; 49.5% RPD), suggesting the presence of acid-generating solids at that site. Based on these results and those observed in similar comparison from March 2015 groundwater sampling at the Site (RPD > 20% at one of eight samples at Site MW09-18; Hemmera/ELR 2015), the results suggest that there is not a consistent or repeatable effect of solids on non-filtered alkalinity, and that ongoing filtering of alkalinity samples is likely not an ongoing recommendation for the program. This conclusion will be made following the final trail of filtered and unfiltered alkalinity which was conducted during September 2015 groundwater sampling.

4.0 RECOMMENDATIONS

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

1. Damaged or degraded wells should be repaired, if possible. Damaged wells were investigated during the June 2015 sampling event using a down-well camera (as specified by AAM).

   Damaged or degraded wells noted during the June 2015 sampling event include the following, CH-P-13-02/10, MW09-23, CH-P-13-03/10, MW09-01, CH-P-13-04/35, and CH-P-13-05/50.

   CH-P-13-02/10 was found dry during the time of sampling. During previous sample events, bentonite was found present at the bottom of the well and therefore the well status had been listed as dry/damaged. Camera footage obtained at this sample site confirms the presence of bentonite and filter pack (filter sand) at the bottom of well. Bentonite was also found seeping in the top portion of the well screen. The bottom portion of well screen appears to be free of bentonite seepage, presumably due to presence of water (i.e. groundwater flow has cleaned/cleared the lower portion of the screen). Based on the camera footage, there appears to be an issue with the well installation. Bentonite/filter pack is typically installed above the top of the screen; however, in this case it appears an insufficient amount of filter pack was installed to cover the entire screen. This has caused the overlaying bentonite to seep into screen slits in the upper portion of the screen. Based on the field observations, we do not believe that this well can be repaired and should continue to be used in its current condition, or be re-installed (re-drilled).

   Sample site MW09-23 was recorded as being damaged (Hemmera, 2015) during previous sampling events (the PVC is bent at the surface). The well appears to have been buckled at an angle during earthworks on the tailings dam, and could only be sampled using Waterra tubing. The transducer installed at this location was also in poor condition (wires frayed). The wires on this instrument were replaced during the June 2015 sampling event. For sampling, Waterra tubing could continue to be used at this well (does not interfere with the transducer wiring and produces a clean, representative sample). Alternatively, a dedicated plastic submersible pump could be considered to reduce turbidity and improve the quality of sample at this location.

   Sampling location CH-P-13-03/10 was investigated during June 2015 sampling event. During a previous sampling program, the upper PVC stick-up of this well became detached from the well casing, allowing sand/filter pack material to drain into the well. Camera footage obtained from the sample site confirmed the presence of sand at the bottom of the well. Hemmera/ELR recommends that the well be re-developed to remove the sand. The following methods should be considered: 1) Injecting water into the well and using air lift method to clear the well (using air compressor). Well logs should be reviewed prior to implementing this method to assess the hydraulic conductivity of the surrounding formation. A low hydraulic conductivity is required in order to saturate the sand and mobilize using an air compressor. This method may require a substantial volume of water. 2) Use a vacuum truck to remove sand. Vacuum head would need to be small enough to fit in the casing.

MW09-01 could not be sampled during previous events due to an excessive quantity of tailings present in the groundwater. Although samples were obtained from well MW09-01 during the June 2015 sampling event, groundwater at this location has been extremely turbid during previous sampling events. Camera footage obtained at this location shows a significant quantity of tailing throughout the well casing. The well also has a large gash/opening at the top of PVC. Tailings likely enter the well through this opening during periods of high water. The opening at the top of PVC should be sealed. This well should be cleaned of fines and debris which may be possible through a combination of open-ended standard or large diameter Waterra tubing (to capture sediment in the end of the tubing), followed by redevelopment using Waterra tubing and a surge block. Re-development may take several sampling events to complete, and may require the addition of water to re-suspend the fines present.

Sampling location CH-P-13-04/35 was also investigated using a camera during June 2015 sampling event. This well had been recorded as “blocked” in previous sampling events. Camera investigations of the well confirmed that the blockage was ice. The status of CH-P-04/35 has been revised to “frozen”. No future action is required at this location.

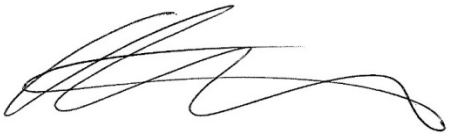
In addition to previously recorded damaged wells, groundwater at sample location CH-P-13-05/50 was extremely turbid (118 NTU) during the time of sampling (**Table 3-2**). This well should also be re-developed using Waterra tubing and a surge block during a future monitoring event in order to obtain a more representative sample.

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.

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.

Report prepared by:
ELR



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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 June Sampling Program

		Site Location	Dome Creek									Mill Complex								
		Sample ID	GSI-DC-01B	GSI-DC-02B	GSI-DC-03B	GSI-DC-05B	GSI-DC-06B	GSI-DC-07B	GSI-DC-08B	GSI-DC-09B	GSI-DC-10B	GSI-HA-01A	GSI-HA-02A	GSI-HA-03A	GSI-HA-04A	GSI-HA-05A	MW09-16	MW09-17	MW09-18	MW09-19
		Date Sampled	01/06/2015	01/06/2015	02/06/2015	03/06/2015	04/06/2015	04/06/2015	04/06/2015	04/06/2015	04/06/2015	02/06/2015 13:50	01/06/2015 15:30	01/06/2015 16:15	01/06/2015	01/06/2015 16:45	01/06/2015 18:00	02/06/2015 11:35	02/06/2015 10:10	02/06/2015 8:30
		ALS Work Number	-	-	-	-	-	-	-	-	-	L1620902	-	-	-	-	L1620902	L1620902	L1620902	L1620902
		Station Status	Dry	Frozen	Frozen	Frozen	Frozen	Frozen	Frozen	Frozen	Frozen	Direct Sampled	Direct Sampled	Direct Sampled	Frozen	Direct Sampled	Sampled	Sampled	Sampled	Sampled
Parameter	Units	CCME-FAL[1, 2, 3, 4]																		
Physical Tests																				
Lab pH	pH units	6.5-9.0 [5]	-	-	-	-	-	-	-	-	-	8.14	-	-	-	-	7.97	8.02	8.05	7.80
Field pH	pH units	6.5-9.0 [5]	-	-	-	-	-	-	-	-	-	7.15	-	-	-	-	6.75	6.92	6.94	6.77
Field Temperature	C	-	-	-	-	-	-	-	-	-	-	5.20	-	-	-	-	5.00	1.20	1.40	0.70
Lab Conductivity	uS/cm	-	-	-	-	-	-	-	-	-	-	977	-	-	-	-	1970	2740	2560	2340
Field Conductivity	uS/cm	-	-	-	-	-	-	-	-	-	-	688	-	-	-	-	1257	1572	1495	1344
Field Specific Conductivity	uS/cm	-	-	-	-	-	-	-	-	-	-	1106	-	-	-	-	2036	2884	2700	2507
Total Hardness (as CaCO3)	mg/L	-	-	-	-	-	-	-	-	-	-	593	-	-	-	-	1260	1950	1780	1460
Field Dissolved Oxygen	mg/L	9.5 [6]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.05	0.86	0.52	1.14
Field Oxidation - Redox Potent	mV	-	-	-	-	-	-	-	-	-	-	-40.2	-	-	-	-	128.7	84.0	66.2	-86.8
Field Turbidity	NTU	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.89	0.02	0.51	0.22
Anions and Nutrients																				
Alkalinity, Total (CaCO3)	mg/L	-	-	-	-	-	-	-	-	-	-	257	-	-	-	-	224	425	396	403
Alkalinity, Total (CaCO3, filtered)	mg/L	-	-	-	-	-	-	-	-	-	-	242	-	-	-	-	221	423	415	409
Ammonia, Total (as N)	mg/L	Varies [7]	-	-	-	-	-	-	-	-	-	0.0669	-	-	-	-	0.0331	<0.0050	0.0284	3.23
Ammonia CCME-FAL	*mg/L*	-	-	-	-	-	-	-	-	-	-	*10.65*	-	-	-	-	*27.15*	*25.11*	*23.58*	*36.97*
Chloride (Cl)	mg/L	-	-	-	-	-	-	-	-	-	-	<0.50	-	-	-	-	<5.0	<5.0	<5.0	<5.0
Fluoride (F)	mg/L	0.12	-	-	-	-	-	-	-	-	-	0.118	-	-	-	-	0.47	<0.20	<0.20	0.28
Nitrate (as N)	mg/L	13	-	-	-	-	-	-	-	-	-	0.0059	-	-	-	-	<0.050	0.391	<0.050	<0.050
Nitrite (as N)	mg/L	0.06	-	-	-	-	-	-	-	-	-	<0.0010	-	-	-	-	<0.010	<0.010	<0.010	<0.010
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	-	-	-	-	-	-	0.346	-	-	-	-	0.181	0.093	0.129	4.02
Sulfate (SO4)	mg/L	-	-	-	-	-	-	-	-	-	-	312	-	-	-	-	1100	1540	1440	1230
Sulphide as S	mg/L	-	-	-	-	-	-	-	-	-	-	0.133	-	-	-	-	<0.020	<0.020	<0.020	0.123
Field Sulphide	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.00	0.07	0.01	0.05
Anion Sum	meq/L	-	-	-	-	-	-	-	-	-	-	11.7	-	-	-	-	27.5	40.7	38.0	33.6
Cation Sum	meq/L	-	-	-	-	-	-	-	-	-	-	12.4	-	-	-	-	26.0	39.7	36.3	31.7
Cation - Anion Balance	%	-	-	-	-	-	-	-	-	-	-	3.0	-	-	-	-	-2.8	-1.2	-2.2	-3.0
Cyanides																				
Cyanide, Total	mg/L	-	-	-	-	-	-	-	-	-	-	<0.0050	-	-	-	-	<0.0050	<0.0050	<0.0050	<0.0050
Cyanide, Free	mg/L	0.005	-	-	-	-	-	-	-	-	-	<0.0050	-	-	-	-	<0.0050	<0.0050	<0.0050	<0.0050
Cyanide, Weak Acid Diss	mg/L	-	-	-	-	-	-	-	-	-	-	<0.0050	-	-	-	-	<0.0050	<0.0050	<0.0050	<0.0050
Thiocyanate (SCN)	mg/L	-	-	-	-	-	-	-	-	-	-	<0.50	-	-	-	-	<0.50	<0.50	<0.50	0.53
Organic/Inorganic Carbon																				
Total Inorganic Carbon	mg/L	-	-	-	-	-	-	-	-	-	-	51.4	-	-	-	-	52.2	95.1	95.6	96.4
Total Organic Carbon	mg/L	-	-	-	-	-	-	-	-	-	-	4.27	-	-	-	-	3.57	2.49	2.63	12.6

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

		Site Location	Brown McDade Pit													Pony Creek						
		Sample ID	CH-P-13-01/10	CH-P-13-03/10	CH-P-13-03/50	CH-P-13-04/10	CH-P-13-04/35	CH-P-13-05/50	GLL07-01	GLL07-02	GLL07-03	MW09-13	MW09-14	MW09-15	CH-P-13-02/10	GSI-PC-02B	GSI-PC-03B	GSI-PC-04B	GSI-PC-05B	MP09-02	MP09-03	MP09-08
		Date Sampled	01/06/2015	01/06/2015	04/06/2015	01/06/2015	01/06/2015	02/06/2015 17:00	01/06/2015	03/06/2015	01/06/2015	01/06/2015	01/06/2015	01/06/2015	01/06/2015	03/06/2015	04/06/2015 17:41	03/06/2015	03/06/2015	03/06/2015	03/06/2015	03/06/2015
		ALS Work Number	-	-	-	-	-	L1620902	-	-	-	-	-	-	-	-	L1622366	-	-	-	-	-
		Station Status	Frozen	Frozen	Insufficient Volume	Frozen	Frozen	Sampled	Frozen	Dry	Dry	Frozen	Frozen	Frozen	Dry/Damaged	Frozen	Direct Sampled	Frozen	Frozen	Frozen	Frozen	Frozen
Parameter	Units	CCME-FAL [1, 2, 3, 4]																				
Physical Tests																						
Lab pH	pH units	6.5-9.0 [5]	-	-	-	-	-	7.16	-	-	-	-	-	-	-	-	8.07	-	-	-	-	-
Field pH	pH units	6.5-9.0 [5]	-	-	-	-	-	6.19	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field Temperature	C	-	-	-	-	-	-	2.86	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lab Conductivity	uS/cm	-	-	-	-	-	-	2860	-	-	-	-	-	-	-	-	3490	-	-	-	-	-
Field Conductivity	uS/cm	-	-	-	-	-	-	1682	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field Specific Conductivity	uS/cm	-	-	-	-	-	-	2912	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Hardness (as CaCO3)	mg/L	-	-	-	-	-	-	1940	-	-	-	-	-	-	-	-	2440	-	-	-	-	-
Field Dissolved Oxygen	mg/L	9.5 [6]	-	-	-	-	-	3.17	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field Oxidation - Redox Potent	mV	-	-	-	-	-	-	121.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field Turbidity	NTU	-	-	-	-	-	-	118.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anions and Nutrients																						
Alkalinity, Total (CaCO3)	mg/L	-	-	-	-	-	-	76.8	-	-	-	-	-	-	-	-	935	-	-	-	-	-
Alkalinity, Total (CaCO3, filtered)	mg/L	-	-	-	-	-	-	71.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia, Total (as N)	mg/L	Varies [7]	-	-	-	-	-	0.0395	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ammonia CCME-FAL	*mg/L*	-	-	-	-	-	-	*117.4*	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Chloride (Cl)	mg/L	-	-	-	-	-	-	<5.0	-	-	-	-	-	-	-	-	<10	-	-	-	-	-
Fluoride (F)	mg/L	0.12	-	-	-	-	-	0.25	-	-	-	-	-	-	-	-	<0.60	-	-	-	-	-
Nitrate (as N)	mg/L	13	-	-	-	-	-	<0.050	-	-	-	-	-	-	-	-	0.17	-	-	-	-	-
Nitrite (as N)	mg/L	0.06	-	-	-	-	-	<0.010	-	-	-	-	-	-	-	-	<0.020	-	-	-	-	-
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	-	-	0.240	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Sulfate (SO4)	mg/L	-	-	-	-	-	-	2040	-	-	-	-	-	-	-	-	1570	-	-	-	-	-
Sulphide as S	mg/L	-	-	-	-	-	-	<0.020	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Field Sulphide	mg/L	-	-	-	-	-	-	1.77	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Anion Sum	meq/L	-	-	-	-	-	-	44.1	-	-	-	-	-	-	-	-	51.3	-	-	-	-	-
Cation Sum	meq/L	-	-	-	-	-	-	42.0	-	-	-	-	-	-	-	-	54.8	-	-	-	-	-
Cation - Anion Balance	%	-	-	-	-	-	-	-2.4	-	-	-	-	-	-	-	-	3.3	-	-	-	-	-
Cyanides																						
Cyanide, Total	mg/L	-	-	-	-	-	-	<0.0050	-	-	-	-	-	-	-	-	<0.0050	-	-	-	-	-
Cyanide, Free	mg/L	0.005	-	-	-	-	-	<0.0050	-	-	-	-	-	-	-	-	<0.0050	-	-	-	-	-
Cyanide, Weak Acid Diss	mg/L	-	-	-	-	-	-	<0.0050	-	-	-	-	-	-	-	-	<0.0050	-	-	-	-	-
Thiocyanate (SCN)	mg/L	-	-	-	-	-	-	<0.50	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Organic/Inorganic Carbon																						
Total Inorganic Carbon	mg/L	-	-	-	-	-	-	12.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Total Organic Carbon	mg/L	-	-	-	-	-	-	5.34	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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

		Site Location	Seepage Dam			Tailings Facility										
		Sample ID	W14103083BH01	W14103083BH02	W14103083BH04	MP09-04	MP09-05	MP09-09	MP09-10	MP09-11	MP09-12	MP09-14	MW09-01	MW09-02	MW09-03	MW09-04
		Date Sampled	03/06/2015	03/06/2015	03/06/2015	04/06/2015	03/06/2015 17:45	04/06/2015 8:05	02/06/2015	04/06/2015 9:10	02/06/2015	02/06/2015 14:50	03/06/2015 12:15	02/06/2015 10:20	02/06/2015 15:10	02/06/2015 13:50
		ALS Work Number	-	-	-	-	L1622366	L1622366	-	L1622366	-	L1620902	L1622366	L1620902	L1620902	L1620902
		Station Status	Frozen	Frozen	Frozen	Frozen	Sampled	Sampled	Frozen	Sampled	Frozen	Direct Sampled	Damaged	Sampled	Sampled	Sampled
Parameter	Units	CCME-FAL [1, 2, 3, 4]														
Physical Tests																
Lab pH	pH units	6.5-9.0 [5]	-	-	-	-	6.95	8.90	-	7.75	-	-	7.91	7.03	8.01	8.09
Field pH	pH units	6.5-9.0 [5]	-	-	-	-	6.66	9.31	-	7.65	-	-	7.13	7.18	7.21	8.03
Field Temperature	C	-	-	-	-	-	2.70	1.50	-	1.40	-	-	4.76	3.90	3.24	4.32
Lab Conductivity	uS/cm	-	-	-	-	-	2120	631	-	717	-	-	2700	2930	2600	2670
Field Conductivity	uS/cm	-	-	-	-	-	1361	388	-	454	-	-	1731	1753	1557	1640
Field Specific Conductivity	uS/cm	-	-	-	-	-	2369	707	-	818	-	-	2821	2934	2666	2706
Total Hardness (as CaCO3)	mg/L	-	-	-	-	-	1270	288	-	383	-	372	1490	1410	1600	1630
Field Dissolved Oxygen	mg/L	9.5 [6]	-	-	-	-	0.07	0.79	-	3.14	-	-	1.78	0.48	0.22	0.29
Field Oxidation - Redox Potent	mV	-	-	-	-	-	-46.9	80.5	-	-126.4	-	-	-11.5	-87.3	12.4	32.7
Field Turbidity	NTU	-	-	-	-	-	1.87	45.86	-	159.00	-	-	2643.00	5.29	0.77	2.43
Anions and Nutrients																
Alkalinity, Total (CaCO3)	mg/L	-	-	-	-	-	280	63.9	-	386	-	-	255	26.6	137	100
Alkalinity, Total (CaCO3, filtered)	mg/L	-	-	-	-	-	282	62.8	-	395	-	-	264	25.9	121	-
Ammonia, Total (as N)	mg/L	Varies [7]	-	-	-	-	10.1	3.88	-	9.49	-	-	17.8	14.2	3.06	6.27
Ammonia CCME-FAL	*mg/L*	-	-	-	-	-	*40.32*	*0.1187*	-	*4.613*	-	-	*11.55*	*11.05*	*10.88*	*1.524*
Chloride (Cl)	mg/L	-	-	-	-	-	<2.5	2.59	-	0.58	-	-	<5.0	<5.0	<5.0	<5.0
Fluoride (F)	mg/L	0.12	-	-	-	-	0.14	1.62	-	0.491	-	-	0.33	0.82	0.58	0.64
Nitrate (as N)	mg/L	13	-	-	-	-	<0.025	0.0273	-	0.0103	-	-	0.053	<0.050	0.534	0.269
Nitrite (as N)	mg/L	0.06	-	-	-	-	<0.0050	0.0040	-	0.0143	-	-	<0.010	<0.010	0.072	0.040
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	-	13.8	5.82	-	12.9	-	-	21.6	16.1	3.70	7.51
Sulfate (SO4)	mg/L	-	-	-	-	-	1120	234	-	22.1	-	-	1640	2240	1610	1550
Sulphide as S	mg/L	-	-	-	-	-	<0.020	<1.0	-	<0.020	-	-	<0.020	<0.020	<0.020	<0.020
Field Sulphide	mg/L	-	-	-	-	-	0.00	0.36	-	1.26	-	-	2.20	0.02	0.03	0.07
Anion Sum	meq/L	-	-	-	-	-	28.9	6.32	-	8.21	-	-	39.2	47.2	36.4	34.4
Cation Sum	meq/L	-	-	-	-	-	31.1	7.40	-	9.59	-	-	36.4	38.3	35.2	35.5
Cation - Anion Balance	%	-	-	-	-	-	3.5	7.9	-	7.8	-	-	-3.8	-10.4	-1.6	1.6
Cyanides																
Cyanide, Total	mg/L	-	-	-	-	-	0.0108	1.36	-	0.0254	-	-	0.0881	0.132	0.0363	<0.0050
Cyanide, Free	mg/L	0.005	-	-	-	-	<0.0050	0.251	-	<0.0050	-	-	0.0058	<0.0050	0.0108	<0.0050
Cyanide, Weak Acid Diss	mg/L	-	-	-	-	-	<0.0050	0.278	-	<0.0050	-	-	0.0091	0.0192	0.0118	<0.0050
Thiocyanate (SCN)	mg/L	-	-	-	-	-	0.78	0.98	-	0.56	-	-	4.84	1.34	<0.50	<0.50
Organic/Inorganic Carbon																
Total Inorganic Carbon	mg/L	-	-	-	-	-	61.3	8.43	-	85.7	-	-	56.9	2.3	27.8	18.7
Total Organic Carbon	mg/L	-	-	-	-	-	25.4	31.4	-	34.3	-	-	17.8	5.87	6.60	6.29

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

		Site Location	Tailings Facility									
		Sample ID	MW09-05	MW09-06	MW09-07	MW09-08	MW09-11	MW09-20	MW09-21	MW09-22	MW09-23	MW09-24	W14103083BH03
		Date Sampled	03/06/2015	03/06/2015 13:55	03/06/2015	04/06/2015 13:10	02/06/2015	04/06/2015	03/06/2015	04/06/2015 10:10	04/06/2015 8:20	04/06/2015 14:40	03/06/2015 8:45
		ALS Work Number	-	L1622366	-	L1622366	-	-	-	L1622366	L1622366	L1622366	L1622366
		Station Status	Dry	Sampled	Dry	Sampled	Dry	Dry	Frozen	Sampled	Damaged	Sampled	Sampled
Parameter	Units	CCME-FAL [1, 2, 3, 4]											
Physical Tests													
Lab pH	pH units	6.5-9.0 [5]	-	7.90	-	6.66	-	-	-	6.33	7.54	7.86	7.23
Field pH	pH units	6.5-9.0 [5]	-	7.44	-	6.67	-	-	-	6.25	6.90	7.03	6.88
Field Temperature	C	-	-	5.70	-	2.30	-	-	-	3.40	0.85	0.67	2.10
Lab Conductivity	uS/cm	-	-	1970	-	385	-	-	-	1560	2040	900	1070
Field Conductivity	uS/cm	-	-	1354	-	197	-	-	-	991	1180	499	683
Field Specific Conductivity	uS/cm	-	-	2135	-	349	-	-	-	1674	2189	933	1215
Total Hardness (as CaCO3)	mg/L	-	-	1230	-	201	-	-	-	924	1270	550	657
Field Dissolved Oxygen	mg/L	9.5 [6]	-	0.05	-	0.06	-	-	-	0.26	2.47	8.27	5.15
Field Oxidation - Redox Potent	mV	-	-	108.6	-	-96.0	-	-	-	17.7	-51.3	121.1	66.7
Field Turbidity	NTU	-	-	18.41	-	2.14	-	-	-	12.60	66.00	7.06	2.18
Anions and Nutrients													
Alkalinity, Total (CaCO3)	mg/L	-	-	182	-	125	-	-	-	70.6	336	280	378
Alkalinity, Total (CaCO3, filtered)	mg/L	-	-	185	-	130	-	-	-	117	349	282	376
Ammonia, Total (as N)	mg/L	Varies [7]	-	1.15	-	2.15	-	-	-	1.47	3.80	<0.0050	1.76
Ammonia CCME-FAL	*mg/L*	-	-	*5.253*	-	*40.73*	-	-	-	*97.81*	*27.07*	*20.38*	*25.54*
Chloride (Cl)	mg/L	-	-	<2.5	-	<0.50	-	-	-	<2.5	<2.5	1.10	<0.50
Fluoride (F)	mg/L	0.12	-	0.41	-	<0.20	-	-	-	0.10	0.18	0.038	<0.20
Nitrate (as N)	mg/L	13	-	2.54	-	<0.0050	-	-	-	0.039	<0.025	2.37	<0.0050
Nitrite (as N)	mg/L	0.06	-	0.0919	-	<0.0010	-	-	-	0.0205	<0.0050	0.0019	<0.0010
Total Kjeldahl Nitrogen	mg/L	-	-	1.81	-	2.94	-	-	-	4.42	6.81	0.542	2.76
Sulfate (SO4)	mg/L	-	-	1160	-	75.9	-	-	-	809	979	226	265
Sulphide as S	mg/L	-	-	<0.020	-	0.058	-	-	-	<0.020	<0.020	<0.020	<0.020
Field Sulphide	mg/L	-	-	-	-	0.02	-	-	-	0.07	0.64	0.04	0.05
Anion Sum	meq/L	-	-	28.0	-	4.08	-	-	-	18.3	27.1	10.5	13.1
Cation Sum	meq/L	-	-	26.5	-	7.98	-	-	-	24.0	29.0	11.3	15.7
Cation - Anion Balance	%	-	-	-2.8	-	32.4	-	-	-	13.5	3.4	3.9	9.3
Cyanides													
Cyanide, Total	mg/L	-	-	<0.0050	-	0.0069	-	-	-	0.0124	0.0093	<0.0050	<0.0050
Cyanide, Free	mg/L	0.005	-	<0.0050	-	<0.0050	-	-	-	0.0059	<0.0050	<0.0050	<0.0050
Cyanide, Weak Acid Diss	mg/L	-	-	<0.0050	-	<0.0050	-	-	-	<0.0050	<0.0050	<0.0050	<0.0050
Thiocyanate (SCN)	mg/L	-	-	<0.50	-	0.62	-	-	-	<0.50	0.51	<0.50	0.53
Organic/Inorganic Carbon													
Total Inorganic Carbon	mg/L	-	-	40.1	-	28.0	-	-	-	15.6	77.7	66.9	83.2
Total Organic Carbon	mg/L	-	-	9.74	-	15.4	-	-	-	14.6	14.9	7.74	19.0

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

		Site Location	Dome Creek									Mill Complex								
		Sample ID	GSI-DC-01B	GSI-DC-02B	GSI-DC-03B	GSI-DC-05B	GSI-DC-06B	GSI-DC-07B	GSI-DC-08B	GSI-DC-09B	GSI-DC-10B	GSI-HA-01A	GSI-HA-02A	GSI-HA-03A	GSI-HA-04A	GSI-HA-05A	MW09-16	MW09-17	MW09-18	MW09-19
		Date Sampled	01/06/2015	01/06/2015	02/06/2015	03/06/2015	04/06/2015	04/06/2015	04/06/2015	04/06/2015	04/06/2015	02/06/2015 13:50	01/06/2015 15:30	01/06/2015 16:15	01/06/2015	01/06/2015 16:45	01/06/2015 18:00	02/06/2015 11:35	02/06/2015 10:10	02/06/2015 8:30
		ALS Work Number	-	-	-	-	-	-	-	-	-	L1620902	-	-	-	-	L1620902	L1620902	L1620902	L1620902
		Station Status	Dry	Frozen	Frozen	Frozen	Frozen	Frozen	Frozen	Frozen	Frozen	Direct Sampled	Direct Sampled	Direct Sampled	Frozen	Direct Sampled	Sampled	Sampled	Sampled	Sampled
Parameter	Units	CCME-FAL[1, 2, 3, 4]																		
Dissolved Metals																				
Aluminum (Al)	mg/L	Varies [8]	-	-	-	-	-	-	-	-	-	0.0031	-	-	-	-	<0.0010	<0.0020	<0.0020	0.0090
Aluminum CCME-FAL	*mg/L*	-	-	-	-	-	-	-	-	-	-	*0.1*	-	-	-	-	*0.1*	*0.1*	*0.1*	*0.1*
Antimony (Sb)	mg/L	-	-	-	-	-	-	-	-	-	-	0.00017	-	-	-	-	0.0801	0.00032	0.00034	<0.00020
Arsenic (As)	mg/L	0.005	-	-	-	-	-	-	-	-	-	0.0115	-	-	-	-	0.0426	0.0208	0.0518	0.117
Barium (Ba)	mg/L	-	-	-	-	-	-	-	-	-	-	0.161	-	-	-	-	0.0144	0.00749	0.00768	0.0460
Beryllium (Be)	mg/L	-	-	-	-	-	-	-	-	-	-	<0.000020	-	-	-	-	<0.000020	<0.000040	<0.000040	<0.000040
Bismuth (Bi)	mg/L	-	-	-	-	-	-	-	-	-	-	<0.000050	-	-	-	-	<0.000050	<0.00010	<0.00010	<0.00010
Boron (B)	mg/L	1.5	-	-	-	-	-	-	-	-	-	<0.010	-	-	-	-	0.062	0.083	<0.020	0.190
Cadmium (Cd)	mg/L	Varies [9]	-	-	-	-	-	-	-	-	-	0.0000071	-	-	-	-	0.0440	0.000017	0.000056	<0.000010
Cadmium CCME-FAL	*mg/L*	-	-	-	-	-	-	-	-	-	-	*0.00037*	-	-	-	-	*0.00037*	*0.00037*	*0.00037*	*0.00037*
Calcium (Ca)	mg/L	-	-	-	-	-	-	-	-	-	-	153	-	-	-	-	297	337	323	313
Chromium (Cr)	mg/L	-	-	-	-	-	-	-	-	-	-	0.00044	-	-	-	-	<0.00010	<0.00020	<0.00020	<0.00020
Cobalt (Co)	mg/L	-	-	-	-	-	-	-	-	-	-	0.00019	-	-	-	-	0.00295	<0.00020	<0.00020	0.00251
Copper (Cu)	mg/L	Varies [10]	-	-	-	-	-	-	-	-	-	0.00020	-	-	-	-	0.00526	0.00061	<0.00040	<0.00040
Copper CCME-FAL	*mg/L*	-	-	-	-	-	-	-	-	-	-	*0.004*	-	-	-	-	*0.004*	*0.004*	*0.004*	*0.004*
Iron (Fe)	mg/L	0.3	-	-	-	-	-	-	-	-	-	3.71	-	-	-	-	0.033	<0.010	<0.010	20.5
Lead (Pb)	mg/L	Varies [11]	-	-	-	-	-	-	-	-	-	0.000056	-	-	-	-	0.00583	<0.00010	<0.00010	<0.00010
Lead CCME-FAL	*mg/L*	-	-	-	-	-	-	-	-	-	-	*0.007*	-	-	-	-	*0.007*	*0.007*	*0.007*	*0.007*
Lithium (Li)	mg/L	-	-	-	-	-	-	-	-	-	-	0.0068	-	-	-	-	0.0097	0.0199	0.0212	0.0106
Magnesium (Mg)	mg/L	-	-	-	-	-	-	-	-	-	-	51.1	-	-	-	-	127	269	237	165
Manganese (Mn)	mg/L	-	-	-	-	-	-	-	-	-	-	0.185	-	-	-	-	0.803	<0.00020	0.611	7.05
Mercury (Hg)	mg/L	0.000026	-	-	-	-	-	-	-	-	-	<0.0000050	-	-	-	-	0.0000175	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)	mg/L	0.073	-	-	-	-	-	-	-	-	-	0.000406	-	-	-	-	0.000222	<0.00010	<0.00010	0.00018
Nickel (Ni)	mg/L	Varies [12]	-	-	-	-	-	-	-	-	-	0.00251	-	-	-	-	0.00535	<0.0010	<0.0010	<0.0010
Nickel CCME-FAL	*mg/L*	-	-	-	-	-	-	-	-	-	-	*0.15*	-	-	-	-	*0.15*	*0.15*	*0.15*	*0.15*
Phosphorus (P)	mg/L	-	-	-	-	-	-	-	-	-	-	<0.050	-	-	-	-	<0.050	<0.050	<0.050	0.145
Potassium (K)	mg/L	-	-	-	-	-	-	-	-	-	-	3.38	-	-	-	-	6.32	7.11	6.99	6.76
Selenium (Se)	mg/L	0.001	-	-	-	-	-	-	-	-	-	<0.000050	-	-	-	-	0.000097	0.00061	0.00059	0.00021
Silicon (Si)	mg/L	-	-	-	-	-	-	-	-	-	-	6.38	-	-	-	-	4.53	5.10	4.96	8.46
Silver (Ag)	mg/L	0.0001	-	-	-	-	-	-	-	-	-	<0.000010	-	-	-	-	0.000097	<0.000020	<0.000020	<0.000020
Sodium (Na)	mg/L	-	-	-	-	-	-	-	-	-	-	5.08	-	-	-	-	7.32	12.7	11.1	16.8
Strontium (Sr)	mg/L	-	-	-	-	-	-	-	-	-	-	0.341	-	-	-	-	0.665	1.01	0.929	1.07
Sulfur (S)	mg/L	-	-	-	-	-	-	-	-	-	-	103	-	-	-	-	317	462	414	345
Thallium (Tl)	mg/L	0.0008	-	-	-	-	-	-	-	-	-	<0.000010	-	-	-	-	0.000459	0.000094	0.000261	<0.000020
Tin (Sn)	mg/L	-	-	-	-	-	-	-	-	-	-	<0.00010	-	-	-	-	<0.00010	<0.00020	<0.00020	<0.00020
Titanium (Ti)	mg/L	-	-	-	-	-	-	-	-	-	-	<0.00030	-	-	-	-	<0.00030	<0.00060	<0.00060	0.00079
Uranium (U)	mg/L	0.015	-	-	-	-	-	-	-	-	-	0.000030	-	-	-	-	0.00301	0.00753	0.00652	0.000755
Vanadium (V)	mg/L	-	-	-	-	-	-	-	-	-	-	<0.00050	-	-	-	-	<0.00050	<0.0010	<0.0010	<0.0010
Zinc (Zn)	mg/L	0.03	-	-	-	-	-	-	-	-	-	0.0023	-	-	-	-	6.24	<0.0020	0.0025	<0.0020
Zirconium (Zr)	mg/L	-	-	-	-	-	-	-	-	-	-	<0.00030	-	-	-	-	<0.00030	<0.00060	<0.00060	<0.00060

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

		Site Location	Brown McDade Pit													Pony Creek						
		Sample ID	CH-P-13-01/10	CH-P-13-03/10	CH-P-13-03/50	CH-P-13-04/10	CH-P-13-04/35	CH-P-13-05/50	GLL07-01	GLL07-02	GLL07-03	MW09-13	MW09-14	MW09-15	CH-P-13-02/10	GSI-PC-02B	GSI-PC-03B	GSI-PC-04B	GSI-PC-05B	MP09-02	MP09-03	MP09-08
		Date Sampled	01/06/2015	01/06/2015	04/06/2015	01/06/2015	01/06/2015	02/06/2015 17:00	01/06/2015	03/06/2015	01/06/2015	01/06/2015	01/06/2015	01/06/2015	01/06/2015	03/06/2015	04/06/2015 17:41	03/06/2015	03/06/2015	03/06/2015	03/06/2015	03/06/2015
		ALS Work Number	-	-	-	-	-	L1620902	-	-	-	-	-	-	-	-	L1622366	-	-	-	-	-
		Station Status	Frozen	Frozen	Insufficient Volume	Frozen	Frozen	Sampled	Frozen	Dry	Dry	Frozen	Frozen	Frozen	Dry/Damaged	Frozen	Direct Sampled	Frozen	Frozen	Frozen	Frozen	Frozen
Parameter	Units	CCME-FAL [1, 2, 3, 4]																				
Dissolved Metals																						
Aluminum (Al)	mg/L	Varies [8]	-	-	-	-	-	0.0599	-	-	-	-	-	-	-	-	0.0472	-	-	-	-	-
Aluminum CCME-FAL	*mg/L*	-	-	-	-	-	-	*0.005*	-	-	-	-	-	-	-	-	*0.1*	-	-	-	-	-
Antimony (Sb)	mg/L	-	-	-	-	-	-	0.00436	-	-	-	-	-	-	-	-	0.00220	-	-	-	-	-
Arsenic (As)	mg/L	0.005	-	-	-	-	-	0.00966	-	-	-	-	-	-	-	-	0.0969	-	-	-	-	-
Barium (Ba)	mg/L	-	-	-	-	-	-	0.00604	-	-	-	-	-	-	-	-	0.108	-	-	-	-	-
Beryllium (Be)	mg/L	-	-	-	-	-	-	0.00015	-	-	-	-	-	-	-	-	<0.000040	-	-	-	-	-
Bismuth (Bi)	mg/L	-	-	-	-	-	-	<0.00025	-	-	-	-	-	-	-	-	<0.00010	-	-	-	-	-
Boron (B)	mg/L	1.5	-	-	-	-	-	<0.050	-	-	-	-	-	-	-	-	0.057	-	-	-	-	-
Cadmium (Cd)	mg/L	Varies [9]	-	-	-	-	-	0.329	-	-	-	-	-	-	-	-	0.000048	-	-	-	-	-
Cadmium CCME-FAL	*mg/L*	-	-	-	-	-	-	*0.00037*	-	-	-	-	-	-	-	-	*0.00037*	-	-	-	-	-
Calcium (Ca)	mg/L	-	-	-	-	-	-	455	-	-	-	-	-	-	-	-	149	-	-	-	-	-
Chromium (Cr)	mg/L	-	-	-	-	-	-	<0.00050	-	-	-	-	-	-	-	-	0.0296	-	-	-	-	-
Cobalt (Co)	mg/L	-	-	-	-	-	-	0.0365	-	-	-	-	-	-	-	-	0.00802	-	-	-	-	-
Copper (Cu)	mg/L	Varies [10]	-	-	-	-	-	0.015	-	-	-	-	-	-	-	-	0.00122	-	-	-	-	-
Copper CCME-FAL	*mg/L*	-	-	-	-	-	-	*0.004*	-	-	-	-	-	-	-	-	*0.004*	-	-	-	-	-
Iron (Fe)	mg/L	0.3	-	-	-	-	-	12.8	-	-	-	-	-	-	-	-	15.4	-	-	-	-	-
Lead (Pb)	mg/L	Varies [11]	-	-	-	-	-	0.00573	-	-	-	-	-	-	-	-	0.00038	-	-	-	-	-
Lead CCME-FAL	*mg/L*	-	-	-	-	-	-	*0.007*	-	-	-	-	-	-	-	-	*0.007*	-	-	-	-	-
Lithium (Li)	mg/L	-	-	-	-	-	-	0.0394	-	-	-	-	-	-	-	-	0.0526	-	-	-	-	-
Magnesium (Mg)	mg/L	-	-	-	-	-	-	194	-	-	-	-	-	-	-	-	502	-	-	-	-	-
Manganese (Mn)	mg/L	-	-	-	-	-	-	34.3	-	-	-	-	-	-	-	-	2.67	-	-	-	-	-
Mercury (Hg)	mg/L	0.000026	-	-	-	-	-	<0.0000050	-	-	-	-	-	-	-	-	<0.0000050	-	-	-	-	-
Molybdenum (Mo)	mg/L	0.073	-	-	-	-	-	0.00040	-	-	-	-	-	-	-	-	0.0155	-	-	-	-	-
Nickel (Ni)	mg/L	Varies [12]	-	-	-	-	-	0.0129	-	-	-	-	-	-	-	-	0.0845	-	-	-	-	-
Nickel CCME-FAL	*mg/L*	-	-	-	-	-	-	*0.15*	-	-	-	-	-	-	-	-	*0.15*	-	-	-	-	-
Phosphorus (P)	mg/L	-	-	-	-	-	-	<0.050	-	-	-	-	-	-	-	-	<0.050	-	-	-	-	-
Potassium (K)	mg/L	-	-	-	-	-	-	5.01	-	-	-	-	-	-	-	-	25.1	-	-	-	-	-
Selenium (Se)	mg/L	0.001	-	-	-	-	-	<0.00025	-	-	-	-	-	-	-	-	0.00035	-	-	-	-	-
Silicon (Si)	mg/L	-	-	-	-	-	-	7.50	-	-	-	-	-	-	-	-	8.59	-	-	-	-	-
Silver (Ag)	mg/L	0.0001	-	-	-	-	-	<0.000050	-	-	-	-	-	-	-	-	<0.000020	-	-	-	-	-
Sodium (Na)	mg/L	-	-	-	-	-	-	7.72	-	-	-	-	-	-	-	-	103	-	-	-	-	-
Strontium (Sr)	mg/L	-	-	-	-	-	-	0.584	-	-	-	-	-	-	-	-	2.84	-	-	-	-	-
Sulfur (S)	mg/L	-	-	-	-	-	-	621	-	-	-	-	-	-	-	-	516	-	-	-	-	-
Thallium (Tl)	mg/L	0.0008	-	-	-	-	-	0.000564	-	-	-	-	-	-	-	-	<0.000020	-	-	-	-	-
Tin (Sn)	mg/L	-	-	-	-	-	-	<0.00050	-	-	-	-	-	-	-	-	0.00043	-	-	-	-	-
Titanium (Ti)	mg/L	-	-	-	-	-	-	<0.0015	-	-	-	-	-	-	-	-	0.00257	-	-	-	-	-
Uranium (U)	mg/L	0.015	-	-	-	-	-	0.000749	-	-	-	-	-	-	-	-	0.0164	-	-	-	-	-
Vanadium (V)	mg/L	-	-	-	-	-	-	<0.0025	-	-	-	-	-	-	-	-	0.0029	-	-	-	-	-
Zinc (Zn)	mg/L	0.03	-	-	-	-	-	29.1	-	-	-	-	-	-	-	-	0.0071	-	-	-	-	-
Zirconium (Zr)	mg/L	-	-	-	-	-	-	<0.0015	-	-	-	-	-	-	-	-	0.00076	-	-	-	-	-

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

		Site Location	Seepage Dam			Tailings Facility										
		Sample ID	W14103083BH01	W14103083BH02	W14103083BH04	MP09-04	MP09-05	MP09-09	MP09-10	MP09-11	MP09-12	MP09-14	MW09-01	MW09-02	MW09-03	MW09-04
		Date Sampled	03/06/2015	03/06/2015	03/06/2015	04/06/2015	03/06/2015 17:45	04/06/2015 8:05	02/06/2015	04/06/2015 9:10	02/06/2015	02/06/2015 14:50	03/06/2015 12:15	02/06/2015 10:20	02/06/2015 15:10	02/06/2015 13:50
		ALS Work Number	-	-	-	-	L1622366	L1622366	-	L1622366	-	L1620902	L1622366	L1620902	L1620902	L1620902
		Station Status	Frozen	Frozen	Frozen	Frozen	Sampled	Sampled	Frozen	Sampled	Frozen	Direct Sampled	Damaged	Sampled	Sampled	Sampled
Parameter	Units	CCME-FAL[1, 2, 3, 4]														
Dissolved Metals																
Aluminum (Al)	mg/L	Varies [8]	-	-	-	-	0.0218	0.0030	-	0.0046	-	0.0041	<0.0020	<0.0050	<0.0050	<0.0020
Aluminum CCME-FAL	*mg/L*	-	-	-	-	-	*0.1*	*0.1*	-	*0.1*	-	-	*0.1*	*0.1*	*0.1*	*0.1*
Antimony (Sb)	mg/L	-	-	-	-	-	0.00033	0.0776	-	0.0140	-	0.00586	0.0442	0.00314	0.467	0.285
Arsenic (As)	mg/L	0.005	-	-	-	-	0.00755	15.3	-	7.35	-	3.44	0.206	20.2	1.47	3.84
Barium (Ba)	mg/L	-	-	-	-	-	0.0321	0.00053	-	0.145	-	0.145	0.0217	0.00683	0.0316	0.00758
Beryllium (Be)	mg/L	-	-	-	-	-	<0.000040	<0.000040	-	<0.000020	-	<0.000020	<0.000040	<0.00010	<0.00010	<0.000040
Bismuth (Bi)	mg/L	-	-	-	-	-	<0.00010	<0.00010	-	<0.000050	-	<0.000050	<0.00010	<0.00025	<0.00025	<0.00010
Boron (B)	mg/L	1.5	-	-	-	-	0.074	0.254	-	0.033	-	0.025	0.098	<0.050	0.155	0.307
Cadmium (Cd)	mg/L	Varies [9]	-	-	-	-	0.00141	0.000438	-	0.0000719	-	0.0000311	0.0332	0.000447	0.000608	0.000029
Cadmium CCME-FAL	*mg/L*	-	-	-	-	-	*0.00037*	*0.00037*	-	*0.00037*	-	*0.00037*	*0.00037*	*0.00037*	*0.00037*	*0.00037*
Calcium (Ca)	mg/L	-	-	-	-	-	382	114	-	86.2	-	121	502	438	493	469
Chromium (Cr)	mg/L	-	-	-	-	-	0.00069	<0.00020	-	0.00101	-	0.00019	<0.00020	<0.00050	<0.00050	<0.00020
Cobalt (Co)	mg/L	-	-	-	-	-	0.0183	0.0424	-	0.00128	-	0.00068	0.0192	0.0104	0.00325	0.00089
Copper (Cu)	mg/L	Varies [10]	-	-	-	-	0.00096	0.526	-	0.00043	-	<0.00020	0.00361	<0.0010	<0.0010	<0.00040
Copper CCME-FAL	*mg/L*	-	-	-	-	-	*0.004*	*0.004*	-	*0.004*	-	*0.004*	*0.004*	*0.004*	*0.004*	*0.004*
Iron (Fe)	mg/L	0.3	-	-	-	-	42.3	0.171	-	8.87	-	7.72	1.75	46.4	0.167	0.011
Lead (Pb)	mg/L	Varies [11]	-	-	-	-	<0.00010	0.00027	-	0.00171	-	0.000798	0.00430	<0.00025	<0.00025	0.00052
Lead CCME-FAL	*mg/L*	-	-	-	-	-	*0.007*	*0.007*	-	*0.007*	-	*0.007*	*0.007*	*0.007*	*0.007*	*0.007*
Lithium (Li)	mg/L	-	-	-	-	-	<0.0020	<0.0020	-	0.0022	-	0.0063	0.0054	0.0239	<0.0050	0.0093
Magnesium (Mg)	mg/L	-	-	-	-	-	75.6	1.10	-	40.8	-	16.7	56.9	75.7	89.8	112
Manganese (Mn)	mg/L	-	-	-	-	-	15.0	0.0239	-	2.48	-	0.363	20.5	38.2	35.1	6.47
Mercury (Hg)	mg/L	0.000026	-	-	-	-	<0.0000050	0.0000661	-	<0.0000050	-	0.0000067	0.0000103	0.0000051	<0.0000050	<0.0000050
Molybdenum (Mo)	mg/L	0.073	-	-	-	-	0.00085	0.0219	-	0.00350	-	0.00146	0.00260	0.00491	0.00511	0.00573
Nickel (Ni)	mg/L	Varies [12]	-	-	-	-	0.0083	0.0195	-	0.00654	-	0.00146	0.0066	0.0027	<0.0025	<0.0010
Nickel CCME-FAL	*mg/L*	-	-	-	-	-	*0.15*	*0.15*	-	*0.15*	-	*0.15*	*0.15*	*0.15*	*0.15*	*0.15*
Phosphorus (P)	mg/L	-	-	-	-	-	<0.050	0.205	-	<0.050	-	<0.050	<0.050	<0.050	0.051	0.078
Potassium (K)	mg/L	-	-	-	-	-	8.48	9.37	-	8.36	-	31.5	14.8	82.7	22.1	35.0
Selenium (Se)	mg/L	0.001	-	-	-	-	0.00027	0.00188	-	0.000246	-	0.000128	0.00013	<0.00025	<0.00025	<0.00010
Silicon (Si)	mg/L	-	-	-	-	-	5.85	6.22	-	9.06	-	2.90	6.55	5.81	13.9	13.4
Silver (Ag)	mg/L	0.0001	-	-	-	-	<0.000020	0.0244	-	0.000012	-	<0.000010	0.000076	<0.000050	<0.000050	<0.000020
Sodium (Na)	mg/L	-	-	-	-	-	46.2	25.3	-	11.0	-	17.7	93.2	73.5	27.6	30.8
Strontium (Sr)	mg/L	-	-	-	-	-	1.08	0.168	-	0.667	-	0.442	1.10	0.933	1.27	1.34
Sulfur (S)	mg/L	-	-	-	-	-	368	95.7	-	8.48	-	72.3	516	538	490	535
Thallium (Tl)	mg/L	0.0008	-	-	-	-	0.000024	0.000042	-	0.000012	-	<0.000010	0.000860	0.000216	0.000055	0.000107
Tin (Sn)	mg/L	-	-	-	-	-	<0.00020	<0.00020	-	<0.00010	-	<0.00010	<0.00020	<0.00050	<0.00050	<0.00020
Titanium (Ti)	mg/L	-	-	-	-	-	0.00113	<0.00060	-	0.00123	-	<0.00030	<0.00060	<0.0015	<0.0015	<0.00060
Uranium (U)	mg/L	0.015	-	-	-	-	0.00217	0.000861	-	0.000281	-	0.000355	0.00189	0.000535	0.00149	0.000346
Vanadium (V)	mg/L	-	-	-	-	-	0.0017	<0.0010	-	0.00354	-	<0.00050	<0.0010	<0.0025	<0.0025	<0.0010
Zinc (Zn)	mg/L	0.03	-	-	-	-	0.0249	<0.0020	-	0.0401	-	0.0018	2.98	0.178	<0.0050	0.713
Zirconium (Zr)	mg/L	-	-	-	-	-	0.00076	<0.00060	-	0.00160	-	<0.00030	<0.00060	<0.0015	<0.0015	<0.00060

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

		Site Location	Tailings Facility									
		Sample ID	MW09-05	MW09-06	MW09-07	MW09-08	MW09-11	MW09-20	MW09-21	MW09-22	MW09-23	MW09-24	W14103083BH03
		Date Sampled	03/06/2015	03/06/2015 13:55	03/06/2015	04/06/2015 13:10	02/06/2015	04/06/2015	03/06/2015	04/06/2015 10:10	04/06/2015 8:20	04/06/2015 14:40	03/06/2015 8:45
		ALS Work Number	-	L1622366	-	L1622366	-	-	-	L1622366	L1622366	L1622366	L1622366
		Station Status	Dry	Sampled	Dry	Sampled	Dry	Dry	Frozen	Sampled	Damaged	Sampled	Sampled
Parameter	Units	CCME-FAL [1, 2, 3, 4]											
Dissolved Metals													
Aluminum (Al)	mg/L	Varies [8]	-	<0.0020	-	0.0553	-	-	-	0.0475	0.0133	0.0016	0.0208
Aluminum CCME-FAL	*mg/L*	-	-	*0.1*	-	*0.1*	-	-	-	*0.005*	*0.1*	*0.1*	*0.1*
Antimony (Sb)	mg/L	-	-	0.259	-	0.00021	-	-	-	0.00019	<0.00050	0.00020	0.00060
Arsenic (As)	mg/L	0.005	-	0.122	-	0.189	-	-	-	0.0131	0.0136	0.00169	0.0541
Barium (Ba)	mg/L	-	-	0.00611	-	0.191	-	-	-	0.202	0.0734	0.0996	0.101
Beryllium (Be)	mg/L	-	-	<0.000040	-	<0.000020	-	-	-	<0.000020	<0.00010	<0.000020	<0.000020
Bismuth (Bi)	mg/L	-	-	<0.00010	-	<0.000050	-	-	-	<0.000050	<0.00025	<0.000050	<0.000050
Boron (B)	mg/L	1.5	-	0.116	-	<0.010	-	-	-	0.028	0.148	0.013	0.028
Cadmium (Cd)	mg/L	Varies [9]	-	0.00623	-	<0.0000050	-	-	-	0.0000778	<0.000025	0.0000435	0.0000064
Cadmium CCME-FAL	*mg/L*	-	-	*0.00037*	-	*0.00028*	-	-	-	*0.00037*	*0.00037*	*0.00037*	*0.00037*
Calcium (Ca)	mg/L	-	-	380	-	61.3	-	-	-	320	308	151	190
Chromium (Cr)	mg/L	-	-	<0.00020	-	0.00082	-	-	-	0.00079	<0.00050	0.00037	0.00045
Cobalt (Co)	mg/L	-	-	0.00151	-	0.00119	-	-	-	0.0144	0.0215	<0.00010	0.00467
Copper (Cu)	mg/L	Varies [10]	-	0.0107	-	<0.00020	-	-	-	0.00034	<0.0010	0.00855	0.00050
Copper CCME-FAL	*mg/L*	-	-	*0.004*	-	*0.004*	-	-	-	*0.004*	*0.004*	*0.004*	*0.004*
Iron (Fe)	mg/L	0.3	-	<0.010	-	65.0	-	-	-	64.7	15.1	<0.010	32.9
Lead (Pb)	mg/L	Varies [11]	-	0.00045	-	0.000070	-	-	-	<0.000050	<0.00025	<0.000050	0.000090
Lead CCME-FAL	*mg/L*	-	-	*0.007*	-	*0.007*	-	-	-	*0.007*	*0.007*	*0.007*	*0.007*
Lithium (Li)	mg/L	-	-	0.0099	-	<0.0010	-	-	-	<0.0010	<0.0050	0.0010	0.0010
Magnesium (Mg)	mg/L	-	-	67.1	-	11.6	-	-	-	30.3	122	42.0	44.3
Manganese (Mn)	mg/L	-	-	5.77	-	5.59	-	-	-	9.41	24.9	0.00029	6.37
Mercury (Hg)	mg/L	0.000026	-	0.0000180	-	<0.0000050	-	-	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)	mg/L	0.073	-	0.00401	-	0.000162	-	-	-	0.000235	0.00311	0.000309	0.000970
Nickel (Ni)	mg/L	Varies [12]	-	0.0025	-	<0.00050	-	-	-	0.00267	<0.0025	<0.00050	0.00241
Nickel CCME-FAL	*mg/L*	-	-	*0.15*	-	*0.15*	-	-	-	*0.15*	*0.15*	*0.15*	*0.15*
Phosphorus (P)	mg/L	-	-	<0.050	-	0.100	-	-	-	<0.050	<0.050	<0.050	0.074
Potassium (K)	mg/L	-	-	16.4	-	1.54	-	-	-	4.49	9.27	1.50	3.98
Selenium (Se)	mg/L	0.001	-	0.00019	-	0.000119	-	-	-	0.000168	<0.00025	0.00102	0.000139
Silicon (Si)	mg/L	-	-	7.56	-	10.0	-	-	-	5.07	6.24	6.20	9.64
Silver (Ag)	mg/L	0.0001	-	0.000062	-	<0.000010	-	-	-	0.000021	<0.000050	<0.000010	<0.000010
Sodium (Na)	mg/L	-	-	29.8	-	1.75	-	-	-	33.7	30.2	7.35	8.68
Strontium (Sr)	mg/L	-	-	0.748	-	0.238	-	-	-	1.06	0.727	0.537	0.498
Sulfur (S)	mg/L	-	-	364	-	26.3	-	-	-	295	330	80.1	90.7
Thallium (Tl)	mg/L	0.0008	-	0.000298	-	<0.000010	-	-	-	<0.000010	<0.000050	<0.000010	<0.000010
Tin (Sn)	mg/L	-	-	<0.00020	-	<0.00010	-	-	-	<0.00010	<0.00050	<0.00010	<0.00010
Titanium (Ti)	mg/L	-	-	<0.00060	-	0.00259	-	-	-	<0.0018	<0.0015	<0.00030	0.00102
Uranium (U)	mg/L	0.015	-	0.00215	-	0.000067	-	-	-	0.000293	0.00340	0.00436	0.00115
Vanadium (V)	mg/L	-	-	<0.0010	-	0.00257	-	-	-	0.00150	<0.0025	<0.00050	0.00158
Zinc (Zn)	mg/L	0.03	-	0.171	-	0.0022	-	-	-	0.0040	0.0807	0.0011	0.0027
Zirconium (Zr)	mg/L	-	-	<0.00060	-	0.00066	-	-	-	0.00047	<0.0015	<0.00030	0.00054

Table B: QAéQC Analytical Data

		Site Location	MW09-16			MW09-19		MP09-05				MW09-04				MW09-22				
		Sample ID	MW09-16	DUP-2 (MW09-16)		MW09-19	FB2 (MW09-19)	MP09-05	DUP-4 (MP09-05)		FB3 (MP09-05)	MW09-04	DUP-1 (MW09-04)		FB1 (MW09-04)	MW09-22	FB4 (MW09-22)	TRAVEL BLANK	TRAVEL BLANK
		Date Sampled	01/06/2015 18:00	01/06/2015 18:00		02/06/2015 8:30	02/06/2015 8:30	03/06/2015 17:45	03/06/2015 17:45		03/06/2015 17:45	02/06/2015 13:50	02/06/2015 13:50		02/06/2015 13:50	04/06/2015 10:10	04/06/2015 10:10	03/06/2015	05/06/2015
		ALS Work Number	L1620902	L1620902	*RPD (%)* [13]	L1620902	L1620902	L1622366	L1622366	*RPD (%)* [13]	L1622366	L1620902	L1620902	*RPD (%)* [13]	L1620902	L1622366	L1622366	L1620902	L1622366
		Station Status	Sampled	Sampled		Sampled	Sampled	Sampled	Sampled		Sampled	Sampled	Sampled		Sampled	Sampled	Sampled	-	-
Parameter	Units	CCME-FAL [1,2,3,4]																	
Physical Tests																			
Lab pH	pH units	6.5-9.0 [5]	7.97	7.98	*0.1*	7.80	5.55	6.95	7.06	*1.6*	5.5	8.09	8.12	*0.4*	5.66	6.33	5.58	5.48	5.43
Field pH	pH units	6.5-9.0 [5]	6.75	6.75	*0.0*	6.77	-	6.66	6.66	*0.0*	-	8.03	8.03	*0.0*	-	6.25	-	-	-
Field Temperature	C	-	5.00	5.00	*0.0*	0.70	-	2.70	2.70	*0.0*	-	4.32	4.32	*0.0*	-	3.40	-	-	-
Lab Conductivity	uS/cm	-	1970	1960	*0.5*	2340	<2.0	2120	2120	*0.0*	<2.0	2670	2660	*0.4*	<2.0	1560	<2.0	<2.0	<2.0
Field Conductivity	uS/cm	-	1257	1257	*0.0*	1344	-	1361	1361	*0.0*	-	1640	1640	*0.0*	-	991	-	-	-
Field Specific Conductivity	uS/cm	-	2036	2036	*0.0*	2507	-	2369	2369	*0.0*	-	2706	2706	*0.0*	-	1674	-	-	-
Total Hardness (as CaCO3)	mg/L	-	1260	1280	*1.6*	1460	<0.50	1270	1300	*2.3*	<0.50	1630	1630	*0.0*	<0.50	924	<0.50	<0.50	<0.50
Field Dissolved Oxygen	mg/L	9.5 [6]	0.05	0.05	*0.0*	1.14	-	0.07	0.07	*0.0*	-	0.29	0.29	*0.0*	-	0.26	-	-	-
Field Oxidation - Redox Potent	mV	-	128.7	128.7	*0.0*	-86.8	-	-46.9	-46.9	*0.0*	-	32.7	32.7	*0.0*	-	17.7	-	-	-
Field Turbidity	NTU	-	0.89	0.89	*0.0*	0.22	-	1.87	1.87	*0.0*	-	2.43	2.43	*0.0*	-	12.60	-	-	-
Anions and Nutrients																			
Alkalinity, Total (CaCO3)	mg/L	-	224	240	*6.9*	403	<1.0	280	277	*1.1*	<1.0	100	97.0	*3.0*	<1.0	70.6	<1.0	<1.0	<1.0
Alkalinity, Total (CaCO3, filtered)	mg/L	-	221	-	*nc*	409	<1.0	282	288	*2.1*	<1.0	-	96.3	*nc*	<1.0	117	<1.0	-	-
Ammonia, Total (as N)	mg/L	Varies [7]	0.0331	0.0321	*3.1*	3.23	<0.0050	10.1	10.1	*0.0*	<0.0050	6.27	6.19	*1.3*	<0.0050	1.47	<0.0050	**0.0071**	<0.0050
Ammonia CCME-FAL	*mg/L*	-	*27.15*	*27.15*	-	*36.97*	-	*40.32*	*40.32*	-	-	*1.524*	*1.524*	-	*1.524*	*97.81*	-	-	-
Chloride (Cl)	mg/L	-	<5.0	<2.5	*nc*	<5.0	<0.50	<2.5	<5.0	*nc*	<0.50	<5.0	<5.0	*nc*	<0.50	<2.5	<0.50	<0.50	<0.50
Fluoride (F)	mg/L	0.12	0.47	0.25	*nc*	0.28	<0.020	0.14	<0.20	*nc*	<0.020	0.64	0.55	*15.1*	<0.020	0.10	<0.020	<0.020	<0.020
Nitrate (as N)	mg/L	13	<0.050	<0.025	*nc*	<0.050	<0.0050	<0.025	<0.050	*nc*	<0.0050	0.269	0.300	*10.9*	<0.0050	0.039	<0.0050	<0.0050	<0.0050
Nitrite (as N)	mg/L	0.06	<0.010	<0.0050	*nc*	<0.010	<0.0010	<0.0050	<0.010	*nc*	<0.0010	0.040	0.045	*11.8*	<0.0010	0.0205	<0.001	<0.0010	<0.0010
Total Kjeldahl Nitrogen	mg/L	-	0.181	0.192	*5.9*	4.02	<0.050	13.8	13.6	*1.5*	<0.050	7.51	7.21	*4.1*	<0.050	4.42	<0.050	<0.050	<0.050
Sulfate (SO4)	mg/L	-	1100	1120	*1.8*	1230	<0.30	1120	1090	*2.7*	<0.30	1550	1760	*12.7*	<0.30	809	<0.30	<0.30	<0.30
Sulphide as S	mg/L	-	<0.020	<0.020	*nc*	0.123	<0.020	<0.020	<0.020	*nc*	<0.020	<0.020	<0.020	*nc*	<0.020	<0.020	<0.020	<0.020	<0.020
Field Sulphide	mg/L	-	0.00	0.00	*nc*	0.05	-	0.00	0.00	*nc*	-	0.07	0.07	*0.0*	-	0.07	-	-	-
Anion Sum	meq/L	-	27.5	28.2	*2.5*	33.6	<0.10	28.9	28.2	*2.5*	<0.10	34.4	38.5	*11.2*	<0.10	18.3	<0.10	<0.10	<0.10
Cation Sum	meq/L	-	26.0	26.4	*1.5*	31.7	<0.10	31.1	31.9	*2.5*	<0.10	35.5	35.4	*0.3*	<0.10	24.0	<0.10	<0.10	<0.10
Cation - Anion Balance	%	-	-2.8	-3.4	-	-3.0	0.0	3.5	6.1	-	0.0	1.6	-4.2	-	0.0	13.5	94.6	0.0	0.0
Cyanides																			
Cyanide, Total	mg/L	-	<0.0050	<0.0050	*nc*	<0.0050	<0.0050	0.0108	0.0140	*nc*	<0.0050	<0.0050	<0.0050	*nc*	<0.0050	0.0124	<0.0050	<0.0050	<0.0050
Cyanide, Free	mg/L	0.005	<0.0050	<0.0050	*nc*	<0.0050	<0.0050	<0.0050	0.006	*nc*	<0.0050	<0.0050	<0.0050	*nc*	<0.0050	0.0059	<0.0050	<0.0050	<0.0050
Cyanide, Weak Acid Diss	mg/L	-	<0.0050	<0.0050	*nc*	<0.0050	<0.0050	<0.0050	<0.0050	*nc*	<0.0050	<0.0050	<0.0050	*nc*	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Thiocyanate (SCN)	mg/L	-	<0.50	<0.50	*nc*	0.53	<0.50	0.78	0.78	*0.0*	<0.50	<0.50	<0.50	*nc*	<0.50	<0.50	<0.50	<0.50	<0.50
Organic/Inorganic Carbon																			
Total Inorganic Carbon	mg/L	-	52.2	50.5	*3.3*	96.4	<0.50	61.3	58.3	*5.0*	<0.50	18.7	19.0	*1.6*	<0.50	15.6	<0.50	<0.50	<0.50
Total Organic Carbon	mg/L	-	3.57	3.56	*0.3*	12.6	<0.50	25.4	26.2	*3.1*	<0.50	6.29	6.23	*1.0*	<0.50	14.6	<0.50	<0.50	**0.52**
Dissolved Metals																			
Aluminum (Al)	mg/L	Varies [8]	<0.0010	<0.0010	*nc*	0.0090	<0.0010	0.0218	0.0230	*5.4*	<0.0010	<0.0020	<0.0020	*nc*	<0.0010	0.0475	<0.0010	-	-
Aluminum CCME-FAL	*mg/L*	-	*0.1*	*0.1*	-	*0.1*	-	*0.1*	*0.1*	-	-	*0.1*	*0.1*	-	*0.1*	*0.005*	-	-	-
Antimony (Sb)	mg/L	-	0.0801	0.0780	*2.7*	<0.00020	<0.00010	0.00033	0.00033	*0.0*	<0.00010	0.285	0.283	*0.7*	<0.00010	0.00019	<0.00010	-	-
Arsenic (As)	mg/L	0.005	0.0426	0.0420	*1.4*	0.117	<0.00010	0.00755	0.00811	*7.2*	<0.00010	3.84	3.85	*0.3*	<0.00010	0.0131	<0.00010	-	-
Barium (Ba)	mg/L	-	0.0144	0.0147	*2.1*	0.0460	<0.000050	0.0321	0.0324	*0.9*	<0.000050	0.00758	0.00735	*3.1*	<0.000050	0.202	<0.000050	-	-
Beryllium (Be)	mg/L	-	<0.000020	<0.000020	*nc*	<0.000040	<0.000020	<0.000040	<0.000040	*nc*	<0.000020	<0.000040	<0.000040	*nc*	<0.000020	<0.000020	<0.000020	-	-
Bismuth (Bi)	mg/L	-	<0.000050	<0.000050	*nc*	<0.00010	<0.000050	<0.00010	<0.00010	*nc*	<0.000050	<0.00010	<0.00010	*nc*	<0.000050	<0.000050	<0.000050	-	-
Boron (B)	mg/L	1.5	0.062	0.068	*9.2*	0.190	<0.010	0.074	0.071	*4.1*	<0.010	0.307	0.296	*3.6*	<0.010	0.028	<0.010	-	-
Cadmium (Cd)	mg/L	Varies [9]	0.0440	0.0448	*1.8*	<0.000010	<0.0000050	0.00141	0.00128	*9.7*	<0.0000050	0.000029	0.000026	*10.9*	<0.0000050	0.0000778	<0.0000050	-	-
Cadmium CCME-FAL	*mg/L*	-	*0.00037*	*0.00037*	*0.0*	*0.00037*	-	*0.00037*	*0.00037*	*0.0*	-	*0.00037*	*0.00037*	*0.0*	*0.0004*	*0.00037*	-	-	-
Calcium (Ca)	mg/L	-	297	303	*2.0*	313	<0.050	382	392	*2.6*	<0.050	469	484	*3.1*	<0.050	320	<0.050	-	-
Chromium (Cr)	mg/L	-	<0.00010	<0.00010	*nc*	<0.00020	<0.00010	0.00069	0.00160	*nc*	<0.00010	<0.00020	<0.00020	*nc*	<0.00010	0.00079	<0.00010	-	-
Cobalt (Co)	mg/L	-	0.00295	0.00290	*1.7*	0.00251	<0.00010	0.0183	0.0181	*1.1*	<0.00010	0.00089	0.00086	*3.4*	<0.00010	0.0144	<0.00010	-	-
Copper (Cu)	mg/L	Varies [10]	0.00526	0.00513	*2.5*	<0.00040	<0.00020	0.00096	0.00098	*2.1*	<0.00020	<0.00040	<0.00040	*nc*	<0.00020	0.00034	<0.00020	-	-
Copper CCME-FAL	*mg/L*	-	*0.004*	*0.004*	-	*0.004*	-	*0.004*	*0.004*	-	-	*0.004*	*0.004*	-	*0.02*	*0.004*	-	-	-
Iron (Fe)	mg/L	0.3	0.033	0.034	*3.0*	20.5	<0.010	42.3	43.8	*3.5*	<0.010	0.011	0.019	*nc*	<0.010	64.7	<0.010	-	-
Lead (Pb)	mg/L	Varies [11]	0.00583	0.00635	*8.5*	<0.00010	<0.000050	<0.00010	<0.00010	*nc*	<0.000050	0.00052	0.00071	*nc*	<0.000050	<0.000050	<0.000050	-	-
Lead CCME-FAL	*mg/L*	-	*0.007*	*0.007*	-	*0.007*	-	*0.007*	*0.007*	-	-	*0.007*	*0.007*	-	*0.001*	*0.007*	-	-	-
Lithium (Li)	mg/L	-	0.0097	0.0101	*4.0*	0.0106	<0.0010	<0.0020	<0.0020	*nc*	<0.0010	0.0093	0.0093	*0.0*	<0.0010	<0.0010	<0.0010	-	-
Magnesium (Mg)	mg/L	-	127	128	*0.8*	165	<0.10	75.6	78.4	*3.6*	<0.10	112	101	*10.3*	<0.10	30.3	<0.10	-	-
Manganese (Mn)	mg/L	-	0.803	0.777	*3.3*	7.05	<0.00010	15.0	15.1	*0.7*	<0.00010	6.47	6.32	*2.3*	<0.00010	9.41	<0.00010	-	-
Mercury (Hg)	mg/L	0.000026	0.0000175	0.0000165	*5.9*	<0.0000050	<0.0000050	<0.0000050	<0.0000050	*nc*	<0.0000050	<0.0000050	<0.0000050	*nc*	<0.0000050	<0.0000050	<0.0000050	-	-
Molybdenum (Mo)	mg/L	0.073	0.000222	0.000228	*2.7*	0.00018	<0.000050	0.00085	0.00078	*8.6*	<0.000050	0.00573	0.00570	*0.5*	<0.000050	0.000235	<0.000050	-	-
Nickel (Ni)	mg/L	Varies [12]	0.00535	0.00518	*3.2*	<0.0010	<0.0050	0.0083	0.0081	*2.4*	<0.0050	<0.0010	<0.0010	*nc*	<0.0050	0.00267	<0.00050	-	-
Nickel CCME-FAL	*mg/L*	-	*0.15*	*0.15*	-	*0.15*	-	*0.15*	*0.15*	-	-	*0.15*	*0.15*	-	*0.025*	*0.15*	-	-	-
Phosphorus (P)	mg/L	-	<0.050	<0.050	*nc*	0.145	<0.050	<0.050	<0.050	*nc*	<0.050	0.078	0.074	*5.3*	<0.050	<0.050	<0.050	-	-
Potassium (K)	mg/L	-	6.32	6.49	*2.7*	6.76	<0.10	8.48	9.07	*6.7*	<0.10	35.0	36.7	*4.7*	<0.10	4.49	<0.10	-	-
Selenium (Se)	mg/L	0.001	0.000097	0.000100	*3.0*	0.00021	<0.000050	0.00027	0.00031	*13.8*	<0.000050	<0.00010	<0.00010	*nc*	<0.000050	0.000168	<0.000050	-	-
Silicon (Si)	mg/L	-	4.53	4.61	*1.8*	8.46	<0.050	5.85	5.92	*1.2*	<0.050	13.4	13.8	*2.9*	<0.050	5.07	<0.050	-	-
Silver (Ag)	mg/L	0.0001	0.000097	0.000103	*6.0*	<0.000020	<0.000010	<0.000020	<0.000020	*nc*	<0.000010	<0.000020	<0.000020	*nc*	<0.000010	0.000021	<0.000010	-	-
Sodium (Na)	mg/L	-	7.32	6.99	*4.6*	16.8	<0.050	46.2	45.2	*2.2*	<0.050	30.8	30.3	*1.6*	<0.050	33.7	<0.050	-	-
Strontium (Sr)	mg/L	-	0.665	0.676	*1.6*	1.07	<0.00020	1.08	1.07	*0.9*	<0.00020	1.34	1.31	*2.3*	<0.00020	1.06	<0.00020	-	-
Sulfur (S)	mg/L	-	317	321	*1.3*	345	<0.50	368	355	*3.6*	<0.50	535	493	*8.2*	<0.50	295	<0.50	-	-
Thallium (Tl)	mg/L	0.0008	0.000459	0.000454	*1.1*	<0.000020	<0.000010	0.000024	0.000020	*18.2*	<0.000010	0.000107	0.000108	*0.9*	<0.000010	<0.000010	<0.000010	-	-
Tin (Sn)	mg/L	-	<0.00010	<0.00010	*nc*	<0.00020	<0.00010	<0.00020	<0.00020	*nc*	<0.00010	<0.00020	<0.00020	*nc*	<0.00010	<0.00010	<0.00010	-	-
Titanium (Ti)	mg/L	-	<0.00030	<0.00030	*nc*	0.00079	<0.00030	0.00113	<0.0015	*nc*	<0.00030	<0.00060	<0.00060	*nc*	<0.00030	<0.0018	<0.00030	-	-
Uranium (U)	mg/L	0.015	0.00301	0.00293	*2.7*	0.000755	<0.000010	0.00217	0.00216	*0.5*	<0.000010	0.000346	0.000332	*4.1*	<0.000010	0.000293	<0.000010	-	-
Vanadium (V)	mg/L	-	<0.00050	<0.00050	*nc*	<0.0010	<0.00050	0.0017	0.0017	*0.0*	<0.00050	<0.0010	<0.0010	*nc*	<0.00050	0.00150	<0.00050	-	-
Zinc (Zn)	mg/L	0.03	6.24	6.09	*2.4*	<0.0020	<0.0010	0.0249	0.0251	*0.8*	<0.0010	0.713	0.705	*1.1*	<0.0010	0.0040	<0.0010	-	-
Zirconium (Zr)	mg/L	-	<0.00030	<0.00030	*nc*	<0.00060	<0.00030	0.00076	0.00075	*1.3*	<0.00030	<0.00060	<0.00060	*nc*	<0.00030	0.00047	<0.00030	-	-

Table B: QAéQC Analytical Data

		Site Location	MW09-16			MW09-19		MP09-05				MW09-04				MW09-22			
		Sample ID	MW09-16	DUP-2 (MW09-16)		MW09-19	FB2 (MW09-19)	MP09-05	DUP-4 (MP09-05)		FB3 (MP09-05)	MW09-04	DUP-1 (MW09-04)		FB1 (MW09-04)	MW09-22	FB4 (MW09-22)	TRAVEL BLANK	TRAVEL BLANK
		Date Sampled	01/06/2015 18:00	01/06/2015 18:00		02/06/2015 8:30	02/06/2015 8:30	03/06/2015 17:45	03/06/2015 17:45		03/06/2015 17:45	02/06/2015 13:50	02/06/2015 13:50		02/06/2015 13:50	04/06/2015 10:10	04/06/2015 10:10	03/06/2015	05/06/2015
		ALS Work Number	L1620902	L1620902	*RPD (%)* [13]	L1620902	L1620902	L1622366	L1622366	*RPD (%)* [13]	L1622366	L1620902	L1620902	*RPD (%)* [13]	L1620902	L1622366	L1622366	L1620902	L1622366
		Station Status	Sampled	Sampled		Sampled	Sampled	Sampled	Sampled		Sampled	Sampled	Sampled		Sampled	Sampled	Sampled	-	-
Parameter	Units	CCME-FAL [1,2,3,4]																	
Total Metals																			
Aluminum (Al)	mg/L	Varies [8]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0030	<0.0030
Aluminum CCME-FAL	*mg/L*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Antimony (Sb)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	<0.00010
Arsenic (As)	mg/L	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	<0.00010
Barium (Ba)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000050	<0.000050
Beryllium (Be)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000020	<0.000020
Bismuth (Bi)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000050	<0.000050
Boron (B)	mg/L	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.010	<0.010
Cadmium (Cd)	mg/L	Varies [9]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0000050	<0.0000050
Cadmium CCME-FAL	*mg/L*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Calcium (Ca)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.050	<0.050
Chromium (Cr)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	<0.00010
Cobalt (Co)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	<0.00010
Copper (Cu)	mg/L	Varies	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00050	<0.00050
Copper CCME-FAL	*mg/L*	Varies [10]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Iron (Fe)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.010	<0.010
Lead (Pb)	mg/L	Varies [11]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000050	<0.000050
Lead CCME-FAL	*mg/L*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Lithium (Li)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0010	<0.0010
Magnesium (Mg)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.10	<0.10
Manganese (Mn)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	<0.00010
Mercury (Hg)	mg/L	0.000026	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0000050	<0.0000050
Molybdenum (Mo)	mg/L	0.073	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000050	<0.000050
Nickel (Ni)	mg/L	Varies [12]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00050	<0.00050
Nickel CCME-FAL	*mg/L*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.050	<0.050
Potassium (K)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.10	<0.10
Selenium (Se)	mg/L	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000050	<0.000050
Silicon (Si)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.050	<0.050
Silver (Ag)	mg/L	0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000010	<0.000010
Sodium (Na)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.050	<0.050
Strontium (Sr)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00020	<0.00020
Thallium (Tl)	mg/L	0.0008	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000010	<0.000010
Tin (Sn)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00010	<0.00010
Titanium (Ti)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00030	<0.00030
Uranium (U)	mg/L	0.015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.000010	<0.000010
Vanadium (V)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00050	<0.00050
Zinc (Zn)	mg/L	0.03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.0030	<0.0030
Zirconium (Zr)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	<0.00030	<0.00030

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

(6) Guideline note: Lowest acceptable dissolved oxygen concentration for cold-water biota, early life stages

(7) Ammonia varies with pH and temperature for CCME FAL; see the CCME ammonia fact sheet for details regarding the applicable criteria, ammonia-NH3 versus total ammonia-N,and other usage guidelines. CCME values listed in the table are expressed as ammonia (N) When field pH is not available, lab pH is used. When field and lab pH are both not available, the most stringent guideline has been used.

(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) 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

(11) 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

(12) 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

(13) 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.

Italics text indicates the parameter-specific standard (calculated) for a particular sample.

Bold and underlined indicates values above RDL in Field Blank of Travel Blank

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

APPENDIX A
Site Photographs

Photo 1: View of drive point wells GSI-DC-01A and GSI-DC-01B. Photo taken on June 1, 2015.

Photo 2: View of drive point wells GSI-DC-02A and GSI-DC-02B. Photo taken on June 1, 2015.

Photo 3: View of drive point wells GSI-DC-03A and GSI-DC-03B. Photo taken on June 2, 2015. Drive point wells are frozen beneath accumulated ice.

Photo 4: View of drive point wells GSI-DC-05A and GSI-DC-05B. Photo taken on June 3, 2015.

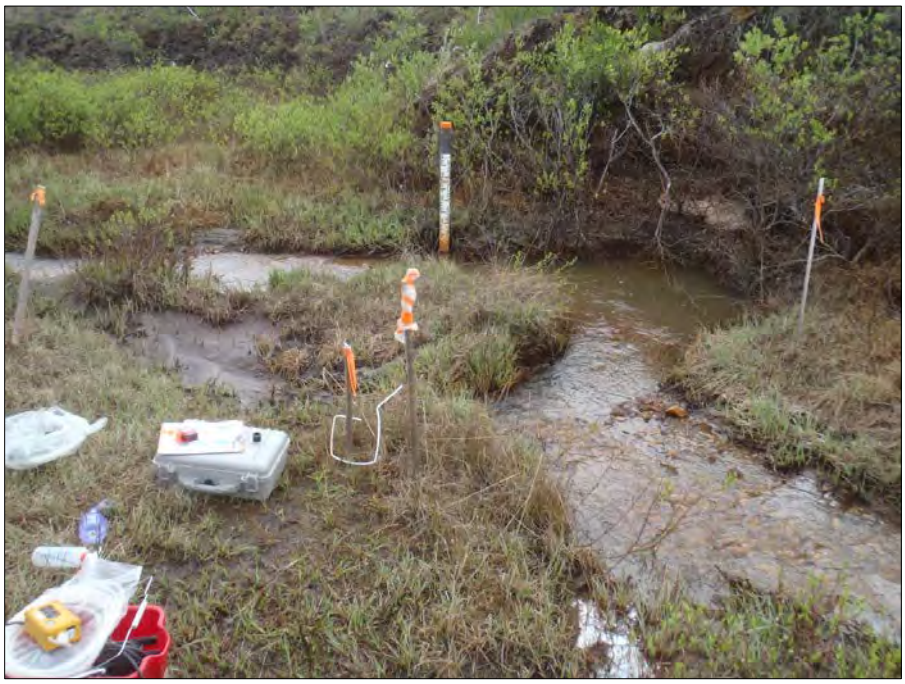

Photo 5: View of drive point wells GSI-DC-06A and GSI-DC-06B. Photo taken on June 4, 2015.

Photo 6: View of drive point wells GSI-DC-07A and GSI-DC-07B. Photo taken on June 4, 2015.

Photo 7: View of drive point wells GSI-DC-08A and GSI-DC-08B. Photo taken on June 4, 2015.

Photo 8: View of drive point wells GSI-DC-09A and GSI-DC-09B. Photo taken on June 4, 2015.

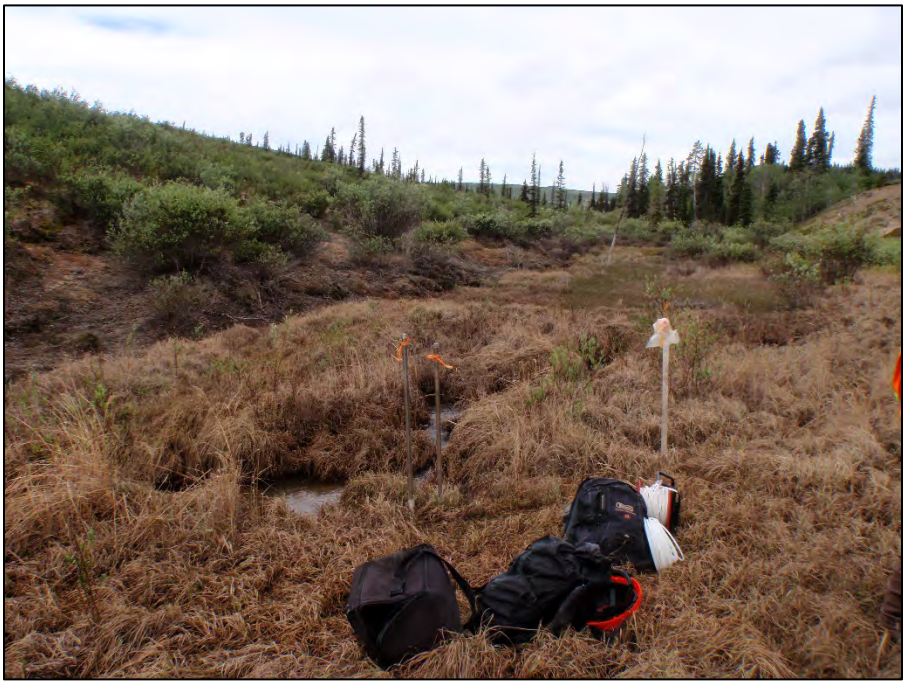

Photo 9: View of drive point wells GSI-DC-10A and GSI-DC-10B. Photo taken on June 4, 2015.

Photo 10: View of drive point well GSI-HA-01A. Photo taken on June 1, 2015.

Photo 11: View of drive point well GSI-HA-02A. Photo taken on June 1, 2015.

Photo 12: View of drive point well GSI-HA-03A. Photo taken on June 1, 2015.

Photo 13: View of drive point well GSI-HA-04A. Photo taken on June 1, 2015.

Photo 14: View of drive point well GSI-HA-05A. Photo taken on June 1, 2015.

Photo 15: View of well MW09-15. Photo taken on June 1, 2015.

Photo 16: View of well MW09-16. Photo taken on June 1, 2015.

Photo 17: View of well MW09-17. Photo taken on June 2, 2015.

Photo 18: View of well MW09-18. Photo taken on June 2, 2015.

Photo 19: View of well MW09-19. Photo taken on June 2, 2015.

Photo 20: View of well CH-P-13-01/10. Photo taken on June 1, 2015.

Photo 21: View of wells CH-P-13-03/50 and CH-P-13-03/10. Photo taken on June 1, 2015.

Photo 22: View of wells CH-P-13-04/10 and CH-P-13-04/35. Photo taken on June 1, 2015.

Photo 23: View of well CH-P-13-05/50. Photo taken on June 1, 2015.

Photo 24: View of well GLL07-01. Photo taken on June 1, 2015.

Photo 25: View of well GLL07-02. Photo taken on June 3, 2015.

Photo 26: View of well GLL07-03. Photo taken on June 1, 2015.

Photo 27: View of well MW09-13. Photo taken on June 1, 2015.

Photo 28: View of well MW09-14. Photo taken on June 1, 2015.

Photo 29: View of well GSI-PC-02A and GSI-PC-02B. Photo taken on June 3, 2015.

Photo 30: General location of well GSI-PC-03A and GSI-PC-03B. Photo taken on June 3, 2015.

Photo 31: View of wells GSI-PC-04A and GSI-PC-04B. Photo taken on June 3, 2015.

Photo 32: View of wells GSI-PC-05A and GSI-PC-05B. Photo taken on June 3, 2015.

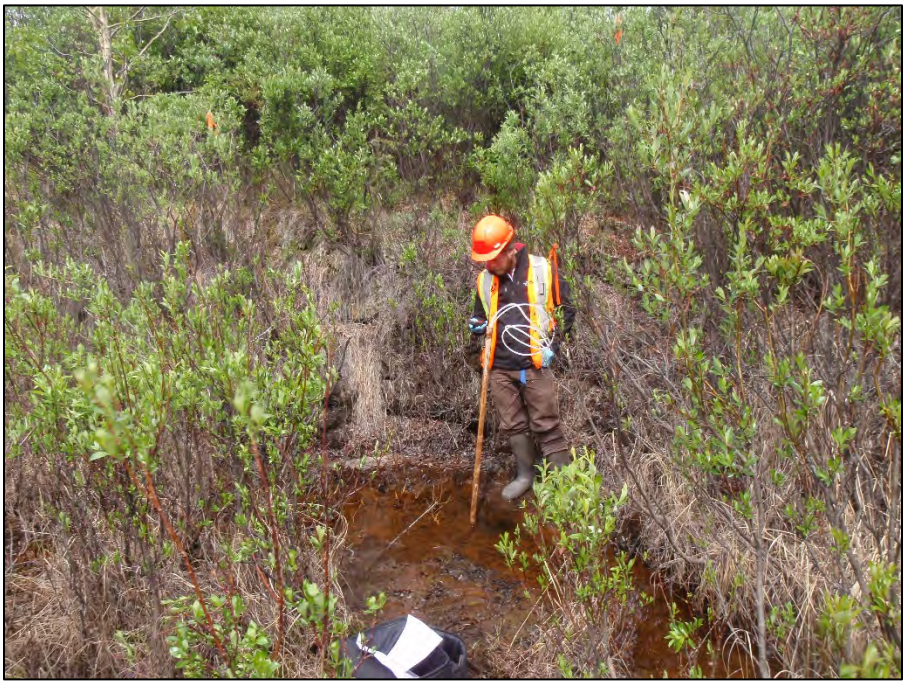

Photo 33: View of well MP09-02. Photo taken on June 3, 2015.

Photo 34: View of well MP09-03. Photo taken on June 3, 2015.

Photo 35: View of well MP09-08. Photo taken on June 3, 2015.

Photo 36: View of well W14103083BH01. Photo taken on June 3, 2015.

Photo 37: View of well W14103083BH02. Photo taken on June 3, 2015.

Photo 38: View of well W14103083BH04. Photo taken on June 3, 2015.

Photo 39: View of well MP09-04. Photo taken on June 4, 2015.

Photo 40: View of well MP09-05. Photo taken on June 3, 2015.

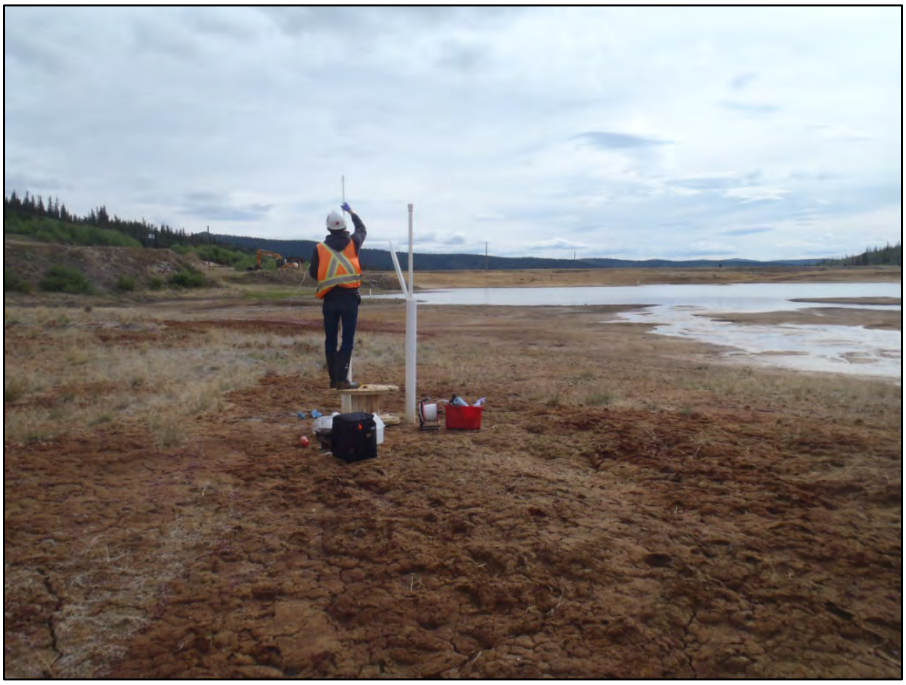

Photo 41: View of wells MP09-09 and MP09-10. Photo taken on June 2, 2015.

Photo 42: View of wells MP09-11 and MP09-12. Photo taken on June 2, 2015.

Photo 43: View of well MP09-14. Photo taken on June 2, 2015.

Photo 44: View of wells MW09-01 and MW09-02. Photo taken on June 2, 2015.

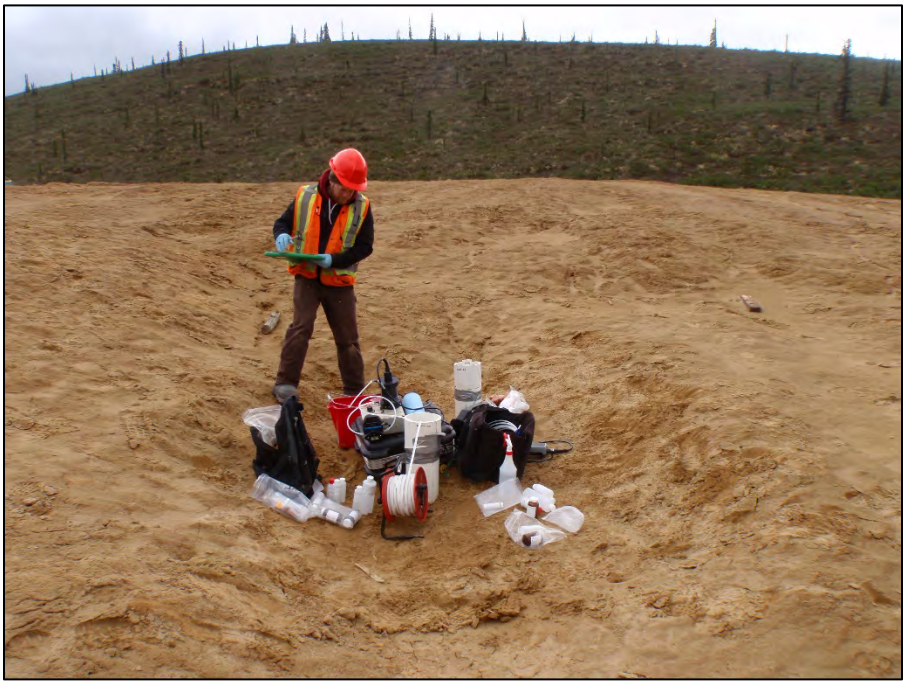

Photo 45: View of wells MW09-03 and MW09-04. Photo taken on June 2, 2015.

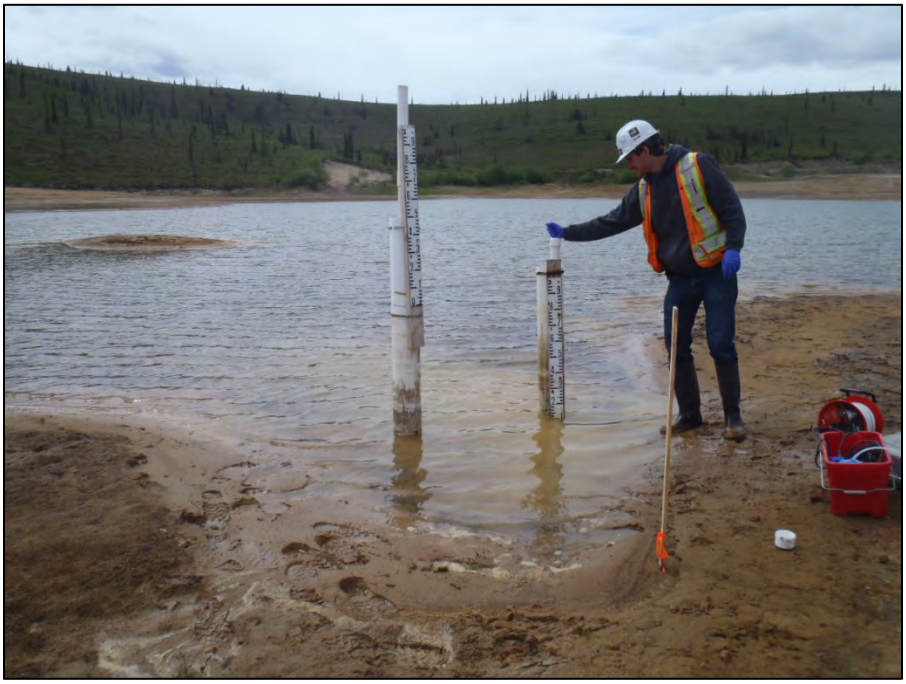

Photo 46: View of wells MW09-05 and MW09-06. Photo taken on June 3, 2015.

Photo 47: View of well MW09-07. Photo taken on June 3, 2015.

Photo 48: View of well MW09-08. Photo taken on June 4, 2015.

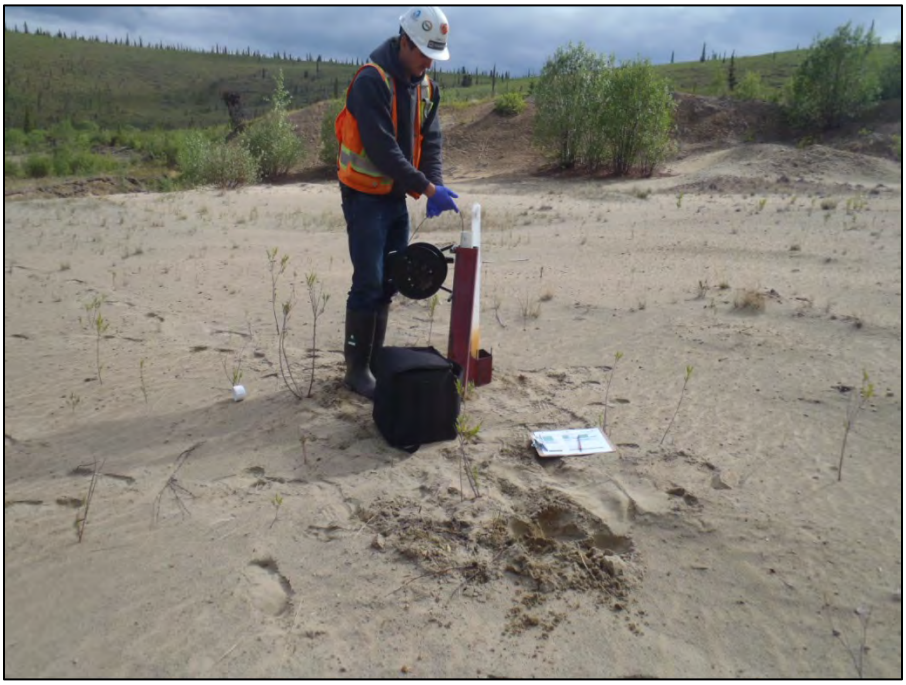

Photo 49: View of well MW09-11. Photo taken on June 2, 2015.

Photo 50: View of well MW09-20. Photo taken on June 4, 2015.

Photo 51: View of well MW09-21. Photo taken on June 3, 2015.

Photo 52: View of well MW09-22. Photo taken on June 3, 2015.

Photo 53: View of well MW09-23. Photo taken on June 3, 2015.

Photo 54: View of well MW09-24. Photo taken on June 4, 2015.

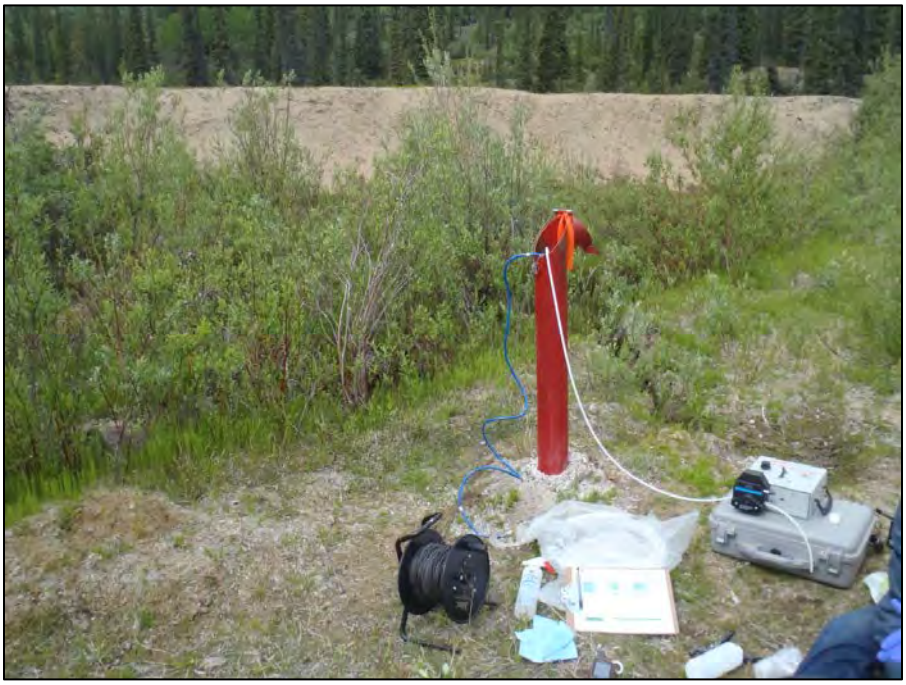

Photo 55: View of well W14103083BH03. Photo taken on June 2, 2015.

Photo 56: View of well CH-P-13-02/10. Photo taken on June 1, 2015.

APPENDIX B
Field Forms

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	CH-P-13-01/10	**Project Number:**	1343-005.09	**Date:**	01/06/2015
Approximate Date Drilled:	unknown	**Client:**	GY - AAM	**Sampler:**	AN, RM
Piezometer Diameter / Screen Length:	1½" / unknown	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Overcast ~10°C
UTM Location	Z. 8 E. 388652 N. 6881119	**Waypoint**	GPS AN Name CH-P-13-01/10	**Recovery:**	☐ Good ☐ Bad
Photos	Cam. EJR Nos. 167-169	**Purge Method**			
Duplicate Collected:	☐ Yes Name _____		**Waterra**	**Peristaltic**	**Disp. Bailer**
Field Blank Collected	☐ Yes Name _____	**Analysis**			

Initial Depth to ~~Water~~ (m): ICE	6.446	**Purge Start Time:**		**Purge End Time:**							
Depth to Bottom (m):		**Purge Interval Time (___) min, Vol. (___) L**									
Submerged Tubing Depth (m):		**Depth to water (m)**									
Well Stick-up Height (m):	0.52	**Temperature (°C)**									
Estimated Water Volume (L):		**pH (pH Units)**									
		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		**DO (%)**									
		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		**Interval Purge Volume (L)**									
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Cumulative Purge Volume (L):**									

FROZEN

YSI Field Parameters Logged:	☐ Yes ☐ No	**Sample Method**			
Time on YSI (24hr):			**Waterra**	**Peristaltic**	**Disp. Bailer**
Actual time of measurement (24hr):		**Analysis**			

HEMMERA

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

Sample Date (Con't): _____

Sample Time: _____

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

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

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

Head Space Gas Measurements

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

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☒	Preservative Added ☒	Vol. 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, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

Ice formed on tip of water level meter when dipped

Used Insight Vision 2D camera to investigate blockage. Footage recorded on USB. Footage shows obvious ice blockage.

Tubing was removed from well. Tubing removed very easily. tubing only slightly below ice blockage. Hole in ice blockage where tubing was removed showed on footage.

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	CH-P-13-02/10	**Project Number:**	1343-005.09	**Date:**	01/06/2015
Approximate Date Drilled:	unknown	**Client:**	GY - AAM	**Sampler:**	AN, RM
Piezometer Diameter / Screen Length:	1½" / unknown	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	overcast ~10°C
UTM Location	Z.8 E.388724 N.6881014	**Waypoint**	GPS AN Name CH-P-13-02/10	**Recovery:**	☐ Good ☐ Bad
Photos	Cam. EL R Nos. 164-166	**Purge Method**			
Duplicate Collected:	☐ Yes Name _____		**Waterra**	**Peristaltic**	**Disp. Bailer**
Field Blank Collected	☐ Yes Name _____	**Analysis**			

Initial Depth to Water (m):	DRY	**Purge Start Time:**				**Purge End Time:**					
Depth to Bottom (m):	8.202	**Purge Interval** Time (___) min, Vol. (___) L									
Submerged Tubing Depth (m):		**Depth to water (m)**									
Well Stick-up Height (m):	0.63	**Temperature (°C) 3%**									
Estimated Water Volume (L):		**pH (pH Units) ±0.1**									
		Cond. (µs/cm) 3%									
		Specific Cond. (µs/cm) 3%									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Redox (mV) 10%**									
		DO (mg/L) 10%									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**DO (%) 10%**									
		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		**Interval Purge Volume (L)**									
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Cumulative Purge Volume (L):**									

DRY

YSI Field Parameters Logged:	☐ Yes ☐ No	**Sample Method**		
Time on YSI (24hr):			**Waterra**	**Peristaltic**	**Disp. Bailer**
Actual time of measurement (24hr):		**Analysis**			

HEMMERA

Sample Site (Con't): CH-P-13-02/10

Sample Date (Con't): _____

Sample Time: _____

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

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

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

Head Space Gas Measurements

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

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☒	Preservative Added ☒	Vol. 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, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

Trace amount of water found in bottom of well

Bentonite and filter pack (screen sand) found on tip of water level meter.

Used Insight Vision 2D camera to investigate bottom of well Footage recorded on USB.

Footage shows bentonite at bottom of screen. From the video footage, it appears that bentonite seeped through the upper portion of screen slots into the well.

Check. Low 1

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	CH-P-13-03/10	Project Number:	1343-005.09	Date:	01/06/2015
Approximate Date Drilled:	unknown	Client:	GY - AAM	Sampler:	AN, RM
Piezometer Diameter / Screen Length:	1.½ / unknown	Project Name:	Mount Nansen 2015 GW Sampling Program	Weather/Temperature:	cloudy ~10°C
UTM Location	Z. 8 E. 389142 N. 6881107	Waypoint	GPS AN Name CH-P-13-03/10	Recovery:	☐ Good ☐ Bad
Photos	Cam. ELR Nos. 159-163	Purge Method			
Duplicate Collected:	☐ Yes Name		Waterra	Peristaltic	Disp. Bailer
Field Blank Collected	☐ Yes Name	Analysis			

Initial Depth to Water (m):	FROZEN	Purge Start Time:				Purge End Time:					
Depth to ~~Bottom~~ (m):	ICE 4.995	Purge Interval Time (___) min, Vol. (___) L									
Submerged Tubing Depth (m):		Depth to water (m)									
Well Stick-up Height (m):	0.69	Temperature (°C) 3%									
Estimated Water Volume (L):		pH (pH Units) ±0.1									
		Cond. (µs/cm) 3%									
		Specific Cond. (µs/cm) 3%									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		Redox (mV) 10%									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		DO (mg/L) 10%									
		DO (%) 10%									
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)									
		Only for final readings: Turbidity (NTU)									
		Interval Purge Volume (L)									
		Cumulative Purge Volume (L):									

FROZEN

YSI Field Parameters Logged:	☐ Yes ☐ No	Sample Method			
Time on YSI (24hr):			Waterra	Peristaltic	Disp. Bailer
Actual time of measurement (24hr):		Analysis			

HEMMERA

Sample Site (Con't): CH-P-13-03/10

Sample Date (Con't): _____

Sample Time: _____

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

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

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

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.3
Carbon Dioxide (C02)	PPM	300

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☒	Preservative Added ☒	Vol. 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, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

Peri. fading frozen in water column

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	CH-P-13-03/50	**Project Number:**	1343-005.09	**Date:**	01/06/2015
Approximate Date Drilled:	unknown	**Client:**	GY - AAM	**Sampler:**	AN, RM
Piezometer Diameter / Screen Length:	1.0/unknown	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Overcast ~10
UTM Location	Z.8 E.389142 N.6881108	**Waypoint**	GPS AN Name CH-P-13-03/50	**Recovery:**	☐ Good ☐ Bad
Photos	Cam. ELR Nos. 159-163	**Purge Method**			
Duplicate Collected:	☐ Yes Name _____		**Waterra**	**Peristaltic**	**Disp. Bailer**
Field Blank Collected	☐ Yes Name _____	**Analysis**			

Initial Depth to Water (m):	50.224	**Purge Start Time:**				**Purge End Time:**					
Depth to Bottom (m):	50.600	**Purge Interval** Time (___) min, Vol. (___) L									
Submerged Tubing Depth (m):		**Depth to water (m)**									
Well Stick-up Height (m):	0.58	**Temperature (°C) 3%**									
Estimated Water Volume (L):		**pH (pH Units) ±0.1**									
		Cond. (µs/cm) 3%									
		Specific Cond. (µs/cm) 3%									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Redox (mV) 10%**									
		DO (mg/L) 10%									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**DO (%) 10%**									
		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		**Interval Purge Volume (L)**									
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Cumulative Purge Volume (L):**									

Insufficient Volume

YSI Field Parameters Logged:	☐ Yes ☐ No	**Sample Method**			
Time on YSI (24hr):			**Waterra**	**Peristaltic**	**Disp. Bailer**
Actual time of measurement (24hr):		**Analysis**			

HEMMERA

Sample Site (Con't): CH-P-13-03/50

Sample Date (Con't): _____

Sample Time: _____

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

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

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

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	26.1
Carbon Dioxide (C02)	PPM	0

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☒	Preservative Added ☒	Vol. 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, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

Vibrating Piezometer wire found in well

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	CH-P-13-04/10	**Project Number:**	1343-005.09	**Date:**	01/06/2015
Approximate Date Drilled:	unknown	**Client:**	GY - AAM	**Sampler:**	AN, RM
Piezometer Diameter / Screen Length:	1½ / unknown	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Overcast ~10°C
UTM Location	Z.8 E389136 N. 6881471	**Waypoint**	GPS AN Name CH-P-13-04/10	**Recovery:**	☐ Good ☐ Bad
Photos	Cam. ELR Nos. 147-151	**Purge Method**			
Duplicate Collected:	☐ Yes Name _____		**Waterra**	**Peristaltic**	**Disp. Bailer**
Field Blank Collected	☐ Yes Name _____	**Analysis**			

Initial Depth to ~~Water~~ (m): ICE	6.207	**Purge Start Time:**				**Purge End Time:**					
Depth to Bottom (m):		**Purge Interval** Time (___) min, Vol. (___) L									
Submerged Tubing Depth (m):		**Depth to water (m)**									
Well Stick-up Height (m):	0.65	**Temperature (°C) 3%**									
Estimated Water Volume (L):		**pH (pH Units) ±0.1**									
		Cond. (µs/cm) 3%									
		Specific Cond. (µs/cm) 3%									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Redox (mV) 10%**									
		DO (mg/L) 10%									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**DO (%) 10%**									
		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		**Interval Purge Volume (L)**									
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Cumulative Purge Volume (L):**									

FROZEN

YSI Field Parameters Logged:	☐ Yes ☐ No	**Sample Method**			
Time on YSI (24hr):			**Waterra**	**Peristaltic**	**Disp. Bailer**
Actual time of measurement (24hr):		**Analysis**			

HEMMERA

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

Sample Date (Con't): _____

Sample Time: _____

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

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

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

Head Space Gas Measurements

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

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☒	Preservative Added ☒	Vol. 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, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

ICE/water found on tip of water level meter.

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	CH-P-13-04/15	**Project Number:**	1343-005.09	**Date:**	01/06/2015
Approximate Date Drilled:		**Client:**	GY - AAM	**Sampler:**	AN, RM
Piezometer Diameter / Screen Length:	1.0 / unknown	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Overcast -10°C
UTM Location	Z.8 E.389136 N.6881471	**Waypoint**	GPS AN Name CH-P-13-04/15	**Recovery:**	☐ Good ☐ Bad
Photos	Cam. EL R Nos. 147-151	**Purge Method**			
Duplicate Collected:	☐ Yes Name		**Waterra**	**Peristaltic**	**Disp. Bailer**
Field Blank Collected	☐ Yes Name	**Analysis**			

Initial Depth to ~~Water~~ (m):	6.490	**Purge Start Time:**					**Purge End Time:**				
Depth to Bottom (m):	ICE	**Purge Interval** Time (___) min, Vol. (___) L									
Submerged Tubing Depth (m):		**Depth to water (m)**									
Well Stick-up Height (m):	0.70	**Temperature (°C) 3%**									
Estimated Water Volume (L):		**pH (pH Units) ±0.1**									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Cond. (µs/cm) 3%**									
		Specific Cond. (µs/cm) 3%									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**Redox (mV) 10%**									
		DO (mg/L) 10%									
2" casing has 0.16 USgal/ft or 2.032 l/m		**DO (%) 10%**									
1" casing has 0.04 USgal/ft or 0.508 l/m		**Appearance & Odour (Clear, Silty, HC odours, etc.)**									
8" sand pack has 0.73 USgal/ft or 9.271 l/m		**Only for final readings**	**Sulphide (mg/L)**								
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m			**Turbidity (NTU)**								
		Interval Purge Volume (L)									
		Cumulative Purge Volume (L):									

FROZEN

YSI Field Parameters Logged:	☐ Yes ☐ No	**Sample Method**		
Time on YSI (24hr):			**Waterra**	**Peristaltic**	**Disp. Bailer**
Actual time of measurement (24hr):		**Analysis**			

HEMMERA

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

Sample Date (Con't): _____

Sample Time: _____

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 cap not properly fitted. should replace with 1" cap.

Head Space Gas Measurements

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

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☒	Preservative Added ☒	Vol. 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, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

Ice and wetness on the end of water level meter. Could not use camera.
Well diameter 1.0", camera width 1 1/4"
Well was previously recorded as "blocked". We believe the well was in fact frozen during previous events. 3 June 2015 - frozen water column confirmed using ELR in-house camera (see photos #181, #182)

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	CH-P-13-05/50	Project Number:	1343-005.09	Date:	01/06/2015
Approximate Date Drilled:	unknown	Client:	GY - AAM	Sampler:	AN, RM
Piezometer Diameter / Screen Length:	1.0" / unknown.	Project Name:	Mount Nansen 2015 GW Sampling Program	Weather/Temperature:	cloudy ~10°C
UTM Location	Z.8 E. 388958 N. 6881470	Waypoint	GPS AN Name CH-P-13-05/50	Recovery:	☒ Good ☐ Bad
Photos	Cam ELR Nos. 156–158	Purge Method			
Duplicate Collected:	☐ Yes Name _____		Waterra	Peristaltic	Disp. Bailer
Field Blank Collected	☐ Yes Name _____	Analysis	X		

Initial Depth to Water (m):	29.585	Purge Start Time:	16:30			Purge End Time:				
Depth to Bottom (m):	50.30	Purge Interval Time (5) min, Vol. (___) L	16:36	16:40	16:43	16:48	16:52	16:55		
Submerged Tubing Depth (m):	~35.0	Depth to water (m)	—	—	—	—	—	—		
Well Stick-up Height (m):	0.79	Temperature (°C) 3%	5.25	4.61	4.66	4.10	4.30	2.86		
Estimated Water Volume (L):	16.5	pH (pH Units) ±0.1	6.46	6.30	6.22	6.16	6.23	6.19		
		Cond. (µs/cm) 3% (ms/cm)	1.701	1.705	1.719	1.739	1.685	1.682		
		Specific Cond. (µs/cm) 3%	2731	2742	2852	2892	2849	2912		
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		Redox (mV) 10%	148.7	138.2	132.9	130.8	121.5	121.6		
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		DO (mg/L) 10%	7.71	4.57	4.88	2.96	6.08 ↓	3.17		
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		DO (%) 10%	64.1	35.5	36.0	22.7	40.0 ↓	23.9		
		Appearance & Odour (Clear, Silty, HC odours, etc.)	turbid brown	Same	Same	Same	Same	Same reduction turbid.		
		Only for final readings: Sulphide (mg/L)						177		
		Only for final readings: Turbidity (NTU)						118		
		Interval Purge Volume (L)	5.0	5.0	5.0	5	5	5		
		Cumulative Purge Volume (L):	5.0	10	15	20	25	30		

YSI Field Parameters Logged:	☐ Yes ☒ No	Sample Method			
Time on YSI (24hr):	X		Waterra	Peristaltic	Disp. Bailer
Actual time of measurement (24hr):	X	Analysis	X		

HEMMERA

Sample Site (Con't): CH-P-13-05/50

Sample Date (Con't): 02/06/2015

Sample Time: 17:00

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

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

Well properly sealed for gas monitoring: ☐ Yes ☒ No Details: no 1" PVC caps for replacement.

Head Space Gas Measurements

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

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

General Notes (Condition of well or other features):

01/06/2015 - tubing removed. GW frozen within tubing. Tubing does not reach bottom of well and was therefore replaced.
Will return following day to sample.
Needed to let well settle to collect/measure accurate water level.

02/06/2015 - Well purged and sampled. Well should be redeveloped using a hydrolift (purge for 2 to 4 hrs).
Purge water was highly turbid during site visit
Installed 50 m of waterra tubing

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GLL07-01	Project Number:	1343-005.09	Date:	01/06/2015
Approximate Date Drilled:	unknown	Client:	GY - AAM	Sampler:	AN, RM
Piezometer Diameter / Screen Length:	2" / unknown	Project Name:	Mount Nansen 2015 GW Sampling Program	Weather/Temperature:	Raining ~10°C
UTM Location	Z. 8 E. 388851 N. 6881779	Waypoint	GPS AN Name GLL07-01	Recovery:	☐ Good ☐ Bad
Photos	Cam. 5 R Nos. 135-137	Purge Method			
Duplicate Collected:	☐ Yes Name		Waterra	Peristaltic	Disp. Bailer
Field Blank Collected	☐ Yes Name	Analysis			

Initial Depth to Water (m): ICE	13.840	Purge Start Time:				Purge End Time:				
Depth to Bottom (m):		Purge Interval Time (___) min, Vol. (___) L								
Submerged Tubing Depth (m):		Depth to water (m)								
Well Stick-up Height (m):	0.80	Temperature (°C) 3%								
Estimated Water Volume (L):		pH (pH Units) ±0.1								
		Cond. (µs/cm) 3%								
		Specific Cond. (µs/cm) 3%								
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		Redox (mV) 10%								
		DO (mg/L) 10%								
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		DO (%) 10%								
		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		Only for final readings: Turbidity (NTU)								
8" sand pack has 0.73 USgal/ft or 9.271 l/m		Interval Purge Volume (L)								
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		Cumulative Purge Volume (L):								

FROZEN

YSI Field Parameters Logged:	☐ Yes ☐ No	Sample Method			
Time on YSI (24hr):			Waterra	Peristaltic	Disp. Bailer
Actual time of measurement (24hr):		Analysis			

HEMMERA

Sample Site (Con't): GLL07-01

Sample Date (Con't): _____

Sample Time: _____

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

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

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

Head Space Gas Measurements

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

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☒	Preservative Added ☒	Vol. 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, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GLL07-02	**Project Number:**	1343-005.09	**Date:**	03/06/2015
Approximate Date Drilled:	unknown	**Client:**	GY - AAM	**Sampler:**	AN, RM
Piezometer Diameter / Screen Length:	6" / unknown	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Sunny ~20°C
UTM Location	Z. 8 E. 389069 N. 6881701	**Waypoint**	GPS AN Name GLL07-02	**Recovery:**	☐ Good ☐ Bad
Photos	Cam. ELR Nos. 198-200	**Purge Method**			
Duplicate Collected:	☐ Yes Name		**Waterra**	**Peristaltic**	**Disp. Bailer**
Field Blank Collected	☐ Yes Name	**Analysis**			

Initial Depth to Water (m):	DRY	**Purge Start Time:**		**Purge End Time:**						
Depth to Bottom (m):	7.094	**Purge Interval Time (___) min, Vol. (___) L**								
Submerged Tubing Depth (m):		**Depth to water (m)**								
Well Stick-up Height (m):	1.37	**Temperature (°C)**								
Estimated Water Volume (L):		**pH (pH Units)**								
		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		**DO (%)**								
		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		**Interval Purge Volume (L)**								
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Cumulative Purge Volume (L):**								

DRY

YSI Field Parameters Logged:	☐ Yes ☐ No	**Sample Method**			
Time on YSI (24hr):			**Waterra**	**Peristaltic**	**Disp. Bailer**
Actual time of measurement (24hr):		**Analysis**			

HEMMERA

Sample Site (Con't): GLL07-02

Sample Date (Con't): _____

Sample Time: _____

Well Head Seal: ☐ J-Plug ☐ PVC Cap ☐ Not Sealed ☒ Other Metal lid

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

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

Head Space Gas Measurements

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

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☒	Preservative Added ☐	Vol. 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, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

Large rusty metal casing. No inner PVC well casing.
Well dry. Oxidized soil found on the tip of the water level meter.

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GLL07-03	**Project Number:**	1343-005.09	**Date:**	01/06/2015
Approximate Date Drilled:	unknown.	**Client:**	GY - AAM	**Sampler:**	AN, RM
Piezometer Diameter / Screen Length:	2" / unknown.	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Overcast/windy ~10°C.
UTM Location	Z.8 E. 388962 N. 6881978	**Waypoint**	GPS AN Name GLL07-03	**Recovery:**	☐ Good ☐ Bad
Photos	Cam. SLR Nos. 153-155	**Purge Method**			
Duplicate Collected:	☐ Yes Name _____		**Waterra**	**Peristaltic**	**Disp. Bailer**
Field Blank Collected	☐ Yes Name _____	**Analysis**			

Initial Depth to Water (m):	DRY	**Purge Start Time:**				**Purge End Time:**					
Depth to Bottom (m):	11.652	**Purge Interval** Time (___) min, Vol. (___) L									
Submerged Tubing Depth (m):		**Depth to water (m)**									
Well Stick-up Height (m):	1.11	**Temperature (°C) 3%**									
Estimated Water Volume (L):		**pH (pH Units) ±0.1**									
		Cond. (µs/cm) 3%									
		Specific Cond. (µs/cm) 3%									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Redox (mV) 10%**									
		DO (mg/L) 10%									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**DO (%) 10%**									
		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		**Interval Purge Volume (L)**									
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Cumulative Purge Volume (L):**									

DRY

YSI Field Parameters Logged:	☐ Yes ☐ No	**Sample Method**			
Time on YSI (24hr):			**Waterra**	**Peristaltic**	**Disp. Bailer**
Actual time of measurement (24hr):		**Analysis**			

HEMMERA

Sample Site (Con't): GLL07-03

Sample Date (Con't): _____

Sample Time: _____

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

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

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

Head Space Gas Measurements

	Units	Value
Methane (CH4)	%LEL	0
Oxygen (O2)	%	19.8
Carbon Dioxide (C02)	PPM	550

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☒	Preservative Added ☒	Vol. 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, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

Transducer found in well. Sound found on tip of WL meter when dipped.
Transducer also outside of well on hinge to measure atmosphere pressure.

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GSI-DC-01B	**Project Number:**	1343-005.09	**Date:**	June 1, 2015
Approximate Date Drilled:		**Client:**	GY - AAM	**Sampler:**	JC / [illegible]
Piezometer Diameter / Screen Length:	1.5"	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	rainy
UTM Location	Z. 8 E. [illegible] N. 6981124	**Waypoint**	GPS [illegible] Name GSI-DC-01	**Recovery:**	☐ Good ☐ Bad
Photos	Cam [illegible] Nos. [illegible]	**Purge Method**			
Duplicate Collected:	☐ Yes Name _____		**Waterra**	**Peristaltic**	**Disp. Bailer**
Field Blank Collected	☐ Yes Name _____	**Analysis**			

Initial Depth to Water (m):		**Purge Start Time:**				**Purge End Time:**					
Depth to Bottom (m):	1.60 1.61	**Purge Interval** Time (___) min, Vol. (___) L									
Submerged Tubing Depth (m):		**Depth to water (m)**									
Well Stick-up Height (m):	[illegible] 0.93	**Temperature (°C) 3%**									
Estimated Water Volume (L):		**pH (pH Units) ±0.1**									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Cond. (µs/cm) 3%**									
		Specific Cond. (µs/cm) 3%									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**Redox (mV) 10%**									
		DO (mg/L) 10%									
2" casing has 0.16 USgal/ft or 2.032 l/m		**DO (%) 10%**									
1" casing has 0.04 USgal/ft or 0.508 l/m		**Appearance & Odour (Clear, Silty, HC odours, etc.)**									
8" sand pack has 0.73 USgal/ft or 9.271 l/m		**Only for final readings**	**Sulphide (mg/L)**								
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m			**Turbidity (NTU)**								
		Interval Purge Volume (L)									
		Cumulative Purge Volume (L):									

YSI Field Parameters Logged:	☐ Yes ☐ No	**Sample Method**			
Time on YSI (24hr):			**Waterra**	**Peristaltic**	**Disp. Bailer**
Actual time of measurement (24hr):		**Analysis**			

HEMMERA

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

Sample Date (Con't): _____

Sample Time: _____

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

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

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

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.6
Carbon Dioxide (C02)	PPM	~~590~~ 560

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☒	Preservative Added ☒	Vol. 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, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

GSI-SC-01A

CO_2 - 570 ~ stabilizing

O_2 - 20.6

CH_4 - 0

IDW - N/A

DTB - 1.306

Creek virtually dried up, small trickle running down hill

Stick-up - 0.915

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GSI-DC-02B	**Project Number:**	1343-005.09	**Date:**	June 1, 2015
Approximate Date Drilled:	unknown	**Client:**	GY - AAM	**Sampler:**	JC / MM
Piezometer Diameter / Screen Length:	1" DP	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Rainy, Cloudy (Light)
UTM Location	Z. 08 E. 0187836 N. 6861128	**Waypoint**	GPS ELK Name GSI-DC-02A/B	**Recovery:**	☐ Good ☐ Bad
Photos	Cam WL Nos. 83-85	**Purge Method**			
Duplicate Collected:	☐ Yes Name N/A		**Waterra**	**Peristaltic**	**Disp. Bailer**
Field Blank Collected	☐ Yes Name NO	**Analysis**			

Initial Depth to Water (m):	0.921	**Purge Start Time:**				**Purge End Time:**					
Depth to Bottom (m): (suspected ice)	1.994	**Purge Interval** Time (___) min, Vol. (___) L									
Submerged Tubing Depth (m):		**Depth to water (m)**									
Well Stick-up Height (m):	0.658	**Temperature (°C) 3%**									
Estimated Water Volume (L):		**pH (pH Units) ±0.1**									
		Cond. (µs/cm) 3%									
		Specific Cond. (µs/cm) 3%									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Redox (mV) 10%**									
		DO (mg/L) 10%									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**DO (%) 10%**									
		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		**Interval Purge Volume (L)**									
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Cumulative Purge Volume (L):**									

FROZEN

YSI Field Parameters Logged:	☐ Yes ☐ No	**Sample Method**			
Time on YSI (24hr):			**Waterra**	**Peristaltic**	**Disp. Bailer**
Actual time of measurement (24hr):		**Analysis**			

HEMMERA

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

Sample Date (Con't): _____

Sample Time: _____

Well Head Seal: ☐ J-Plug ☐ PVC Cap ☐ Not Sealed ☒ Other Black cap

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

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

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.9
Carbon Dioxide (C02)	PPM	650

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☒	Preservative Added ☒	Vol. 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, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

GS1-DC-02B

- small volume of water above ice (~ 150mL) attempted to collect sample, only generated ~ 3mL
- Frozen, may return tomorrow to attempt to thaw

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GSI-DC-035	**Project Number:**	1343-005.09	**Date:**	02-Jun-15
Approximate Date Drilled:		**Client:**	GY - AAM	**Sampler:**	JC / MM
Piezometer Diameter / Screen Length:	1" DP	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	overcast
UTM Location	Z. 8 E. 388106 N. 6881079	**Waypoint**	GPS 32 Name GSI-DC-035	**Recovery:**	☐ Good ☐ Bad
Photos	Cam. 11 Nos. 115-117	**Purge Method**			
Duplicate Collected:	☐ Yes Name 115		**Waterra**	**Peristaltic**	**Disp. Bailer**
Field Blank Collected	☐ Yes Name	**Analysis**			

Initial Depth to Water (m):	1.504	**Purge Start Time:**			**Purge End Time:**					
Depth to Bottom (m):	1.089	**Purge Interval** Time (___) min, Vol. (___) L								
Submerged Tubing Depth (m):		**Depth to water (m)**								
Well Stick-up Height (m):	0.120	**Temperature (°C) 3%**								
Estimated Water Volume (L):		**pH (pH Units) ±0.1**								
		Cond. (µs/cm) 3%								
		Specific Cond. (µs/cm) 3%								
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Redox (mV) 10%**								
		DO (mg/L) 10%								
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**DO (%) 10%**								
		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		**Interval Purge Volume (L)**								
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Cumulative Purge Volume (L):**								

FROZEN

YSI Field Parameters Logged:	☐ Yes ☒ No	**Sample Method**			
Time on YSI (24hr):			**Waterra**	**Peristaltic**	**Disp. Bailer**
Actual time of measurement (24hr):		**Analysis**			

HEMMERA

Sample Site (Con't): GS1-DC-20B

Sample Date (Con't): _____

Sample Time: _____

Well Head Seal: ☐ J-Plug ☐ PVC Cap ☐ Not Sealed ☒ Other plastic bag.

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

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

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.5
Carbon Dioxide (C02)	PPM	950

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☒	Preservative Added ☒	Vol. 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, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

GS1-DC-
CH4%LEL - 0
O2 % - 20.9
CO2 ppm - 600
* plastic bag over opening instead of cap
DTW - 0.812
DTB - 1.130

stick up - 0.045 (m) ↳ above snow

share to tell if TW due to condensation of tape

- pack ice large, barely able to see SP stick-up
- tubing stuck in well @ 8, possibly frozen (most likely due to snow)
- insufficient water to attempt dip sample above ice

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GSI-DC-05B	**Project Number:**	1343-005.09	**Date:**	03-June-15
Approximate Date Drilled:		**Client:**	GY - AAM	**Sampler:**	DC/MM
Piezometer Diameter / Screen Length:	1" DP	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	overcast
UTM Location	Z. 8 E. 338832 N. 6972083	**Waypoint**	GPS E/L Name GSI705	**Recovery:**	☐ Good ☐ Bad
Photos	Cam. WL Nos. 127124	**Purge Method**			
Duplicate Collected:	☐ Yes Name 128-130		**Waterra**	**Peristaltic**	**Disp. Bailer**
Field Blank Collected	☐ Yes Name	**Analysis**			

Initial Depth to Water (m):	0.684	**Purge Start Time:**				**Purge End Time:**				
Depth to Bottom (m):	0.694	**Purge Interval Time (___) min, Vol. (___) L**								
Submerged Tubing Depth (m):	—	**Depth to water (m)**								
Well Stick-up Height (m):	0.113 above ICP	**Temperature (°C)**								
Estimated Water Volume (L):	—	**pH (pH Units)**								
		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		**DO (%)**								
		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		**Interval Purge Volume (L)**								
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Cumulative Purge Volume (L):**								

FROZEN

YSI Field Parameters Logged:	☐ Yes ☐ No	**Sample Method**			
Time on YSI (24hr):			**Waterra**	**Peristaltic**	**Disp. Bailer**
Actual time of measurement (24hr):		**Analysis**			

HEMMERA

Sample Site (Con't): GS1-DC-GSB

Sample Date (Con't): _____

Sample Time: _____

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

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

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

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.6
Carbon Dioxide (C02)	PPM	1,200

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☒	Preservative Added ☒	Vol. 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, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

GS1-DC-GSB
- slit in bag covering opening
LEL - 0
CO_2 - 480
O_2 - 20.6
DW - 0.629
DTB - 6.724

elevation (m): 0.636
above ice

- tubing pulled out so DTW could be determined frozen .. need to pull tubing out
- ice surrounding DP
- new sleeving added high intree

Yes DTW - 0.63
DTB - 2.69 > not good recovery

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GSI-DC-06B	Project Number:	1343-005.09	Date:	04-June-15
Approximate Date Drilled:		Client:	GY - AAM	Sampler:	JC / MH
Piezometer Diameter / Screen Length:	1" DP	Project Name:	Mount Nansen 2015 GW Sampling Program	Weather/Temperature:	Overcast, Slight Breeze
UTM Location	Zone E. 0389789 N. 6880566	Waypoint	GPS ELR Name GSI-DC-06A/B	Recovery:	☐ Good ☐ Bad
Photos	Cam. WL Nos. 171-173	Purge Method			
Duplicate Collected:	☐ Yes Name 172-174		Waterra	Peristaltic	Disp. Bailer
Field Blank Collected	☐ Yes Name	Analysis			

Initial Depth to Water (m):	0.700	Purge Start Time:				Purge End Time:					
Depth to Bottom (m):	1.007 (ice)	Purge Interval Time (___) min, Vol. (___) L									
Submerged Tubing Depth (m):	\	Depth to water (m)									
Well Stick-up Height (m):	0.531	Temperature (°C) 3%									
Estimated Water Volume (L):	\	pH (pH Units) ±0.1									
		Cond. (µs/cm) 3%									
		Specific Cond. (µs/cm) 3%									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		Redox (mV) 10%									
		DO (mg/L) 10%									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		DO (%) 10%									
		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		Interval Purge Volume (L)									
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		Cumulative Purge Volume (L):									

FROZEN

YSI Field Parameters Logged	☐ Yes ☐ No	Sample Method			
Time on YSI (24hr):			Waterra	Peristaltic	Disp. Bailer
Actual time of measurement (24hr):		Analysis			

GSI-DC-06A

LEL 0
O2% 20.9
CO_2 460

DTW 0.967
DTB 1.404
stick-up = 0.890

HEMMERA

Sample Site (Con't): GS1-OC-06B

Sample Date (Con't): _____

Sample Time: _____

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

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

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

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.5
Carbon Dioxide (C02)	PPM	460

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☐	Preservative Added ☒	Vol. 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, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

- new tubing will be needed due to block in tubing, tubing stuck in well, most likely frozen

last year DTW - 1.27
DTB - 3.71

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GSI-DC-07B	Project Number:	1343-005.09	Date:	04-Jun-15
Approximate Date Drilled:		Client:	GY - AAM	Sampler:	JC/KMM
Piezometer Diameter / Screen Length:	1" DP	Project Name:	Mount Nansen 2015 GW Sampling Program	Weather/Temperature:	breezy, overcast ~10
UTM Location	Z. 8 E. 0390065 N. 6886639	Waypoint	GPS ELE Name GSI-DC-07A/B	Recovery:	☐ Good ☐ Bad
Photos	Cam. WL Nos. 174-176	Purge Method			
Duplicate Collected:	☐ Yes Name ____		Waterra	Peristaltic	Disp. Bailer
Field Blank Collected	☐ Yes Name ____	Analysis			

Initial Depth to Water (m):	0.926	Purge Start Time:				Purge End Time:					
Depth to Bottom (m):	1.217 (1.22)	Purge Interval Time (___) min, Vol. (___) L									
Submerged Tubing Depth (m):	~1	Depth to water (m)									
Well Stick-up Height (m):	0.95	Temperature (°C) 3%									
Estimated Water Volume (L):	~1	pH (pH Units) ±0.1									
		Cond. (µs/cm) 3%									
		Specific Cond. (µs/cm) 3%									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		Redox (mV) 10%									
		DO (mg/L) 10%									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		DO (%) 10%									
		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		Only for final readings: Turbidity (NTU)									
8" sand pack has 0.73 USgal/ft or 9.271 l/m		Interval Purge Volume (L)									
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		Cumulative Purge Volume (L):									

FROZEN

YSI Field Parameters Logged	☐ Yes ☐ No	Sample Method			
Time on YSI (24hr)			Waterra	Peristaltic	Disp. Bailer
Actual time of measurement (24hr)		Analysis			

HEMMERA

Sample Site (Con't): GS1-DC-07B

Sample Date (Con't): _____

Sample Time: _____

Well Head Seal: ☐ J-Plug ☐ PVC Cap ☐ Not Sealed ☒ Other black cap

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

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

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.6
Carbon Dioxide (C02)	PPM	500

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☐	Preservative Added ☒	Vol. 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, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

GS1-DC-07B - bag over stick-up

Stick-up (m) - 0.97 stick-up

LEL - 0

CO_2 - 710

O_2 - 20.9

IDW - 0.907

DTB - 0.924

tube frozen in well

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GS1-DC-08A/B	Project Number:	1343-005.09	Date:	04/06/2015
Approximate Date Drilled:	unknown	Client:	GY - AAM	Sampler:	AN, RM
Piezometer Diameter / Screen Length:	½" OP / unknown	Project Name:	Mount Nansen 2015 GW Sampling Program	Weather/Temperature:	Overcast cloudy ~12°C
UTM Location	Z.8 E.390309 N.6880582	Waypoint	GPS AN Name GS1-DC-08A/B	Recovery:	☐ Good ☐ Bad
Photos	Cam ELA Nos. 121-123	Purge Method			
Duplicate Collected:	☐ Yes Name 221-223	GMR CHANGED AT OFFICE	Waterra	Peristaltic	Disp. Bailer
Field Blank Collected	☐ Yes Name	Analysis			

Initial Depth to Water (m):	A	1.952	B		Purge Start Time:				Purge End Time:				
Depth to Bottom (m):	ICE	1.207		0.514	Purge Interval Time (___) min, Vol. (___) L								
Submerged Tubing Depth (m):					Depth to water (m)								
Well Stick-up Height (m):		0.95		0.31	Temperature (°C) 3%								
Estimated Water Volume (L):					pH (pH Units) ±0.1								
					Cond. (µs/cm) 3%								
					Specific Cond. (µs/cm) 3%								
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume					Redox (mV) 10%								
					DO (mg/L) 10%								
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume					DO (%) 10%								
					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					Only for final readings: Turbidity (NTU)								
8" sand pack has 0.73 USgal/ft or 9.271 l/m					Interval Purge Volume (L)								
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m					Cumulative Purge Volume (L):								

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YSI Field Parameters Logged	☐ Yes ☐ No	Sample Method			
Time on YSI (24hr)			Waterra	Peristaltic	Disp. Bailer
Actual time of measurement (24hr)		Analysis			

HEMMERA

Sample Site (Con't): 651-DC-08A/B

Sample Date (Con't): _____

Sample Time: _____

Well Head Seal: ☐ J-Plug ☒ PVC Cap (B) ☐ Not Sealed ☒ Other (A) ziplock

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

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

Head Space Gas Measurements

	UNIT	[illegible]	[illegible]
Methane (CH4)	%LEL	0	0
Oxygen (O2)	%	20.4	20.4
Carbon Dioxide (C02)	PPM	0	80

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☐	Preservative Added ☐	Vol. 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, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

Small amount of water above ice blockage on well (A).

No water detected in well (B).

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GSI-DC-09A/B	Project Number:	1343-005.09	Date:	04/06/2015
Approximate Date Drilled:	unknown.	Client:	GY - AAM	Sampler:	AN, RM
Piezometer Diameter / Screen Length:	1/2" / unknown. OD	Project Name:	Mount Nansen 2015 GW Sampling Program	Weather/Temperature:	cloudy ~12°C
UTM Location	Z. 8 E390615 N. 6880475	Waypoint	GPS AN Name GSI-DC-MW6	Recovery:	☐ Good ☐ Bad
Photos	Cam. ELR Nos. 218-220	Purge Method			
Duplicate Collected:	☐ Yes Name _____		Waterra	Peristaltic	Disp. Bailer
Field Blank Collected	☐ Yes Name _____	Analysis			

Initial Depth to Water (m):	A	0.966	B	0.957	Purge Start Time:				Purge End Time:			
Depth to Bottom (m):		1.060		1.117	Purge Interval Time (___) min, Vol. (___) L							
Submerged Tubing Depth (m):		—		—	Depth to water (m)							
Well Stick-up Height (m):		1.060		—	Temperature (°C) 3%							
Estimated Water Volume (L):		—		—	pH (pH Units) ±0.1							
					Cond. (µs/cm) 3%							
					Specific Cond. (µs/cm) 3%							
					Redox (mV) 10%							
					DO (mg/L) 10%							
					DO (%) 10%							
					Appearance & Odour (Clear, Silty, HC odours, etc.)							
					Only for final readings: Sulphide (mg/L)							
					Only for final readings: Turbidity (NTU)							
					Interval Purge Volume (L)							
					Cumulative Purge Volume (L):							

* could not measure stick up due to ice. photo.

(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

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YSI Field Parameters Logged:	☐ Yes ☐ No	Sample Method			
Time of YSI (24hr):			Waterra	Peristaltic	Disp. Bailer
Actual time of measurement (24hr):		Analysis			

HEMMERA

Sample Site (Con't): GSI-DC-9A/B

Sample Date (Con't): _____

Sample Time: _____

Well Head Seal: ☐ J-Plug ☒ (B) PVC Cap ☐ Not Sealed ☒ (A) Other ziplock

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

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

Head Space Gas Measurements

Methane (CH4)	%LEL	0	0
Oxygen (O2)	%	20.9	20.9
Carbon Dioxide (C02)	PPM	1060	510

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☐	Preservative Added ☐	Vol. 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, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

Peri. tubing frozen in well (B). Ice covering ½ of well stick-up.

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GSI-DC-10A/B	Project Number:	1343-005.09	Date:	04/06/2015
Approximate Date Drilled:	unknown	Client:	GY - AAM	Sampler:	AN, RM
Piezometer Diameter / Screen Length:	1/2" DP / unknown	Project Name:	Mount Nansen 2015 GW Sampling Program	Weather/Temperature:	overcast windy ~10°C
UTM Location	Z.8 E.590862 N.6880449	Waypoint	GPS AN Name GSI-DC-10A/B	Recovery:	☐ Good ☐ Bad
Photos	Cam. ELR Nos. 215-217	Purge Method			
Duplicate Collected:	☐ Yes Name _____		Waterra	Peristaltic	Disp. Bailer
Field Blank Collected	☐ Yes Name _____	Analysis			

	A	B
Initial Depth to Water (m):	0.983	0.952
Depth to Bottom (m):	1.352 * BOTTOM	1.386 * ICE
Submerged Tubing Depth (m):	—	—
Well Stick-up Height (m):	1.06	0.98
Estimated Water Volume (L):	—	—

Purge Start Time:			Purge End Time:							
Purge Interval Time (___) min, Vol. (___) L										
Depth to water (m)										
Temperature (°C) 3%										
pH (pH Units) ±0.1										
Cond. (µs/cm) 3%										
Specific Cond. (µs/cm) 3%										
Redox (mV) 10%										
DO (mg/L) 10%										
DO (%) 10%										
Appearance & Odour (Clear, Silty, HC odours, etc.)										
Only for final readings: Sulphide (mg/L)										
Only for final readings: Turbidity (NTU)										
Interval Purge Volume (L)										
Cumulative Purge Volume (L):										

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(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

YSI Field Parameters Logged:	☐ Yes ☐ No	Sample Method			
Time for YSI Check:			Waterra	Peristaltic	Disp. Bailer
Actual time of measurement (24hr):		Analysis			

HEMMERA

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

Sample Date (Con't): _____

Sample Time: _____

Well Head Seal: ☐ J-Plug ☑ B PVC Cap ☐ Not Sealed ☑ Other A ziplock

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

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

Head Space Gas Measurements

	Units		
Methane (CH4)	%LEL	0	0
Oxygen (O2)	%	20.5	20.4
Carbon Dioxide (C02)	PPM	0	0

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☒	Preservative Added ☒	Vol. 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, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

Tubing removed from well (B) to measure depth to ice blockage.

Well (A) presumably Dry.

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GSI-HA-01A	Project Number:	1343-005.09	Date:	June 1, 2015
Approximate Date Drilled:	unknown.	Client:	GY - AAM	Sampler:	JC / MM
Piezometer Diameter / Screen Length:	1" DP	Project Name:	Mount Nansen 2015 GW Sampling Program	Weather/Temperature:	Raining ~10
UTM Location	Z. 08 E. 0387846 N. 6881130	Waypoint	GPS elev. Name GSI-HA-01A	Recovery:	☐ Good ☒ Bad
Photos	Cam. WL Nos. 86-88	Purge Method			
Duplicate Collected:	☐ Yes Name N/A		Waterra	Peristaltic	Disp. Bailer
Field Blank Collected	☐ Yes Name N/A	Analysis		✓	

Initial Depth to Water (m):	~~DTT~~ 1.391	Purge Start Time:	13:50				Purge End Time:					
Depth to Bottom (m):	3.121	Purge Interval Time (___) min, Vol. (___) L	collected after sampling									
Submerged Tubing Depth (m):	~2	Depth to water (m)	/									
Well Stick-up Height (m):	~~1.199~~	Temperature (°C) 3%	5.2									
Estimated Water Volume (L):	0.371	pH (pH Units) ±0.1	7.15									
		Cond. (µs/cm) 3%	488									
		Specific Cond. (µs/cm) 3%	1106									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		Redox (mV) 10%	-40.2									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		DO (mg/L) 10%	not calibrated									
		DO (%) 10%	34.7									
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.)	slightly cloudy									
		Only for final readings: Sulphide (mg/L)	0.01									
		Only for final readings: Turbidity (NTU)	11.42									
		Interval Purge Volume (L)	/									
		Cumulative Purge Volume (L):	/									

Sampled 13:50 02/06/2015 following recharge of field parameters collected @ the time of sample.

YSI Field Parameters Logged:	☐ Yes ☒ No	Sample Method		
Time on YSI (24hr):			Waterra	Peristaltic	Disp. Bailer
Actual time of measurement (24hr):		Analysis		✓	

HEMMERA

Sample Site (Con't): GS1-HB-HD

Sample Date (Con't): 01-June-15

Sample Time: 14:00

} Sample discarded
New sample collected
13:50 02/06/15

Well Head Seal: ☐ J-Plug ☐ PVC Cap ☐ Not Sealed ☒ Other Back Cap

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

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

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.6
Carbon Dioxide (C02)	PPM	570

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☒	Preservative Added ☒	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☒ Field Filtered	☒ HNO_3	100	
1b	40 ml (glass)	Dissolved Mercury	15 mL	☒ Field Filtered	☒ HCL	15	
2	1 L (plastic)	General Chemistry	200 ml	-	-	200	
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	100	
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☒ HNO_3	50	
6	120 ml (plastic)	Sulphide	100 ml	-	☒ Zinc Acetate, then NaOH	100	
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-	100	
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☒ Field Filtered	-	200 100	2 bottles

General Notes (Condition of well or other features):

- Purged, sampled, appeared to have slow recharge, may return tomorrow to collect a full sample set & minimum volume collected; purged dry
- water clear @ beginning, near end of purge water became more silty / cloudy to some particles.
- collected YSI parameters ⇐ after samples were collected.
- Returned 02/Jun-15 DTW - 2.39; new sample taken after well fully recharged @ 13:50 02/Jun/15

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GSI-HP09A	Project Number:	1345-035.09	Date:	01-Jun-15
Approximate Date Drilled:	unknown	Client:	GY - AAM	Sampler:	JC/MM
Piezometer Diameter / Screen Length:	1" DP	Project Name:	Mount Nansen 2015 GW Sampling Program	Weather/Temperature:	Sunny Slight breeze.
UTM Location	Z. 8 E. 388389 N. 6881129	Waypoint	GPS 128 Name GSI-HP09A	Recovery:	☐ Good ☒ Bad
Photos	Cam M Nos. 89-91	Purge Method			
Duplicate Collected:	☐ Yes Name N/A		Waterra	Peristaltic	Disp. Bailer
Field Blank Collected	☐ Yes Name N/A	Analysis		X	

Initial Depth to Water (m):	1.891	Purge Start Time:				Purge End Time:					
Depth to Bottom (m):	2.409	Purge Interval Time (___) min, Vol. (___) L									
Submerged Tubing Depth (m):	~2	Depth to water (m)									
Well Stick-up Height (m):	1.509	Temperature (°C) 3%									
Estimated Water Volume (L):	0.863	pH (pH Units) ±0.1									
		Cond. (µs/cm) 3%									
		Specific Cond. (µs/cm) 3%									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		Redox (mV) 10%									
		DO (mg/L) 10%									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		DO (%) 10%									
		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)	0.06								
1" casing has 0.04 USgal/ft or 0.508 l/m		Only for final readings: Turbidity (NTU)	18.6								
8" sand pack has 0.73 USgal/ft or 9.271 l/m		Interval Purge Volume (L)									
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		Cumulative Purge Volume (L):									

DIRECT SAMPLE

YSI Field Parameters Logged:	☐ Yes ☒ No	Sample Method			
Time on YSI (24hr):			Waterra	Peristaltic	Disp. Bailer
Actual time of measurement (24hr):		Analysis		X	

HEMMERA

Sample Site (Con't): 201-HA-02A

Sample Date (Con't): ~~5-30~~ 01-June-15

Sample Time: 15:30

Well Head Seal: ☐ J-Plug ☐ PVC Cap ☐ Not Sealed ☒ Other bolted

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

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

Head Space Gas Measurements

	Units	Value
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.5
Carbon Dioxide (C02)	PPM	600

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☒	Preservative Added ☒	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☒ Field Filtered	☒ HNO_3	100	
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, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

- Purged dry, only able to direct sample diss. metals + diss mercury

-

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GSI-HA-03A	**Project Number:**	1343-005.09	**Date:**	June 1/15
Approximate Date Drilled:		**Client:**	GY - AAM	**Sampler:**	JC / MM
Piezometer Diameter / Screen Length:	1"	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	overcast, ~6°C
UTM Location	Zone E. 0387880 N. 6881128	**Waypoint**	GPS # Name GSI-HA-03A	**Recovery:**	☐ Good ☒ Bad
Photos	Cam. WL Nos. 90-95	**Purge Method**			
Duplicate Collected:	☐ Yes Name		**Waterra**	**Peristaltic**	**Disp. Bailer**
Field Blank Collected	☐ Yes Name	**Analysis**			

Initial Depth to Water (m):	0.942	**Purge Start Time:**				**Purge End Time:**					
Depth to Bottom (m): (Suspected 1.355)	1.355	**Purge Interval** Time (___) min, Vol. (___) L									
Submerged Tubing Depth (m):		**Depth to water (m)**									
Well Stick-up Height (m):	0.965	**Temperature (°C) 3%**									
Estimated Water Volume (L):		**pH (pH Units) ±0.1**									
		Cond. (µs/cm) 3%									
		Specific Cond. (µs/cm) 3%									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Redox (mV) 10%**									
		DO (mg/L) 10%									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**DO (%) 10%**									
		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		**Only for final readings** **Turbidity (NTU)**									
8" sand pack has 0.73 USgal/ft or 9.271 l/m		**Interval Purge Volume (L)**									
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Cumulative Purge Volume (L):**									

DIRECT SAMPLE

YSI Field Parameters Logged:	☐ Yes ☒ No	**Sample Method**		
Time on YSI (24hr):	n/a		**Waterra**	**Peristaltic**	**Disp. Bailer**
Actual time of measurement (24hr):	n/a	**Analysis**		✓	

HEMMERA

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

Sample Date (Con't): June 1, 2015

Sample Time: 16:15

Well Head Seal: ☐ J-Plug ☐ PVC Cap ☐ Not Sealed ☒ Other Block Cap

Seal Replaced: ☐ J-Plug ☐ PVC Cap ☐ Not required ☒ Other

Well properly sealed for gas monitoring: ☒ Yes ☐ No Details:

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.9
Carbon Dioxide (C02)	PPM	480

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☒	Preservative Added ☒	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☒ Field Filtered	☒ HNO_3	100 mL	
1b	40 ml (glass)	Dissolved Mercury	15 mL	☒ Field Filtered	☒ HCL	10 mL	
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, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

- Suspected ice - unable to pull tubing out
- collected dissolved metals + mercury, well went dry = no recovery
- possibility to return to attempt to melt ice in well

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GSI-HA-04A	**Project Number:**	1343-005.09	**Date:**	01-June-15
Approximate Date Drilled:		**Client:**	GY - AAM	**Sampler:**	JC / MM
Piezometer Diameter / Screen Length:	1" DP	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	OVERCAST 10°C
UTM Location	Z. 8E. 384819 N. 6881320	**Waypoint**	GPS Name GSI-HA-04A	**Recovery:**	☐ Good ☐ Bad
Photos	Cam. WL Nos. 22-188	**Purge Method**			
Duplicate Collected:	☐ Yes Name N/A 100-103		**Waterra**	**Peristaltic**	**Disp. Bailer**
Field Blank Collected	☐ Yes Name N/A	**Analysis**			

Initial Depth to Water (m):	0.906	**Purge Start Time:**				**Purge End Time:**						
Depth to Bottom (m):	0.934	**Purge Interval** Time (___) min, Vol. (___) L										
Submerged Tubing Depth (m):		**Depth to water (m)**										
Well Stick-up Height (m):	0.609	**Temperature (°C) 3%**										
Estimated Water Volume (L):	0.142	**pH (pH Units) ±0.1**										
		Cond. (µs/cm) 3%										
		Specific Cond. (µs/cm) 3%										
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Redox (mV) 10%**										
		DO (mg/L) 10%										
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**DO (%) 10%**										
		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		**Interval Purge Volume (L)**										
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Cumulative Purge Volume (L):**										

FROZEN

YSI Field Parameters Logged:	☐ Yes ☐ No	**Sample Method**			
Time on YSI (24hr):			**Waterra**	**Peristaltic**	**Disp. Bailer**
Actual time of measurement (24hr):		**Analysis**			

HEMMERA

Sample Site (Con't): GC1 MW-04A

Sample Date (Con't): _____

Sample Time: [illegible]

Well Head Seal: ☐ J-Plug ☐ PVC Cap ☐ Not Sealed ☒ Other black cap

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

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

Head Space Gas Measurements

	Units	Value
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.6
Carbon Dioxide (C02)	PPM	650

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☒	Preservative Added ☒	Vol. 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, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

Not enough water above ice to attempt to sample for diss metals

tubing frozen in well, may return later to attempt trouving

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GSI-HA-05A	Project Number:	1343-005.09	Date:	01-Jun-15
Approximate Date Drilled:	unknown	Client:	GY - AAM	Sampler:	MM/JC
Piezometer Diameter / Screen Length:	1" DP	Project Name:	Mount Nansen 2015 GW Sampling Program	Weather/Temperature:	overcast
UTM Location	Z. 8 E. 0388[illegible] N. 6981193	Waypoint	GPS [illegible] Name GSIHA05A	Recovery:	☐ Good ☒ Bad
Photos	Cam. w/L Nos. 96-98	Purge Method			
Duplicate Collected:	☐ Yes Name 97-99		Waterra	Peristaltic	Disp. Bailer
Field Blank Collected	☐ Yes Name	Analysis		X	

Initial Depth to Water (m):	1.015	Purge Start Time:				Purge End Time:					
Depth to Bottom (m):	1.481	Purge Interval Time (___) min, Vol. (___) L									
Submerged Tubing Depth (m):		Depth to water (m)									
Well Stick-up Height (m):	1.029	Temperature (°C) 3%									
Estimated Water Volume (L):		pH (pH Units) ±0.1									
		Cond. (µs/cm) 3%									
		Specific Cond. (µs/cm) 3%									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		Redox (mV) 10%									
		DO (mg/L) 10%				direct Sample					
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		DO (%) 10%									
		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		Only for final readings: Turbidity (NTU)									
8" sand pack has 0.73 USgal/ft or 9.271 l/m		Interval Purge Volume (L)									
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		Cumulative Purge Volume (L):									

YSI Field Parameters Logged:	☐ Yes ☒ No	Sample Method			
Time on YSI (24hr):			Waterra	Peristaltic	Disp. Bailer
Actual time of measurement (24hr):		Analysis		X	

HEMMERA

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

Sample Date (Con't): ~~16-15~~ 01-Jun-5

Sample Time: 16:45

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

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

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

Head Space Gas Measurements

	Units	Measure
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.9
Carbon Dioxide (C02)	PPM	460

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☒	Preservative Added ☒	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☒ Field Filtered	☒ HNO_3	80mL	
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, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

- Tubing not able to be removed - suspected ice
- Collected dissolved metals sample
- May return to attempt to melt ice.

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GSI-PC-02-A/B	Project Number:	1343-005.09	Date:	03/06/2015
Approximate Date Drilled:	unknown	Client:	GY - AAM	Sampler:	AN, RM
Piezometer Diameter / Screen Length:	Drive Point 0.5"	Project Name:	Mount Nansen 2015 GW Sampling Program	Weather/Temperature:	Overcast ~10°C
UTM Location	ZZ E588907 N.6881783	Waypoint	GPS AN Name GSI-PC-02 A/B	Recovery:	☐ Good ☐ Bad
Photos	Cam ELR Nos 192-194	Purge Method			
Duplicate Collected:	☐ Yes Name _____		Waterra	Peristaltic	Disp. Bailer
Field Blank Collected	☐ Yes Name _____	Analysis			

Initial Depth to Water (m):	A	0.920	B	0935	Purge Start Time:					Purge End Time:			
Depth to Bottom (m):	ICE	1.19		1155	Purge Interval Time (___) min, Vol. (___) L								
Submerged Tubing Depth (m):		—			Depth to water (m)								
Well Stick-up Height (m):		0.9		0.905	Temperature (°C) 3%								
Estimated Water Volume (L):		—			pH (pH Units) ±0.1								
					Cond. (µs/cm) 3%								
					Specific Cond. (µs/cm) 3%								
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume					Redox (mV) 10%								
					DO (mg/L) 10%								
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume					DO (%) 10%								
					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					Only for final readings: Turbidity (NTU)								
8" sand pack has 0.73 USgal/ft or 9.271 l/m					Interval Purge Volume (L)								
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m					Cumulative Purge Volume (L):								

FROZEN

YSI Field Parameters Logged:	☐ Yes ☐ No	Sample Method			
Time on YSI (24hr):			Waterra	Peristaltic	Disp. Bailer
Actual time of measurement (24hr):		Analysis			

HEMMERA

Sample Site (Con't): GS1-PC-02-A/B

Sample Date (Con't): 3 June 2017

Sample Time: _____

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

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

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

Head Space Gas Measurements

	Units	Values	
Methane (CH4)	%LEL	-	-
Oxygen (O2)	%	20.5	20.3
Carbon Dioxide (C02)	PPM	-	-

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☒	Preservative Added ☒	Vol. 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, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

Small amount of water found above frozen water column.

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GS1-PC-03A/B	Project Number:	1343-005.09	Date:	03/06/2015
Approximate Date Drilled:	unknown	Client:	GY - AAM	Sampler:	AN, RM
Piezometer Diameter / Screen Length:	½" DP / unknown	Project Name:	Mount Nansen 2015 GW Sampling Program	Weather/Temperature:	Sunny ~20°C
UTM Location	Z. 8 E. 389258 N. 6881205	Waypoint	GPS AN Name GS1-PC-03A/B	Recovery:	☐ Good ☒ Bad
Photos	Cam. ELR Nos. 212 - 214	Purge Method			
Duplicate Collected:	☐ Yes Name		Waterra	Peristaltic	Disp. Bailer
Field Blank Collected	☐ Yes Name	Analysis			

Initial Depth to Water (m):	A	1.131	B	1.008	Purge Start Time:		Purge End Time:				
Depth to Bottom (m):		1.354		2.798	Purge Interval Time (___) min, Vol. (___) L						
Submerged Tubing Depth (m):				~2.0	Depth to water (m)						
Well Stick-up Height (m):		0.93		0.95	Temperature (°C)						
Estimated Water Volume (L):					pH (pH Units)						
					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					DO (%)						
					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					Interval Purge Volume (L)						
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m					Cumulative Purge Volume (L):						

Direct Sample

YSI Field Parameters Logged:	☐ Yes ☐ No	Sample Method			
Time on YSI (24hr):			Waterra	Peristaltic	Disp. Bailer
Actual time of measurement (24hr):		Analysis			

HEMMERA

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

Sample Date (Con't): 04/06/2015

Sample Time: 17:41

Well Head Seal: ☐ J-Plug ☐ PVC Cap ☐ Not Sealed ☑ Other plastic threaded cap (B). Plastic bag (A)

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

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

Head Space Gas Measurements

	Unit	Values	
Methane (CH4)	%LEL	⊗	⊗
Oxygen (O2)	%	20.2	20.2
Carbon Dioxide (C02)	PPM	⊗	⊗

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☒	Preservative Added ☒	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☑ Field Filtered	☑ HNO_3	100	Direct Sample 17:41 05/06/2015
1b	40 ml (glass)	Dissolved Mercury	15 mL	☑ Field Filtered	☑ HCL	15	
2	1 L (plastic)	General Chemistry	200 ml	-	-	200	
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		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

Metal stick-up. No inner waterra casing. Used 2.5 m of peri. tubing.

Attempted to collect additional sample vol. @ 18:47. No recovery in well.

Revisited well 04/06/2015 to collect addition sample vol. DTW = 2.709 m @ 11:00

unable to extract additional vol. 8cm recharge over 16 hrs.

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GSI-PC-04A/B	**Project Number:**	1343-005.09	**Date:**	03/06/2015
Approximate Date Drilled:	unknown	**Client:**	GY - AAM	**Sampler:**	AN, RM
Piezometer Diameter / Screen Length:	½" DP / unknown.	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	cloudy ~15°C
UTM Location	Z. 8 E. 389584 N. 6881656	**Waypoint**	GPS AN Name GSI-PC-04A/B	**Recovery:**	☐ Good ☐ Bad
Photos	Cam. ELR Nos. 206-208	**Purge Method**			
Duplicate Collected:	☐ Yes Name _____		**Waterra**	**Peristaltic**	**Disp. Bailer**
Field Blank Collected	☐ Yes Name _____	**Analysis**			

Initial Depth to Water (m):	A	0.914	B	0.947	**Purge Start Time:**		**Purge End Time:**					
Depth to Bottom (m):		1.318		1.225	**Purge Interval** Time (___) min, Vol. (___) L							
Submerged Tubing Depth (m):		—			**Depth to water (m)**							
Well Stick-up Height (m):		0.9		0.9	**Temperature (°C)**							
Estimated Water Volume (L):		—			**pH (pH Units)**							
					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					**DO (%)**							
					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					**Interval Purge Volume (L)**							
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m					**Cumulative Purge Volume (L):**							

FROZEN

YSI Field Parameters Logged:	☐ Yes ☐ No	**Sample Method**		
Time on YSI (24hr):			**Waterra**	**Peristaltic**	**Disp. Bailer**
Actual time of measurement (24hr):		**Analysis**			

HEMMERA

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

Sample Date (Con't): _____

Sample Time: _____

Well Head Seal: ☐ J-Plug ☒ PVC Cap (A) ☐ Not Sealed ☒ Other ziplock (B)

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

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

Head Space Gas Measurements

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

* same for both A+B

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☒	Preservative Added ☒	Vol. 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, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GSI-PC-05A/B	**Project Number:**	1343-005.09	**Date:**	03/06/2015
Approximate Date Drilled:	unknown	**Client:**	GY - AAM	**Sampler:**	AN, RM
Piezometer Diameter / Screen Length:	½" DP / unknown.	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Sunny/cloudy ~15°C
UTM Location	Z. 8 E. 389710 N. 6881660	**Waypoint**	GPS AN Name GSI-PC-05A/B	**Recovery:**	☐ Good ☐ Bad
Photos	Cam. ELR Nos. 209-211	**Purge Method**			
Duplicate Collected:	☐ Yes Name _____		**Waterra**	**Peristaltic**	**Disp. Bailer**
Field Blank Collected	☐ Yes Name _____	**Analysis**			

Initial Depth to Water (m):	A	DRY	B	ICE	**Purge Start Time:**		**Purge End Time:**				
Depth to Bottom (m):		1.127		1.236	**Purge Interval** Time (___) min, Vol. (___) L						
Submerged Tubing Depth (m):					**Depth to water (m)**						
Well Stick-up Height (m):		0.87		0.9	**Temperature (°C)**						
Estimated Water Volume (L):					**pH (pH Units)**						
					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					**DO (%)**						
					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					**Interval Purge Volume (L)**						
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m					**Cumulative Purge Volume (L):**						

DRY

YSI Field Parameters Logged:	☐ Yes ☐ No	**Sample Method**			
Time on YSI (24hr):			**Waterra**	**Peristaltic**	**Disp. Bailer**
Actual time of measurement (24hr):		**Analysis**			

HEMMERA

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

Sample Date (Con't): _____

Sample Time: _____

Well Head Seal: ☐ J-Plug ☒ PVC Cap (5) ☐ Not Sealed ☒ Other Ziplock (A)

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

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

Head Space Gas Measurements

	Units	[illegible]	[illegible]
Methane (CH4)	%LEL	0	0
Oxygen (O2)	%	20.4	19.8
Carbon Dioxide (C02)	PPM	0	890

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☒	Preservative Added ☒	Vol. 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, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

From top of bottom of the creek

Sample Site:	MP09-02	Project Number:	1343-005.09	Date:	3 June 2015
Approximate Date Drilled:	2009	Client:	GY - AAM	Sampler:	RM AN
Piezometer Diameter / Screen Length:	Drive Point	Project Name:	Mount Nansen 2015 GW Sampling Program	Weather/Temperature:	cloudy 10°C
UTM Location	Z. 8 E. 388866 N. 6881814	Waypoint	GPS AN Name MP09-02	Recovery:	☐ Good ☐ Bad
Photos	Cam. ELR Nos. 180 - 188	Purge Method			
Duplicate Collected:	☐ Yes Name _____		Waterra	Peristaltic	Disp. Bailer
Field Blank Collected	☐ Yes Name _____	Analysis			

Initial Depth to Water (m):		Purge Start Time:				Purge End Time:					
Depth to ~~Bottom~~ (m):	ICE 1.618	Purge Interval Time (___) min, Vol. (___) L									
Submerged Tubing Depth (m):		Depth to water (m)									
Well Stick-up Height (m):	1.12 ≈ 1.29	Temperature (°C) 3%									
Estimated Water Volume (L):	measured from creek bed	pH (pH Units) ±0.1									
	measured from WL of Pony creek.	Cond. (µs/cm) 3%									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		Specific Cond. (µs/cm) 3%									
		Redox (mV) 10%									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		DO (mg/L) 10%									
		DO (%) 10%									
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		Interval Purge Volume (L)									
		Cumulative Purge Volume (L):									

FROZEN

YSI Field Parameters Logged:	☐ Yes ☐ No	Sample Method			
Time on YSI (24hr):			Waterra	Peristaltic	Disp. Bailer
Actual time of measurement (24hr):		Analysis			

HEMMERA

Sample Site (Con't): MP09-02

Sample Date (Con't): 3 June 2015

Sample Time: _____

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: no 0.5" caps (DP caps).

Head Space Gas Measurements

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

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☒	Preservative Added ☒	Vol. 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, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

DP is metal, rusty, has plastic liner, and is at slight angle (~5°)
The creek bed has lots of iron precipitate.
Attempted to defrost well by boiling DI water and pouring down DP. Spent 25 m attempting to defrost, used 4.0 L of DI water. No change in depth to ice.

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MP09-03	**Project Number:**	1343-005.09	**Date:**	03/06/2015
Approximate Date Drilled:	unknown	**Client:**	GY - AAM	**Sampler:**	AN, RM
Piezometer Diameter / Screen Length:	0.9 DP.	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Sunny ~15-20°C
UTM Location	Z. 8 E. 388956 N. 6881738	**Waypoint**	GPS AN Name MP09-03	**Recovery:**	☐ Good ☐ Bad
Photos	Cam. ELR Nos. 195-197	**Purge Method**			
Duplicate Collected:	☐ Yes Name _____		**Waterra**	**Peristaltic**	**Disp. Bailer**
Field Blank Collected	☐ Yes Name _____	**Analysis**			

Initial Depth to Water (m):		**Purge Start Time:**			**Purge End Time:**						
Depth to Bottom (m): ICE	1.477	**Purge Interval** Time (___) min, Vol. (___) L									
Submerged Tubing Depth (m):		**Depth to water (m)**									
Well Stick-up Height (m):	0.80	**Temperature (°C) 3%**									
Estimated Water Volume (L):		**pH (pH Units) ±0.1**									
		Cond. (µs/cm) 3%									
		Specific Cond. (µs/cm) 3%									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Redox (mV) 10%**									
		DO (mg/L) 10%									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**DO (%) 10%**									
		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		**Interval Purge Volume (L)**									
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Cumulative Purge Volume (L):**									

FROZEN

YSI Field Parameters Logged	☐ Yes ☐ No	**Sample Method**			
Time on YSI (24hr):			**Waterra**	**Peristaltic**	**Disp. Bailer**
Actual time of measurement (24hr):		**Analysis**			

HEMMERA

Sample Site (Con't): MP09-03

Sample Date (Con't): 03/06/2015

Sample Time: _____

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: not 0.5" caps.

Head Space Gas Measurements

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

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☒	Preservative Added ☒	Vol. 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, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

Metal stick up (drive point) rusted, with inner waterra liner.

2014 DTW = 1.96
2014 DTB = 3.09

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MP09-04	Project Number:	1343-005.09	Date:	04-Jun-15
Approximate Date Drilled:	~	Client:	GY - AAM	Sampler:	JC/MM
Piezometer Diameter / Screen Length:	1.5	Project Name:	Mount Nansen 2015 GW Sampling Program	Weather/Temperature:	overcast & breeze
UTM Location	Z 8 E. [illegible] N. [illegible]	Waypoint	GPS ☐ / ☐ Name MP09-04	Recovery:	☐ Good ☐ Bad
Photos	Cam. ☐ Nos. [illegible]	Purge Method			
Duplicate Collected:	☐ Yes Name 163-165		Waterra	Peristaltic	Disp. Bailer
Field Blank Collected	☐ Yes Name	Analysis			

Initial Depth to Water (m):	2.106	Purge Start Time:				Purge End Time:					
Depth to Bottom (m):	2.253 to 10	Purge Interval Time (___) min, Vol. (___) L									
Submerged Tubing Depth (m):		Depth to water (m)									
Well Stick-up Height (m):	1.205	Temperature (°C) 3%									
Estimated Water Volume (L):		pH (pH Units) ±0.1									
		Cond. (µs/cm) 3%									
		Specific Cond. (µs/cm) 3%									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		Redox (mV) 10%									
		DO (mg/L) 10%									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		DO (%) 10%									
		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		Only for final readings: Turbidity (NTU)									
8" sand pack has 0.73 USgal/ft or 9.271 l/m		Interval Purge Volume (L)									
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		Cumulative Purge Volume (L):									

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YSI Field Parameters Logged:	☐ Yes ☐ No	Sample Method			
Time (hr) YSI (24hr):			Waterra	Peristaltic	Disp. Bailer
Actual time of measurement (24hr):		Analysis			

HEMMERA

Sample Site (Con't): MP09-04

Sample Date (Con't): _____

Sample Time: _____

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

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

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

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.6
Carbon Dioxide (C02)	PPM	620

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☒	Preservative Added ☒	Vol. 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, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

- Frozen @ 2.253, attempt to thaw in stove, started @ 11:40, no success after working in waterra tubing

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MP09-05	**Project Number:**	1343-005.09	**Date:**	03/June/15
Approximate Date Drilled:	~	**Client:**	GY - AAM	**Sampler:**	JC / MM
Piezometer Diameter / Screen Length:	1.5"	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Sunny & Clouds
UTM Location	Z. 8 E. [illegible] N. 6980592	**Waypoint**	GPS FIE Name MP09-05	**Recovery:**	☒ Good ☐ Bad
Photos	Cam. WL Nos. 159-164 160-162	**Purge Method**			
Duplicate Collected:	☒ Yes Name Dup-4		**Waterra**	**Peristaltic**	**Disp. Bailer**
Field Blank Collected	☒ Yes Name FB-3	**Analysis**		X	

Initial Depth to Water (m):	1.437	**Purge Start Time:**	17:22		**Purge End Time:**						
Depth to Bottom (m):	1.670	**Purge Interval Time (5) min, Vol. (___) L**	17:23	17:28	17:33	17:38	17:43			
Submerged Tubing Depth (m):	~1.5	**Depth to water (m)**	1.491	1.492	1.484	1.484	1.485			
Well Stick-up Height (m):	1.114	**Temperature (°C)**	5.1	2.8	3.1	2.6	0.7			
Estimated Water Volume (L):	1.278	**pH (pH Units)**	6.45	6.57	6.61	6.63	6.66			
		Cond. (µs/cm)	1295	1362	1376	1299	1361			
		Specific Cond. (µs/cm)	2139	2372	2372	2348	2369			
		Redox (mV)	-34.4	-44.7	-46.2	-46.8	-46.9			
		DO (mg/L)	0.08	0.07	0.07	0.07	0.07			
		DO (%)	0.9	0.7	0.6	0.6	0.6			
		Appearance & Odour (Clear, Silty, HC odours, etc.)	slightly turbid	same	clear	yellow tinge	same			
		Only for final readings Sulphide (mg/L)	\	\	\	\	0			
		Only for final readings Turbidity (NTU)		\	\	\	1.87			
		Interval Purge Volume (L)	\	1.25	1.25	1	1			
		Cumulative Purge Volume (L):	\	1.25	2.50	3.5	4.5			

(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

YSI Field Parameters Logged:	☒ Yes ☐ No	**Sample Method**			
Time on YSI (24hr):	17:44		**Waterra**	**Peristaltic**	**Disp. Bailer**
Actual time of measurement (24hr):	17:44	**Analysis**		X	

HEMMERA

Sample Site (Con't): MP09-05

Sample Date (Con't): 03/Jun/15

Sample Time: 17:45

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

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

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

Head Space Gas Measurements

Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.9
Carbon Dioxide (C02)	PPM	500

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☒	Preservative Added ☒	Vol. 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	-	-	1	
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, 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	

General Notes (Condition of well or other features):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MP09-08	**Project Number:**	1343-005.09	**Date:**	03/06/2015
Approximate Date Drilled:	unknown	**Client:**	GY - AAM	**Sampler:**	AN, RM
Piezometer Diameter / Screen Length:	0.5" / unknown DP	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	sunny ~15°C
UTM Location	Z 8 E 389160 N 6881719	**Waypoint**	GPS AN Name MP09-08	**Recovery:**	☐ Good ☐ Bad
Photos	Cam. ELP Nos. 201-203	**Purge Method**			
Duplicate Collected:	☐ Yes Name		**Waterra**	**Peristaltic**	**Disp. Bailer**
Field Blank Collected	☐ Yes Name	**Analysis**			

Initial Depth to Water (m):		**Purge Start Time:**			**Purge End Time:**							
Depth to Bottom (m): ICE	1.587	**Purge Interval** Time (___) min, Vol. (___) L										
Submerged Tubing Depth (m):		**Depth to water (m)**										
Well Stick-up Height (m):	0.99	**Temperature (°C)**										
Estimated Water Volume (L):		**pH (pH Units)**										
		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		**DO (%)**										
		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		**Interval Purge Volume (L)**										
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Cumulative Purge Volume (L):**										

FROZEN

YSI Field Parameters Logged:	☐ Yes ☐ No	**Sample Method**			
Time on YSI (24hr):			**Waterra**	**Peristaltic**	**Disp. Bailer**
Actual time of measurement (24hr):		**Analysis**			

HEMMERA

Sample Site (Con't): MP09-08

Sample Date (Con't): _____

Sample Time: _____

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: no 0.5" well caps

Head Space Gas Measurements

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

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☑	Preservative Added ☑	Vol. 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, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

Rusty metal stick-up (Drive point) with inner waterra casing.

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MP00-09	**Project Number:**	1343-005.09	**Date:**	06-Jun-15
Approximate Date Drilled:		**Client:**	GY - AAM	**Sampler:**	ZK / MM
Piezometer Diameter / Screen Length:	1.05	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	overcast
UTM Location	Z. 8E. 38[illegible] N. 68[illegible]	**Waypoint**	GPS [illegible] Name MP00-09	**Recovery:**	☒ Good ☐ Bad
Photos	Cam. WL Nos. 130-132	**Purge Method**			
Duplicate Collected:	☐ Yes Name		**Waterra**	**Peristaltic**	**Disp. Bailer**
Field Blank Collected	☐ Yes Name	**Analysis**	[illegible]		X Small

Initial Depth to Water (m):	3.591	**Purge Start Time:**	11:00			**Purge End Time:**		11:36	
Depth to Bottom (m):	5.634	**Purge Interval Time (___) min, Vol. (1) L**	11:02	11:08	11:18	11:26	11:36	45wk 8.33	
Submerged Tubing Depth (m):	—	**Depth to water (m)**	✓	✓	✓	✓	✓	✓	
Well Stick-up Height (m):	2.451	**Temperature (°C)**	1.9	1.9	2.4	2.3	2.4	1.5	
Estimated Water Volume (L):	~~4.086~~	**pH (pH Units)**	9.26	9.35	9.49	9.54	9.66	9.31	
		Cond. (µs/cm)	303.2	314.8	355.9	366.3	359.0	288.4	
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Specific Cond. (µs/cm)**	576.8	555.0	631.1	692.1	636.4	706.6	
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**Redox (mV)**	62.5	147.2	164.1	136.8	134.5	80.5	
2" casing has 0.16 USgal/ft or 2.032 l/m		**DO (mg/L)**	8.31	6.57	0.09	0.13	0.01	0.79	
1" casing has 0.04 USgal/ft or 0.508 l/m		**DO (%)**	69.9	66.0	0.8	1.0	0.1	4.7	
8" sand pack has 0.73 USgal/ft or 9.271 l/m		**Appearance & Odour (Clear, Silty, HC odours, etc.)**	turbid (silt)	very turbid	very turbid	very turbid	very turbid	slightly turbid	
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Only for final readings** — **Sulphide (mg/L)**	/	/	/	/	/	0.36	
		Only for final readings — **Turbidity (NTU)**	/	/	/	/	/	45.3	
		Interval Purge Volume (L)	1	1	1	1	1	/	
		Cumulative Purge Volume (L):	1	2	3	4	5	/	

YSI Field Parameters Logged:	☐ Yes ☒ No	**Sample Method**			
Time on YSI (24hr):			**Waterra**	**Peristaltic**	**Disp. Bailer**
Actual time of measurement (24hr):		**Analysis**			X

HEMMERA

Sample Site (Con't): MP09-20

Sample Date (Con't): 04-June-15

Sample Time: 8:05

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

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

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

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.9
Carbon Dioxide (C02)	PPM	430

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☒	Preservative Added ☒	Vol. 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	-	-	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, 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	

General Notes (Condition of well or other features):

- water level went down during purging, suspected slow recharge
- went dry at ~ 5L
- will return to sample following day.
- DTW on June 2 = 3.54 mbTOC

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MD09-10	**Project Number:**	1343-005.09	**Date:**	09-Jun-15
Approximate Date Drilled:		**Client:**	GY - AAM	**Sampler:**	JC / MM
Piezometer Diameter / Screen Length:	1.25"	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Overcast, 2cm breeze.
UTM Location	Z. 8 E. ____ N. ____	**Waypoint**	GPS ___ Name ____	**Recovery:**	☐ Good ☐ Bad
Photos	Cam. W Nos. 130-132	**Purge Method**			
Duplicate Collected:	☐ Yes Name ____		**Waterra**	**Peristaltic**	**Disp. Bailer**
Field Blank Collected	☐ Yes Name ____	**Analysis**			

Initial Depth to Water (m):	2.227	**Purge Start Time:**		**Purge End Time:**					
Depth to Bottom (m):	Frozen	**Purge Interval** Time (___) min, Vol. (___) L							
Submerged Tubing Depth (m):		**Depth to water (m)**							
Well Stick-up Height (m):	2.163	**Temperature (°C)**							
Estimated Water Volume (L):		**pH (pH Units)**							
		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		**DO (%)**							
		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		**Interval Purge Volume (L)**							
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Cumulative Purge Volume (L):**							

FROZEN

YSI Field Parameters Logged:	☐ Yes ☐ No	**Sample Method**			
Time on YSI (24hr):			**Waterra**	**Peristaltic**	**Disp. Bailer**
Actual time of measurement (24hr):		**Analysis**			

HEMMERA

Sample Site (Con't): MW0-22

Sample Date (Con't): _____

Sample Time: _____

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: plug inside

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.9
Carbon Dioxide (C02)	PPM	450

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☒	Preservative Added ☒	Vol. 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, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

~~[illegible]~~ - Frozen attempt to ~~be~~thaw on June 2, returned June 3 to continue thawing attempt @ water & using to try to mechanically work the ice

ice level observed to become deeper by ~ 4 cm, however not able to break through

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MP00-11	**Project Number:**	1343-005.09	**Date:**	03-Jun-15
Approximate Date Drilled:		**Client:**	GY - AAM	**Sampler:**	JC / MW
Piezometer Diameter / Screen Length:	1.25" PVC	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	overcast, windy
UTM Location	Z. 8 E. 38[illegible] N. [illegible]	**Waypoint**	GPS [illegible] Name MP00-11/12	**Recovery:**	☐ Good ☒ Bad - Today
Photos	Cam. WL Nos. [illegible] 134-136	**Purge Method**			
Duplicate Collected:	☐ Yes Name		**Waterra**	**Peristaltic**	**Disp. Bailer**
Field Blank Collected	☐ Yes Name	**Analysis**			X Small Bailer

Initial Depth to Water (m):	2.308	**Purge Start Time:**	12:18			**Purge End Time:**		12:56		
Depth to Bottom (m):	4.971	**Purge Interval** Time (___) min, Vol. (___) L	0 21	12:25	2:33	12:42	12:48	12:56		4-Jun 9:30
Submerged Tubing Depth (m):	—	**Depth to water (m)**	—	—	—	—	—	—		—
Well Stick-up Height (m):	1.207	**Temperature (°C)**	2.8	1.7	1.7	2.1	1.7	2.1		1.4
Estimated Water Volume (L):	2.90	**pH (pH Units)**	7.47	7.41	7.39	7.37	7.39	7.38		7.65
		Cond. (µs/cm)	378.7	44106	45370	418.2	450.8	454.1		454.1
		Specific Cond. (µs/cm)	657.3	7089	699.1	720.9	811.4	804.0		976
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Redox (mV)**	-125.3	-139.7	-132.1	-119.9	-122.2	-120.3		-126.4
		DO (mg/L)	0.56	0.3	0.3	0.02	0.09	0.14		3.64
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**DO (%)**	4.3	1.1	2.3	0.2	0.8	0.9		34.9
		Appearance & Odour (Clear, Silty, HC odours, etc.)	turbid (very)	same	same	same	same	same		very turbid
2" casing has 0.16 USgal/ft or 2.032 l/m		**Only for final readings** Sulphide (mg/L)	/	/	/	/	/	/		1.26
1" casing has 0.04 USgal/ft or 0.508 l/m		**Only for final readings** Turbidity (NTU)	/	/	/	/	/	/		159
8" sand pack has 0.73 USgal/ft or 9.271 l/m		**Interval Purge Volume (L)**	1	1	1	1	1	1		/
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Cumulative Purge Volume (L):**	1	2	3	4	5	6		/

YSI Field Parameters Logged:	☒ Yes ☐ No	**Sample Method**			
Time on YSI (24hr):	9:31		**Waterra**	**Peristaltic**	**Disp. Bailer**
Actual time of measurement (24hr):	9:31	**Analysis**			X

HEMMERA

Sample Site (Con't): MW 09-11

Sample Date (Con't): June 4, 2014

Sample Time: 9:10

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

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

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

Head Space Gas Measurements

Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.9
Carbon Dioxide (C02)	PPM	500

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☒	Preservative Added ☒	Vol. 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	-	-	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, 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	

General Notes (Condition of well or other features):

- Frozen DTW last visit 4.06
- Poured boiling water to attempt to thaw, will return tomorrow to check & thaw if
- June 3 → poured more boiling water down well will wait to weather to see if able to break through ice
- able to break through ice June 3rd & no boiled water, will return to sample tomorrow
- June 4 DTB 2.56m

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

✓

Sample Site:	MP02-12	Project Number:	1343-005.09	Date:	02-Jun-15
Approximate Date Drilled:		Client:	GY - AAM	Sampler:	JR / MM
Piezometer Diameter / Screen Length:	1.25" PVC	Project Name:	Mount Nansen 2015 GW Sampling Program	Weather/Temperature:	overcast, windy
UTM Location	Z.8 E.389[illegible] N.6880[illegible]	Waypoint	GPS [illegible] Name MP02-11/12	Recovery:	☐ Good ☐ Bad
Photos	Cam. ___ Nos. ______	Purge Method			
Duplicate Collected:	☐ Yes Name ______		Waterra	Peristaltic	Disp. Bailer
Field Blank Collected	☐ Yes Name ______	Analysis			

Initial Depth to Water (m):	0.685	Purge Start Time:				Purge End Time:				
Depth to Bottom (m):	Frozen/	Purge Interval Time (__) min, Vol. (__) L								
Submerged Tubing Depth (m):		Depth to water (m)								
Well Stick-up Height (m):	1.831	Temperature (°C)								
Estimated Water Volume (L):		pH (pH Units)								
		Cond. (µs/cm)								
		Specific Cond. (µs/cm)								
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		Redox (mV)		FROZEN						
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		DO (mg/L)								
		DO (%)								
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		Interval Purge Volume (L)								
		Cumulative Purge Volume (L):								

YSI Field Parameters Logged:	☐ Yes ☐ No	Sample Method			
Time on YSI (24hr):			Waterra	Peristaltic	Disp. Bailer
Actual time of measurement (24hr):		Analysis			

HEMMERA

Sample Site (Con't): MW09-13

Sample Date (Con't): _____

Sample Time: _____

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

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

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

Head Space Gas Measurements

	Units	Value
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.9
Carbon Dioxide (C02)	PPM	510

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☒	Preservative Added ☒	Vol. 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, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

- Frozen, salted water to seal down, will return tomorrow to see if well is thawed
- June 3 → poured more boiling water down well, will work to weather to see if able to break ice

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MP09-14	**Project Number:**	1343-005.09	**Date:**	09-Jun-15
Approximate Date Drilled:	unknown	**Client:**	GY - AAM	**Sampler:**	DC/MM
Piezometer Diameter / Screen Length:	1"	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	overcast ~15
UTM Location	Z. 8 E. 389130 N. 6899821	**Waypoint**	GPS ELE Name MP09-14	**Recovery:**	☐ Good ☒ Bad
Photos	Cam. NL Nos. 119-120	**Purge Method**			
Duplicate Collected:	☐ Yes Name N/A 119-12		**Waterra**	**Peristaltic**	**Disp. Bailer**
Field Blank Collected	☐ Yes Name N/A	**Analysis**		X	

Initial Depth to Water (m):	1.089	**Purge Start Time:**				**Purge End Time:**					
Depth to Bottom (m):	1.609	**Purge Interval Time (___) min, Vol. (___) L**									
Submerged Tubing Depth (m):	~1.2	**Depth to water (m)**									
Well Stick-up Height (m):	0.960	**Temperature (°C) 3%**									
Estimated Water Volume (L):	0.864	**pH (pH Units) ±0.1**									
		Cond. (µs/cm) 3%									
		Specific Cond. (µs/cm) 3%									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Redox (mV) 10%**									
		DO (mg/L) 10%									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**DO (%) 10%**									
		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		**Interval Purge Volume (L)**									
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Cumulative Purge Volume (L):**									

DIRECT SAMPLE — SEE BACK FOR DETAILS

YSI Field Parameters Logged:	☐ Yes ☐ No	**Sample Method**			
Time on YSI (24hr):			**Waterra**	**Peristaltic**	**Disp. Bailer**
Actual time of measurement (24hr):		**Analysis**			

HEMMERA

Sample Site (Con't): MP09-14

Sample Date (Con't): 08-Jun-15

Sample Time: 14:50

Well Head Seal: ☐ J-Plug ☐ PVC Cap ☒ Not Sealed ☒ Other → plastic bag over well opening

Seal Replaced: ☐ J-Plug ☐ PVC Cap ☒ Not required ☐ Other ______

Well properly sealed for gas monitoring: ☐ Yes ☒ No Details: ______

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.5
Carbon Dioxide (C02)	PPM	570

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☒	Preservative Added ☒	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☒ Field Filtered	☒ HNO_3	100	
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, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

lots of water by the well

- Direct sample
- Stick-up taken from water surface (outside the well)
- new peri-tubing installed ~6m.
- so much silt present when attempting direct sample that sample appears black; hard to filter; attempted to let silt settle before sampling!

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09-01	Project Number:	1343-005.09	Date:	02/06/2015
Approximate Date Drilled:	unknown	Client:	GY - AAM	Sampler:	AN, RM
Piezometer Diameter / Screen Length:	1½"/unknown	Project Name:	Mount Nansen 2015 GW Sampling Program	Weather/Temperature:	Overcast ~10°C
UTM Location	Z.8 E.389394 N. 6880559	Waypoint	GPS AN Name MW09-01	Recovery:	☐ Good ☒ Bad
Photos	Cam. ELR Nos. 170-173	Purge Method			
Duplicate Collected:	☐ Yes Name _____		Waterra	Peristaltic	Disp. Bailer
Field Blank Collected	☐ Yes Name _____	Analysis		X	

Initial Depth to Water (m):	7.147	Purge Start Time:	11:05			Purge End Time:					
Depth to Bottom (m):	9.060	Purge Interval Time (___) min, Vol. (___) L	11:12	11:16	11:22	DRY					
Submerged Tubing Depth (m):	8.8	Depth to water (m)	8.05	8.42	8.8						
Well Stick-up Height (m):	0.82	Temperature (°C) 3%		3.78	4.76						
Estimated Water Volume (L):	~4.0	pH (pH Units) ±0.1		7.04	7.13						
		Cond. ~~(µs/cm)~~ 3% (ms/cm)		1.728	1.731						
		Specific Cond. (µs/cm) 3%		2910	2821						
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		Redox (mV) 10%		-28.0	-11.5						
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		DO (mg/L) 10%		11.48	1.78						
		DO (%) 10%		78.2	13.8						
2" casing has 0.16 USgal/ft or 2.032 l/m		Appearance & Odour (Clear, Silty, HC odours, etc.)	turbid very brown	same	same						
1" casing has 0.04 USgal/ft or 0.508 l/m		Only for final readings: Sulphide (mg/L)							220	The tweeze was reading "Limit" message	
8" sand pack has 0.73 USgal/ft or 9.271 l/m		Only for final readings: Turbidity (NTU)							2643	AV	
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		Interval Purge Volume (L)	1.0	2.0	1.0						
		Cumulative Purge Volume (L):	1.0	2.0	3.0						

Sampled 02/06/2015 12:15

* Not enough vol. to measure field parameters

YSI Field Parameters Logged:	☐ Yes ☒ No	Sample Method		
Time on YSI (24hr):	X		Waterra	Peristaltic	Disp. Bailer
Actual time of measurement (24hr):	X	Analysis			X

3 June 2015
10:20
WL = 7.350 m

HEMMERA

Sample Site (Con't): MW09-01

Sample Date (Con't): 03/06/2015

Sample Time: 12:15

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: large slit at the top PVC or gash.

Head Space Gas Measurements

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

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☒	Preservative Added ☒	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☑ Field Filtered	☑ HNO_3	100	
1b	40 ml (glass)	Dissolved Mercury	15 mL	☑ Field Filtered	☑ HCL	15	
2	1 L (plastic)	General Chemistry	200 ml	-	-	200	
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	120	
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☑ HNO_3	50	
6	120 ml (plastic)	Sulphide	100 ml	-	☑ Zinc Acetate, then NaOH	100	
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-	100	
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☑ Field Filtered	-	100	

General Notes (Condition of well or other features):

Well investigated with Vision Insight Camera. Lots of tailings observed throughout PVC. Large gash/slit in top of PVC

02/06/2015 Added 9.0m of peri tubing

Very turbid conditions, purged well dry on 02/06/2015. Will return to sample following day.

03/06/2015 - returned to collect sample, WL measured @ 7.390 m (10:20). Fully recharged
- Attempted to sample with peri. pump. Tubing became clogged with tailings Will return with 1" bailer after well water has settled
- Returned @ 12:00 sample collected @ 12:15 using 1" bailer. Extremely turbid. Full set of min. vol. collected.

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09-02	Project Number:	1343-005.09	Date:	02/06/2015
Approximate Date Drilled:	unknown	Client:	GY - AAM	Sampler:	AN, RM
Piezometer Diameter / Screen Length:	2"/unknown	Project Name:	Mount Nansen 2015 GW Sampling Program	Weather/Temperature:	overcast ~10°C
UTM Location	Z. 8 E. 389395 N. 6880558	Waypoint	GPS AN Name MW09-02	Recovery:	☒ Good ☐ Bad
Photos	Cam. ELR Nos. 170-173	Purge Method			
Duplicate Collected:	☐ Yes Name		Waterra	Peristaltic	Disp. Bailer
Field Blank Collected	☐ Yes Name	Analysis		X	

Initial Depth to Water (m):	3.137	Purge Start Time:	09:41			Purge End Time:			10:18		
Depth to Bottom (m):	4.75	Purge Interval Time (5) min, Vol. (___) L	09:46	09:51	09:56	10:06	10:13	10:18			
Submerged Tubing Depth (m):	≈ 4.3	Depth to water (m)	3.57	3.84	3.94	4.02	4.16	4.03			
Well Stick-up Height (m):	0.7	Temperature (°C) 3%	3.34	3.71	3.18	3.31	3.25	3.90			
Estimated Water Volume (L):	~ 3.2	pH (pH Units) ±0.1	7.18	7.18	7.17	7.18	7.18	7.18			
		Cond. ~~(µs/cm)~~ 3% (ms/cm)	1.674	1.684	1.660	1.685	1.706	1.753			
		Specific Cond. (µs/cm) 3%	2843	2840	2846	2877	2918	2934			
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		Redox (mV) 10%	-57.2	-53.3	-55.1	-61.1	-73.2	-87.3			
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		DO (mg/L) 10%	4.20	1.48	1.21	1.04	0.63	0.48			
		DO (%) 10%	26.4	11.2	9.1	7.8	4.8	3.8			
2" casing has 0.16 USgal/ft or 2.032 l/m		Appearance & Odour (Clear, Silty, HC odours, etc.)	cloudy grey	clear.	clear.	clear.	Sand.	Sand.			
1" casing has 0.04 USgal/ft or 0.508 l/m		Only for final readings: Sulphide (mg/L)						0.02			
8" sand pack has 0.73 USgal/ft or 9.271 l/m		Only for final readings: Turbidity (NTU)						5.29			
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		Interval Purge Volume (L)	1.5	0.75	0.75	0.75	0.75	0.75			
		Cumulative Purge Volume (L):	2	2.75	3.5	4.25	5.0	5.75			

YSI Field Parameters Logged:	☒ Yes ☐ No	Sample Method			
Time on YSI (24hr):	X		Waterra	Peristaltic	Disp. Bailer
Actual time of measurement (24hr):	X	Analysis		X	

HEMMERA

Sample Site (Con't): MW09-02

Sample Date (Con't): 02/06/2015

Sample Time: 10:20

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

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

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

Head Space Gas Measurements

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

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☒	Preservative Added ☒	Vol. 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, then NaOH	\	
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-	\	
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☑ Field Filtered	-	\	

General Notes (Condition of well or other features):

Added 5m of peri tubing.

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09-03	Project Number:	1343-005.09	Date:	02/06/2015
Approximate Date Drilled:	unknown.	Client:	GY - AAM	Sampler:	AN, RM
Piezometer Diameter / Screen Length:	2" / unknown.	Project Name:	Mount Nansen 2015 GW Sampling Program	Weather/Temperature:	overcast + rain light ~ 10°C
UTM Location	Z. 8 E. 389920 N. 6880557	Waypoint	GPS AN Name MW09-04	Recovery:	☒ Good ☐ Bad
Photos	Cam. ELR Nos. 174-177	Purge Method			
Duplicate Collected:	☐ Yes Name		Waterra	Peristaltic	Disp. Bailer
Field Blank Collected	☐ Yes Name	Analysis		X	

Initial Depth to Water (m):	6.924	Purge Start Time:	14:22			Purge End Time:	15:00			
Depth to Bottom (m):	9.930	Purge Interval Time (___) min, Vol. (___) L	14:27	14:35	14:40	14:45	14:50	14:55	15:00	
Submerged Tubing Depth (m):		Depth to water (m)	7.09	7.12	7.13	7.14	7.13	7.13	7.13	
Well Stick-up Height (m):	0.42	Temperature (°C) 3%	3.55	3.70	3.41	3.46	3.32	3.24	3.24	
Estimated Water Volume (L):	6.0	pH (pH Units) ±0.1	7.90	7.88	7.59	7.41	7.30	7.23	7.21	
		Cond. (µs/cm) 3%	2762	2716	2711	2683	2681	2673	2666	
		Specific Cond. (µs/cm) 3% (redo)	1.650	1.611	1.593	1.580	1.571	1.562	1.557	
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		Redox (mV) 10%	-3.4	-13.1	-14.0	-1.9	4.6	9.1	12.4	
		DO (mg/L) 10%	4.01	0.63	0.35	0.27	0.24	0.22	0.22	
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		DO (%) 10%	41.2	4.7	2.5	2.0	1.9	1.7	1.7	
		Appearance & Odour (Clear, Silty, HC odours, etc.)	clear	→	→	→	→	→	→	
2" casing has 0.16 USgal/ft or 2.032 l/m		Only for final readings: Sulphide (mg/L)							0.03	
1" casing has 0.04 USgal/ft or 0.508 l/m		Only for final readings: Turbidity (NTU)							0.77	
8" sand pack has 0.73 USgal/ft or 9.271 l/m		Interval Purge Volume (L)	1	1	1	1	1	1	1	
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		Cumulative Purge Volume (L):	1	2	3	4	5	6	7	

YSI Field Parameters Logged:	☐ Yes ☒ No	Sample Method:			
Time on YSI (24hr):	—		Waterra	Peristaltic	Disp. Bailer
Actual time of measurement (24hr):	15:10	Analysis		X	

HEMMERA

Sample Site (Con't): MW09-03

Sample Date (Con't): 2 June 2015

Sample Time: 15:10

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

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

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

Head Space Gas Measurements

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

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☒	Preservative Added ☒	Vol. 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, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☑ Field Filtered	-		

General Notes (Condition of well or other features):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09-04	Project Number:	1343-005.09	Date:	02/06/2015
Approximate Date Drilled:	unknown	Client:	GY - AAM	Sampler:	AN, RM
Piezometer Diameter / Screen Length:	2" / unknown	Project Name:	Mount Nansen 2015 GW Sampling Program	Weather/Temperature:	overcast light rain ~10°C
UTM Location	Z.8 E.389420N. 6880557	Waypoint	GPS AN Name MW09-04	Recovery:	☒ Good ☐ Bad
Photos	Cam. ER Nos. 174-177	Purge Method			
Duplicate Collected:	☒ Yes Name DUP-1		Waterra	Peristaltic	Disp. Bailer
Field Blank Collected	☒ Yes Name FB1	Analysis		X	

Initial Depth to Water (m):	4.631	Purge Start Time:	13:00				Purge End Time:				13:45
Depth to Bottom (m):	7.675	Purge Interval Time (5) min, Vol. (___) L	13:05	13:10	13:15	13:20	13:25	13:30	13:35	13:45
Submerged Tubing Depth (m):	7.2	Depth to water (m)	5.05	5.31	5.47	5.57	5.64	5.69	5.74	5.74
Well Stick-up Height (m):	0.58	Temperature (°C) 3%	3.96	3.96	3.92	4.20	4.05	4.97	4.15	4.82
Estimated Water Volume (L):	~6.0	pH (pH Units) ±0.1	8.05	8.01	8.00	7.99	7.99	7.99	8.00	8.03
		Cond. ~~(µs/cm)~~ 3% (ms/cm)	1.649	1.659	1.629	1.633	1.625	1.622	1.622	1.640
		Specific Cond. (µs/cm) 3%	2761	2741	2729	2706	2711	2709	2699	2706
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		Redox (mV) 10%	72.9	61.2	53.9	50.3	46.5	44.3	42.4	32.7
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		DO (mg/L) 10%	1.77	0.45	0.24	0.23	0.20	0.19	0.20	0.29
		DO (%) 10%	13.3	3.4	1.9	1.7	1.5	1.5	1.5	2.2
2" casing has 0.16 USgal/ft or 2.032 l/m		Appearance & Odour (Clear, Silty, HC odours, etc.)	clear	Sand	Sand	Sand	Sand	Sand	Sand	Sand
1" casing has 0.04 USgal/ft or 0.508 l/m		Only for final readings: Sulphide (mg/L)								0.07
8" sand pack has 0.73 USgal/ft or 9.271 l/m		Only for final readings: Turbidity (NTU)								2.43
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		Interval Purge Volume (L)	1.0	1.0	0.5	0.5	0.5	0.5	0.5	1.5
		Cumulative Purge Volume (L):	1.0	2.0	2.5	3.0	3.5	4.0	4.5	6.0

YSI Field Parameters Logged	☐ Yes ☒ No	Sample Method			
Time on YSI (24hr):			Waterra	Peristaltic	Disp. Bailer
Actual time of measurement (24hr):		Analysis		X	

HEMMERA

Sample Site (Con't): MW09-04

Sample Date (Con't): 02/06/2015

Sample Time: 13:50

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

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

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

Head Space Gas Measurements

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

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

General Notes (Condition of well or other features):

Well located on tailings. Lots of silt and sand. potential for contamination during sampling process Wet sand on everything.

Duplicate collected (DUP-1)

Field Blank collected (FB1)

DTB 2014 = 5.945

HEMMERA

Right

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09-05	**Project Number:**	1343-005.09	**Date:**	03/Jun/15
Approximate Date Drilled:	~	**Client:**	GY - AAM	**Sampler:**	JC / MN
Piezometer Diameter / Screen Length:	2"	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	OVERCAST, WINDY
UTM Location	Z 05 E. 0569113 N. 6880654	**Waypoint**	GPS ELR Name MW09-05/06	**Recovery:**	☐ Good ☐ Bad
Photos	Cam. WL Nos. ~~145-148~~	**Purge Method**			
Duplicate Collected:	☐ Yes Name 141-143		**Waterra**	**Peristaltic**	**Disp. Bailer**
Field Blank Collected	☐ Yes Name	**Analysis**			

Initial Depth to Water (m):	Dry	**Purge Start Time:**			**Purge End Time:**					
Depth to Bottom (m):	7.552	**Purge Interval Time (___) min, Vol. (___) L**								
Submerged Tubing Depth (m):	~	**Depth to water (m)**								
Well Stick-up Height (m):	1.097	**Temperature (°C)**								
Estimated Water Volume (L):	~	**pH (pH Units)**								
		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		**DO (%)**								
		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		**Interval Purge Volume (L)**								
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Cumulative Purge Volume (L):**								

YSI Field Parameters Logged?	☐ Yes ☐ No	**Sample Method**			
Time on YSI (24hr):			**Waterra**	**Peristaltic**	**Disp. Bailer**
Actual time of measurement (24hr):		**Analysis**			

HEMMERA

Sample Site (Con't): MW09-05

Sample Date (Con't): _____

Sample Time: _____

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

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

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

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	9.6
Carbon Dioxide (C02)	PPM	1430

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☒	Preservative Added ☒	Vol. 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, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09-06	**Project Number:**	1343-005.09	**Date:**	02/Jun/15
Approximate Date Drilled:		**Client:**	GY - AAM	**Sampler:**	JC / MH
Piezometer Diameter / Screen Length:	2"	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	overcast, windy
UTM Location	Z 08 E. 0339413 N. 6880654	**Waypoint**	GPS CSR Name MW09-05/06	**Recovery:**	☒ Good ☐ Bad
Photos	Cam. WL Nos. 140-142	**Purge Method**			
Duplicate Collected:	☐ Yes Name		**Waterra**	**Peristaltic**	**Disp. Bailer**
Field Blank Collected	☐ Yes Name	**Analysis**		X	

Initial Depth to Water (m):	3.055	**Purge Start Time:**	14:09			**Purge End Time:**		14:43	
Depth to Bottom (m):	6.020	**Purge Interval Time (5) min, Vol. (___) L**	14:12	14:17	14:22	14:27	14:32	14:37	14:42
Submerged Tubing Depth (m):	5.60	**Depth to water (m)**	3.239	3.268	3.278	3.288	3.302	3.310	3.318
Well Stick-up Height (m):	1.946	**Temperature (°C)**	6.7	5.9	5.7	5.9	5.8	5.7	5.7
Estimated Water Volume (L):	5.93	**pH (pH Units)**	7.28	7.32	7.38	7.40	7.42	7.43	7.44
		Cond. (µs/cm)	1366	1376	1363	1341	1347	1349	1354
		Specific Cond. (µs/cm)	2091	2164	2155	2117	2127	2140	2135
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Redox (mV)**	56.9	84.2	97.2	104.6	107.8	108.6	108.6
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**DO (mg/L)**	0.08	0.06	0.04	0.04	0.04	0.04	0.05
		DO (%)	0.7	0.5	0.4	0.4	0.4	0.4	0.5
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.)**	clear slightly turbid	clear	clear	clear	clear	clear	clear
		Only for final readings Sulphide (mg/L)	/	/	/	/	/	/	0.09
		Only for final readings Turbidity (NTU)	/	/	/	/	/	/	18.41
		Interval Purge Volume (L)	0	1	1	1	1	1	1
		Cumulative Purge Volume (L):	0	1	2	3	4	5	6

YSI Field Parameters Logged:	☐ Yes ☒ No	**Sample Method**			
Time on YSI (24hr):			**Waterra**	**Peristaltic**	**Disp. Bailer**
Actual time of measurement (24hr):		**Analysis**		X	

HEMMERA

Sample Site (Con't): MW09-06

Sample Date (Con't): June 3/15

Sample Time: 14:55

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

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

Well properly sealed for gas monitoring: ☐ Yes ☒ No Details: Slit in side of cap

Head Space Gas Measurements

	[illegible]	[illegible]
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.5
Carbon Dioxide (C02)	PPM	708

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☒	Preservative Added ☒	Vol. 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	-	-	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, 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	

General Notes (Condition of well or other features):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09-07	**Project Number:**	1343-005.09	**Date:**	03-Jun-15
Approximate Date Drilled:		**Client:**	GY - AAM	**Sampler:**	JC
Piezometer Diameter / Screen Length:	2"	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	overcast
UTM Location	Z.8 E.389327 N.6886098	**Waypoint**	GPS# 12 Name MW09-07	**Recovery:**	☐ Good ☐ Bad
Photos	Cam. VL Nos. ~~126~~ 137-140	**Purge Method**			
Duplicate Collected:	☐ Yes Name		**Waterra**	**Peristaltic**	**Disp. Bailer**
Field Blank Collected	☐ Yes Name	**Analysis**			

Initial Depth to Water (m):	1.024	**Purge Start Time:**			**Purge End Time:**					
Depth to Bottom (m):	3.404	**Purge Interval** Time (___) min, Vol. (___) L								
Submerged Tubing Depth (m):	—	**Depth to water (m)**								
Well Stick-up Height (m):	1.359	**Temperature (°C)**								
Estimated Water Volume (L):	—	**pH (pH Units)**								
		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		**DO (%)**								
		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		**Interval Purge Volume (L)**								
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Cumulative Purge Volume (L):**								

DPY

YSI Field Parameters Logged:	☐ Yes ☐ No	**Sample Method**			
Time on YSI (24hr):			**Waterra**	**Peristaltic**	**Disp. Bailer**
Actual time of measurement (24hr):		**Analysis**			

HEMMERA

Sample Site (Con't): MW03-07

Sample Date (Con't): _____

Sample Time: _____

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

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

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

Head Space Gas Measurements

	[illegible]	[illegible]
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.4
Carbon Dioxide (C02)	PPM	810

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☒	Preservative Added ☒	Vol. 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, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

2014 DTW = 1.12
2014 DTB = 3.93

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09-08	Project Number:	1343-005.09	Date:	04-June-15
Approximate Date Drilled:		Client:	GY - AAM	Sampler:	JC / MM
Piezometer Diameter / Screen Length:	2"	Project Name:	Mount Nansen 2015 GW Sampling Program	Weather/Temperature:	overcast, breezy
UTM Location	Z. 8 E. 389688 N. 6880578	Waypoint	GPS ☐ Name MW09-08	Recovery:	☒ Good ☐ Bad
Photos	Cam W Nos. 168-170	Purge Method			
Duplicate Collected:	☐ Yes Name 169-171		Waterra	Peristaltic	Disp. Bailer
Field Blank Collected	☐ Yes Name	Analysis		X	

Initial Depth to Water (m):	1.281	Purge Start Time:	12:11		Purge End Time:								
Depth to Bottom (m):	3.897	Purge Interval Time (5) min, Vol. (___) L	12:12	12:17	12:22	12:27	12:32	12:37	12:42	12:47	12:52	12:57
Submerged Tubing Depth (m):	~3	Depth to water (m)	1.354	1.357	1.352	1.358	1.357	1.361	1.359	1.361	1.361	1.360
Well Stick-up Height (m):	1.113	Temperature (°C) 3%	4.5	2.7	2.5	2.2	2.4	2.3	2.3	2.2	2.3	2.4
Estimated Water Volume (L):	5.23	pH (pH Units) ±0.1	6.65	6.63	6.63	6.65	6.64	6.67	6.66	6.68	6.67	6.67
		Cond. (µs/cm) 3%	272.1	262.0	237.6	260.2	265.0	260.6	209.6	245.0	190.4	196.8
		Specific Cond. (µs/cm) 3%	461.3	455.5	418.4	478.9	466.6	456.1	367.0	436.5	337.1	346.3
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		Redox (mV) 10%	-64.5	-81.0	-83.7	-86.3	-89.0	-90.8	-92.3	-93.3	-94.5	-95.0
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		DO (mg/L) 10%	0.09	0.14	0.01	0.19	0.08	0.14	0.06	0.11	0.08	0.07
2" casing has 0.16 USgal/ft or 2.032 l/m		DO (%) 10%	1.4	1.8	0.1	1.6	0.6	0.5	0.7	0.9	0.5	0.6
1" casing has 0.04 USgal/ft or 0.508 l/m		Appearance & Odour (Clear, Silty, HC odours, etc.)	slightly turbid	same	slight brown sheen	same	same	same	same	same	same	same
8" sand pack has 0.73 USgal/ft or 9.271 l/m		Only for final readings: Sulphide (mg/L)	/	/	/	/	/	/	/	/	/	/
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		Only for final readings: Turbidity (NTU)	/	/	/	/	/	/	/	/	/	/
		Interval Purge Volume (L)	/	1	0.75	1	1	1	1	1	1	1
		Cumulative Purge Volume (L):	/	1	1.75	2.75	3.75	4.75	5.75	6.75	7.75	8.75

[illegible] Logged:	☒ Yes ☐ No	Sample Method			
Time on [illegible] (24hr):	13:02		Waterra	Peristaltic	Disp. Bailer
Actual Time of Measurement (24hr):	13:02	Analysis		X	

more on back →

HEMMERA

Sample Site (Con't): MW09-08

Sample Date (Con't): 04-Jun-15

Sample Time: 13:10

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

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

Well properly sealed for gas monitoring: ☐ Yes ☒ No Details: Slits in PVC

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.9
Carbon Dioxide (C02)	PPM	730

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☒	Preservative Added ☒	Vol. 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	-	-	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, 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	

General Notes (Condition of well or other features):

- Conductivity bouncing between 300-500 since beginning of purge, everything else is stable @time of sample.

time - 13:02
DTW - 1.362
temp - 2.3
pH - 6.67
Cond - 197.2
Spec - 348.6
ORP - -96.0
DO mg - 0.06
DO % - 0.6
Sulphide - 0.02
turb - 2.14
appearance - orange tinge
purge vol - 1 L
tot vol - 9.75 L

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09-11	**Project Number:**	1343-005.09	**Date:**	
Approximate Date Drilled:		**Client:**	GY - AAM	**Sampler:**	
Piezometer Diameter / Screen Length:	2"	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	
UTM Location	Z8 E. [illegible] N. [illegible]	**Waypoint**	GPS ___ Name _____	**Recovery:**	☐ Good ☐ Bad
Photos	Cam. WL Nos. 89-95	**Purge Method**			
Duplicate Collected:	☐ Yes Name 125-127		**Waterra**	**Peristaltic**	**Disp. Bailer**
Field Blank Collected	☐ Yes Name _____	**Analysis**			

Initial Depth to Water (m):		**Purge Start Time:**		**Purge End Time:**						
Depth to Bottom (m):	4.910	**Purge Interval Time (___) min, Vol. (___) L**								
Submerged Tubing Depth (m):		**Depth to water (m)**								
Well Stick-up Height (m):	0.205	**Temperature (°C)**								
Estimated Water Volume (L):		**pH (pH Units)**								
		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		**DO (%)**								
		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		**Interval Purge Volume (L)**								
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Cumulative Purge Volume (L):**								

DRY

YSI Field Parameters Logged:	☐ Yes ☐ No	**Sample Method**			
Time on YSI (24hr)			**Waterra**	**Peristaltic**	**Disp. Bailer**
Actual time of measurement (24hr):		**Analysis**			

HEMMERA

Sample Site (Con't): MW03-11

Sample Date (Con't): _____

Sample Time: _____

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: [illegible]

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.5
Carbon Dioxide (C02)	PPM	1700

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☐	Preservative Added ☐	Vol. 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, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

- GPS battery died, took coordinates from EA last year

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09-13	Project Number:	1343-005.09	Date:	01/06/2015
Approximate Date Drilled:	unknown	Client:	GY - AAM	Sampler:	AN, RM
Piezometer Diameter / Screen Length:	2" / unknown	Project Name:	Mount Nansen 2015 GW Sampling Program	Weather/Temperature:	Raining ~10°C
UTM Location	Z. 5 E. 389005 N. 6881663	Waypoint	GPS AN Name MWO9-13	Recovery:	☐ Good ☐ Bad
Photos	Cam. CLR Nos. 141-146	Purge Method			
Duplicate Collected:	☐ Yes Name _____		Waterra	Peristaltic	Disp. Bailer
Field Blank Collected	☐ Yes Name _____	Analysis			

Initial Depth to Water (m): ICE	8.986	Purge Start Time:				Purge End Time:						
Depth to Bottom (m):		Purge Interval Time (___) min, Vol. (___) L										
Submerged Tubing Depth (m):		Depth to water (m)										
Well Stick-up Height (m):	0.76	Temperature (°C) 3%										
Estimated Water Volume (L):		pH (pH Units) ±0.1										
		Cond. (µs/cm) 3%										
		Specific Cond. (µs/cm) 3%										
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		Redox (mV) 10%										
		DO (mg/L) 10%										
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		DO (%) 10%										
		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		Interval Purge Volume (L)										
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		Cumulative Purge Volume (L):										

FROZEN

YSI Field Parameters Logged	☐ Yes ☐ No	Sample Method			
Time on YSI (24hr):			Waterra	Peristaltic	Disp. Bailer
Actual time of measurement (24hr):		Analysis			

HEMMERA

Sample Site (Con't): MW09-13

Sample Date (Con't): _____

Sample Time: _____

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

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

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

Head Space Gas Measurements

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

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☒	Preservative Added ☒	Vol. 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, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09-14	Project Number:	1343-005.09	Date:	01/06/2015
Approximate Date Drilled:	unknown	Client:	GY - AAM	Sampler:	AN, RM
Piezometer Diameter / Screen Length:	2" / unknown	Project Name:	Mount Nansen 2015 GW Sampling Program	Weather/Temperature:	Raining ~10°C
UTM Location	Z. 8 E. 389007 N. 6881662	Waypoint	GPS AN Name MW09-14	Recovery:	☐ Good ☐ Bad
Photos	Cam ELR Nos. 141-146	Purge Method			
Duplicate Collected:	☐ Yes Name _____		Waterra	Peristaltic	Disp. Bailer
Field Blank Collected	☐ Yes Name _____	Analysis			

Initial Depth to Water (m):	ICE 4.965	Purge Start Time:				Purge End Time:					
Depth to Bottom (m):		Purge Interval Time (___) min, Vol. (___) L									
Submerged Tubing Depth (m):		Depth to water (m)									
Well Stick-up Height (m):	0.74	Temperature (°C) 3%									
Estimated Water Volume (L):		pH (pH Units) ±0.1									
		Cond. (µs/cm) 3%									
		Specific Cond. (µs/cm) 3%									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		Redox (mV) 10%									
		DO (mg/L) 10%									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		DO (%) 10%									
		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		Interval Purge Volume (L)									
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		Cumulative Purge Volume (L):									

FROZEN

YSI Field Parameters Logged:	☐ Yes ☐ No	Sample Method			
Time on YSI (24hr):			Waterra	Peristaltic	Disp. Bailer
Actual time of measurement (24hr):		Analysis			

HEMMERA

Sample Site (Con't): MW09-14

Sample Date (Con't): _____

Sample Time: _____

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

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

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

Head Space Gas Measurements

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

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☒	Preservative Added ☒	Vol. 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, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09-15	**Project Number:**	1343-005.09	**Date:**	21/06/2015
Approximate Date Drilled:	unknown	**Client:**	GY - AAM	**Sampler:**	AW RM.
Piezometer Diameter / Screen Length:	2"/unknown	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Raining ~0°C
UTM Location	Z. 8 E. 388720 N. 6881723	**Waypoint**	GPS AW Name MW09-15	**Recovery:**	☐ Good ☐ Bad
Photos	Cam. ELR Nos. 138-140	**Purge Method**			
Duplicate Collected:	☐ Yes Name _____		**Waterra**	**Peristaltic**	**Disp. Bailer**
Field Blank Collected	☐ Yes Name _____	**Analysis**			

Initial Depth to Water (m):	13.976	**Purge Start Time:**				**Purge End Time:**					
Depth to ~~Bottom~~ (m): ICE	14.077	**Purge Interval** Time (___) min, Vol. (___) L									
Submerged Tubing Depth (m):		**Depth to water (m)**									
Well Stick-up Height (m):	0.90	**Temperature (°C) 3%**									
Estimated Water Volume (L):		**pH (pH Units) ±0.1**									
		Cond. (µs/cm) 3%									
		Specific Cond. (µs/cm) 3%									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Redox (mV) 10%**									
		DO (mg/L) 10%									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**DO (%) 10%**									
		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		**Interval Purge Volume (L)**									
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Cumulative Purge Volume (L):**									

FROZEN

YSI Field Parameters Logged:	☐ Yes ☐ No	**Sample Method**			
Time on YSI (24hr):			**Waterra**	**Peristaltic**	**Disp. Bailer**
Actual time of measurement (24hr):		**Analysis**			

HEMMERA

Sample Site (Con't): MW09-15

Sample Date (Con't): _____

Sample Time: _____

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

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

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

Head Space Gas Measurements

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

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☒	Preservative Added ☒	Vol. 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, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

Small amount of GW detected on top of ice blockage.

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09-16	Project Number:	1343-005.09	Date:	01-Jun-15
Approximate Date Drilled:		Client:	GY - AAM	Sampler:	JC / MM
Piezometer Diameter / Screen Length:	2"	Project Name:	Mount Nansen 2015 GW Sampling Program	Weather/Temperature:	overcast
UTM Location	Z.8 E. 388990 N. 6881096	Waypoint	GPS ELR Name MW09-16	Recovery:	☒ Good ☐ Bad
Photos	Cam. NL Nos. 104-105	Purge Method			
Duplicate Collected:	☒ Yes Name DP-2		Waterra	Peristaltic	Disp. Bailer
Field Blank Collected	☐ Yes Name N/A	Analysis		X	

Initial Depth to Water (m):	1.830	Purge Start Time:	17:27		Purge End Time:					
Depth to Bottom (m):	2.745	Purge Interval Time (5) min, Vol. (___) L	17:33	17:38	17:43	17:48	17:53	17:58	18:03	
Submerged Tubing Depth (m):	~2	Depth to water (m)	1.826	1.826	1.826	1.826	1.826	1.826	1.826	
Well Stick-up Height (m):	1.314	Temperature (°C) 3%	6.6	5.3	5.2	5.2	5.1	5.1	5.0	
Estimated Water Volume (L):	1.83	pH (pH Units) ±0.1	7.06	6.80	6.78	6.77	6.76	6.75	6.75	
		Cond. (µs/cm) 3%	1345	1254	1259	1259	1259	1261	1257	
		Specific Cond. (µs/cm) 3%	1578	2025	2027	2029	2029	2034	2036	
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		Redox (mV) 10%	114.6	122.5	123.3	124.5	126.2	128.3	128.7	
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		DO (mg/L) 10%	0.08	0.06	0.06	0.05	0.06	0.06	0.05	
		DO (%) 10%	0.7	0.6	0.5	0.5	0.6	0.6	0.5	
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.)	Clear	Clear	clear	Clear	Clear	Clear	Clear	
		Only for final readings: Sulphide (mg/L)	—	—	—	—	—	—	0	
		Only for final readings: Turbidity (NTU)	—	—	—	—	—	—	0.89	
		Interval Purge Volume (L)	—	1	1	1	1	1	1	
		Cumulative Purge Volume (L):	—	1	2	3	4	5	6	

YSI Field Parameters Logged:	☒ Yes ☐ No	Sample Method			
Time on YSI (24hr):			Waterra	Peristaltic	Disp. Bailer
Actual Time of measurement (24hr):		Analysis		✓	

HEMMERA

Sample Site (Con't): MW09-16

Sample Date (Con't): 04-Jun-15

Sample Time: 18:00

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: ghite on side

Head Space Gas Measurements

	Units	Value
Methane (CH4)	%LEL	0
Oxygen (O2)	%	19.5
Carbon Dioxide (C02)	PPM	31.60

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☒	Preservative Added ☒	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☐ Field Filtered	☒ HNO_3	180	
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☒ HCL	40	
2	1 L (plastic)	General Chemistry	200 ml	-	-	1500	
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, then NaOH	60	
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-	250	
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-	120	

General Notes (Condition of well or other features):

DUP collected

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09-17	**Project Number:**	1343-005.09	**Date:**	June 2, 2015
Approximate Date Drilled:	unknown	**Client:**	GY - AAM	**Sampler:**	JC / MM
Piezometer Diameter / Screen Length:	2"	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	cloudy, 8°C
UTM Location	Z.8 E. 388028 N. 6880970	**Waypoint**	GPS EL8 Name MW09-17	**Recovery:**	☒ Good ☐ Bad
Photos	Cam. WL Nos. 112-114 113-115	**Purge Method**			
Duplicate Collected:	☐ Yes Name N/A		**Waterra**	**Peristaltic**	**Disp. Bailer**
Field Blank Collected	☐ Yes Name N/A	**Analysis**		x	

Initial Depth to Water (m):	~~4.974~~ 4.949	**Purge Start Time:**	11:00				**Purge End Time:**		11:30		
Depth to Bottom (m):	~~5.1~~ 5.711	**Purge Interval Time (5) min, Vol. (1) L**	11:05	11:10	11:15	11:20	11:25	11:30			
Submerged Tubing Depth (m):	5	**Depth to water (m)**	4.945	4.944	4.944	4.944	4.944	4.944			
Well Stick-up Height (m):	0.985	**Temperature (°C) 3%**	2.1	1.1	1.3	1.2	1.2	1.8			
Estimated Water Volume (L):	1.524	**pH (pH Units) ±0.1**	6.88	6.93	6.89	6.93	6.92	6.92			
		Cond. (µs/cm) 3%	1613	1592	1577	1573	1573	1576			
		Specific Cond. (µs/cm) 3%	2889	2855	2883	2885	2885	2884			
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Redox (mV) 10%**	80.0	84.2	85.1	84.0	84.1	84.0			
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**DO (mg/L) 10%**	1.46	1.05	1.36	1.13	0.97	0.96			
		DO (%) 10%	11.6	8.7	11.0	9.6	8.1	7.2			
2" casing has 0.16 USgal/ft or 2.032 l/m		**Appearance & Odour (Clear, Silty, HC odours, etc.)**	clear	clear	clear	clear	clear	clear			
1" casing has 0.04 USgal/ft or 0.508 l/m		**Only for final readings** Sulphide (mg/L)	-	-	-	-	-	0.01			
8" sand pack has 0.73 USgal/ft or 9.271 l/m		**Only for final readings** Turbidity (NTU)	-	-	-	-	-	0.02			
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Interval Purge Volume (L)**	0.5	1	1	1	1	1			
		Cumulative Purge Volume (L):	0.5	1.5	2.5	3.5	4.5	5.5			

YSI Field Parameters Logged:	☒ Yes ☐ No	**Sample Method**			
Time on YSI (24hr):	11:21		**Waterra**	**Peristaltic**	**Disp. Bailer**
Actual time of measurement (24hr):	11:31	**Analysis**		x	

HEMMERA

Sample Site (Con't): MW09-17

Sample Date (Con't): June 2, 2015

Sample Time: 11:35

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

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

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

Head Space Gas Measurements

	Units	Value
Methane (CH4)	%LEL	0
Oxygen (O2)	%	8.0
Carbon Dioxide (C02)	~~PPM~~ %	~~5.15~~ 3.00

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☒	Preservative Added ☒	Vol. 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	-	-	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, then NaOH	120	
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-	250	
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☒ Field Filtered	-	20	

General Notes (Condition of well or other features):

- CO_2 so high it would not display PPM
- Bentonite on tape when tape was put on (expected behaviour)
- DO was not stabilizing 3 well volumes purged & sampled
- Was getting a -ve turbidity reading (-0.29), calibrated using 0.0 NTU solution.

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW 09-18	**Project Number:**	1343-005.09	**Date:**	June 2/15
Approximate Date Drilled:	unknown	**Client:**	GY - AAM	**Sampler:**	JC / MM
Piezometer Diameter / Screen Length:	2"	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Sun, clouds 8°C
UTM Location	Z 08 E. 0388054 N. 6880984	**Waypoint**	GPS ELR Name MW09-18	**Recovery:**	☒ Good ☐ Bad
Photos	Cam. 2L Nos. 109-110	**Purge Method**			
Duplicate Collected:	☐ Yes Name N/A		**Waterra**	**Peristaltic**	**Disp. Bailer**
Field Blank Collected	☐ Yes Name N/A	**Analysis**		X	

Initial Depth to Water (m):	4.598	**Purge Start Time:**	9:28			**Purge End Time:**	10:07			
Depth to Bottom (m):	7.799	**Purge Interval** Time (5) min, Vol. (___) L	9:32	9:37	9:42	9:47	9:52	9:57	10:02	10:07
Submerged Tubing Depth (m):	~7.5	**Depth to water (m)**	4.584	4.588	4.588	4.590	4.590	4.590	4.590	4.590
Well Stick-up Height (m):	0.880	**Temperature (°C) 3%**	1.6	1.0	1.0	1.1	1.2	1.2	1.4	1.4
Estimated Water Volume (L):	6.402	**pH (pH Units) ±0.1**	7.35	7.04	6.98	6.96	6.98	6.94	6.94	6.94
		Cond. (µs/cm) 3%	1488	1441	1449	1450	1452	1457	1469	1495
		Specific Cond. (µs/cm) 3%	2661	2658	2666	2666	2668	2667	2666	2700
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Redox (mV) 10%**	41.3	54.0	59.9	62.7	64.2	65.5	66.2	66.2
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**DO (mg/L) 10%**	2.58	0.78	1.0	1.04	0.78	0.60	0.51	0.52
		DO (%) 10%	21.6	6.4	8.2	8.5	6.6	5.0	4.3	4.3
2" casing has 0.16 USgal/ft or 2.032 l/m		**Appearance & Odour (Clear, Silty, HC odours, etc.)**	clear	clear	clear	clear	clear	clear	clear	clear
1" casing has 0.04 USgal/ft or 0.508 l/m		**Only for final readings** Sulphide (mg/L)	/	/	/	/	/	/	/	0.01
8" sand pack has 0.73 USgal/ft or 9.271 l/m		**Only for final readings** Turbidity (NTU)	/	/	/	/	/	/	/	0.51
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Interval Purge Volume (L)**	/	1	1	1	1	1	1	1
		Cumulative Purge Volume (L):	/	1	2	3	4	5	6	7

YSI Field Parameters Logged:	☐ Yes ☒ No	**Sample Method**			
Time on YSI (24hr):			**Waterra**	**Peristaltic**	**Disp. Bailer**
Actual time of measurement (24hr):		**Analysis**		X	

HEMMERA

Sample Site (Con't): MW09-18

Sample Date (Con't): June 2, 2015

Sample Time: 10:10

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

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

Well properly sealed for gas monitoring: ☐ Yes ☒ No Details: silts

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.6
Carbon Dioxide (C02)	PPM	870

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☒	Preservative Added ☒	Vol. 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	spilled, re-collected
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, 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	

General Notes (Condition of well or other features):

- ice in tubing, had to crack it to get water to flow

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09-19	**Project Number:**	1343-005.09	**Date:**	June 2, 2015
Approximate Date Drilled:		**Client:**	GY - AAM	**Sampler:**	JC / MM
Piezometer Diameter / Screen Length:	2"	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	cloudy, ~ 5°C
UTM Location	Z8 E.[illegible] N.6882[illegible]	**Waypoint**	GPS elev. Name MW09-19	**Recovery:**	☐ Good ☐ Bad ☒ OK
Photos	Cam. WL Nos. 106-108	**Purge Method**			
Duplicate Collected:	☐ Yes Name 107 - 109		**Waterra**	**Peristaltic**	**Disp. Bailer**
Field Blank Collected	☒ Yes Name FB-2	**Analysis**		X	

Initial Depth to Water (m):	2.565	**Purge Start Time:**	7:56					**Purge End Time:**	8:35				
Depth to Bottom (m):	5.885	**Purge Interval** Time (5) min, Vol. (0.5) L	7:59	8:02	8:05	8:08	8:11	8:14	8:17	8:20	8:23	8:26	8:29
Submerged Tubing Depth (m):	2.5	**Depth to water (m)**	2.885	2.955	2.996	3.010	3.049	3.079	3.038	3.014	3.032	3.079	3.037
Well Stick-up Height (m):	1.08	**Temperature (°C) 3%**	0.6	0.8	0.8	0.8	0.8	0.7	0.9	1.0	0.9	0.7	0.7
Estimated Water Volume (L):	6.4	**pH (pH Units) ±0.1**	6.98	6.84	6.87	6.80	6.79	6.78	6.78	6.78	6.78	6.78	6.77
		Cond. (µs/cm) 3%	1329	1356	1378	1388	1387	1357	1371	1387	1374	1382	1394
		Specific Cond. (µs/cm) 3%	2495	2532	2566	2584	2583	2528	2539	2556	2548	2539	2507
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Redox (mV) 10%**	-62.7	-64.5	-67.8	-72.1	-75.3	-78.8	-80.8	-82.5	-83.6	-85.2	-86.8
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**DO (mg/L) 10%**	1.95	1.72	1.37	1.27	1.20	1.17	1.13	1.15	1.16	1.16	1.14
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		**DO (%) 10%**	15.8	13.9	11.1	10.4	9.9	9.5	9.4	9.5	9.4	9.3	9.3
		Appearance & Odour (Clear, Silty, HC odours, etc.)	clear	clear	clear	clear	clear	clear	clear	clear	clear	clear	clear
		Only for final readings Sulphide (mg/L)	-	-	-	-	-	-	-	-	-	-	-
		Only for final readings Turbidity (NTU)	-	-	-	-	-	-	-	-	-	-	-
		Interval Purge Volume (L)	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
		Cumulative Purge Volume (L):	0.5	1	1.5	2	2.5	3	3.5	4	4.5	5	5.5

YSI Field Parameters Logged:	☒ Yes ☐ No	**Sample Method**			
Time on YSI (24hr):	8:31		**Waterra**	**Peristaltic**	**Disp. Bailer**
Actual time of measurement (24hr):		**Analysis**		X	

Turbidity (NTU) = 0.22
Sulphide (mg/L) = 0.05

Continued purging to 8:59

HEMMERA

Sample Site (Con't): MW09-19

Sample Date (Con't): June 2, 2015

Sample Time: 9:30

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

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

Well properly sealed for gas monitoring: ☐ Yes ☒ No Details: [illegible]

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	1
Oxygen (O2)	%	20.5
Carbon Dioxide (C02)	PPM	760

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☒	Preservative Added ☒	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☒ Field Filtered	☒ HNO_3	150	
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, 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	

General Notes (Condition of well or other features):

- 2.5m ice plug, drive to break through, had to crack ice in tubing to get water to flow

- DI water batch 26 May. 15

2014 DTB: 3.71
DRY

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09-20	Project Number:	1343-005.09	Date:	04-Jun-15
Approximate Date Drilled:	\	Client:	GY - AAM	Sampler:	JC/ML
Piezometer Diameter / Screen Length:	2"	Project Name:	Mount Nansen 2015 GW Sampling Program	Weather/Temperature:	overcast, breezy
UTM Location	Z 8 E. 388092 N. 6880587	Waypoint	GPS 72 Name MW09-20	Recovery:	☐ Good ☐ Bad
Photos	Cam. WL Nos. 167-167	Purge Method			
Duplicate Collected:	☐ Yes Name 166-168		Waterra	Peristaltic	Disp. Bailer
Field Blank Collected	☐ Yes Name	Analysis			

Initial Depth to Water (m):	0.24	Purge Start Time:				Purge End Time:					
Depth to Bottom (m):	3.684	Purge Interval Time (___) min, Vol. (___) L									
Submerged Tubing Depth (m):	\	Depth to water (m)									
Well Stick-up Height (m):	0.923	Temperature (°C) 3%									
Estimated Water Volume (L):	\	pH (pH Units) ±0.1									
		Cond. (µs/cm) 3%									
		Specific Cond. (µs/cm) 3%									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		Redox (mV) 10%									
		DO (mg/L) 10%									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		DO (%) 10%									
		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		Interval Purge Volume (L)									
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		Cumulative Purge Volume (L):									

DRY

YSI Field Parameters Logged:	☐ Yes ☐ No	Sample Method			
Time on YSI (24hr):			Waterra	Peristaltic	Disp. Bailer
Actual time of measurement (24hr):		Analysis			

HEMMERA

Sample Site (Con't): MW09 - 20

Sample Date (Con't): _____

Sample Time: _____

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: Slic inside of PVC

Head Space Gas Measurements

Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.9
Carbon Dioxide (C02)	PPM	950

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☒	Preservative Added ☒	Vol. 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, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

LM DXG 3.60

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09-21	**Project Number:**	1343-005.09	**Date:**	03-June-15
Approximate Date Drilled:	\	**Client:**	GY - AAM	**Sampler:**	JC/MM
Piezometer Diameter / Screen Length:	2"	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	
UTM Location	Z. 08 E. 0389535 N. 6880977	**Waypoint**	GPS ELN Name MW09-21	**Recovery:**	☐ Good ☐ Bad
Photos	Cam. JNL Nos. ~~156-158~~ 157-159	**Purge Method**			
Duplicate Collected:	☐ Yes Name		**Waterra**	**Peristaltic**	**Disp. Bailer**
Field Blank Collected	☐ Yes Name	**Analysis**			

Initial Depth to Water (m):	1.493	**Purge Start Time:**		**Purge End Time:**						
Depth to Bottom (m):	1.552	**Purge Interval Time (___) min, Vol. (___) L**								
Submerged Tubing Depth (m):		**Depth to water (m)**								
Well Stick-up Height (m):	0.744	**Temperature (°C)**								
Estimated Water Volume (L):		**pH (pH Units)**								
		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		**DO (%)**								
		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		**Interval Purge Volume (L)**								
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Cumulative Purge Volume (L):**								

FROZEN

VSI Field Parameters Logged:	☐ Yes ☐ No	**Sample Method**			
Time on VSI (24hr):			**Waterra**	**Peristaltic**	**Disp. Bailer**
Actual time of measurement (24hr):		**Analysis**			

HEMMERA

Sample Site (Con't): MW09 - 21

Sample Date (Con't): _____

Sample Time: _____

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 the side

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.9
Carbon Dioxide (C02)	PPM	460

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☒	Preservative Added ☒	Vol. 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, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

-Frozen, attempted to thaw for 20 mins

GTS 2014 - 5.1 km

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09-22	**Project Number:**	1343-005.09	**Date:**	June 3, 2015
Approximate Date Drilled:	—	**Client:**	GY - AAM	**Sampler:**	SC / MM
Piezometer Diameter / Screen Length:	3"	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Sunny, 15°C, windy
UTM Location	Z 08 E. 0389496 N. 6880547	**Waypoint**	GPS ELR Name MW09-22	**Recovery:**	☐ Good ☒ Bad
Photos	Cam. WL Nos. 145-158	**Purge Method**			
Duplicate Collected:	☐ Yes Name 153-156		**Waterra**	**Peristaltic**	**Disp. Bailer**
Field Blank Collected	☒ Yes Name FB-4	**Analysis**		X	

Initial Depth to Water (m):	4.531	**Purge Start Time:**	16:15			**Purge End Time:**					
Depth to Bottom (m):	5.267	**Purge Interval** Time (5) min, Vol. (___) L		16:17	16:22		June 4 10:44				
Submerged Tubing Depth (m):	5.00	**Depth to water (m)**		4.794	4.953		—				
Well Stick-up Height (m):	0.389	**Temperature (°C)**		4.2	3.7		3.4				
Estimated Water Volume (L):	0.7m x 2 L/m = 1.4 L	**pH (pH Units)**		6.80	6.20		6.25				
		Cond. (µs/cm)		425.3	988		991				
		Specific Cond. (µs/cm)		705.4	1662		1674				
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Redox (mV)**		-18.9	9.3		17.7				
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**DO (mg/L)**		0.03	0.06		0.26				
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		**DO (%)**		0.3	0.6		82.3				
		Appearance & Odour (Clear, Silty, HC odours, etc.)		yellowish brown turbid	light yellow turbid		slightly muddy				
		Only for final readings	**Sulphide (mg/L)**	—	—		0.07				
			Turbidity (NTU)	—	—		12.6				
		Interval Purge Volume (L)		0.25	0.75		—				
		Cumulative Purge Volume (L):		0.25	1		—				

YSI Field Parameters Logged:	☐ Yes ☒ No	**Sample Method**			
Time on YSI (24hr):			**Waterra**	**Peristaltic**	**Disp. Bailer**
Actual time of measurement (24hr):		**Analysis**		X	

HEMMERA

Sample Site (Con't): MW09-22

Sample Date (Con't): June 4/15

Sample Time: 10:10

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

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

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

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.6
Carbon Dioxide (C02)	PPM	2350

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☒	Preservative Added ☒	Vol. 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	-	-	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, 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	

General Notes (Condition of well or other features):

- Noted poor recovery & large draw down while purging
- lowered tubing to bottom of MW and purged dry. Become thick, brown and silty
- to return tomorrow to direct sample.

-June4 DTW -4.549

-FB Batch 30-May-15

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09-23	Project Number:	1343-005.09	Date:	3 June 2015
Approximate Date Drilled:	2009	Client:	GY - AAM	Sampler:	AW, RM
Piezometer Diameter / Screen Length:	2" / unknown	Project Name:	Mount Nansen 2015 GW Sampling Program	Weather/Temperature:	overcast 8°C
UTM Location	Z.9 E.389459 N. 6880553	Waypoint	GPS AW Name MW09-23	Recovery:	☒ Good ☐ Bad
Photos	Cam ELR Nos. 183-185	Purge Method			
Duplicate Collected:	☐ Yes Name _____		Waterra	Peristaltic	Disp. Bailer
Field Blank Collected	☐ Yes Name _____	Analysis	X		

Initial Depth to Water (m):	12.748	Purge Start Time:	13:04			Purge End Time:				
Depth to Bottom (m):	15.890	Purge Interval Time (___) min, Vol. (___) L	13:06	13:09	13:12	13:16	13:25			
Submerged Tubing Depth (m):	15.2	Depth to water (m)	—	—	—	—	12.805			
Well Stick-up Height (m):	0.17	Temperature (°C) 3%	1.25	1.27	0.78	0.71	0.85			
Estimated Water Volume (L):	6.0	pH (pH Units) ±0.1	7.00	6.93	6.94	6.90	6.90			
		Cond. ~~(µS/cm)~~ 3% (mS/cm)	1.106	1.105	1.130	1.155	1.180			
		Specific Cond. (µs/cm) 3%	2019	2021	2101	2148	2189			
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		Redox (mV) 10%	-262	-299	-388	+452	-513			
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		DO (mg/L) 10%	3.92	4.96	3.41	2.95	2.47			
		DO (%) 10%	28.5	29.5	24.0	20.7	17.4			
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.)	Slight sulfur odour, brown	sh/grey colour	Sand	—	Sand			
		Only for final readings: Sulphide (mg/L)							0.64	@ time of sample
		Only for final readings: Turbidity (NTU)							66	@ time of sample
		Interval Purge Volume (L)	5	5	5	5	5			
		Cumulative Purge Volume (L):	5	5	10	15	20			

Sampled 08:20 04/06/2015

YSI Field Parameters Logged:	☐ Yes ☐ No	Sample Method			
Time for YSI (24hr):			Waterra	Peristaltic	Disp. Bailer
Actual time of measurement (24hr):		Analysis	X		

HEMMERA

Sample Site (Con't): MW09-23

Sample Date (Con't): 04/06/2015

Sample Time: 08:15

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: silts.

Head Space Gas Measurements

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

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☒	Preservative Added ☒	Vol. Collected (ml)	Comments
1a	120 ml (plastic)	Dissolved Metals	100 ml	☑ Field Filtered	☑ HNO_3	100	
1b	40 ml (glass)	Dissolved Mercury	15 mL	☑ Field Filtered	☑ HCL	15	
2	1 L (plastic)	General Chemistry	200 ml	-	-	200	
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	120	
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☑ HNO_3	50	
6	120 ml (plastic)	Sulphide	100 ml	-	☑ Zinc Acetate, then NaOH	100	
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-	100	
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☑ Field Filtered	-	100	

General Notes (Condition of well or other features):

Used 16m of waterra tubing and foot valve and waterra foot valve.
Replaced metal wire for tranducer. Wire was frayed, potential to break and drop down well
Purged well on Jun 3/2015. Sample very turbid. Good recharge. 20 L purged. will return to sample once well water has settled. Suggest using a different sampling method, dedicated plastic submersible pump. Well has been damaged by grading/addition of rock material to tailings dam (bent @ ~30° from vertical).

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09-24	**Project Number:**	1343-005.09	**Date:**	04/06/2015
Approximate Date Drilled:	unknown	**Client:**	GY - AAM	**Sampler:**	AN, RM
Piezometer Diameter / Screen Length:	2" / unknown	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	overcast ~10°C
UTM Location	Z.8 E.389560 N.6880624	**Waypoint**	GPS AN Name MW09-24	**Recovery:**	☒ Good ☐ Bad
Photos	Cam. ELR Nos. 219-229	**Purge Method**			
Duplicate Collected:	☐ Yes Name 224-226		**Waterra**	**Peristaltic**	**Disp. Bailer**
Field Blank Collected	☐ Yes Name	**Analysis**			X

Initial Depth to Water (m):	9.540	**Purge Start Time:**	11:40			**Purge End Time:**		11:54		
Depth to Bottom (m):	11.190	**Purge Interval Time (___) min, Vol. (___) L**	11:43	11:46	11:50	11:54				
Submerged Tubing Depth (m):		**Depth to water (m)**				9.541				
Well Stick-up Height (m):		**Temperature (°C)**	1.94	0.58	0.60	0.67				
Estimated Water Volume (L):	~3.3	**pH (pH Units)**	7.08	6.95	6.98	7.03				
		Cond. (µs/cm)	0.544	0.500	0.499	0.499				
		Specific Cond. (µs/cm)	980	939	936	933				
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Redox (mV)**	121.8	123.4	122.2	121.1				
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**DO (mg/L)**	1203	7.56	6.96	8.27				
		DO (%)	16.56	54.3	48.5	56.8				
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.)**	grey silty	Same	slightly turbid.	Same				
		Only for final readings Sulphide (mg/L)					0.04			
		Only for final readings Turbidity (NTU)					7.06			
		Interval Purge Volume (L)	6	4	5	5				
		Cumulative Purge Volume (L):	6	10	15	20				

YSI Field Parameters Logged:	☐ Yes ☐ No	**Sample Method**			
Time on YSI (24hr):			**Waterra**	**Peristaltic**	**Disp. Bailer**
Actual time of measurement (24hr):		**Analysis**			X

HEMMERA

Sample Site (Con't): MW09-24

Sample Date (Con't): 04/06/2015

Sample Time: 14:40

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

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

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

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.4
Carbon Dioxide (C02)	PPM	200

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☒	Preservative Added ☒	Vol. 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	full set
3	125 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, 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	

General Notes (Condition of well or other features):

Purged 20 L @ 11:40 using bailer. Will return to sample after the well has settled (slightly turbid).

Sandy/windy conditions while sampling. Potential for dust contamination.

DTB 2014 = 6.46m

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	W141050838H01	**Project Number:**	1343-005.09	**Date:**	June 3, 2015
Approximate Date Drilled:		**Client:**	GY - AAM	**Sampler:**	JC / MM
Piezometer Diameter / Screen Length:	2"	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Sunny, 13°C
UTM Location	Z. 08 E. 0389519 N. 6880667	**Waypoint**	GPS ELR Name BH01	**Recovery:**	☐ Good ☐ Bad
Photos	Cam. WL Nos. 143-145	**Purge Method**			
Duplicate Collected:	☐ Yes Name 144 - 146		**Waterra**	**Peristaltic**	**Disp. Bailer**
Field Blank Collected	☐ Yes Name	**Analysis**			

Initial Depth to Water (m):	— (DRY)	**Purge Start Time:**		**Purge End Time:**							
Depth to Bottom (m):	6.538 (ICE)	**Purge Interval Time (___) min, Vol. (___) L**									
Submerged Tubing Depth (m):	–	**Depth to water (m)**									
Well Stick-up Height (m):	0.635	**Temperature (°C)**									
Estimated Water Volume (L):	–	**pH (pH Units)**									
(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)			FROZEN						
		Redox (mV)									
		DO (mg/L)									
		DO (%)									
		Appearance & Odour (Clear, Silty, HC odours, etc.)									
		Only for final readings	**Sulphide (mg/L)**								
			Turbidity (NTU)								
		Interval Purge Volume (L)									
		Cumulative Purge Volume (L):									

YSI Field Parameters Logged:	☐ Yes ☐ No	**Sample Method**			
Time on YSI (24hr):			**Waterra**	**Peristaltic**	**Disp. Bailer**
Actual time of measurement (24hr):		**Analysis**			

HEMMERA

Sample Site (Con't): BH01

Sample Date (Con't): _____

Sample Time: _____

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

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

Well properly sealed for gas monitoring: ☐ Yes ☒ No Details: No Cap

Head Space Gas Measurements

Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.9
Carbon Dioxide (C02)	PPM	620

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☒	Preservative Added ☒	Vol. 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, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

DTB 2014: 6.76

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	WIII103083BH02	**Project Number:**	1343-005.09	**Date:**	June 3/15
Approximate Date Drilled:		**Client:**	GY - AAM	**Sampler:**	JC / MH
Piezometer Diameter / Screen Length:	2"	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Sunny, 13°C
UTM Location	Z. 08 E. 0389560 N. 6980664	**Waypoint**	GPS ELR Name BH02	**Recovery:**	☐ Good ☐ Bad
Photos	Cam. WL Nos. 149-150	**Purge Method**			
Duplicate Collected:	☐ Yes Name		**Waterra**	**Peristaltic**	**Disp. Bailer**
Field Blank Collected	☐ Yes Name	**Analysis**			

Initial Depth to Water (m):	— (DRY)	**Purge Start Time:**		**Purge End Time:**							
Depth to Bottom (m):	6.766 (ICE)	**Purge Interval Time (___) min, Vol. (___) L**									
Submerged Tubing Depth (m):		**Depth to water (m)**									
Well Stick-up Height (m):	0.790	**Temperature (°C)**									
Estimated Water Volume (L):		**pH (pH Units)**									
		Cond. (µs/cm)									
		Specific Cond. (µs/cm)									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Redox (mV)**			FROZEN						
		DO (mg/L)									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**DO (%)**									
		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		**Interval Purge Volume (L)**									
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Cumulative Purge Volume (L):**									

YSI Field Parameters Logged:	☐ Yes ☐ No	**Sample Method**			
Time on YSI (24hr):			**Waterra**	**Peristaltic**	**Disp. Bailer**
Actual time of measurement (24hr):		**Analysis**			

HEMMERA

Sample Site (Con't): BH02

Sample Date (Con't): June 5 '15

Sample Time: _____

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: Not Sealed

Head Space Gas Measurements

	Units	Value
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.9
Carbon Dioxide (C02)	PPM	460

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☒	Preservative Added ☒	Vol. 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, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	WH10308 38H03	Project Number:	1343-005.09	Date:	02-Jun-5
Approximate Date Drilled:		Client:	GY - AAM	Sampler:	JC / MN
Piezometer Diameter / Screen Length:	2"	Project Name:	Mount Nansen 2015 GW Sampling Program	Weather/Temperature:	Overcast, some sun
UTM Location	Z.8 E. 38[illegible]0 N. 6[illegible]30	Waypoint	GPS ENR Name WH-BH03	Recovery:	☒ Good ☐ Bad
Photos	Cam WL Nos. [illegible]	Purge Method			
Duplicate Collected:	☐ Yes Name N/A 122-124		Waterra	Peristaltic	Disp. Bailer
Field Blank Collected	☐ Yes Name N/A	Analysis		✓	

Initial Depth to Water (m):	1.60	Purge Start Time:	8:01		Purge End Time:								
Depth to Bottom (m):	1.879 (ice) / 5.38 From last year	Purge Interval Time (5) min, Vol. (__) L		June 2 purge data	8:23	8:28	8:33	8:38	8:43	8:48	8:53	8:58
Submerged Tubing Depth (m):	~1.8	Depth to water (m)			/	/	/	/	/	/	/	/
Well Stick-up Height (m):	0.75	Temperature (°C) 3%	5.8		2.5	1.9	1.9	2.0	2.3	1.8	1.8	2.1
Estimated Water Volume (L):	0.5	pH (pH Units) ±0.1	7.33	Lab pH data	7.26	7.0	6.93	6.90	6.90	6.87	6.87	6.88
		Cond. (µs/cm) 3%	779		678	655	598	680	680	573	530	463
		Specific Cond. (µs/cm) 3%	1228		1069	1173	1158	1104	1204	1357	958	1215
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		Redox (mV) 10%	80.5		70.8	75.2	74.7	74.5	69.0	69.6	70.3	66.7
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		DO (mg/L) 10%	2.17		1.25	1.29	4.11	4.17	2.86	1.81	1.77	5.15
		DO (%) 10%	2.31		11.1	10.3	34.1	34.5	25.6	14.9	14.7	42.9
2" casing has 0.16 USgal/ft or 2.032 l/m		Appearance & Odour (Clear, Silty, HC odours, etc.)	slight Cloudy		slightly cloudy	same	same	same	same	very cloudy	clear	cloudy
1" casing has 0.04 USgal/ft or 0.508 l/m	Only for final readings: Sulphide (mg/L)		0.06		/	/	/	/	/	/	/	0.05
8" sand pack has 0.73 USgal/ft or 9.271 l/m	Only for final readings: Turbidity (NTU)		6.15		/	/	/	/	/	/	/	2.18
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		Interval Purge Volume (L)	/		/	1	0.5	1	0.5	0.5	0.75	0.75
		Cumulative Purge Volume (L):	/		/	1	1.5	2.5	3	3.5	4.25	5

YSI Field Parameters Logged:	☒ Yes ☐ No	Sample Method			
Time on YSI (24hr):	16:14		Waterra	Peristaltic	Disp. Bailer
Actual time of measurement (24hr):	16:14	Analysis		X	

- DTW not taken during purge b/c reading depth to ice
- 1 well volume = 7.4L, combined are 2.5L purged last two samples will not purged

* new sample logged @ 8:58

- calibrated turbidity meter June 3/15 @ 8:40

June3/15 Snow * -> Returned 05/June to purge property + sample; was purged ~0.5L yesterday, will check for stable parameters (see other side)
-> Sampled 03/June/15 @ 8:45

HEMMERA

Sample Site (Con't): W1410309358H03

Sample Date (Con't): ~~02-June-15~~ see above note

Sample Time: ~~15:30~~

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

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

Well properly sealed for gas monitoring: ☐ Yes ☒ No Details: no seal + metal casing open.

Head Space Gas Measurements

	Units	Value
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.9
Carbon Dioxide (C02)	PPM	530

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☒	Preservative Added ☒	Vol. 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	46	
2	1 L (plastic)	General Chemistry	200 ml	-	-	300	
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	~~300~~ 250	
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☒ HNO_3	120	
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, 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	

General Notes (Condition of well or other features):

Frozen @ 1 8:39

- 3.5m of tubing used, attempted to sample water on top of ~~ice~~ ice (corrected ice plug ~~thing~~ existing tubing in well is not coming out when pulled

- water ~~very~~ turbid

- assumption that there is a crack in the ice. ~~Attempted~~ direct sample of the water above the ice + was able to fill an entire bottle ~~set~~ bot parameters as well, will return after consultation as to whether we should try an entire purge + resample.

June 2/15 notes

- no cap, when return will try to remember to bring J-plug.
- All sampling done as new tubing that was added.
- will return tomorrow to ~~same~~ purge + sample

DTB 2014 - 6.59m

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	WH10308BH04	**Project Number:**	1343-005.09	**Date:**	June 3, 2015
Approximate Date Drilled:		**Client:**	GY - AAM	**Sampler:**	JC / MM
Piezometer Diameter / Screen Length:	2"	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Sunny, 13°C
UTM Location	Z. 08 E. 0389543 N. 6880663	**Waypoint**	GPS ELR Name BH04	**Recovery:**	☐ Good ☐ Bad
Photos	Cam. WL Nos. 146-148	**Purge Method**			
Duplicate Collected:	☐ Yes Name 147-149		**Waterra**	**Peristaltic**	**Disp. Bailer**
Field Blank Collected	☐ Yes Name	**Analysis**			

Initial Depth to Water (m):	— (DRY)	**Purge Start Time:**			**Purge End Time:**						
Depth to Bottom (m):	6.457 (ICE)	**Purge Interval Time (___) min, Vol. (___) L**									
Submerged Tubing Depth (m):		**Depth to water (m)**									
Well Stick-up Height (m):	0.795	**Temperature (°C)**									
Estimated Water Volume (L):		**pH (pH Units)**									
		Cond. (µs/cm)									
		Specific Cond. (µs/cm)									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Redox (mV)**			FROZEN						
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**DO (mg/L)**									
		DO (%)									
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		**Interval Purge Volume (L)**									
		Cumulative Purge Volume (L):									

YSI Field Parameters Logged:	☐ Yes ☐ No	**Sample Method**			
Time on YSI (24hr):			**Waterra**	**Peristaltic**	**Disp. Bailer**
Actual time of measurement (24hr):		**Analysis**			

HEMMERA

Sample Site (Con't): BH04

Sample Date (Con't): ~~June 3/15~~

Sample Time: _____

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: Not Sealed

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.9
Carbon Dioxide (C02)	PPM	840

Priority	Bottle Type	Parameters Analyzed	Min. Volume	Treatment ☒	Preservative Added ☒	Vol. 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, then NaOH		
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

APPENDIX C
Laboratory Reports

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

Date Received: 03-JUN-15
Report Date: 16-JUN-15 13:41 (MT)
Version: FINAL

Client Phone: 867-456-4865

Certificate of Analysis

Lab Work Order #: L1620902

Project P.O. #: NOT SUBMITTED
Job Reference: 1343-005.09
C of C Numbers: 1, 2
Legal Site Desc:

Brent Mack, B.Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1620902-2 Water 02-JUN-15 13:50 GS1-HA-01A	L1620902-3 Water 02-JUN-15 11:35 MW09-017	L1620902-4 Water 02-JUN-15 10:10 MW09-018	L1620902-5 Water 02-JUN-15 08:30 MW09-019	L1620902-6 Water 02-JUN-15 08:30 FB-2
WATER						
Physical Tests	Conductivity (uS/cm)	977	2740	2560	2340	<2.0
	Hardness (as CaCO3) (mg/L)	593	1950	1780	1460	<0.50
	pH (pH)	8.14	8.02	8.05	7.80	5.55
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	257	425	396	403	<1.0
	Ammonia, Total (as N) (mg/L)	0.0669	<0.0050 DLA	0.0284 DLA	3.23 DLA	<0.0050
	Chloride (Cl) (mg/L)	<0.50	<5.0 DLA	<5.0 DLA	<5.0 DLA	<0.50
	Fluoride (F) (mg/L)	0.118	<0.20 DLA	<0.20 DLA	0.28 DLA	<0.020
	Nitrate (as N) (mg/L)	0.0059	0.391 DLA	<0.050 DLA	<0.050 DLA	<0.0050
	Nitrite (as N) (mg/L)	<0.0010	<0.010 DLA	<0.010 DLA	<0.010 DLA	<0.0010
	Total Kjeldahl Nitrogen (mg/L)	0.346	0.093	0.129	4.02	<0.050
	Sulfate (SO4) (mg/L)	312	1540	1440	1230	<0.30
	Sulphide as S (mg/L)	0.133	<0.020	<0.020	0.123	<0.020
	Anion Sum (meq/L)	11.7	40.7	38.0	33.6	<0.10
	Cation Sum (meq/L)	12.4	39.7	36.3	31.7	<0.10
	Cation - Anion Balance (%)	3.0	-1.2	-2.2	-3.0	0.0
Cyanides	Cyanide, Weak Acid Diss (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Cyanide, Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Thiocyanate (SCN) (mg/L)	<0.50	<0.50	<0.50	0.53	<0.50
	Cyanide, Free (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Organic / Inorganic Carbon	Total Inorganic Carbon (mg/L)	51.4	95.1	95.6	96.4	<0.50
	Total Organic Carbon (mg/L)	4.27	2.49	2.63	12.6	<0.50
Total Metals	Aluminum (Al)-Total (mg/L)					
	Antimony (Sb)-Total (mg/L)					
	Arsenic (As)-Total (mg/L)					
	Barium (Ba)-Total (mg/L)					
	Beryllium (Be)-Total (mg/L)					
	Bismuth (Bi)-Total (mg/L)					
	Boron (B)-Total (mg/L)					
	Cadmium (Cd)-Total (mg/L)					
	Calcium (Ca)-Total (mg/L)					
	Chromium (Cr)-Total (mg/L)					
	Cobalt (Co)-Total (mg/L)					
	Copper (Cu)-Total (mg/L)					
	Iron (Fe)-Total (mg/L)					
	Lead (Pb)-Total (mg/L)					
	Lithium (Li)-Total (mg/L)					

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1620902-7 Water 02-JUN-15 14:40 MP09-14	L1620902-8 Water 02-JUN-15 17:00 CH-P-13-05/50	L1620902-9 Water 02-JUN-15 13:50 MW09-004	L1620902-10 Water 02-JUN-15 13:50 DUP-1	L1620902-11 Water 02-JUN-15 13:50 FB1
WATER						
Physical Tests	Conductivity (uS/cm)	372	2860	2670	2660	<2.0
	Hardness (as CaCO3) (mg/L)		1940	1630	1630	<0.50
	pH (pH)		7.16	8.09	8.12	5.66
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)		76.8	100	97.0	<1.0
	Ammonia, Total (as N) (mg/L)		0.0395	6.27	6.19	<0.0050
	Chloride (Cl) (mg/L)		<5.0 DLA	<5.0 DLA	<5.0 DLA	<0.50
	Fluoride (F) (mg/L)		0.25	0.64	0.55	<0.020
	Nitrate (as N) (mg/L)		<0.050 DLA	0.269	0.300	<0.0050
	Nitrite (as N) (mg/L)		<0.010 DLA	0.040	0.045	<0.0010
	Total Kjeldahl Nitrogen (mg/L)		0.240	7.51	7.21	<0.050
	Sulfate (SO4) (mg/L)		2040	1550	1760	<0.30
	Sulphide as S (mg/L)		<0.020	<0.020	<0.020	<0.020
	Anion Sum (meq/L)		44.1	34.4	38.5	<0.10
	Cation Sum (meq/L)		42.0	35.5	35.4	<0.10
	Cation - Anion Balance (%)		-2.4	1.6	-4.2	0.0
Cyanides	Cyanide, Weak Acid Diss (mg/L)		<0.0050	<0.0050	<0.0050	<0.0050
	Cyanide, Total (mg/L)		<0.0050	<0.0050	<0.0050	<0.0050
	Thiocyanate (SCN) (mg/L)		<0.50	<0.50	<0.50	<0.50
	Cyanide, Free (mg/L)		<0.0050	<0.0050	<0.0050	<0.0050
Organic / Inorganic Carbon	Total Inorganic Carbon (mg/L)		12.0	18.7	19.0	<0.50
	Total Organic Carbon (mg/L)		5.34	6.29	6.23	<0.50
Total Metals	Aluminum (Al)-Total (mg/L)					
	Antimony (Sb)-Total (mg/L)					
	Arsenic (As)-Total (mg/L)					
	Barium (Ba)-Total (mg/L)					
	Beryllium (Be)-Total (mg/L)					
	Bismuth (Bi)-Total (mg/L)					
	Boron (B)-Total (mg/L)					
	Cadmium (Cd)-Total (mg/L)					
	Calcium (Ca)-Total (mg/L)					
	Chromium (Cr)-Total (mg/L)					
	Cobalt (Co)-Total (mg/L)					
	Copper (Cu)-Total (mg/L)					
	Iron (Fe)-Total (mg/L)					
	Lead (Pb)-Total (mg/L)					
	Lithium (Li)-Total (mg/L)					

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L1620902-12	L1620902-13	L1620902-14	L1620902-16	L1620902-17
Description	Water	Water	Water	Water	Water
Sampled Date		02-JUN-15	02-JUN-15	01-JUN-15	01-JUN-15
Sampled Time		15:10	10:20	18:00	18:00
Client ID	TRAVEL BLANK	MW09-03	MW09-02	MW09-016	DUP-2
Grouping / **Analyte**					
WATER					
Physical Tests					
Conductivity (uS/cm)	<2.0	2600	2930	1970	1960
Hardness (as CaCO3) (mg/L)	<0.50	1600	1410	1260	1280
pH (pH)	5.48	8.01	7.03	7.97	7.98
Anions and Nutrients					
Alkalinity, Total (as CaCO3) (mg/L)	<1.0	137	26.6	224	240
Ammonia, Total (as N) (mg/L)	0.0071 RRV	3.06 DLA	14.2 DLA	0.0331 DLA	0.0321 DLA
Chloride (Cl) (mg/L)	<0.50	<5.0	<5.0	<5.0	<2.5
Fluoride (F) (mg/L)	<0.020	0.58	0.82	0.47	0.25
Nitrate (as N) (mg/L)	<0.0050	0.534	<0.050 DLA	<0.050 DLA	<0.025 DLA
Nitrite (as N) (mg/L)	<0.0010	0.072	<0.010 DLA	<0.010 DLA	<0.0050 DLA
Total Kjeldahl Nitrogen (mg/L)	<0.050	3.70	16.1	0.181	0.192
Sulfate (SO4) (mg/L)	<0.30	1610	2240	1100	1120
Sulphide as S (mg/L)	<0.020	<0.020	<0.020	<0.020	<0.020
Anion Sum (meq/L)	<0.10	36.4	47.2	27.5	28.2
Cation Sum (meq/L)	<0.10	35.2	38.3	26.0	26.4
Cation - Anion Balance (%)	0.0	-1.6	-10.4	-2.8	-3.4
Cyanides					
Cyanide, Weak Acid Diss (mg/L)	<0.0050	0.0118	0.0192	<0.0050	<0.0050
Cyanide, Total (mg/L)	<0.0050	0.0363	0.132	<0.0050	<0.0050
Thiocyanate (SCN) (mg/L)	<0.50	<0.50	1.34	<0.50	<0.50
Cyanide, Free (mg/L)	<0.0050	0.0108	<0.0050	<0.0050	<0.0050
Organic / Inorganic Carbon					
Total Inorganic Carbon (mg/L)	<0.50	27.8	2.3 RRA	52.2	50.5
Total Organic Carbon (mg/L)	<0.50	6.60	5.87	3.57	3.56
Total Metals					
Aluminum (Al)-Total (mg/L)	<0.0030				
Antimony (Sb)-Total (mg/L)	<0.00010				
Arsenic (As)-Total (mg/L)	<0.00010				
Barium (Ba)-Total (mg/L)	<0.000050				
Beryllium (Be)-Total (mg/L)	<0.000020				
Bismuth (Bi)-Total (mg/L)	<0.000050				
Boron (B)-Total (mg/L)	<0.010				
Cadmium (Cd)-Total (mg/L)	<0.0000050				
Calcium (Ca)-Total (mg/L)	<0.050				
Chromium (Cr)-Total (mg/L)	<0.00010				
Cobalt (Co)-Total (mg/L)	<0.00010				
Copper (Cu)-Total (mg/L)	<0.00050				
Iron (Fe)-Total (mg/L)	<0.010				
Lead (Pb)-Total (mg/L)	<0.000050				
Lithium (Li)-Total (mg/L)	<0.0010				

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1620902-22 Water 02-JUN-15 13:50 GSI-HA-01A FILTERED ALK	L1620902-23 Water 02-JUN-15 11:35 MW09-17 FILTERED ALK	L1620902-24 Water 02-JUN-15 10:10 MW09-18 FILTERED ALK	L1620902-25 Water 02-JUN-15 08:30 MW09-19 FILTERED ALK	L1620902-26 Water 02-JUN-15 08:30 FB-2 FILTERED ALK
WATER						
Physical Tests	Conductivity (uS/cm)					
	Hardness (as CaCO3) (mg/L)					
	pH (pH)					
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	242	423	415	409	<1.0
	Ammonia, Total (as N) (mg/L)					
	Chloride (Cl) (mg/L)					
	Fluoride (F) (mg/L)					
	Nitrate (as N) (mg/L)					
	Nitrite (as N) (mg/L)					
	Total Kjeldahl Nitrogen (mg/L)					
	Sulfate (SO4) (mg/L)					
	Sulphide as S (mg/L)					
	Anion Sum (meq/L)					
	Cation Sum (meq/L)					
	Cation - Anion Balance (%)					
Cyanides	Cyanide, Weak Acid Diss (mg/L)					
	Cyanide, Total (mg/L)					
	Thiocyanate (SCN) (mg/L)					
	Cyanide, Free (mg/L)					
Organic / Inorganic Carbon	Total Inorganic Carbon (mg/L)					
	Total Organic Carbon (mg/L)					
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	L1620902-27 Water 02-JUN-15 17:00 CH-P-13-05/50 FILTERED ALK	L1620902-28 Water 02-JUN-15 13:50 MW09-04	L1620902-29 Water 02-JUN-15 13:50 DUP-1 FILTERED ALK	L1620902-30 Water 02-JUN-15 13:50 FB1 FILTERED ALK	L1620902-31 Water 02-JUN-15 15:10 MW09-03 FILTERED ALK
WATER						
Physical Tests	Conductivity (uS/cm)					
	Hardness (as CaCO3) (mg/L)					
	pH (pH)					
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	71.0	96.4	96.3	<1.0	121
	Ammonia, Total (as N) (mg/L)					
	Chloride (Cl) (mg/L)					
	Fluoride (F) (mg/L)					
	Nitrate (as N) (mg/L)					
	Nitrite (as N) (mg/L)					
	Total Kjeldahl Nitrogen (mg/L)					
	Sulfate (SO4) (mg/L)					
	Sulphide as S (mg/L)					
	Anion Sum (meq/L)					
	Cation Sum (meq/L)					
	Cation - Anion Balance (%)					
Cyanides	Cyanide, Weak Acid Diss (mg/L)					
	Cyanide, Total (mg/L)					
	Thiocyanate (SCN) (mg/L)					
	Cyanide, Free (mg/L)					
Organic / Inorganic Carbon	Total Inorganic Carbon (mg/L)					
	Total Organic Carbon (mg/L)					
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	L1620902-32	L1620902-33	L1620902-34		
	Description	Water	Water	Water		
	Sampled Date	02-JUN-15	01-JUN-15	01-JUN-15		
	Sampled Time	10:20	18:00	18:00		
	Client ID	MW09-02 FILTERED ALK	MW09-16 FILTERED ALK	DUP-2 MW09-16		
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)					
	Hardness (as CaCO3) (mg/L)					
	pH (pH)					
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	25.9	221	241		
	Ammonia, Total (as N) (mg/L)					
	Chloride (Cl) (mg/L)					
	Fluoride (F) (mg/L)					
	Nitrate (as N) (mg/L)					
	Nitrite (as N) (mg/L)					
	Total Kjeldahl Nitrogen (mg/L)					
	Sulfate (SO4) (mg/L)					
	Sulphide as S (mg/L)					
	Anion Sum (meq/L)					
	Cation Sum (meq/L)					
	Cation - Anion Balance (%)					
Cyanides	Cyanide, Weak Acid Diss (mg/L)					
	Cyanide, Total (mg/L)					
	Thiocyanate (SCN) (mg/L)					
	Cyanide, Free (mg/L)					
Organic / Inorganic Carbon	Total Inorganic Carbon (mg/L)					
	Total Organic Carbon (mg/L)					
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	L1620902-2 Water 02-JUN-15 13:50 GS1-HA-01A	L1620902-3 Water 02-JUN-15 11:35 MW09-017	L1620902-4 Water 02-JUN-15 10:10 MW09-018	L1620902-5 Water 02-JUN-15 08:30 MW09-019	L1620902-6 Water 02-JUN-15 08:30 FB-2
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)					
	Zirconium (Zr)-Total (mg/L)					
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	0.0031	<0.0020 DLA	<0.0020 DLA	0.0090	<0.0010
	Antimony (Sb)-Dissolved (mg/L)	0.00017	0.00032	0.00034	<0.00020 DLA	<0.00010
	Arsenic (As)-Dissolved (mg/L)	0.0115	0.0208	0.0518	0.117	<0.00010
	Barium (Ba)-Dissolved (mg/L)	0.161	0.00749	0.00768	0.0460	<0.000050
	Beryllium (Be)-Dissolved (mg/L)	<0.000020	<0.000040 DLA	<0.000040 DLA	<0.000040 DLA	<0.000020
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.00010 DLA	<0.00010 DLA	<0.00010 DLA	<0.000050
	Boron (B)-Dissolved (mg/L)	<0.010	0.083	<0.020 DLA	0.190	<0.010
	Cadmium (Cd)-Dissolved (mg/L)	0.0000071	0.000017	0.000056	<0.000010 DLA	<0.0000050
	Calcium (Ca)-Dissolved (mg/L)	153	337	323	313	<0.050
	Chromium (Cr)-Dissolved (mg/L)	0.00044	<0.00020 DLA	<0.00020 DLA	<0.00020 DLA	<0.00010
	Cobalt (Co)-Dissolved (mg/L)	0.00019	<0.00020 DLA	<0.00020 DLA	0.00251	<0.00010
	Copper (Cu)-Dissolved (mg/L)	0.00020	0.00061	<0.00040 DLA	<0.00040 DLA	<0.00020
	Iron (Fe)-Dissolved (mg/L)	3.71	<0.010	<0.010	20.5	<0.010
	Lead (Pb)-Dissolved (mg/L)	0.000056	<0.00010 DLA	<0.00010 DLA	<0.00010 DLA	<0.000050
	Lithium (Li)-Dissolved (mg/L)	0.0068	0.0199	0.0212	0.0106	<0.0010

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1620902-7 Water 02-JUN-15 14:40 MP09-14	L1620902-8 Water 02-JUN-15 17:00 CH-P-13-05/50	L1620902-9 Water 02-JUN-15 13:50 MW09-004	L1620902-10 Water 02-JUN-15 13:50 DUP-1	L1620902-11 Water 02-JUN-15 13:50 FB1
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)					
	Zirconium (Zr)-Total (mg/L)					
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	0.0041	0.0599	<0.0020 DLA	<0.0020 DLA	<0.0010
	Antimony (Sb)-Dissolved (mg/L)	0.00586	0.00436	0.285	0.283	<0.00010
	Arsenic (As)-Dissolved (mg/L)	3.44	0.00966	3.84	3.85	<0.00010
	Barium (Ba)-Dissolved (mg/L)	0.145	0.00604	0.00758	0.00735	<0.000050
	Beryllium (Be)-Dissolved (mg/L)	<0.000020	0.00015	<0.000040 DLA	<0.000040 DLA	<0.000020
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.00025 DLA	<0.00010 DLA	<0.00010 DLA	<0.000050
	Boron (B)-Dissolved (mg/L)	0.025	<0.050 DLA	0.307	0.296	<0.010
	Cadmium (Cd)-Dissolved (mg/L)	0.0000311	0.329	0.000029	0.000026	<0.0000050
	Calcium (Ca)-Dissolved (mg/L)	121	455	469	484	<0.050
	Chromium (Cr)-Dissolved (mg/L)	0.00019	<0.00050 DLA	<0.00020 DLA	<0.00020 DLA	<0.00010
	Cobalt (Co)-Dissolved (mg/L)	0.00068	0.0365	0.00089	0.00086	<0.00010
	Copper (Cu)-Dissolved (mg/L)	<0.00020	0.0150	<0.00040 DLA	<0.00040 DLA	<0.00020
	Iron (Fe)-Dissolved (mg/L)	7.72	12.8	0.011	0.019	<0.010
	Lead (Pb)-Dissolved (mg/L)	0.000798	0.00573	0.00052	0.00071	<0.000050
	Lithium (Li)-Dissolved (mg/L)	0.0063	0.0394	0.0093	0.0093	<0.0010

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1620902-12	L1620902-13	L1620902-14	L1620902-16	L1620902-17
	Description	Water	Water	Water	Water	Water
	Sampled Date		02-JUN-15	02-JUN-15	01-JUN-15	01-JUN-15
	Sampled Time		15:10	10:20	18:00	18:00
	Client ID	TRAVEL BLANK	MW09-03	MW09-02	MW09-016	DUP-2
Grouping	**Analyte**					
WATER						
Total Metals	Magnesium (Mg)-Total (mg/L)	<0.10				
	Manganese (Mn)-Total (mg/L)	<0.00010				
	Mercury (Hg)-Total (mg/L)	<0.0000050				
	Molybdenum (Mo)-Total (mg/L)	<0.000050				
	Nickel (Ni)-Total (mg/L)	<0.00050				
	Phosphorus (P)-Total (mg/L)	<0.050				
	Potassium (K)-Total (mg/L)	<0.10				
	Selenium (Se)-Total (mg/L)	<0.000050				
	Silicon (Si)-Total (mg/L)	<0.050				
	Silver (Ag)-Total (mg/L)	<0.000010				
	Sodium (Na)-Total (mg/L)	<0.050				
	Strontium (Sr)-Total (mg/L)	<0.00020				
	Sulfur (S)-Total (mg/L)	<0.50				
	Thallium (Tl)-Total (mg/L)	<0.000010				
	Tin (Sn)-Total (mg/L)	<0.00010				
	Titanium (Ti)-Total (mg/L)	<0.00030				
	Uranium (U)-Total (mg/L)	<0.000010				
	Vanadium (V)-Total (mg/L)	<0.00050				
	Zinc (Zn)-Total (mg/L)	<0.0030				
	Zirconium (Zr)-Total (mg/L)	<0.00030				
Dissolved Metals	Dissolved Mercury Filtration Location		FIELD	FIELD	FIELD	FIELD
	Dissolved Metals Filtration Location		FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)		<0.0050 DLA	<0.0050 DLA	<0.0010	<0.0010
	Antimony (Sb)-Dissolved (mg/L)		0.467	0.00314	0.0801	0.0780
	Arsenic (As)-Dissolved (mg/L)		1.47	20.2	0.0426	0.0420
	Barium (Ba)-Dissolved (mg/L)		0.0316	0.00683	0.0144	0.0147
	Beryllium (Be)-Dissolved (mg/L)		<0.00010 DLA	<0.00010 DLA	<0.000020	<0.000020
	Bismuth (Bi)-Dissolved (mg/L)		<0.00025 DLA	<0.00025 DLA	<0.000050	<0.000050
	Boron (B)-Dissolved (mg/L)		0.155	<0.050 DLA	0.062	0.068
	Cadmium (Cd)-Dissolved (mg/L)		0.000608	0.000447	0.0440	0.0448
	Calcium (Ca)-Dissolved (mg/L)		493	438	297	303
	Chromium (Cr)-Dissolved (mg/L)		<0.00050 DLA	<0.00050 DLA	<0.00010	<0.00010
	Cobalt (Co)-Dissolved (mg/L)		0.00325	0.0104	0.00295	0.00290
	Copper (Cu)-Dissolved (mg/L)		<0.0010 DLA	<0.0010 DLA	0.00526	0.00513
	Iron (Fe)-Dissolved (mg/L)		0.167	46.4	0.033	0.034
	Lead (Pb)-Dissolved (mg/L)		<0.00025 DLA	<0.00025 DLA	0.00583	0.00635
	Lithium (Li)-Dissolved (mg/L)		<0.0050 DLA	0.0239	0.0097	0.0101

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1620902-22	L1620902-23	L1620902-24	L1620902-25	L1620902-26
	Description	Water	Water	Water	Water	Water
	Sampled Date	02-JUN-15	02-JUN-15	02-JUN-15	02-JUN-15	02-JUN-15
	Sampled Time	13:50	11:35	10:10	08:30	08:30
	Client ID	GSI-HA-01A FILTERED ALK	MW09-17 FILTERED ALK	MW09-18 FILTERED ALK	MW09-19 FILTERED ALK	FB-2 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)					
	Zirconium (Zr)-Total (mg/L)					
Dissolved Metals	Dissolved Mercury Filtration Location					
	Dissolved Metals Filtration Location					
	Aluminum (Al)-Dissolved (mg/L)					
	Antimony (Sb)-Dissolved (mg/L)					
	Arsenic (As)-Dissolved (mg/L)					
	Barium (Ba)-Dissolved (mg/L)					
	Beryllium (Be)-Dissolved (mg/L)					
	Bismuth (Bi)-Dissolved (mg/L)					
	Boron (B)-Dissolved (mg/L)					
	Cadmium (Cd)-Dissolved (mg/L)					
	Calcium (Ca)-Dissolved (mg/L)					
	Chromium (Cr)-Dissolved (mg/L)					
	Cobalt (Co)-Dissolved (mg/L)					
	Copper (Cu)-Dissolved (mg/L)					
	Iron (Fe)-Dissolved (mg/L)					
	Lead (Pb)-Dissolved (mg/L)					
	Lithium (Li)-Dissolved (mg/L)					

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1620902-27	L1620902-28	L1620902-29	L1620902-30	L1620902-31
	Description	Water	Water	Water	Water	Water
	Sampled Date	02-JUN-15	02-JUN-15	02-JUN-15	02-JUN-15	02-JUN-15
	Sampled Time	17:00	13:50	13:50	13:50	15:10
	Client ID	CH-P-13-05/50 FILTERED ALK	MW09-04	DUP-1 FILTERED ALK	FB1 FILTERED ALK	MW09-03 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)					
	Zirconium (Zr)-Total (mg/L)					
Dissolved Metals	Dissolved Mercury Filtration Location					
	Dissolved Metals Filtration Location					
	Aluminum (Al)-Dissolved (mg/L)					
	Antimony (Sb)-Dissolved (mg/L)					
	Arsenic (As)-Dissolved (mg/L)					
	Barium (Ba)-Dissolved (mg/L)					
	Beryllium (Be)-Dissolved (mg/L)					
	Bismuth (Bi)-Dissolved (mg/L)					
	Boron (B)-Dissolved (mg/L)					
	Cadmium (Cd)-Dissolved (mg/L)					
	Calcium (Ca)-Dissolved (mg/L)					
	Chromium (Cr)-Dissolved (mg/L)					
	Cobalt (Co)-Dissolved (mg/L)					
	Copper (Cu)-Dissolved (mg/L)					
	Iron (Fe)-Dissolved (mg/L)					
	Lead (Pb)-Dissolved (mg/L)					
	Lithium (Li)-Dissolved (mg/L)					

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1620902-32	L1620902-33	L1620902-34		
	Description	Water	Water	Water		
	Sampled Date	02-JUN-15	01-JUN-15	01-JUN-15		
	Sampled Time	10:20	18:00	18:00		
	Client ID	MW09-02 FILTERED ALK	MW09-16 FILTERED ALK	DUP-2 MW09-16		
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)					
	Zirconium (Zr)-Total (mg/L)					
Dissolved Metals	Dissolved Mercury Filtration Location					
	Dissolved Metals Filtration Location					
	Aluminum (Al)-Dissolved (mg/L)					
	Antimony (Sb)-Dissolved (mg/L)					
	Arsenic (As)-Dissolved (mg/L)					
	Barium (Ba)-Dissolved (mg/L)					
	Beryllium (Be)-Dissolved (mg/L)					
	Bismuth (Bi)-Dissolved (mg/L)					
	Boron (B)-Dissolved (mg/L)					
	Cadmium (Cd)-Dissolved (mg/L)					
	Calcium (Ca)-Dissolved (mg/L)					
	Chromium (Cr)-Dissolved (mg/L)					
	Cobalt (Co)-Dissolved (mg/L)					
	Copper (Cu)-Dissolved (mg/L)					
	Iron (Fe)-Dissolved (mg/L)					
	Lead (Pb)-Dissolved (mg/L)					
	Lithium (Li)-Dissolved (mg/L)					

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1620902-2 Water 02-JUN-15 13:50 GS1-HA-01A	L1620902-3 Water 02-JUN-15 11:35 MW09-017	L1620902-4 Water 02-JUN-15 10:10 MW09-018	L1620902-5 Water 02-JUN-15 08:30 MW09-019	L1620902-6 Water 02-JUN-15 08:30 FB-2
WATER						
Dissolved Metals	Magnesium (Mg)-Dissolved (mg/L)	51.1	269	237	165	<0.10
	Manganese (Mn)-Dissolved (mg/L)	0.185	<0.00020 DLA	0.611	7.05	<0.00010
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)	0.000406	<0.00010 DLA	<0.00010 DLA	0.00018	<0.000050
	Nickel (Ni)-Dissolved (mg/L)	0.00251	<0.0010 DLA	<0.0010 DLA	<0.0010 DLA	<0.00050
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	0.145	<0.050
	Potassium (K)-Dissolved (mg/L)	3.38	7.11	6.99	6.76	<0.10
	Selenium (Se)-Dissolved (mg/L)	<0.000050	0.00061	0.00059	0.00021	<0.000050
	Silicon (Si)-Dissolved (mg/L)	6.38	5.10	4.96	8.46	<0.050
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000020 DLA	<0.000020 DLA	<0.000020 DLA	<0.000010
	Sodium (Na)-Dissolved (mg/L)	5.08	12.7	11.1	16.8	<0.050
	Strontium (Sr)-Dissolved (mg/L)	0.341	1.01	0.929	1.07	<0.00020
	Sulfur (S)-Dissolved (mg/L)	103	462	414	345	<0.50
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	0.000094	0.000261	<0.000020 DLA	<0.000010
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00020 DLA	<0.00020 DLA	<0.00020 DLA	<0.00010
	Titanium (Ti)-Dissolved (mg/L)	<0.00030	<0.00060 DLA	<0.00060 DLA	0.00079	<0.00030
	Uranium (U)-Dissolved (mg/L)	0.000030	0.00753	0.00652	0.000755	<0.000010
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.0010 DLA	<0.0010 DLA	<0.0010 DLA	<0.00050
	Zinc (Zn)-Dissolved (mg/L)	0.0023	<0.0020 DLA	0.0025 DLA	<0.0020 DLA	<0.0010
	Zirconium (Zr)-Dissolved (mg/L)	<0.00030	<0.00060 DLA	<0.00060 DLA	<0.00060 DLA	<0.00030

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1620902-7 Water 02-JUN-15 14:40 MP09-14	L1620902-8 Water 02-JUN-15 17:00 CH-P-13-05/50	L1620902-9 Water 02-JUN-15 13:50 MW09-004	L1620902-10 Water 02-JUN-15 13:50 DUP-1	L1620902-11 Water 02-JUN-15 13:50 FB1
WATER						
Dissolved Metals	Magnesium (Mg)-Dissolved (mg/L)	16.7	194	112	101	<0.10
	Manganese (Mn)-Dissolved (mg/L)	0.363	34.3	6.47	6.32	<0.00010
	Mercury (Hg)-Dissolved (mg/L)	0.0000067	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)	0.00146	0.00040	0.00573	0.00570	<0.000050
	Nickel (Ni)-Dissolved (mg/L)	0.00146	0.0129	<0.0010 DLA	<0.0010 DLA	<0.00050
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	0.078	0.074	<0.050
	Potassium (K)-Dissolved (mg/L)	31.5	5.01	35.0	36.7	<0.10
	Selenium (Se)-Dissolved (mg/L)	0.000128	<0.00025 DLA	<0.00010 DLA	<0.00010 DLA	<0.000050
	Silicon (Si)-Dissolved (mg/L)	2.90	7.50	13.4	13.8	<0.050
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000050 DLA	<0.000020 DLA	<0.000020 DLA	<0.000010
	Sodium (Na)-Dissolved (mg/L)	17.7	7.72	30.8	30.3	<0.050
	Strontium (Sr)-Dissolved (mg/L)	0.442	0.584	1.34	1.31	<0.00020
	Sulfur (S)-Dissolved (mg/L)	72.3	621	535	493	<0.50
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	0.000564	0.000107	0.000108	<0.000010
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00050 DLA	<0.00020 DLA	<0.00020 DLA	<0.00010
	Titanium (Ti)-Dissolved (mg/L)	<0.00030	<0.0015 DLA	<0.00060 DLA	<0.00060 DLA	<0.00030
	Uranium (U)-Dissolved (mg/L)	0.000355	0.000749	0.000346	0.000332	<0.000010
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.0025 DLA	<0.0010 DLA	<0.0010 DLA	<0.00050
	Zinc (Zn)-Dissolved (mg/L)	0.0018	29.1	0.713	0.705	<0.0010
	Zirconium (Zr)-Dissolved (mg/L)	<0.00030	<0.0015 DLA	<0.00060 DLA	<0.00060 DLA	<0.00030

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L1620902-12	L1620902-13	L1620902-14	L1620902-16	L1620902-17
Description	Water	Water	Water	Water	Water
Sampled Date		02-JUN-15	02-JUN-15	01-JUN-15	01-JUN-15
Sampled Time		15:10	10:20	18:00	18:00
Client ID	TRAVEL BLANK	MW09-03	MW09-02	MW09-016	DUP-2
Grouping **Analyte**					
WATER					
Dissolved Metals Magnesium (Mg)-Dissolved (mg/L)		89.8	75.7	127	128
Manganese (Mn)-Dissolved (mg/L)		35.1	38.2	0.803	0.777
Mercury (Hg)-Dissolved (mg/L)		<0.0000050	0.0000051	0.0000175	0.0000165
Molybdenum (Mo)-Dissolved (mg/L)		0.00511	0.00491	0.000222	0.000228
Nickel (Ni)-Dissolved (mg/L)		<0.0025 DLA	0.0027	0.00535	0.00518
Phosphorus (P)-Dissolved (mg/L)		0.051	<0.050	<0.050	<0.050
Potassium (K)-Dissolved (mg/L)		22.1	82.7	6.32	6.49
Selenium (Se)-Dissolved (mg/L)		<0.00025 DLA	<0.00025 DLA	0.000097	0.000100
Silicon (Si)-Dissolved (mg/L)		13.9	5.81	4.53	4.61
Silver (Ag)-Dissolved (mg/L)		<0.000050 DLA	<0.000050 DLA	0.000097	0.000103
Sodium (Na)-Dissolved (mg/L)		27.6	73.5	7.32	6.99
Strontium (Sr)-Dissolved (mg/L)		1.27	0.933	0.665	0.676
Sulfur (S)-Dissolved (mg/L)		490	538	317	321
Thallium (Tl)-Dissolved (mg/L)		0.000055	0.000216	0.000459	0.000454
Tin (Sn)-Dissolved (mg/L)		<0.00050 DLA	<0.00050 DLA	<0.00010	<0.00010
Titanium (Ti)-Dissolved (mg/L)		<0.0015 DLA	<0.0015 DLA	<0.00030	<0.00030
Uranium (U)-Dissolved (mg/L)		0.00149	0.000535	0.00301	0.00293
Vanadium (V)-Dissolved (mg/L)		<0.0025 DLA	<0.0025 DLA	<0.00050	<0.00050
Zinc (Zn)-Dissolved (mg/L)		<0.0050 DLA	0.178 DLA	6.24	6.09
Zirconium (Zr)-Dissolved (mg/L)		<0.0015 DLA	<0.0015 DLA	<0.00030	<0.00030

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1620902-22	L1620902-23	L1620902-24	L1620902-25	L1620902-26
	Description	Water	Water	Water	Water	Water
	Sampled Date	02-JUN-15	02-JUN-15	02-JUN-15	02-JUN-15	02-JUN-15
	Sampled Time	13:50	11:35	10:10	08:30	08:30
	Client ID	GSI-HA-01A FILTERED ALK	MW09-17 FILTERED ALK	MW09-18 FILTERED ALK	MW09-19 FILTERED ALK	FB-2 FILTERED ALK
Grouping	**Analyte**					
WATER						
Dissolved Metals	Magnesium (Mg)-Dissolved (mg/L)					
	Manganese (Mn)-Dissolved (mg/L)					
	Mercury (Hg)-Dissolved (mg/L)					
	Molybdenum (Mo)-Dissolved (mg/L)					
	Nickel (Ni)-Dissolved (mg/L)					
	Phosphorus (P)-Dissolved (mg/L)					
	Potassium (K)-Dissolved (mg/L)					
	Selenium (Se)-Dissolved (mg/L)					
	Silicon (Si)-Dissolved (mg/L)					
	Silver (Ag)-Dissolved (mg/L)					
	Sodium (Na)-Dissolved (mg/L)					
	Strontium (Sr)-Dissolved (mg/L)					
	Sulfur (S)-Dissolved (mg/L)					
	Thallium (Tl)-Dissolved (mg/L)					
	Tin (Sn)-Dissolved (mg/L)					
	Titanium (Ti)-Dissolved (mg/L)					
	Uranium (U)-Dissolved (mg/L)					
	Vanadium (V)-Dissolved (mg/L)					
	Zinc (Zn)-Dissolved (mg/L)					
	Zirconium (Zr)-Dissolved (mg/L)					

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1620902-27	L1620902-28	L1620902-29	L1620902-30	L1620902-31
	Description	Water	Water	Water	Water	Water
	Sampled Date	02-JUN-15	02-JUN-15	02-JUN-15	02-JUN-15	02-JUN-15
	Sampled Time	17:00	13:50	13:50	13:50	15:10
	Client ID	CH-P-13-05/50 FILTERED ALK	MW09-04	DUP-1 FILTERED ALK	FB1 FILTERED ALK	MW09-03 FILTERED ALK
Grouping	**Analyte**					
WATER						
Dissolved Metals	Magnesium (Mg)-Dissolved (mg/L)					
	Manganese (Mn)-Dissolved (mg/L)					
	Mercury (Hg)-Dissolved (mg/L)					
	Molybdenum (Mo)-Dissolved (mg/L)					
	Nickel (Ni)-Dissolved (mg/L)					
	Phosphorus (P)-Dissolved (mg/L)					
	Potassium (K)-Dissolved (mg/L)					
	Selenium (Se)-Dissolved (mg/L)					
	Silicon (Si)-Dissolved (mg/L)					
	Silver (Ag)-Dissolved (mg/L)					
	Sodium (Na)-Dissolved (mg/L)					
	Strontium (Sr)-Dissolved (mg/L)					
	Sulfur (S)-Dissolved (mg/L)					
	Thallium (Tl)-Dissolved (mg/L)					
	Tin (Sn)-Dissolved (mg/L)					
	Titanium (Ti)-Dissolved (mg/L)					
	Uranium (U)-Dissolved (mg/L)					
	Vanadium (V)-Dissolved (mg/L)					
	Zinc (Zn)-Dissolved (mg/L)					
	Zirconium (Zr)-Dissolved (mg/L)					

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1620902-32	L1620902-33	L1620902-34		
	Description	Water	Water	Water		
	Sampled Date	02-JUN-15	01-JUN-15	01-JUN-15		
	Sampled Time	10:20	18:00	18:00		
	Client ID	MW09-02 FILTERED ALK	MW09-16 FILTERED ALK	DUP-2 MW09-16		
Grouping	**Analyte**					
WATER						
Dissolved Metals	Magnesium (Mg)-Dissolved (mg/L)					
	Manganese (Mn)-Dissolved (mg/L)					
	Mercury (Hg)-Dissolved (mg/L)					
	Molybdenum (Mo)-Dissolved (mg/L)					
	Nickel (Ni)-Dissolved (mg/L)					
	Phosphorus (P)-Dissolved (mg/L)					
	Potassium (K)-Dissolved (mg/L)					
	Selenium (Se)-Dissolved (mg/L)					
	Silicon (Si)-Dissolved (mg/L)					
	Silver (Ag)-Dissolved (mg/L)					
	Sodium (Na)-Dissolved (mg/L)					
	Strontium (Sr)-Dissolved (mg/L)					
	Sulfur (S)-Dissolved (mg/L)					
	Thallium (Tl)-Dissolved (mg/L)					
	Tin (Sn)-Dissolved (mg/L)					
	Titanium (Ti)-Dissolved (mg/L)					
	Uranium (U)-Dissolved (mg/L)					
	Vanadium (V)-Dissolved (mg/L)					
	Zinc (Zn)-Dissolved (mg/L)					
	Zirconium (Zr)-Dissolved (mg/L)					

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

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Duplicate	Total Inorganic Carbon	HTA	L1620902-10, -13, -16, -4, -5, -9
Duplicate	Total Inorganic Carbon	HTA	L1620902-10, -13, -16, -4, -5, -9
Duplicate	Total Inorganic Carbon	HTA	L1620902-10, -13, -16, -4, -5, -9
Matrix Spike	Total Inorganic Carbon	MS-B	L1620902-10, -13, -16, -4, -5, -9
Matrix Spike	Thiocyanate (SCN)	MS-B	L1620902-10, -11, -12, -13, -14, -16, -17, -2, -3, -4, -5, -6, -8, -9
Matrix Spike	Thiocyanate (SCN)	MS-B	L1620902-10, -11, -12, -13, -14, -16, -17, -2, -3, -4, -5, -6, -8, -9
Matrix Spike	Sulfate (SO4)	MS-B	L1620902-10, -11, -12, -13, -14, -16, -17, -2, -3, -4, -5, -6, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1620902-10, -11, -13, -14, -16, -17, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L1620902-10, -11, -13, -14, -16, -17, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1620902-10, -11, -13, -14, -16, -17, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1620902-10, -11, -13, -14, -16, -17, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Total Organic Carbon	MS-B	L1620902-8
Matrix Spike	Total Organic Carbon	MS-B	L1620902-8
Matrix Spike	Sulfur (S)-Dissolved	MS-B	L1620902-10, -11, -13, -14, -16, -17, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sulfur (S)-Dissolved	MS-B	L1620902-10, -11, -13, -14, -16, -17, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Total Kjeldahl Nitrogen	MS-B	L1620902-10, -11, -12, -13, -14, -16, -17, -2, -3, -4, -5, -6, -8, -9
Matrix Spike	Boron (B)-Dissolved	MS-B	L1620902-10, -11, -13, -14, -16, -17, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L1620902-10, -11, -13, -14, -16, -17, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1620902-10, -11, -13, -14, -16, -17, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1620902-10, -11, -13, -14, -16, -17, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Total Inorganic Carbon	MS-B	L1620902-3, -8

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLA	Detection Limit adjusted for required dilution
HTA	Analytical holding time was exceeded.
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-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.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

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

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

BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)

Reference Information

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

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

CARBONS-TIC-VA Water Total inorganic carbon by CO2 purge APHA 5310B TOTAL ORGANIC CARBON (TOC)

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

CARBONS-TOC-VA Water Total organic carbon by combustion APHA 5310B TOTAL ORGANIC CARBON (TOC)

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

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

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

CN-FREE-CFA-VA Water Free Cyanide in water by CFA ASTM 7237

This analysis is carried out using procedures adapted from ASTM Method 7237 "Free Cyanide with Flow Injection Analysis (FIA) Utilizing Gas Diffusion Separation and Amperometric Detection". Free cyanide is determined by in-line gas diffusion at pH 6 with final determination by colourimetric analysis.

CN-SCN-VA Water Thiocyanate by Colour APHA 4500-CN CYANIDE

This analysis is carried out using procedures adapted from APHA Method 4500-CN- M "Thiocyanate" Thiocyanate is determined by the ferric nitrate colourimetric method.

CN-T-CFA-VA Water Total Cyanide in water by CFA ISO 14403:2002

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

CN-WAD-CFA-VA Water Weak Acid Diss. Cyanide in water by CFA APHA 4500-CN CYANIDE

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

EC-PCT-VA Water Conductivity (Automated) APHA 2510 Auto. Conduc.

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

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

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

HARDNESS-CALC-VA Water Hardness APHA 2340B

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

HG-D-CVAA-VA Water Diss. Mercury in Water by CVAAS or CVAFS APHA 3030B/EPA 1631E (mod)

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

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

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

IONBALANCE-VA Water Ion Balance Calculation APHA 1030E

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

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

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

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

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

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

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

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United

Reference Information

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

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

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

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

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

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

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

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

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

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

NO2-L-IC-N-WR Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

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

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

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

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

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)

Reference Information

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

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

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

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

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

Laboratory Definition Code	Laboratory Location
WR	ALS ENVIRONMENTAL - WHITEHORSE, YUKON, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

1 2

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

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

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L1620902-COFC

COC Number: 1 -

Page 1 of 2

Report To		Report Format	Turnaround Time (TAT) Requested (Rush TAT is not available for all tests)
Company:	Hemmera Environchem Inc.	Select Report Format: ☑ PDF ☑ EXCEL ☑ EDD (DIGITAL)	R ☐ Regular (5-7 bus. days 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:	867-456-4865	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		Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below
	Copy of Invoice with Report ☐ Yes ☑ No	Select Invoice Distribution: ☑ EMAIL ☑ MAIL ☐ FAX	F/P, F/P, , , , P, P, P, P, , F, , ,
Company:	Hemmera Environchem Inc.	Email 1 or Fax nsandys@hemmera.com	
Contact:	Natasha Sandys	Email 2 chris@elr.ca	

Project Information		Oil and Gas Required Fields (client use)	
ALS Quote #:	Q50588	Approver ID:	Cost Center:
Job #:	1343-005.09	GL Account:	Routing Code:
PO / AFE:		Activity Code:	
LSD:		Location:	
ALS Lab Work Order # (lab use only)		ALS Contact:	Sampler: RM, JC, AN, MN

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 Balan	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
	GSI-HA-05A	01-Jun-15	16:45	Water	R													1
	GSI-HA-01A	02-Jun-15	13:50	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	9
	MW09-17	02-Jun-15	11:35	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	9
	MW09-18	02-Jun-15	10:10	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	9
	MW09-19	02-Jun-15	8:30	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	9
	FB-2	02-Jun-15	8:30	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	9
	MP09-14	02-Jun-15	14:50	Water	R	R												2
	CH-P-13-05/50	02-Jun-15	17:00	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	9
	MW09-04	02-Jun-15	13:50	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	9
	DUP-1	02-Jun-15	13:50	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	9
	FB1	02-Jun-15	13:50	Water	R	R	R	R	R	R	R	R	R	R	R	R	R	9
	Travel Blank			Water	R	R	R	R	R	R	R	R	R	R	R	R	R	9

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	- See attached parameter sheet for list of full parameters and metals required.
Are samples for human drinking water use? ☐ Yes ☑ No	GSI-HA2A, GSI-HA-03A, GSI-HA-05A Please put on hold. MW09-14

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		
1.5	0.5	0.7			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: C. Jeilnelsk	Date: Jun 3/15	Time: 11:45	Received by:	Date: 3-Jun-15	Time: 12:00	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

ALS-FM-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.

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

L1620902-COFC

Report To		Report Format /
Company:	Hemmera Environchem Inc.	Select Report Format: ☑PDF ☑EXCEL ☑EDD (DIGITAL)
Contact:	Natasha Sandys	Quality Control (QC) Report with Report ☑ Yes ☐ No
Address:	230 - 2237 2nd Avenue Whitehorse, YT	☐Criteria on Report - provide details below if box checked
		Select Distribution: ☑EMAIL ☐MAIL ☐FAX
Phone:	867-456-4865	Email 1 or Fax nsandys@hemmera.com, rmartinka@hemmera.com
		Email 2 chris@elr.ca

Invoice To	Same as Report To ☑ Yes ☐ No	Invoice Distribution
	Copy of Invoice with Report ☐ Yes ☑ No	Select Invoice Distribution: ☑EMAIL ☑MAIL ☐FAX
Company:	Hemmera Environchem Inc.	Email 1 or Fax nsandys@hemmera.com
Contact:	Natasha Sandys	Email 2 chris@elr.ca

Project Information		Oil and Gas Required Fields (client use)	
ALS Quote #:	Q50588	Approver ID:	Cost Center:
Job #:	1343-005.09	GL Account:	Routing Code:
PO / AFE:		Activity Code:	
LSD:		Location:	

ALS Lab Work Order # (lab use only)

ALS Contact: **Sampler:** RM, JC, AN, MN

w (Rush Turnaround Time (TAT) is not available for all tests)

R ☑Regular (Standard TAT if received by 3 pm - business days)

P ☐Priority (2-4 bus. days if received by 3pm) 50% surcharge - contact ALS to confirm TAT

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

Specify Date Required for E2,E or P:

Analysis Request

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

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	F/P Dissolved Metals, Hardness	F/P Dissolved Mercury	Nitrate, Nitrite, Total Kjeldahl N (TKN)	Cl, Fl, Sulfate, conductivity, pH, alkalinity	Anion Sum, Cation Sum,Cation/Anion Balan	P Cyanide - Weak Acid Diss., Total, Free	P Ammonia N (total), Total Organic Carbon	P Thiocyanate (SCN)	P Sulphide as S	Total Inorganic Carbon	F Dissolved Alkalinity			Number of Containers
	MW09-03	02-Jun-15	15:10	Water	R	R	R	R	R	R	R	R	R	R	R			9
	MW09-02	02-Jun-15	10:20	Water	R	R	R	R	R	R	R	R	R	R	R			9
	GSI-HA-03A	01-Jun-15	16:15	Water	R	R												2
	MW09-16	01-Jun-15	18:00	Water	R	R	R	R	R	R	R	R	R	R	R			9
	DP-2	01-Jun-15	18:00	Water	R	R	R	R	R	R	R	R	R	R	R			9
	GSI-HA-02A	01-Jun-15	15:30	Water	R	R												2

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

Are samples taken from a Regulated DW System?
☐ Yes ☑ No

Are samples for human drinking water use?
☐ Yes ☑ No

Special Instructions / Specify Criteria to add on report (client Use)

- See attached parameter sheet for list of full parameters and metals required.

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		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by:	Date:	Time:	Received by:	Date:	Time:	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION WHITE - LABORATORY COPY YELLOW - CLIENT COPY

NA-FM-00266 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: 05-JUN-15
Report Date: 23-JUN-15 12:48 (MT)
Version: FINAL

Client Phone: 867-456-4865

Certificate of Analysis

Lab Work Order #: L1622366

Project P.O. #: NOT SUBMITTED
Job Reference: 1343-005.09
C of C Numbers: 1, 2
Legal Site Desc:

Comments: ADDITIONAL 18-JUN-15 11:36

Brent Mack, B.Sc.
Account Manager

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1622366-1 Water 03-JUN-15 17:45 MP09-05	L1622366-2 Water 02-JUN-15 14:55 MW09-06	L1622366-3 Water 03-JUN-15 08:45 W14103083BH03	L1622366-4 Water 03-JUN-15 12:15 MW09-01	L1622366-5 Water 04-JUN-15 14:40 MW09-24
WATER						
Physical Tests	Conductivity (uS/cm)	2120	1970	1070	2700	900
	Hardness (as CaCO3) (mg/L)	1270	1230	657	1490	550
	pH (pH)	6.95	7.90	7.23	7.91	7.86
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	280	182	378	255	280
	Ammonia, Total (as N) (mg/L)	10.1 DLA	1.15 DLA	1.76	17.8 DLA	<0.0050
	Chloride (Cl) (mg/L)	<2.5	<2.5	<0.50 DLM	<5.0	1.10
	Fluoride (F) (mg/L)	0.14 DLA	0.41	<0.20	0.33	0.038
	Nitrate (as N) (mg/L)	<0.025 DLA	2.54	<0.0050	0.053 DLA	2.37
	Nitrite (as N) (mg/L)	<0.0050	0.0919	<0.0010	<0.010	0.0019
	Total Kjeldahl Nitrogen (mg/L)	13.8	1.81	2.76	21.6	0.542
	Sulfate (SO4) (mg/L)	1120	1160	265	1640	226
	Sulphide as S (mg/L)	<0.020	<0.020	<0.020	<0.020	<0.020
	Anion Sum (meq/L)	28.9	28.0	13.1	39.2	10.5
	Cation Sum (meq/L)	31.1	26.5	15.7	36.4	11.3
	Cation - Anion Balance (%)	3.5	-2.8	9.3	-3.8	3.9
Cyanides	Cyanide, Weak Acid Diss (mg/L)	<0.0050	<0.0050	<0.0050	0.0091	<0.0050
	Cyanide, Total (mg/L)	0.0108	<0.0050	<0.0050	0.0881	<0.0050
	Thiocyanate (SCN) (mg/L)	0.78	<0.50	0.53	4.84	<0.50
	Cyanide, Free (mg/L)	<0.0050	<0.0050	<0.0050	0.0058	<0.0050
Organic / Inorganic Carbon	Total Inorganic Carbon (mg/L)	61.3	40.1	83.2	56.9	66.9
	Total Organic Carbon (mg/L)	25.4	9.74	19.0	17.8	7.74
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)					

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1622366-6 Water 04-JUN-15 17:41 GSI-PC-03-B	L1622366-7 Water 04-JUN-15 08:15 MW09-23	L1622366-8 Water 04-JUN-15 08:05 MP09-09	L1622366-9 Water 04-JUN-15 09:10 MP09-11	L1622366-10 Water 04-JUN-15 10:10 MW09-22
WATER						
Physical Tests	Conductivity (uS/cm)	3490	2040	631	717	1560
	Hardness (as CaCO3) (mg/L)	2440	1270	288	383	924
	pH (pH)	8.07	7.54	8.90	7.75	6.33
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	935	336	63.9	386	70.6
	Ammonia, Total (as N) (mg/L)		3.80	3.88	9.49	1.47
	Chloride (Cl) (mg/L)	<10 DLA	<2.5 DLA	2.59	0.58	<2.5 DLA
	Fluoride (F) (mg/L)	<0.60 DLM	0.18	1.62	0.491	0.10
	Nitrate (as N) (mg/L)	0.17	<0.025 DLA	0.0273	0.0103	0.039
	Nitrite (as N) (mg/L)	<0.020 DLA	<0.0050 DLA	0.0040	0.0143	0.0205
	Total Kjeldahl Nitrogen (mg/L)		6.81	5.82	12.9	4.42
	Sulfate (SO4) (mg/L)	1570	979	234	22.1	809
	Sulphide as S (mg/L)		<0.020	<1.0 DLM	<0.020	<0.020
	Anion Sum (meq/L)	51.3	27.1	6.32	8.21	18.3
	Cation Sum (meq/L)	54.8	29.0	7.40	9.59	24.0
	Cation - Anion Balance (%)	3.3	3.4	7.9	7.8	13.5
Cyanides	Cyanide, Weak Acid Diss (mg/L)	<0.0050	<0.0050	0.278	<0.0050	<0.0050
	Cyanide, Total (mg/L)	<0.0050	0.0093	1.36	0.0254	0.0124
	Thiocyanate (SCN) (mg/L)		0.51	0.98	0.56	<0.50
	Cyanide, Free (mg/L)	<0.0050	<0.0050	0.251	<0.0050	0.0059
Organic / Inorganic Carbon	Total Inorganic Carbon (mg/L)		77.7	8.43	85.7	15.6
	Total Organic Carbon (mg/L)		14.9	31.4	34.3	14.6
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)					

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1622366-11 Water 04-JUN-15 10:10 FB-4	L1622366-12 Water 04-JUN-15 13:10 MW09-08	L1622366-13 Water 03-JUN-15 17:45 FB-3	L1622366-14 Water 03-JUN-15 17:45 DUP-4	L1622366-15 Water 05-JUN-15 TRAVEL BLANK
WATER						
Physical Tests	Conductivity (uS/cm)	<2.0	385	<2.0	2120	<2.0
	Hardness (as CaCO3) (mg/L)	<0.50	201	<0.50	1300	<0.50
	pH (pH)	5.58	6.66	5.50	7.06	5.43
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	<1.0	125	<1.0	277	<1.0
	Ammonia, Total (as N) (mg/L)	<0.0050	2.15	<0.0050	10.1 DLA	<0.0050
	Chloride (Cl) (mg/L)	<0.50	<0.50 DLM	<0.50	<5.0 DLA	<0.50
	Fluoride (F) (mg/L)	<0.020	<0.20	<0.020	<0.20 DLA	<0.020
	Nitrate (as N) (mg/L)	<0.0050	<0.0050	<0.0050	<0.050 DLA	<0.0050
	Nitrite (as N) (mg/L)	<0.001	<0.0010	<0.0010	<0.010 DLA	<0.0010
	Total Kjeldahl Nitrogen (mg/L)	<0.050	2.94	<0.050	13.6	<0.050
	Sulfate (SO4) (mg/L)	<0.30	75.9	<0.30	1090	<0.30
	Sulphide as S (mg/L)	<0.020	0.058	<0.020	<0.020	<0.020
	Anion Sum (meq/L)	<0.10	4.08	<0.10	28.2	<0.10
	Cation Sum (meq/L)	<0.10	7.98	<0.10	31.9	<0.10
	Cation - Anion Balance (%)	94.6	32.4	0.0	6.1	0.0
		0.0				
Cyanides	Cyanide, Weak Acid Diss (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Cyanide, Total (mg/L)	<0.0050	0.0069	<0.0050	0.0140	<0.0050
	Thiocyanate (SCN) (mg/L)	<0.50	0.62	<0.50	0.78	<0.50
	Cyanide, Free (mg/L)	<0.0050	<0.0050	<0.0050	0.0060	<0.0050
Organic / Inorganic Carbon	Total Inorganic Carbon (mg/L)	<0.50	28.0	<0.50	58.3	<0.50
	Total Organic Carbon (mg/L)	<0.50	15.4	<0.50	26.2	0.52
Total Metals	Aluminum (Al)-Total (mg/L)					<0.0030
	Antimony (Sb)-Total (mg/L)					<0.00010
	Arsenic (As)-Total (mg/L)					<0.00010
	Barium (Ba)-Total (mg/L)					<0.000050
	Beryllium (Be)-Total (mg/L)					<0.000020
	Bismuth (Bi)-Total (mg/L)					<0.000050
	Boron (B)-Total (mg/L)					<0.010
	Cadmium (Cd)-Total (mg/L)					<0.0000050
	Calcium (Ca)-Total (mg/L)					<0.050
	Chromium (Cr)-Total (mg/L)					<0.00010
	Cobalt (Co)-Total (mg/L)					<0.00010
	Copper (Cu)-Total (mg/L)					<0.00050
	Iron (Fe)-Total (mg/L)					<0.010
	Lead (Pb)-Total (mg/L)					<0.000050

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1622366-16 Water 03-JUN-15 17:45 MP09-05 FILTERED ALK	L1622366-17 Water 03-JUN-15 14:55 MW09-06 FILTERED ALK	L1622366-18 Water 03-JUN-15 08:45 W14103083BH03 FILTERED ALK	L1622366-19 Water 03-JUN-15 12:15 MW09-01 FILTERED ALK	L1622366-20 Water 04-JUN-15 14:40 MW09-24 FILTERED ALK
WATER						
Physical Tests	Conductivity (uS/cm)					
	Hardness (as CaCO3) (mg/L)					
	pH (pH)					
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	282	185	376	264	282
	Ammonia, Total (as N) (mg/L)					
	Chloride (Cl) (mg/L)					
	Fluoride (F) (mg/L)					
	Nitrate (as N) (mg/L)					
	Nitrite (as N) (mg/L)					
	Total Kjeldahl Nitrogen (mg/L)					
	Sulfate (SO4) (mg/L)					
	Sulphide as S (mg/L)					
	Anion Sum (meq/L)					
	Cation Sum (meq/L)					
	Cation - Anion Balance (%)					
Cyanides	Cyanide, Weak Acid Diss (mg/L)					
	Cyanide, Total (mg/L)					
	Thiocyanate (SCN) (mg/L)					
	Cyanide, Free (mg/L)					
Organic / Inorganic Carbon	Total Inorganic Carbon (mg/L)					
	Total Organic Carbon (mg/L)					
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)					

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1622366-22 Water 04-JUN-15 08:15 MW09-23 FILTERED ALK	L1622366-23 Water 04-JUN-15 08:05 MP09-09 FILTERED ALK	L1622366-24 Water 04-JUN-15 09:10 MP09-11 FILTERED ALK	L1622366-25 Water 04-JUN-15 10:10 MW09-22 FILTERED ALK	L1622366-26 Water 04-JUN-15 10:10 FB-4 FILTERED ALK
WATER						
Physical Tests	Conductivity (uS/cm)					
	Hardness (as CaCO3) (mg/L)					
	pH (pH)					
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	349	62.8	395	117	<1.0
	Ammonia, Total (as N) (mg/L)					
	Chloride (Cl) (mg/L)					
	Fluoride (F) (mg/L)					
	Nitrate (as N) (mg/L)					
	Nitrite (as N) (mg/L)					
	Total Kjeldahl Nitrogen (mg/L)					
	Sulfate (SO4) (mg/L)					
	Sulphide as S (mg/L)					
	Anion Sum (meq/L)					
	Cation Sum (meq/L)					
	Cation - Anion Balance (%)					
Cyanides	Cyanide, Weak Acid Diss (mg/L)					
	Cyanide, Total (mg/L)					
	Thiocyanate (SCN) (mg/L)					
	Cyanide, Free (mg/L)					
Organic / Inorganic Carbon	Total Inorganic Carbon (mg/L)					
	Total Organic Carbon (mg/L)					
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)					

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1622366-27	L1622366-28	L1622366-29		
	Description	Water	Water	Water		
	Sampled Date	04-JUN-15	03-JUN-15	03-JUN-15		
	Sampled Time	13:10	17:45	17:45		
	Client ID	MW09-08 FILTERED ALK	FB-3 FILTERED ALK	DUP-4 FILTERED ALK		
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)					
	Hardness (as CaCO3) (mg/L)					
	pH (pH)					
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	130	<1.0	288		
	Ammonia, Total (as N) (mg/L)					
	Chloride (Cl) (mg/L)					
	Fluoride (F) (mg/L)					
	Nitrate (as N) (mg/L)					
	Nitrite (as N) (mg/L)					
	Total Kjeldahl Nitrogen (mg/L)					
	Sulfate (SO4) (mg/L)					
	Sulphide as S (mg/L)					
	Anion Sum (meq/L)					
	Cation Sum (meq/L)					
	Cation - Anion Balance (%)					
Cyanides	Cyanide, Weak Acid Diss (mg/L)					
	Cyanide, Total (mg/L)					
	Thiocyanate (SCN) (mg/L)					
	Cyanide, Free (mg/L)					
Organic / Inorganic Carbon	Total Inorganic Carbon (mg/L)					
	Total Organic Carbon (mg/L)					
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)					

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1622366-1 Water 03-JUN-15 17:45 MP09-05	L1622366-2 Water 02-JUN-15 14:55 MW09-06	L1622366-3 Water 03-JUN-15 08:45 W14103083BH03	L1622366-4 Water 03-JUN-15 12:15 MW09-01	L1622366-5 Water 04-JUN-15 14:40 MW09-24
WATER						
Total Metals	Lithium (Li)-Total (mg/L)					
	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)					
	Zirconium (Zr)-Total (mg/L)					
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	0.0218	<0.0020 DLA	0.0208	<0.0020 DLA	0.0016
	Antimony (Sb)-Dissolved (mg/L)	0.00033	0.259	0.00060	0.0442	0.00020
	Arsenic (As)-Dissolved (mg/L)	0.00755	0.122	0.0541	0.206	0.00169
	Barium (Ba)-Dissolved (mg/L)	0.0321	0.00611	0.101	0.0217	0.0996
	Beryllium (Be)-Dissolved (mg/L)	<0.000040 DLA	<0.000040 DLA	<0.000020	<0.000040 DLA	<0.000020
	Bismuth (Bi)-Dissolved (mg/L)	<0.00010 DLA	<0.00010 DLA	<0.000050	<0.00010 DLA	<0.000050
	Boron (B)-Dissolved (mg/L)	0.074	0.116	0.028	0.098	0.013
	Cadmium (Cd)-Dissolved (mg/L)	0.00141	0.00623	0.0000064	0.0332	0.0000435
	Calcium (Ca)-Dissolved (mg/L)	382	380	190	502	151
	Chromium (Cr)-Dissolved (mg/L)	0.00069	<0.00020 DLA	0.00045	<0.00020 DLA	0.00037
	Cobalt (Co)-Dissolved (mg/L)	0.0183	0.00151	0.00467	0.0192	<0.00010
	Copper (Cu)-Dissolved (mg/L)	0.00096	0.0107	0.00050	0.00361	0.00855
	Iron (Fe)-Dissolved (mg/L)	42.3	<0.010	32.9	1.75	<0.010
	Lead (Pb)-Dissolved (mg/L)	<0.00010 DLA	0.00045	0.000090	0.00430	<0.000050

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1622366-6 Water 04-JUN-15 17:41 GSI-PC-03-B	L1622366-7 Water 04-JUN-15 08:15 MW09-23	L1622366-8 Water 04-JUN-15 08:05 MP09-09	L1622366-9 Water 04-JUN-15 09:10 MP09-11	L1622366-10 Water 04-JUN-15 10:10 MW09-22
WATER						
Total Metals	Lithium (Li)-Total (mg/L)					
	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)					
	Zirconium (Zr)-Total (mg/L)					
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	0.0472	0.0133	0.0030	0.0046	0.0475
	Antimony (Sb)-Dissolved (mg/L)	0.00220	<0.00050 DLA	0.0776	0.0140	0.00019
	Arsenic (As)-Dissolved (mg/L)	0.0969	0.0136	15.3	7.35	0.0131
	Barium (Ba)-Dissolved (mg/L)	0.108	0.0734	0.00053	0.145	0.202
	Beryllium (Be)-Dissolved (mg/L)	<0.000040 DLA	<0.00010 DLA	<0.000040 DLA	<0.000020	<0.000020
	Bismuth (Bi)-Dissolved (mg/L)	<0.00010 DLA	<0.00025 DLA	<0.00010 DLA	<0.000050	<0.000050
	Boron (B)-Dissolved (mg/L)	0.057	0.148	0.254	0.033	0.028
	Cadmium (Cd)-Dissolved (mg/L)	0.000048	<0.000025 DLA	0.000438	0.0000719	0.0000778
	Calcium (Ca)-Dissolved (mg/L)	149	308	114	86.2	320
	Chromium (Cr)-Dissolved (mg/L)	0.0296	<0.00050 DLA	<0.00020 DLA	0.00101	0.00079
	Cobalt (Co)-Dissolved (mg/L)	0.00802	0.0215	0.0424	0.00128	0.0144
	Copper (Cu)-Dissolved (mg/L)	0.00122	<0.0010 DLA	0.526	0.00043	0.00034
	Iron (Fe)-Dissolved (mg/L)	15.4	15.1	0.171	8.87	64.7
	Lead (Pb)-Dissolved (mg/L)	0.00038	<0.00025 DLA	0.00027	0.00171	<0.000050

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1622366-11 Water 04-JUN-15 10:10 FB-4	L1622366-12 Water 04-JUN-15 13:10 MW09-08	L1622366-13 Water 03-JUN-15 17:45 FB-3	L1622366-14 Water 03-JUN-15 17:45 DUP-4	L1622366-15 Water 05-JUN-15 TRAVEL BLANK
WATER						
Total Metals	Lithium (Li)-Total (mg/L)					<0.0010
	Magnesium (Mg)-Total (mg/L)					<0.10
	Manganese (Mn)-Total (mg/L)					<0.00010
	Mercury (Hg)-Total (mg/L)					<0.0000050
	Molybdenum (Mo)-Total (mg/L)					<0.000050
	Nickel (Ni)-Total (mg/L)					<0.00050
	Phosphorus (P)-Total (mg/L)					<0.050
	Potassium (K)-Total (mg/L)					<0.10
	Selenium (Se)-Total (mg/L)					<0.000050
	Silicon (Si)-Total (mg/L)					<0.050
	Silver (Ag)-Total (mg/L)					<0.000010
	Sodium (Na)-Total (mg/L)					<0.050
	Strontium (Sr)-Total (mg/L)					<0.00020
	Sulfur (S)-Total (mg/L)					<0.50
	Thallium (Tl)-Total (mg/L)					<0.000010
	Tin (Sn)-Total (mg/L)					<0.00010
	Titanium (Ti)-Total (mg/L)					<0.00030
	Uranium (U)-Total (mg/L)					<0.000010
	Vanadium (V)-Total (mg/L)					<0.00050
	Zinc (Zn)-Total (mg/L)					<0.0030
	Zirconium (Zr)-Total (mg/L)					<0.00030
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	
	Aluminum (Al)-Dissolved (mg/L)	<0.0010	0.0553	<0.0010	0.0230	
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	0.00021	<0.00010	0.00033	
	Arsenic (As)-Dissolved (mg/L)	<0.00010	0.189	<0.00010	0.00811	
	Barium (Ba)-Dissolved (mg/L)	<0.000050	0.191	<0.000050	0.0324	
	Beryllium (Be)-Dissolved (mg/L)	<0.000020	<0.000020	<0.000020	<0.000040 DLA	
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.00010 DLA	
	Boron (B)-Dissolved (mg/L)	<0.010	<0.010	<0.010	0.071	
	Cadmium (Cd)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	0.00128	
	Calcium (Ca)-Dissolved (mg/L)	<0.050	61.3	<0.050	392	
	Chromium (Cr)-Dissolved (mg/L)	<0.00010	0.00082	<0.00010	0.00160	
	Cobalt (Co)-Dissolved (mg/L)	<0.00010	0.00119	<0.00010	0.0181	
	Copper (Cu)-Dissolved (mg/L)	<0.00020	<0.00020	<0.00020	0.00098	
	Iron (Fe)-Dissolved (mg/L)	<0.010	65.0	<0.010	43.8	
	Lead (Pb)-Dissolved (mg/L)	<0.000050	0.000070	<0.000050	<0.00010 DLA	

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1622366-16	L1622366-17	L1622366-18	L1622366-19	L1622366-20
	Description	Water	Water	Water	Water	Water
	Sampled Date	03-JUN-15	03-JUN-15	03-JUN-15	03-JUN-15	04-JUN-15
	Sampled Time	17:45	14:55	08:45	12:15	14:40
	Client ID	MP09-05 FILTERED ALK	MW09-06 FILTERED ALK	W14103083BH03 FILTERED ALK	MW09-01 FILTERED ALK	MW09-24 FILTERED ALK
Grouping	**Analyte**					
WATER						
Total Metals	Lithium (Li)-Total (mg/L)					
	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)					
	Zirconium (Zr)-Total (mg/L)					
Dissolved Metals	Dissolved Mercury Filtration Location					
	Dissolved Metals Filtration Location					
	Aluminum (Al)-Dissolved (mg/L)					
	Antimony (Sb)-Dissolved (mg/L)					
	Arsenic (As)-Dissolved (mg/L)					
	Barium (Ba)-Dissolved (mg/L)					
	Beryllium (Be)-Dissolved (mg/L)					
	Bismuth (Bi)-Dissolved (mg/L)					
	Boron (B)-Dissolved (mg/L)					
	Cadmium (Cd)-Dissolved (mg/L)					
	Calcium (Ca)-Dissolved (mg/L)					
	Chromium (Cr)-Dissolved (mg/L)					
	Cobalt (Co)-Dissolved (mg/L)					
	Copper (Cu)-Dissolved (mg/L)					
	Iron (Fe)-Dissolved (mg/L)					
	Lead (Pb)-Dissolved (mg/L)					

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1622366-22	L1622366-23	L1622366-24	L1622366-25	L1622366-26
	Description	Water	Water	Water	Water	Water
	Sampled Date	04-JUN-15	04-JUN-15	04-JUN-15	04-JUN-15	04-JUN-15
	Sampled Time	08:15	08:05	09:10	10:10	10:10
	Client ID	MW09-23 FILTERED ALK	MP09-09 FILTERED ALK	MP09-11 FILTERED ALK	MW09-22 FILTERED ALK	FB-4 FILTERED ALK
Grouping	**Analyte**					
WATER						
Total Metals	Lithium (Li)-Total (mg/L)					
	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)					
	Zirconium (Zr)-Total (mg/L)					
Dissolved Metals	Dissolved Mercury Filtration Location					
	Dissolved Metals Filtration Location					
	Aluminum (Al)-Dissolved (mg/L)					
	Antimony (Sb)-Dissolved (mg/L)					
	Arsenic (As)-Dissolved (mg/L)					
	Barium (Ba)-Dissolved (mg/L)					
	Beryllium (Be)-Dissolved (mg/L)					
	Bismuth (Bi)-Dissolved (mg/L)					
	Boron (B)-Dissolved (mg/L)					
	Cadmium (Cd)-Dissolved (mg/L)					
	Calcium (Ca)-Dissolved (mg/L)					
	Chromium (Cr)-Dissolved (mg/L)					
	Cobalt (Co)-Dissolved (mg/L)					
	Copper (Cu)-Dissolved (mg/L)					
	Iron (Fe)-Dissolved (mg/L)					
	Lead (Pb)-Dissolved (mg/L)					

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1622366-27	L1622366-28	L1622366-29		
	Description	Water	Water	Water		
	Sampled Date	04-JUN-15	03-JUN-15	03-JUN-15		
	Sampled Time	13:10	17:45	17:45		
	Client ID	MW09-08 FILTERED ALK	FB-3 FILTERED ALK	DUP-4 FILTERED ALK		
Grouping	**Analyte**					
WATER						
Total Metals	Lithium (Li)-Total (mg/L)					
	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)					
	Zirconium (Zr)-Total (mg/L)					
Dissolved Metals	Dissolved Mercury Filtration Location					
	Dissolved Metals Filtration Location					
	Aluminum (Al)-Dissolved (mg/L)					
	Antimony (Sb)-Dissolved (mg/L)					
	Arsenic (As)-Dissolved (mg/L)					
	Barium (Ba)-Dissolved (mg/L)					
	Beryllium (Be)-Dissolved (mg/L)					
	Bismuth (Bi)-Dissolved (mg/L)					
	Boron (B)-Dissolved (mg/L)					
	Cadmium (Cd)-Dissolved (mg/L)					
	Calcium (Ca)-Dissolved (mg/L)					
	Chromium (Cr)-Dissolved (mg/L)					
	Cobalt (Co)-Dissolved (mg/L)					
	Copper (Cu)-Dissolved (mg/L)					
	Iron (Fe)-Dissolved (mg/L)					
	Lead (Pb)-Dissolved (mg/L)					

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1622366-1 Water 03-JUN-15 17:45 MP09-05	L1622366-2 Water 02-JUN-15 14:55 MW09-06	L1622366-3 Water 03-JUN-15 08:45 W14103083BH03	L1622366-4 Water 03-JUN-15 12:15 MW09-01	L1622366-5 Water 04-JUN-15 14:40 MW09-24
WATER						
Dissolved Metals	Lithium (Li)-Dissolved (mg/L)	<0.0020 DLA	0.0099	0.0010	0.0054	0.0010
	Magnesium (Mg)-Dissolved (mg/L)	75.6	67.1	44.3	56.9	42.0
	Manganese (Mn)-Dissolved (mg/L)	15.0	5.77	6.37	20.5	0.00029
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	0.0000180	<0.0000050	0.0000103	<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)	0.00085	0.00401	0.000970	0.00260	0.000309
	Nickel (Ni)-Dissolved (mg/L)	0.0083	0.0025	0.00241	0.0066	<0.00050
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	0.074	<0.050	<0.050
	Potassium (K)-Dissolved (mg/L)	8.48	16.4	3.98	14.8	1.50
	Selenium (Se)-Dissolved (mg/L)	0.00027	0.00019	0.000139	0.00013	0.00102
	Silicon (Si)-Dissolved (mg/L)	5.85	7.56	9.64	6.55	6.20
	Silver (Ag)-Dissolved (mg/L)	<0.000020 DLA	0.000062	<0.000010	0.000076	<0.000010
	Sodium (Na)-Dissolved (mg/L)	46.2	29.8	8.68	93.2	7.35
	Strontium (Sr)-Dissolved (mg/L)	1.08	0.748	0.498	1.10	0.537
	Sulfur (S)-Dissolved (mg/L)	368	364	90.7	516	80.1
	Thallium (Tl)-Dissolved (mg/L)	0.000024	0.000298	<0.000010	0.000860	<0.000010
	Tin (Sn)-Dissolved (mg/L)	<0.00020 DLA	<0.00020 DLA	<0.00010	<0.00020 DLA	<0.00010
	Titanium (Ti)-Dissolved (mg/L)	0.00113	<0.00060 DLA	0.00102	<0.00060 DLA	<0.00030
	Uranium (U)-Dissolved (mg/L)	0.00217	0.00215	0.00115	0.00189	0.00436
	Vanadium (V)-Dissolved (mg/L)	0.0017	<0.0010 DLA	0.00158	<0.0010 DLA	<0.00050
	Zinc (Zn)-Dissolved (mg/L)	0.0249	0.171	0.0027	2.98	0.0011
	Zirconium (Zr)-Dissolved (mg/L)	0.00076	<0.00060 DLA	0.00054	<0.00060 DLA	<0.00030

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L1622366-6	L1622366-7	L1622366-8	L1622366-9	L1622366-10
Description	Water	Water	Water	Water	Water
Sampled Date	04-JUN-15	04-JUN-15	04-JUN-15	04-JUN-15	04-JUN-15
Sampled Time	17:41	08:15	08:05	09:10	10:10
Client ID	GSI-PC-03-B	MW09-23	MP09-09	MP09-11	MW09-22
Grouping / **Analyte**					
WATER					
Dissolved Metals Lithium (Li)-Dissolved (mg/L)	0.0526	<0.0050 DLA	<0.0020 DLA	0.0022	<0.0010
Magnesium (Mg)-Dissolved (mg/L)	502	122	1.10	40.8	30.3
Manganese (Mn)-Dissolved (mg/L)	2.67	24.9	0.0239	2.48	9.41
Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	0.0000661	<0.0000050	<0.0000050
Molybdenum (Mo)-Dissolved (mg/L)	0.0155	0.00311	0.0219	0.00350	0.000235
Nickel (Ni)-Dissolved (mg/L)	0.0845	<0.0025 DLA	0.0195	0.00654	0.00267
Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	0.205	<0.050	<0.050
Potassium (K)-Dissolved (mg/L)	25.1	9.27	9.37	8.36	4.49
Selenium (Se)-Dissolved (mg/L)	0.00035	<0.00025 DLA	0.00188	0.000246	0.000168
Silicon (Si)-Dissolved (mg/L)	8.59	6.24	6.22	9.06	5.07
Silver (Ag)-Dissolved (mg/L)	<0.000020 DLA	<0.000050 DLA	0.0244	0.000012	0.000021
Sodium (Na)-Dissolved (mg/L)	103	30.2	25.3	11.0	33.7
Strontium (Sr)-Dissolved (mg/L)	2.84	0.727	0.168	0.667	1.06
Sulfur (S)-Dissolved (mg/L)	516	330	95.7	8.48	295
Thallium (Tl)-Dissolved (mg/L)	<0.000020 DLA	<0.000050 DLA	0.000042	0.000012	<0.000010
Tin (Sn)-Dissolved (mg/L)	0.00043	<0.00050 DLA	<0.00020 DLA	<0.00010	<0.00010
Titanium (Ti)-Dissolved (mg/L)	0.00257	<0.0015 DLA	<0.00060 DLA	0.00123	<0.0018 DLM
Uranium (U)-Dissolved (mg/L)	0.0164	0.00340	0.000861	0.000281	0.000293
Vanadium (V)-Dissolved (mg/L)	0.0029	<0.0025 DLA	<0.0010 DLA	0.00354	0.00150
Zinc (Zn)-Dissolved (mg/L)	0.0071	0.0807	<0.0020 DLA	0.0401	0.0040
Zirconium (Zr)-Dissolved (mg/L)	0.00076	<0.0015 DLA	<0.00060 DLA	0.00160	0.00047

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L1622366-11	L1622366-12	L1622366-13	L1622366-14	L1622366-15
Description	Water	Water	Water	Water	Water
Sampled Date	04-JUN-15	04-JUN-15	03-JUN-15	03-JUN-15	05-JUN-15
Sampled Time	10:10	13:10	17:45	17:45	
Client ID	FB-4	MW09-08	FB-3	DUP-4	TRAVEL BLANK
Grouping **Analyte**					
WATER					
Dissolved Metals Lithium (Li)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0020 DLA	
Magnesium (Mg)-Dissolved (mg/L)	<0.10	11.6	<0.10	78.4	
Manganese (Mn)-Dissolved (mg/L)	<0.00010	5.59	<0.00010	15.1	
Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
Molybdenum (Mo)-Dissolved (mg/L)	<0.000050	0.000162	<0.000050	0.00078	
Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	0.0081	
Phosphorus (P)-Dissolved (mg/L)	<0.050	0.100	<0.050	<0.050	
Potassium (K)-Dissolved (mg/L)	<0.10	1.54	<0.10	9.07	
Selenium (Se)-Dissolved (mg/L)	<0.000050	0.000119	<0.000050	0.00031	
Silicon (Si)-Dissolved (mg/L)	<0.050	10.0	<0.050	5.92	
Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000020 DLA	
Sodium (Na)-Dissolved (mg/L)	<0.050	1.75	<0.050	45.2	
Strontium (Sr)-Dissolved (mg/L)	<0.00020	0.238	<0.00020	1.07	
Sulfur (S)-Dissolved (mg/L)	<0.50	26.3	<0.50	355	
Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	0.000020	
Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00020 DLA	
Titanium (Ti)-Dissolved (mg/L)	<0.00030	0.00259	<0.00030	<0.0015 DLM	
Uranium (U)-Dissolved (mg/L)	<0.000010	0.000067	<0.000010	0.00216	
Vanadium (V)-Dissolved (mg/L)	<0.00050	0.00257	<0.00050	0.0017	
Zinc (Zn)-Dissolved (mg/L)	<0.0010	0.0022	<0.0010	0.0251	
Zirconium (Zr)-Dissolved (mg/L)	<0.00030	0.00066	<0.00030	0.00075	

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	Sample ID Description Sampled Date Sampled Time Client ID	L1622366-16 Water 03-JUN-15 17:45 MP09-05 FILTERED ALK	L1622366-17 Water 03-JUN-15 14:55 MW09-06 FILTERED ALK	L1622366-18 Water 03-JUN-15 08:45 W14103083BH03 FILTERED ALK	L1622366-19 Water 03-JUN-15 12:15 MW09-01 FILTERED ALK	L1622366-20 Water 04-JUN-15 14:40 MW09-24 FILTERED ALK
WATER							
Dissolved Metals	Lithium (Li)-Dissolved (mg/L)						
	Magnesium (Mg)-Dissolved (mg/L)						
	Manganese (Mn)-Dissolved (mg/L)						
	Mercury (Hg)-Dissolved (mg/L)						
	Molybdenum (Mo)-Dissolved (mg/L)						
	Nickel (Ni)-Dissolved (mg/L)						
	Phosphorus (P)-Dissolved (mg/L)						
	Potassium (K)-Dissolved (mg/L)						
	Selenium (Se)-Dissolved (mg/L)						
	Silicon (Si)-Dissolved (mg/L)						
	Silver (Ag)-Dissolved (mg/L)						
	Sodium (Na)-Dissolved (mg/L)						
	Strontium (Sr)-Dissolved (mg/L)						
	Sulfur (S)-Dissolved (mg/L)						
	Thallium (Tl)-Dissolved (mg/L)						
	Tin (Sn)-Dissolved (mg/L)						
	Titanium (Ti)-Dissolved (mg/L)						
	Uranium (U)-Dissolved (mg/L)						
	Vanadium (V)-Dissolved (mg/L)						
	Zinc (Zn)-Dissolved (mg/L)						
	Zirconium (Zr)-Dissolved (mg/L)						

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1622366-22	L1622366-23	L1622366-24	L1622366-25	L1622366-26
	Description	Water	Water	Water	Water	Water
	Sampled Date	04-JUN-15	04-JUN-15	04-JUN-15	04-JUN-15	04-JUN-15
	Sampled Time	08:15	08:05	09:10	10:10	10:10
	Client ID	MW09-23 FILTERED ALK	MP09-09 FILTERED ALK	MP09-11 FILTERED ALK	MW09-22 FILTERED ALK	FB-4 FILTERED ALK
Grouping	**Analyte**					
WATER						
Dissolved Metals	Lithium (Li)-Dissolved (mg/L)					
	Magnesium (Mg)-Dissolved (mg/L)					
	Manganese (Mn)-Dissolved (mg/L)					
	Mercury (Hg)-Dissolved (mg/L)					
	Molybdenum (Mo)-Dissolved (mg/L)					
	Nickel (Ni)-Dissolved (mg/L)					
	Phosphorus (P)-Dissolved (mg/L)					
	Potassium (K)-Dissolved (mg/L)					
	Selenium (Se)-Dissolved (mg/L)					
	Silicon (Si)-Dissolved (mg/L)					
	Silver (Ag)-Dissolved (mg/L)					
	Sodium (Na)-Dissolved (mg/L)					
	Strontium (Sr)-Dissolved (mg/L)					
	Sulfur (S)-Dissolved (mg/L)					
	Thallium (Tl)-Dissolved (mg/L)					
	Tin (Sn)-Dissolved (mg/L)					
	Titanium (Ti)-Dissolved (mg/L)					
	Uranium (U)-Dissolved (mg/L)					
	Vanadium (V)-Dissolved (mg/L)					
	Zinc (Zn)-Dissolved (mg/L)					
	Zirconium (Zr)-Dissolved (mg/L)					

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1622366-27	L1622366-28	L1622366-29		
	Description	Water	Water	Water		
	Sampled Date	04-JUN-15	03-JUN-15	03-JUN-15		
	Sampled Time	13:10	17:45	17:45		
	Client ID	MW09-08 FILTERED ALK	FB-3 FILTERED ALK	DUP-4 FILTERED ALK		
Grouping	**Analyte**					
WATER						
Dissolved Metals	Lithium (Li)-Dissolved (mg/L)					
	Magnesium (Mg)-Dissolved (mg/L)					
	Manganese (Mn)-Dissolved (mg/L)					
	Mercury (Hg)-Dissolved (mg/L)					
	Molybdenum (Mo)-Dissolved (mg/L)					
	Nickel (Ni)-Dissolved (mg/L)					
	Phosphorus (P)-Dissolved (mg/L)					
	Potassium (K)-Dissolved (mg/L)					
	Selenium (Se)-Dissolved (mg/L)					
	Silicon (Si)-Dissolved (mg/L)					
	Silver (Ag)-Dissolved (mg/L)					
	Sodium (Na)-Dissolved (mg/L)					
	Strontium (Sr)-Dissolved (mg/L)					
	Sulfur (S)-Dissolved (mg/L)					
	Thallium (Tl)-Dissolved (mg/L)					
	Tin (Sn)-Dissolved (mg/L)					
	Titanium (Ti)-Dissolved (mg/L)					
	Uranium (U)-Dissolved (mg/L)					
	Vanadium (V)-Dissolved (mg/L)					
	Zinc (Zn)-Dissolved (mg/L)					
	Zirconium (Zr)-Dissolved (mg/L)					

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

Reference Information

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Duplicate	Fluoride (F)	DLM	L1622366-1, -10, -11, -12, -13, -14, -15, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Total Inorganic Carbon	HTA	L1622366-1, -11, -12, -13, -14, -15, -3, -4, -5, -7, -9
Duplicate	Total Inorganic Carbon	HTA	L1622366-1, -11, -12, -13, -14, -15, -3, -4, -5, -7, -9
Duplicate	Total Inorganic Carbon	HTA	L1622366-1, -11, -12, -13, -14, -15, -3, -4, -5, -7, -9
Matrix Spike	Total Inorganic Carbon	MS-B	L1622366-1, -11, -12, -13, -14, -15, -3, -4, -5, -7, -9
Matrix Spike	Thiocyanate (SCN)	MS-B	L1622366-1, -10, -11, -12, -13, -14, -15, -2, -3, -4, -5, -7, -8, -9
Matrix Spike	Thiocyanate (SCN)	MS-B	L1622366-1, -10, -11, -12, -13, -14, -15, -2, -3, -4, -5, -7, -8, -9
Matrix Spike	Antimony (Sb)-Dissolved	MS-B	L1622366-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1622366-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L1622366-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1622366-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1622366-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1622366-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1622366-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1622366-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1622366-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Ammonia, Total (as N)	MS-B	L1622366-14, -4
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L1622366-1, -10, -11, -12, -13, -14, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Total Kjeldahl Nitrogen	MS-B	L1622366-1, -10, -11, -12, -13, -14, -15, -2, -3, -5, -7, -8, -9

Qualifiers for Individual Parameters Listed:

Qualifier	Description
DLA	Detection Limit adjusted for required dilution
DLM	Detection Limit Adjusted due to sample matrix effects.
HTA	Analytical holding time was exceeded.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-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.

BE-D-L-CCMS-VA	Water	Diss. Be (low) in Water by CRC ICPMS	APHA 3030B/6020A (mod)

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

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

BE-T-L-CCMS-VA	Water	Total Be (Low) in Water by CRC ICPMS	EPA 200.2/6020A (mod)

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

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

Reference Information

CARBONS-TIC-VA	Water	Total inorganic carbon by CO2 purge	APHA 5310B TOTAL ORGANIC CARBON (TOC)

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

CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310B TOTAL ORGANIC CARBON (TOC)

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

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

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

CN-FREE-CFA-VA	Water	Free Cyanide in water by CFA	ASTM 7237

This analysis is carried out using procedures adapted from ASTM Method 7237 "Free Cyanide with Flow Injection Analysis (FIA) Utilizing Gas Diffusion Separation and Amperometric Detection". Free cyanide is determined by in-line gas diffusion at pH 6 with final determination by colourimetric analysis.

CN-SCN-VA	Water	Thiocyanate by Colour	APHA 4500-CN CYANIDE

This analysis is carried out using procedures adapted from APHA Method 4500-CN- M "Thiocyanate" Thiocyanate is determined by the ferric nitrate colourimetric method.

CN-T-CFA-VA	Water	Total Cyanide in water by CFA	ISO 14403:2002

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

CN-WAD-CFA-VA	Water	Weak Acid Diss. Cyanide in water by CFA	APHA 4500-CN CYANIDE

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

EC-PCT-VA	Water	Conductivity (Automated)	APHA 2510 Auto. Conduc.

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

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

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

HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

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

HG-D-CVAA-VA	Water	Diss. Mercury in Water by CVAAS or CVAFS	APHA 3030B/EPA 1631E (mod)

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

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

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

IONBALANCE-VA	Water	Ion Balance Calculation	APHA 1030E

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

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

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

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

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

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

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

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves filtration (EPA Method 3005A) and analysis by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

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

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

Reference Information

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

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

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

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

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

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

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

NO2-L-IC-N-WR Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

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

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

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

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

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.

Reference Information

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

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

Laboratory Definition Code	Laboratory Location
WR	ALS ENVIRONMENTAL - WHITEHORSE, YUKON, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

1 2

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

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

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

L1622366-COFC

COC Number: 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:	867-456-4865	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
	Same as Report To ☑ Yes ☐ No	Select Invoice Distribution: ☑EMAIL ☑MAIL ☐FAX
	Copy of Invoice with Report ☐ Yes ☑ No	
Company:	Hemmera Environchem Inc.	Email 1 or Fax nsandys@hemmera.com
Contact:	Natasha Sandys	Email 2 chris@elr.ca

Project Information		Oil and Gas Required Fields (client use)	
ALS Quote #:	Q50588	Approver ID:	Cost Center:
Job #:	1343-005.09	GL Account:	Routing Code:
PO / AFE:		Activity Code:	
LSD:		Location:	

ALS Lab Work Order # (lab use only)		ALS Contact:	Sampler: RM, JC, AN, MM

Analysis Request

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

ALS Sample # (lab use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	Dissolved Metals, Hardness	Dissolved Mercury	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	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			
1	MP09-05	03-Jun-15	17:45	Water	R	R	R	R	R	R	R	R	R	R	R			9
2	MW09-06	03-Jun-15	14:55	Water	R	R	R	R	R	R	R	R	R	R	R			9
3	W14103083BH03	03-Jun-15	8:45	Water	R	R	R	R	R	R	R	R	R	R	R			9
4	MW09-01	03-Jun-15	12:15	Water	R	R	R	R	R	R	R	R	R	R	R			9
5	MW09-24	04-Jun-15	14:40	Water	R	R	R	R	R	R	R	R	R	R	R			9
6	GSI-PC-03-B	04-Jun-15	17:41	Water	R	R	R	R	R	R								4
7	MW09-23	04-Jun-15	8:15	Water	R	R	R	R	R	R	R	R	R	R	R			9
8	MP09-09	04-Jun-15	8:05	Water	R	R	R	R	R	R	R	R	R	R	R			9
9	MP09-11	04-Jun-15	9:10	Water	R	R	R	R	R	R	R	R	R	R	R			9
10	MW09-22	04-Jun-15	10:10	Water	R	R	R	R	R	R	R	R	R	R	R			9
11	FB-4	04-Jun-15	10:10	Water	R	R	R	R	R	R	R	R	R	R	R			9
12	MW09-08	04-Jun-15	13:10	Water	R	R	R	R	R	R	R	R	R	R	R			9

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	- See attached parameter sheet for list of full parameters and metals required.
Are samples for human drinking water use? ☐ Yes ☑ No	

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		
0.7	0.6	1.8			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: (GLENN)	Date: June 5 2015	Time: 9-15	Received by:	Date: 5-JUN-15	Time: 9:15	Received by:	Date:	Time:

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L1622366-COFC

COC Number: 1 -

Page 2 of 2

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
Phone:	867-456-4865	Email 1 or Fax nsandys@hemmera.com, rmartinka@hemmera.com	E2 ☐Same day or weekend emergency - contact ALS to confirm TAT and surcharge
		Email 2 chris@elr.ca	Specify Date Required for E2,E or P:

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		
Company:	Hemmera Environchem Inc.	Email 1 or Fax nsandys@hemmera.com	
Contact:	Natasha Sandys	Email 2 chris@elr.ca	

Project Information		Oil and Gas Required Fields (client use)	
ALS Quote #:	Q50588	Approver ID:	Cost Center:
Job #:	1343-005.09	GL Account:	Routing Code:
PO / AFE:		Activity Code:	
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ALS Lab Work Order # (lab use only)		ALS Contact:	Sampler: RM, JC, AN, MM

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 Balan	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			
13	FB-3	03-Jun-15	17:45	Water	R	R	R	R	R	R	R	R	R	R	R			9
14	Dup-4	03-Jun-15	17:45	Water	R	R	R	R	R	R	R	R	R	R	R			9
15	Travel Blank			Water	R	R	R	R	R	R	R	R	R	R	R			9

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 list of full parameters and metals required.

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		
0.7	0.6	1.9			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: (CENN)	Date: June 5 2015	Time: 9:15	Received by:	Date: 5-Jun-15	Time: 9:15	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION WHITE - LABORATORY COPY YELLOW - CLIENT COPY

NA-FM-0326a 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.

APPENDIX D

Response to Comments Received in Draft Report

Response to Comments from Draft Report Version (as Received September 22, 2015).

Comment No.	Page	Comment	Response
1	1	Merge to introduction	Merge Completed
2	10	Please explain further here (i.e. give rationale provided in October 2014 report).	A rationale for the inclusion has been provided in the text.
3	23	Explain what this means. So as a result of this test; is there any change that should happen with the program; why or why not.	An explanation and rationale has been provided.
4	24	Is this something that can be completed by Hemmera (i.e. within budget)? Was it completed in Fall event?	This comment has been revised. This recommendation was re-assessed by a new program hydrogeologist and at the time of the September 2015 sampling event a submersible pump was not used as there was sufficient volume in the well to sample using flexible Waterra tubing with a footvalve. Should conditions favour the implementation of this recommendation during future events, it should be achievable within the regular program budget.
5	24	Is this something that can be completed by Hemmera (i.e. within budget)? Was it completed in Fall event?	The recommended repairs could have been completed within the available budget for well repairs during the fall event, however a repair was not attempted as the well was found to be dry during that sample event. This repair can be attempted during a future sampling event.
6	25	Through air lift method or other?	Text has been revised. Due to the presence of tailings fines that are quite thick it should be possible through one of three methods – using open ended Waterra tubing to capture the sediment (repeatedly pushing the tubing into the sediment and cutting off the end of the tubing, they re-inserting into the well), adding water as needed to re-suspend the sediment or soften fines, and re-developing using foot valves and surge blocks.
7	25	Is this something that can be completed by Hemmera (i.e. within budget)? Was it completed in Fall event?	Yes – some initial cleaning was completed during the September 2015 event. An interim repair to the broken well tubing was completed in order to prevent further introduction of fines. Re-developing was also attempted, and did remove some fines, however this was limited by the available water column within the well.
8	25	Through air lift method or other?	Text has been updated. This would be likely completed using Waterra tubing with a surge block.
9	25	Is this something that can be completed by Hemmera (i.e. within budget)? Was it completed in Fall event?	This is something that can be completed within the existing program, however it was not completed during the fall 2015 event.
10	25	Is this something that can be completed by Hemmera (i.e. within budget)? Was it completed in Fall event?	This is something that could be completed within the program budget and was started during the fall 2015 sampling event, but has not been fully completed.