Mount Nansen September 2015
Groundwater Monitoring and Sampling

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1.0 INTRODUCTION

This Work was performed in accordance with Contract C00028455 between Hemmera Envirochem Inc. ("Hemmera") and Government of Yukon ("Client"), dated May 11, 2015 ("Contract"). This Report has been prepared by Hemmera, based on fieldwork conducted by Hemmera, for sole benefit and use by Government of Yukon. In performing this Work, Hemmera has relied in good faith on information provided by others, and has assumed that the information provided by those individuals is both complete and accurate. This Work was performed to current industry standard practice for similar environmental work, within the relevant jurisdiction and same locale. The findings presented herein should be considered within the context of the scope of work and project terms of reference; further, the findings are time sensitive and are considered valid only at the time the Report was produced. The conclusions and recommendations contained in this Report are based upon the applicable guidelines, regulations, and legislation existing at the time the Report was produced; any changes in the regulatory regime may alter the conclusions and/or recommendations.

Hemmera Envirochem Inc. and Ecological Logistics & Research Ltd. (Hemmera/ELR) were retained by the Government of Yukon (GY), Assessment and Abandoned Mines (AAM) to conduct a groundwater monitoring and sampling program at the Mount Nansen site (the Site) in September, 2015. Hemmera/ELR's scope of work included the monitoring of groundwater wells and collection of groundwater samples from a series of existing groundwater wells at the Site. This report summarizes the monitoring and sampling activities, a description of methodologies and field conditions encountered, a summary of field *in-situ* and laboratory analytical results including a comparison to applicable guidelines, a description of any observations and/or occurrences that may have influenced program results, and recommendations relating to sample procedures and monitoring well conditions. This report does not provide an interpretation of the results, nor does it provide recommendations relating to groundwater quality at the Site.

1.1 SITE LOCATION

The Mount Nansen site is located approximately 45 kilometres (km) west of the Town of Carmacks (70 km by road). This Type II abandoned mine site consists of three (3) primary areas of existing infrastructure: the Brown McDade Pit, a Mill Complex, and a Tailings Facility (**Figure 1-1**). Groundwater monitoring wells exist throughout the Site, a subset of which were sampled during the September 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

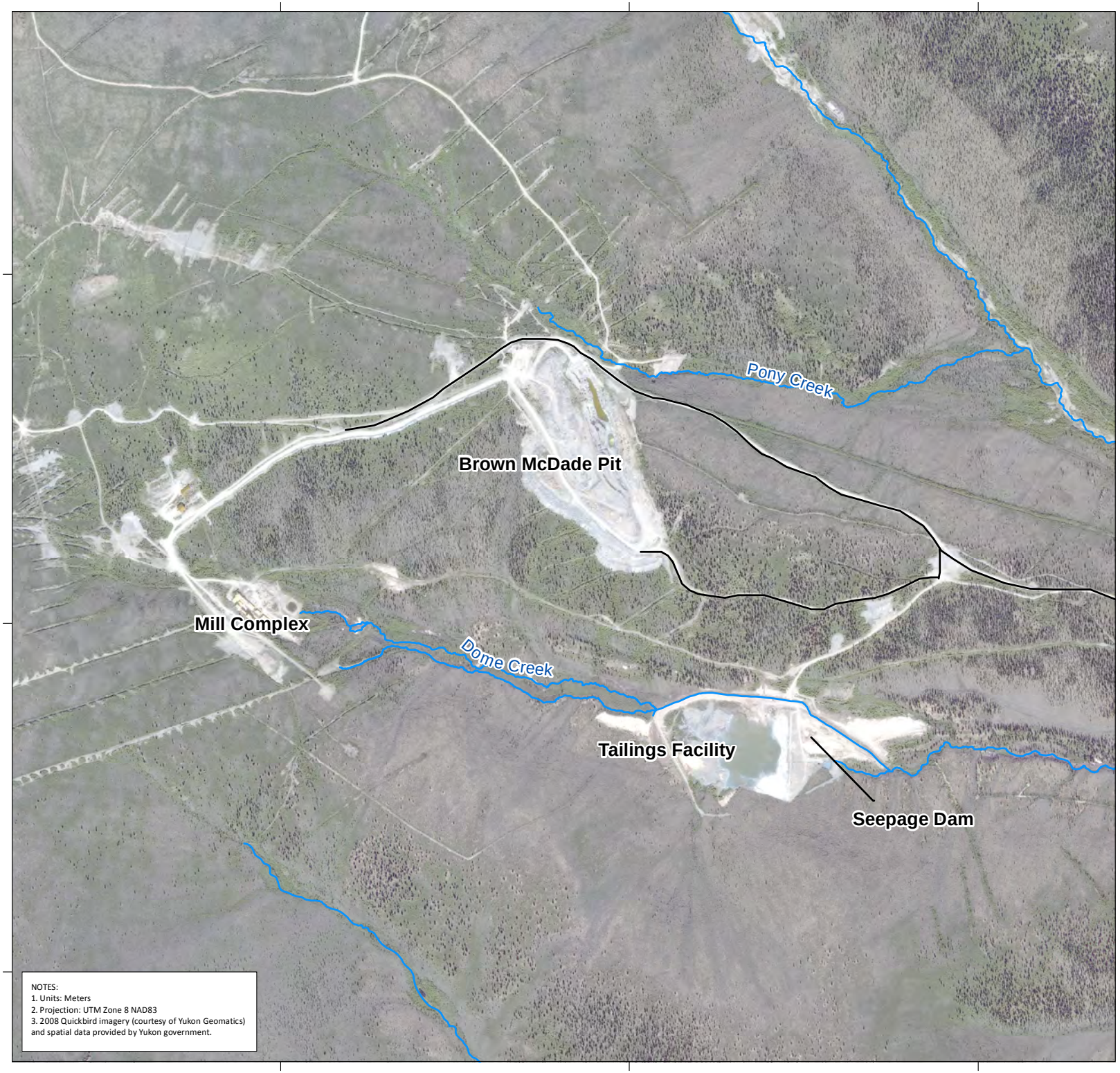
The scope of work for this program included the coordination and execution of the September 2015 groundwater monitoring and sampling, analysis of samples, and the presentation of results in a report.

Groundwater sampling at the Site was conducted over a four (4) day period, between August 31 and September 3, 2015. Sampling was conducted by a team of four (4) qualified field staff from Hemmera/ELR (Justin Hains, Aaron Nicholson, Glenn Rudman, and Jeremy Chua). A total of 65 groundwater wells were included in the September 2015 sampling event (**Table 1-1**). It was not possible to sample four (4) of the groundwater wells listed in the scope of work as they had been destroyed; two (2) previously destroyed (MP09-01 and GSI-PC-01-B) and two (2) that appeared to have been destroyed during placer mining operations in the summer of 2015 (GSI-PC-02-B and MP09-02). One (1) of the remaining 61 groundwater wells assessed was known to be damaged (CH-P-13-02/10), but sampling and monitoring was attempted during the September 2015 program.

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

1.3 SAMPLE SITES

The groundwater wells included in the September 2015 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 September 2015 sampling program. The well locations are also illustrated in **Figures 1-2** and **1-3**. Photographs of each sample site visited in September 2015 are included in **Appendix A**.



Mount Nansen Site - September 2015 Groundwater Monitoring Program

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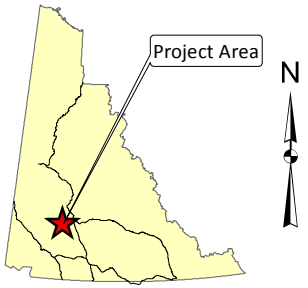
Yukon Energy, Mines and Resources
Assessment and Abandoned Mines

Legend

Watercourses



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250 125 0 250

Meters

January 25, 2016

Hemerra Project: 1343-005.11

ELR Project: 15-200.2

FIGURE 1-1

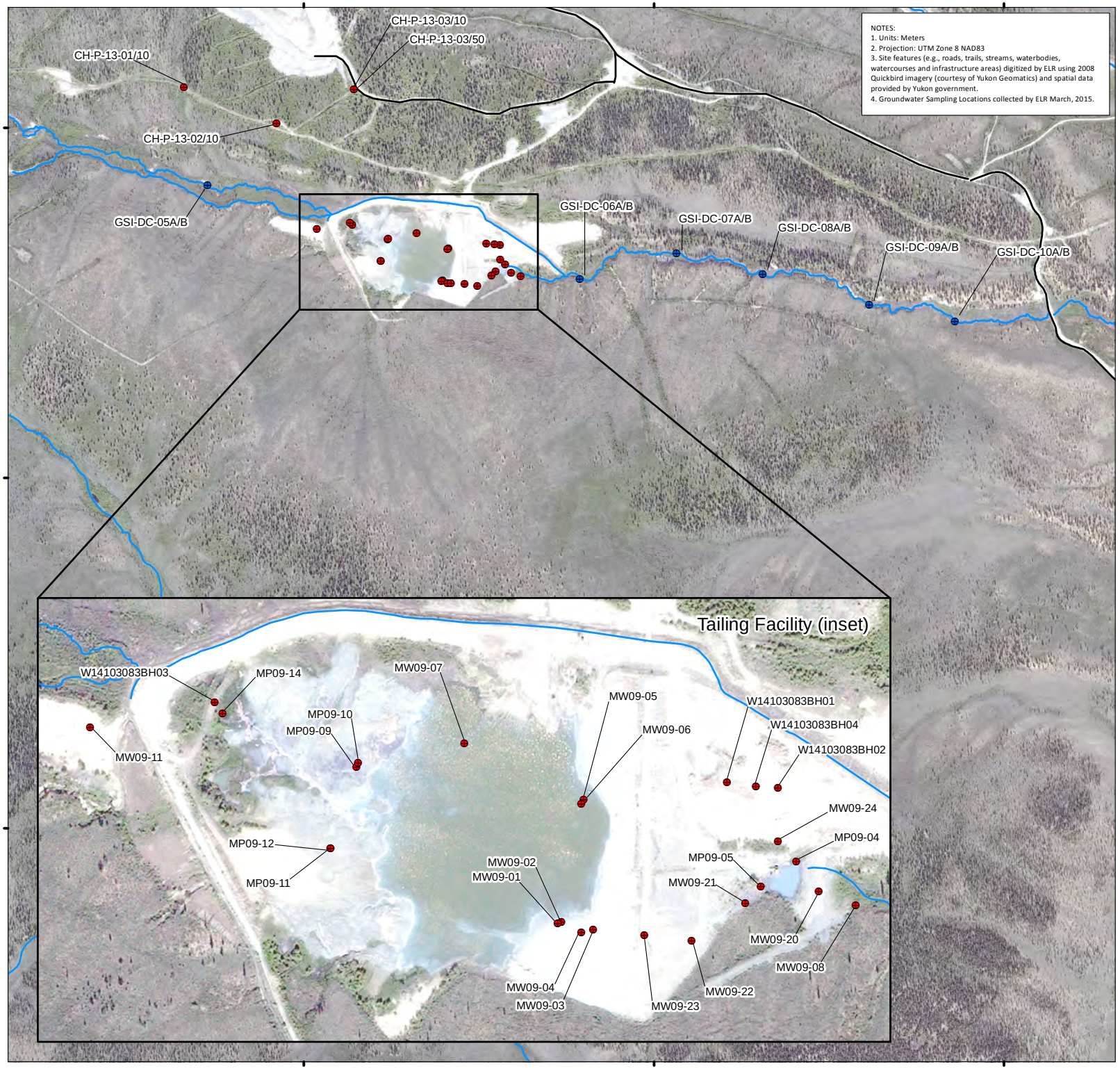
Site Location - Mount Nansen Site

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	Direct Sampled[1]	✓	-
	GSI-DC-02B	387879	6881129	Direct Sampled[1]	✓	-
	GSI-DC-03B	388107	6881079	Direct Sampled[1]	✓	-
	GSI-DC-05B	388725	6880836	Direct Sampled[1]	✓	-
	GSI-DC-06B	389788	6880567	Good	✓	Duplicate
	GSI-DC-07B	390065	6880641	Good	✓	-
	GSI-DC-08-B	390311	6880583	Insufficient Volume	-	-
	GSI-DC-09-B	390614	6880494	Good	✓	-
	GSI-DC-10-B	390859	6880447	Good	✓	-
Mill Complex	GSI-HA-01A	387842	6881132	Direct Sampled[1]	✓	-
	GSI-HA-02A	387861	6881135	Good	✓	-
	GSI-HA-03A	387878	6881131	Direct Sampled[1]	✓	-
	GSI-HA-04A	387916	6881130	Good	✓	-
	GSI-HA-05A	387898	6881125	Good	✓	-
	MW09-16	387992	6881094	Good	✓	Duplicate, Field Blank
	MW09-17	388075	6880970	Good	✓	-
	MW09-18	388054	6880986	Good	✓	-
	MW09-19	388051	6881016	Good	✓	-
Brown McDade Pit	CH-P-13-01/10	388657	6881116	Frozen	-	-
	CH-P-13-03/10	389145	6881105	Dry	-	-
	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	-	-
	CH-P-13-05/50	388954	6881466	Good	✓	-
	GLL07-01	388851	6881783	Frozen	-	-
	GLL07-02	389069	6881703	Dry	-	-
	GLL07-03	388959	6881477	Good	✓	-
	MW09-13	389006	6881664	Frozen	-	-
	MW09-14	389008	6881669	Frozen	-	-
	MW09-15	388920	6881727	Frozen	-	-
	CH-P-13-02/10	388924	6881014	Damaged	-	-
Pony Creek	GSI-PC-01-B	N/A	N/A	Destroyed[2]	-	-
	GSI-PC-02-B	388907	6881786	Destroyed	-	-
	GSI-PC-03-B	389256	6881706	Direct Sampled[1]	✓	-
	GSI-PC-04-B	389586	6881656	Direct Sampled[1]	✓	-
	GSI-PC-05-B	389713	6881661	Good	✓	-
	MP09-01	N/A	N/A	Destroyed[2]	-	-
	MP09-02	388867	6881816	Destroyed	-	-
	MP09-03	388956	6881739	Direct Sampled[1]	✓	-
	MP09-08	389160	6881718	Good	✓	Duplicate, Field Blank

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	Direct Sampled[1]	✓	-
	W14103083BH04	389544	6880666	Direct Sampled[1]	✓	-
Tailings Facility	MP09-04	389575	6880609	Good	✓	-
	MP09-05	389548	6880590	Good	✓	Duplicate
	MP09-09	389240	6880681	Good	✓	-
	MP09-10	389241	6880684	Direct Sampled[1]	✓	-
	MP09-11	389220	6880619	Good	✓	-
	MP09-12	389220	6880619	Direct Sampled[1]	✓	-
	MP09-14	389138	6880722	Direct Sampled[1]	✓	-
	MW09-01	389396	6880563	Direct Sampled[1]	✓	-
	MW09-02	389393	6880562	Good	✓	-
	MW09-03	389411	6880555	Good	✓	-
	MW09-04	389420	6880557	Good	✓	-
	MW09-05	389413	6880656	Dry	-	-
	MW09-06	389411	6880653	Good	✓	-
	MW09-07	389322	6880699	Insufficient Volume	-	-
	MW09-08	389620	6880576	Good	✓	Field Blank
	MW09-11	389037	6880711	Dry	-	-
	MW09-20	389592	6880586	Dry	-	-
	MW09-21	389536	6880577	Good	✓	-
	MW09-22	389495	6880549	Good	✓	-
	MW09-23	389459	6880553	Good	✓	-
	MW09-24	389561	6880624	Good	✓	Duplicate, Field Blank
	W14103083BH03	389132	6880730	Good	✓	-

Notes: [1] Direct sampling was completed at sample stations where insufficient volume had been encountered during the event, which limited standard purging and sampling methodologies.
[2] Destroyed wells are included in the scope of work and are therefore listed above in the summary table.



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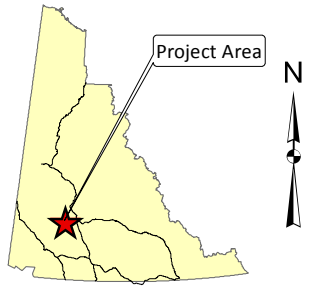
Legend

- Drive Point
- Monitoring Well
- Watercourses



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January 25, 2016

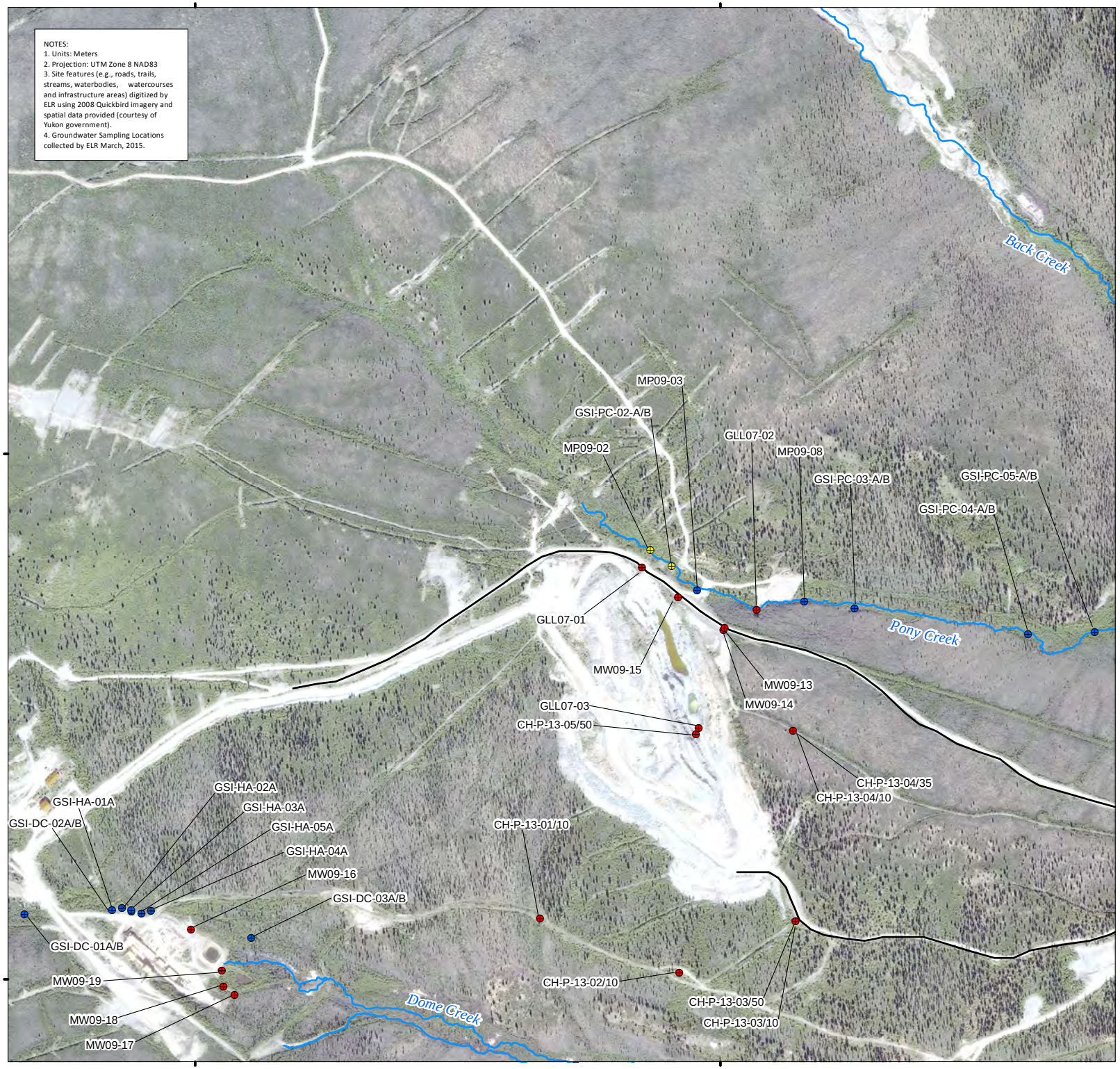
Hemmera Project: 1343-005.11

ELR Project: 15-200.2

FIGURE 1-2

Groundwater Sampling Locations

Dome Creek and Tailings Facility



Mount Nansen Site - September 2015 Groundwater Monitoring Program

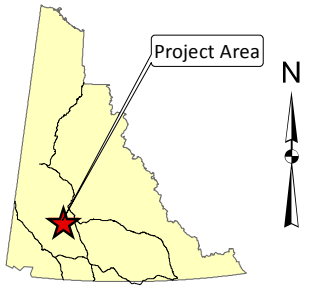
Ecological Logistics & Research Ltd.

HEMMERA

Client: Yukon Energy, Mines and Resources, Assessment and Abandoned Mines

Legend

- Drive Point
- Monitoring Well
- Destroyed
- Watercourses



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January 25, 2016

Hemmera Project: 1343-005.11

ELR Project: 15-200.2

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 MultiRAE Four-Gas Monitor System with photoionization detector (PID).

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

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

Following initial inspection and measurements, groundwater wells were purged and sampled using dedicated equipment. Groundwater wells were purged and sampled using one of three (3) techniques: 1) Hydrolift electric pump using dedicated high density polyethelene (HDPE) Waterra tubing and footvalve, 2) manual purging using high density polyethylene (HDPE) Waterra tubing and a footvalve, or 3) 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 using conventional methods, limiting 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 September 2015 sampling event. At wells 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 was 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, 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 YSI Professional Plus multi-parameter field meters, Lamotte 2020we turbidity meters, and Hach DR 890 Portable Colorimeters. Flow-through cells were used with the YSI meters to minimize field parameter variability; flow-through cells improve the precision of field measurements by limiting sample water contact with air, and by continuously moving sample water across the field meter sensors. The *in-situ* groundwater quality parameters recorded at each sample station included water temperature (^{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 percent saturation), 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 Global was the analytical laboratory chosen for this project, and a summary of the sample bottle set (including parameters analysed and preservation techniques) is provided in **Table 2-2**.

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 2.7.2** 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

Priority	Bottle Type	Parameters Analyzed	Minimum Volume	Sample Treatment	Preservative Added
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	Preserved	HNO_3
6	120 ml (plastic)	Sulphide	100 ml	Preserved	Zinc Acetate, and NaOH
7	250 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	Field Filtered	-

2.6 DATA ANALYSIS

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

2.7 QUALITY ASSURANCE AND QUALITY CONTROL

2.7.1 Field QA/QC

Several controls were used by Hemmera/ELR staff while in the field to ensure that sample integrity was maintained and that data 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 used dedicated disposable nitrile gloves for all measurements, purging, and sampling. Water level meters were cleaned between well locations using Alconox low-foaming phosphate-free detergent and deionized water, and field instruments (YSI field meters, turbidity meters, and portable colorimeters) were checked and calibrated before the site visit to ensure the parameters recorded were as accurate as possible.

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

2.7.2 Analytical QA/QC

Analytical QA/QC measures were included in the September 2015 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 greater than expected variation in data that could potentially have affected the precision of sampling or analysis. RPD was calculated according to the following formula:

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

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 August 31 and September 3, 2015. Weather conditions varied throughout the time of sampling with ambient air temperature ranging from -5 to 12°C.

Of the sixty-five (65) wells specified for the September 2015 sampling event, sixty-one (61) were located and assessed during the program. Two (2) groundwater wells listed in the scope of work had previously been reported as destroyed and are not further discussed in this report (GSI-PC-01-B and MP09-01). Two (2) more groundwater wells were presumed to be destroyed during the September 2015 sampling program as placer mining earthworks were occurring at their location at the time of the site visit (GSI-PC-01-B and MP09-02); further details concerning these wells are provided in **Section 3.2**.

Of the sixty-one (61) wells located, forty-four (44) wells were sampled; twenty-nine (29) using purging and sample methods as per the program protocols, and fifteen (15) sampled directly without purging according to the sample priority ranking. In ten (10) of the fifteen (15) direct sampled wells, volumes were insufficient to collect a full sample set. **Table 3-1** provides a summary of limited sample set collection.

Of the remaining seventeen (17) of sixty-one (61) wells that were assessed but not sampled during the program, eight (8) wells were frozen, five (5) wells were dry, three (3) wells had insufficient volume for sampling, and one (1) well was 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 to the extent possible. Due to a technical issue with one of the gas meters (PIDs), carbon dioxide concentrations were not collected at five (5) of sample locations included in the scope of work (**Table 3-2**). All other headspace gas measurements were obtained prior to sample collection (**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 Direct Samples Collected During September 2015 Sampling Program

Well Name	Dissolved Metals	Dissolved Mercury	Physical Parameters	Anions/ Nutrients	Cyanide	Ammonia	Thiocyanate	Sulphide	Total Inorganic Carbon	Dissolved Alkalinity
Priority	**1a**	**1b**	**2**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
GSI-DC-01B [1]	-	✓	-	-	-	-	-	-	-	-
GSI-DC-02B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
GSI-DC-03B	✓	✓	✓	✓	✓	✓	✓	✓	-	-
GSI-DC-05B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
GSI-HA-01A	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
GSI-HA-03A	✓	✓	✓	✓	✓	✓	✓	✓	✓	-
GSI-PC-03B [2]	✓	✓	-	-	✓	-	-	-	-	-
GSI-PC-04B	✓	✓	✓	-	-	-	-	-	-	-
MP09-03	✓	✓	-	-	-	-	-	-	-	-
W14103083BH02	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
W14103083BH04	✓	✓	✓	✓	✓	✓	-	-	-	-
MP09-10	✓	✓	✓	✓	✓	✓	✓	-	-	-
MP09-12	✓	✓	-	-	-	-	-	-	-	-
MP09-14 [1]	-	✓	-	-	-	-	-	-	-	-
MW09-01	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

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.

[1] Insufficient volumes available to collect a full dissolved metals sample, only dissolved mercury samples were collected.

[2] Insufficient volume available to collect general chemistry sample, remaining sample was used for cyanide analysis.

Table 3-2 Groundwater Field Parameters and Well Measurements for September 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)	Field Sulphide (mg/L)	Methane (%LEL)	Oxygen (%)	Carbon Dioxide (ppm)	Field Turbidity (NTU)	Method Used	Well Diameter (cm)[5]
Dome Creek	GSI-DC-01A	31/08/2015	0.930	0.924	1.481	0.19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.4	840	-	-	2.1
	GSI-DC-01B [2]	31/08/2015	0.950	1.478	1.599	0.04	-	-	-	-	-	DS	-	-	-	-	-	-	-	-	0	20.4	690	-	peristaltic	2.1
	GSI-DC-02A	31/08/2015	0.992	1.493	2.016	0.18	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.5	830	-	-	2.1
	GSI-DC-02B [2]	31/08/2015	0.923	1.848	3.867	0.70	-	-	-	-	-	DS	-	-	-	-	-	-	-	-	0	20.4	870	-	peristaltic	2.1
	GSI-DC-03A [4]	31/08/2015	0.958	1.179	1.979	0.28	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	-	-	-	2.1
	GSI-DC-03B [2, 4]	31/08/2015	0.962	1.327	3.837	0.87	-	-	-	-	-	DS	-	-	-	-	-	-	-	-	0	20.9	-	-	peristaltic	2.1
	GSI-DC-05A	01/09/2015	1.075	1.2	1.952	0.38	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	300	-	-	2.54
	GSI-DC-05B [2]	01/09/2015	0.622	0.703	2.844	1.08	-	-	-	-	-	DS	-	7.37	1	620	1143	-94.6	5.77	-	0	20.9	1200	-	peristaltic	2.54
	GSI-DC-06A	03/09/2015	0.830	0.925	2.001	0.37	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	660	-	-	2.1
	GSI-DC-06B	03/09/2015	0.480	0.059	2.913	0.99	1.3	13:32	13:47	0:15	0.09	PS	1.626	7.4	2.9	845	1457	-127.4	0.16	0.03	0	20.9	610	18	peristaltic	2.1
	GSI-DC-07A	03/09/2015	1.030	1.324	2.001	0.23	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	20	-	-	2.1
	GSI-DC-07B	03/09/2015	1.000	1.419	3.811	0.83	2.8	14:47	15:07	0:20	0.14	PS	0.001	6.84	2.4	782	1377	-52	0.12	0.03	0	20.6	530	15.3	peristaltic	2.1
	GSI-DC-08A	03/09/2015	0.95	1.256	1.855	0.30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	300	-	-	2.54
	GSI-DC-08B	04/09/2015	0.31	0.811	2.777	1.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	300	-	-	2.54
	GSI-DC-09A	03/09/2015	0.885	1.152	1.853	0.36	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.7	300	-	-	2.54
	GSI-DC-09B	03/09/2015	0.894	1.202	1.855	0.33	2	14:24	14:44	0:20	0.10	3WV	-	6.89	3.5	332.1	564	-70	0.24	0.05	0	20.7	200	1.29	peristaltic	2.54
	GSI-DC-10A	03/09/2015	1.155	1.101	1.85	0.38	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	300	-	-	2.54
	GSI-DC-10B	03/09/2015	1.135	1.025	3.698	1.35	2.2	13:06	13:21	0:15	0.15	PS	-	6.6	4.2	745	1238	-54.2	6.27	0.04	0	20.9	600	58.6	peristaltic	2.54
Mill Complex	GSI-HA-01A [2]	31/08/2015	1.240	2.173	3.128	0.33	-	-	-	-	-	DS	-	-	-	-	-	-	-	-	0	20.5	1150	-	peristaltic	2.1
	GSI-HA-02A	31/08/2015	1.530	1.905	3.82	0.97	3.1	9:14	9:52	0:38	0.08	PS	-	6.88	3.7	547	921	-80.8	10.83	0.07	0	20.7	300	0.9	peristaltic	2.54
	GSI-HA-03A [2]	31/08/2015	0.985	1.099	2.192	0.38	-	-	-	-	-	DS	-	-	-	-	-	-	-	-	0	20.6	610	-	peristaltic	2.1
	GSI-HA-04A	31/08/2015	0.61	0.942	2.116	0.59	2.7	13:22	13:36	0:14	0.19	PS	-	6.78	2.8	187.1	325.1	3.1	6.33	0.1	0	20.9	4280	5.69	peristaltic	2.54
	GSI-HA-05A	30/08/2015	1.058	1.268	2.192	0.47	2.05	11:21	11:37	0:16	0.13	3WV	-	6.75	2.6	516	902	-51.6	2.31	0.28	0	20.9	300	39.7	peristaltic	2.54
	MW09-16	31/08/2015	1.310	1.846	2.722	1.78	2.1	11:44	12:07	0:23	0.09	PS	0	6.54	4.5	977	1605	298.9	2.5	0	0	19.5	3420	1.79	peristaltic	5.08
	MW09-17	31/08/2015	0.965	5.303	5.707	0.82	6	15:01	15:22	0:21	0.29	PS	0.007	6.85	0.9	1230	2279	74	1.52	0.01	0	20.9	600	0.61	peristaltic	5.08
	MW09-18	31/08/2015	0.880	4.635	7.795	6.40	5	16:00	16:15	0:15	0.33	PS	0.005	6.89	0.5	1200	2256	73.2	0.41	0.05	0	20.9	300	17.1	peristaltic	5.08
	MW09-19	31/08/2015	0.990	2.58	5.891	6.71	8	17:03	17:39	0:36	0.22	PS	0.6	6.73	2.1	1044	1858	-47.7	0.53	0.18	0	20.9	300	1.2	peristaltic	5.08

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)	Field Sulphide (mg/L)	Methane (%LEL)	Oxygen (%)	Carbon Dioxide (ppm)	Field Turbidity (NTU)	Method Used	Well Diameter (cm)[5]
Brown McDade Pit	CH-P-13-01/10	31/08/2015	0.52	-	6.542	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.5	950	-	-	3.81
	CH-P-13-03/10 [4]	31/08/2015	0.650	-	5.019	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	-	-	-	3.81
	CH-P-13-03/50 [4]	31/08/2015	0.590	50.423	50.649	0.26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	-	-	-	3.81
	CH-P-13-04/10	02/09/2015	0.65	-	6.22	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	200	-	-	3.81
	CH-P-13-04/35	02/09/2015	0.70	-	6.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	200	-	-	3.81
	CH-P-13-05/50	01/09/2015	0.780	25.446	49.99	12.44	70	10:19	10:45	0:26	2.69	PS	-	5.89	0.8	1568	2915	164.5	4.8	0.4	0	20.9	520	1.82	hydrolift	2.54
	GLL07-01	02/09/2015	0.820	-	13.847	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	690	-	-	5.08
	GLL07-02	03/09/2015	1.366	-	7.161	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	1250	-	-	15.24
	GLL07-03	01/09/2015	1.10	3.8	11.69	15.97	50	9:22	9:49	0:27	1.85	3WV	5.718	6.34	1.5	407.6	740	170.9	4.86	0.8	0	20.9	610	>4000	waterra	5.08
	MW09-13	02/09/2015	0.76	-	8.96	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	400	-	-	5.08
	MW09-14	02/09/2015	0.74	-	6.52	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	400	-	-	5.08
	MW09-15	02/09/2015	0.9	-	14.087	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	19.5	2970	-	-	5.08
	CH-P-13-02/10 [4]	31/08/2015	0.640	-	8.12	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	16.5	-	-	-	3.81
Pony Creek	GSI-PC-02A [3]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	GSI-PC-02B [3]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	GSI-PC-03A [3]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	GSI-PC-03B [2]	03/09/2015	0.990	1.385	2.022	0.22	-	-	-	-	-	DS	-	-	-	-	-	-	-	-	0	20.9	580	-	peristaltic	2.1
	GSI-PC-04A	31/08/2015	0.903	0.917	0.93	0.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	300	-	-	2.54
	GSI-PC-04B [2]	03/09/2015	0.985	1.355	1.589	0.12	-	-	-	-	-	DS	-	-	-	-	-	-	-	-	0	20.9	300	-	peristaltic	2.54
	GSI-PC-05A	03/09/2015	0.910	1.251	1.85	0.30	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	400	-	-	2.54
	GSI-PC-05B	03/09/2015	0.910	2.485	3.71	0.62	3.3	9:21	9:36	0:15	0.22	PS	-	6.79	2.5	133.7	234.3	213.1	0.57	0.12	0	20.9	400	29.7	peristaltic	2.54
	MP09-02 [3]	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MP09-03 [2]	03/09/2015	0.730	1.651	1.982	0.11	-	-	-	-	-	DS	-	-	-	-	-	-	-	-	0	20.9	560	-	peristaltic	2.1
	MP09-08	03/09/2015	0.900	1.61	1.963	0.12	1.7	9:25	9:40	0:15	0.11	PS	-	7	1.1	418.3	771	20.8	2.76	0.19	0	20.7	640	2.38	peristaltic	2.1
Seepage Dam	W14103083BH01	02/09/2015	0.600	-	6.535	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.7	3000	-	-	5.08
	W14103083BH02 [2]	02/09/2015	0.780	6.234	6.726	1.00	-	-	-	-	-	DS	-	-	-	-	-	-	-	0.02	0	20.6	750	7.14	peristaltic	5.08
	W14103083BH04 [2]	02/09/2015	0.750	6.254	6.68	0.86	-	-	-	-	-	DS	-	-	-	-	-	-	-	-	0	20.6	640	-	peristaltic	5.08

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)	Field Sulphide (mg/L)	Methane (%LEL)	Oxygen (%)	Carbon Dioxide (ppm)	Field Turbidity (NTU)	Method Used	Well Diameter (cm)[5]
Tailings Facility	MP09-04	01/09/2015	1.245	2.071	3.082	1.15	4	15:35	15:59	0:24	0.17	PS	0.049	7.07	1.8	544	979	61.2	0.73	0	0	20.9	1200	0.57	peristaltic	3.81
	MP09-05	01/09/2015	1.090	1.367	1.832	0.53	3	12:36	12:53	0:17	0.18	PS	0.083	6.64	3.1	1038	1781	27.6	0.33	0.05	0	20.9	300	1.64	peristaltic	3.81
	MP09-09	02/09/2015	2.460	3.51	5.65	1.69	4	14:02	14:29	0:27	0.15	PS	0.935	9.57	4.5	396.6	652	77.5	6.16	0.12	0	20.9	300	41.3	peristaltic	3.175
	MP09-10 [2]	02/09/2015	2.200	3.265	4.32	0.84	-	-	-	-	-	DS	-	-	-	-	-	-	-	>.8	0	20.9	300	>4000	peristaltic	3.175
	MP09-11	02/09/2015	1.900	2.15	4.96	3.20	2.6	11:46	12:13	0:27	0.10	PS	0.71	7.33	4.8	694	1131	-125.5	0.18	0.35	11	20.4	3100	2	peristaltic	3.81
	MP09-12 [2,7]	02/09/2015	1.850	2.184	4.209	2.31	1.4	12:34	12:48	0:14	0.10	DS	1.701	7.52	5.7	166.7	263.6	-9.6	5.14	-	0	20.6	700	-	peristaltic	3.81
	MP09-14 [2]	02/09/2015	1.000	1.149	1.604	0.16	-	-	-	-	-	DS	-	-	-	-	-	-	-	-	0	20.6	720	-	peristaltic	2.1
	MW09-01 [2,7]	01/09/2015	0.790	6.685	9.215	2.88	0.5	16:30	16:36	0:06	0.08	DS	0.655	7	2.2	1668	2951	50.3	0.32	-	0	20.7	580	-	peristaltic	3.81
	MW09-02 [6]	01/09/2015	0.690	3.021	4.715	3.43	3.6	15:49	16:08	0:19	0.19	PS	0.899	7.16	3.1	1636	2808	-71.6	0.12	-	0	20.5	1050	7.74	peristaltic	5.08
	MW09-03	01/09/2015	0.37	6.449	9.925	7.05	2.5	14:20	14:40	0:20	0.13	PS	0.262	8.11	2	1480	2644	163.4	0.14	0.01	0	20.7	630	1.27	peristaltic	5.08
	MW09-04	01/09/2015	0.35	4.261	7.666	6.80	2.4	15:00	15:17	0:17	0.14	PS	0.7	8.39	2.7	1578	2752	178.5	0.13	0.02	0	20.6	580	1.55	peristaltic	5.08
	MW09-05	02/09/2015	1.220	-	7.56	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	19.1	1500	-	-	5.08
	MW09-06	02/09/2015	2.085	3.84	5.99	4.36	2.1	10:45	11:12	0:27	0.08	PS	0.63	7.49	5.3	969	1552	42.9	2.22	0.02	0	20.4	800	6.63	peristaltic	5.08
	MW09-07	02/09/2015	1.340	3.372	3.405	0.07	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	300	-	-	5.08
	MW09-08	01/09/2015	1.130	1.12	3.927	5.69	5.5	16:41	16:59	0:18	0.31	PS	0.085	6.72	3.3	209.9	358.9	-65.7	0.3	0.08	0	20.9	500	4.38	peristaltic	5.08
	MW09-11	02/09/2015	0.810	-	4.894	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.3	2030	-	-	5.08
	MW09-20	01/09/2015	0.950	-	3.605	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	1100	-	-	5.08
	MW09-21	01/09/2015	0.817	1.715	3.622	3.87	5	13:55	14:16	0:21	0.24	PS	0.165	6.82	2.9	1410	2440	-66.7	0.29	0.01	0	20.9	300	9.06	peristaltic	5.08
	MW09-22	01/09/2015	0.860	4.158	5.277	2.27	4	10:58	11:22	0:24	0.17	PS	0.612	6.21	1.2	807	1479	12.2	0.78	0.08	0	20.9	300	13.6	peristaltic	5.08
	MW09-23	01/09/2015	0.019	12.692	15.822	6.34	21	12:00	12:20	0:20	1.05	3WV	0.303	6.94	0.4	1051	1985	32.6	2.51	0.26	0	20.5	660	1.04	hydrolift	5.08
	MW09-24	02/09/2015	0.640	9.575	11.207	3.31	25	9:56	10:20	0:24	1.04	PS	0.075	7.19	0.5	543	1022	194.6	5.56	0.14	0	20.9	1480	64.2	waterra	5.08
	W14103083BH03	02/09/2015	0.760	1.755	4.534	5.63	4.3	14:16	14:44	0:28	0.15	PS	0.025	6.53	2.9	448	776	-57.1	0.19	0.1	0	20.5	810	15.5	peristaltic	5.08

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

[3] Well has either been destroyed by placer mining activity or conditions were unsafe to investigate due to ongoing mining operations.

[4] Due to technical issues with gas monitoring equipment in-situ carbon dioxide measurements were not collected at this location.

[5] Drawdown could not be recorded at drive-point piezometer locations or sites with 2.54 cm diameter wells (or less).

[6] Field sulphide measurement was not collected at this location.

[7] Field sulphide measurement was not collected at these locations due to a lack of sufficient volume (direct sampled wells).

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

3.2 ANALYTICAL RESULTS

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

In several instances, laboratory reportable detection limits (RDL) for parameters exceeded applicable CCME FAL standards (lightly shaded values in **Table A**). In these cases, samples having elevated levels of certain parameters required laboratory dilution 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 August 31 and September 3, 2015. Samples were obtained from eight (8) of the nine (9) drive-point piezometers located in this area. Groundwater well GSI-DC-08B was not sampled during the September 2015 field program due to insufficient volume and recharge. Four (4) of the drive-point piezometers located in this area were sampled directly without purging (GSI-DC-02B, GSI-DC-02B, GSI-DC-03B, GSI-DC-05B). All remaining wells were sampled according program protocols (GSI-DC-06B, GSI-DC-07B, GSI-DC-09B, and GSI-DC-10B). A summary of field measurements, including headspace gases, is provided in **Table 3-2**.

One or more CCME FAL guideline exceedances were observed at seven (7) sites in the Dome Creek area; including, exceedances of fluoride (two sites), dissolved arsenic (six sites), dissolved iron (seven sites) and dissolved zinc (one site). Field dissolved oxygen concentrations were below the CCME FAL guideline minimum at five (5) sites sampled in this area. Lab pH measurements were outside the CCME FAL guideline range at one (1) location. A summary of CCME FAL guidelines exceedances is provided in **Table 3-3**.

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.

Groundwater was turbid at sites GSI-DC-05B (183 NTU) and GSI-DC-10B (58.6 NTU) at the time of sampling. All other turbidity measurements within the Dome Creek area were less than 50 NTU at the time of sampling (**Table 3-2**).

Table 3-3 Summary of CCME FAL Guideline Exceedances for September 2015 Sampling Program

	Group	Physical Tests			Anions and Nutrients				Cyanides	Dissolved Metals									
	Parameter	Lab pH	Field pH	Field Dissolved Oxygen	Ammonia, Total (as N)	*Ammonia CCME-FAL*[2]	Fluoride (F)	Nitrite (as N)	Cyanide, Free	Arsenic (As)	Copper (Cu)	*Copper CCME-FAL* [2]	Iron (Fe)	Lead (Pb)	*Lead CCME-FAL* [2]	Mercury (Hg)	Selenium (Se)	Silver (Ag)	Zinc (Zn)
	Units	pH units	pH units	mg/L	mg/L		mg/L	mg/L	mg/L	mg/L	mg/L		mg/L	mg/L		mg/L	mg/L	mg/L	mg/L
	CCME-FAL[1,]	6.5-9.0 [5]	6.5-9.0 [5]	9.5 [6]	Varies [2]		0.12	0.06	0.005	0.005	Varies [2]		0.3	Varies [2]		0.000026	0.001	0.0001	0.03
Dome Creek	GSI-DC-02B [14]	-	-	-	-	-	-	-	-	0.0122	-	-	7.57	-	-	-	-	-	-
	GSI-DC-03B	-	-	-	-	-	0.141	-	-	0.00677	-	-	0.404	-	-	-	-	-	0.0589
	GSI-DC-05B	-	-	5.77	-	-	-	-	-	-	-	-	0.903	-	-	-	-	-	-
	GSI-DC-06B	-	-	0.16	-	-	0.254	-	-	0.492	-	-	27.4	-	-	-	-	-	-
	GSI-DC-07B	-	-	0.12	-	-	-	-	-	0.188	-	-	41.7	-	-	-	-	-	-
	GSI-DC-09B	-	-	0.24	-	-	-	-	-	0.0595	-	-	15.2	-	-	-	-	-	-
	GSI-DC-10B	6.17	-	6.27	-	-	-	-	-	0.102	-	-	90.8	-	-	-	-	-	-
Mill Complex	GSI-HA-01A [15]	-	-	-	-	-	0.132	-	-	-	0.00574	*0.004*	0.510	-	-	-	-	-	-
	GSI-HA-02A	-	-	-	-	-	-	-	-	0.0844	-	-	83.4	-	-	-	-	-	-
	GSI-HA-03A [16]	-	-	-	-	-	-	-	-	0.0406	-	-	49.5	-	-	-	-	-	-
	GSI-HA-04A	-	-	6.33	-	-	-	-	-	0.0328	-	-	4.28	-	-	-	-	-	-
	GSI-HA-05A	-	-	-	-	-	-	-	-	0.103	-	-	29.1	-	-	-	-	-	-
	MW09-16	-	-	2.5	-	-	0.14	-	-	0.00802	0.00547	*0.004*	-	-	-	-	-	-	3.19
	MW09-17	-	-	1.52	-	-	-	-	-	0.0193	-	-	-	-	-	-	-	-	-
	MW09-18	-	-	0.41	-	-	-	-	-	0.0517	-	-	-	-	-	-	-	-	-
	MW09-19	-	-	0.53	-	-	0.14	-	-	0.121	-	-	17.6	-	-	-	0.00108	-	-
Bown McDade Pit	CH-P-13-05/50	5.98	5.89	4.8	-	-	0.24	-	-	-	0.0993	*0.004*	14.7	-	-	-	-	-	31.1
	GLL07-03	-	6.34	4.86	-	-	-	-	-	-	0.00560	*0.004*	1.34	-	-	-	-	-	4.53
Pony Creek	GSI-PC-03B	-	-	-	-	-	-	-	-	-	0.0145	*0.004*	-	-	-	-	-	-	-
	GSI-PC-04B	-	-	-	-	-	-	-	-	0.0107	-	-	9.79	-	-	-	-	-	-
	GSI-PC-05B	-	-	0.57	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MP09-03	-	-	-	-	-	-	-	-	0.00631	-	-	1.48	-	-	-	-	-	-
	MP09-08	-	-	2.76	-	-	-	-	-	0.0328	-	-	0.519	-	-	-	-	-	-
Seepage Dam	W14103083BH02	-	-	-	-	-	0.254	-	-	-	-	-	-	-	-	-	-	-	-
	W14103083BH04	-	-	-	-	-	0.193	-	-	-	-	-	-	-	-	-	0.00249	-	-
Tailings Facility	MP09-04	-	-	0.73	-	-	0.38	-	-	3.38	-	-	-	-	-	-	-	-	0.471
	MP09-05	-	-	0.33	-	-	-	-	-	0.00861	-	-	3.03	-	-	-	-	-	-
	MP09-09	-	9.57	6.16	4.51	*0.06177*	1.70	-	1.05	14.2	0.327	*0.004*	-	-	-	0.0000697	0.00187	0.0110	-
	MP09-10	-	-	-	-	-	0.169	0.330	0.043	1.82	0.0507	*0.02*	0.328	0.0192	*0.001*	0.0000293	-	0.000491	-
	MP09-11	-	-	0.18	13.7	*7.273*	0.467	-	-	13.9	-	-	30.6	0.0379	*0.007*	-	-	-	0.0670
	MP09-12	-	-	5.14	-	-	-	-	-	6.62	-	-	4.19	-	-	-	-	-	0.0472
	MP09-14	-	-	-	-	-	-	-	-	3.94	-	-	4.12	-	-	-	-	-	-
	MW09-01	-	-	0.32	-	-	0.26	-	-	0.343	0.0041	*0.004*	1.99	-	-	-	-	-	2.67
	MW09-02	6.42	-	0.12	-	-	0.53	-	-	18.0	-	-	44.2	-	-	-	-	-	0.230
	MW09-03	-	-	0.14	3.46	*1.534*	0.34	0.089	-	2.11	-	-	-	-	-	-	-	-	-
	MW09-04	-	-	0.13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MW09-06	-	-	2.22	-	-	0.33	-	-	0.131	0.00689	*0.004*	-	-	-	-	-	-	0.110
	MW09-08	-	-	0.3	-	-	-	-	-	0.0869	-	-	47.5	-	-	-	-	-	-
	MW09-21	-	-	0.29	-	-	-	-	-	0.105	-	-	66.0	-	-	-	-	-	-
	MW09-22	6.26	6.21	0.78	-	-	-	-	-	0.00674	-	-	46.2	-	-	-	-	-	-
	MW09-23	-	-	2.51	-	-	0.16	-	-	0.0261	-	-	23.5	-	-	-	-	-	0.118
	MW09-24	-	-	5.56	-	-	-	-	-	-	0.00811	*0.004*	-	-	-	-	-	-	-
	W14103083BH03	-	-	0.19	-	-	-	-	-	0.0576	-	-	77.3	-	-	-	-	-	-

Notes:
[1] CCME guideline exceedances shaded with dark grey.
[2] Calculated CCME guidelines, refer to **Table A** for details.
"–" indicates either no exceedance was observed or no analysis was conducted. Refer to Table A for full analytical report.

3.2.2 Mill Complex

Groundwater in the Mill Complex Area was sampled on August 31, 2015. Samples were obtained from all of the nine (9) wells identified in this area. Drive-points GSI-HA-01A and GSI-HA-03A were sampled directly without purging, all other wells were sampled according program protocols. A summary of the samples collected is provided in **Table 3-1**.

One or more CCME FAL guideline exceedances were observed at all nine (9) sites in the Mill Complex area, including exceedances of fluoride (three sites), dissolved arsenic (eight sites), dissolved copper (two sites), dissolved iron (six sites), dissolved selenium (one site) and dissolved zinc (one site). Field dissolved oxygen concentrations were below the minimum CCME FAL guideline level at five (5) sites within this area. A summary of CCME FAL guideline exceedances is provided in **Table 3-3**.

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 August 31 and September 1, 2015. Samples were obtained from two (2) of the thirteen (13) sample sites located within this area (CH-P-13-05/50 and GLL07-02). Seven (7) wells were frozen during the time of sampling (CH-P-13-01/10, CH-P-13-04/10, CH-P-13-04/35, GLL07-01, MW09-13, MW09-14, and MW09-15), two (2) wells were dry (CH-P-13-03/10 and GLL07-02), one was damaged (CH-P-13-02/10), and one had insufficient volume to collect a sample (CH-P-13-03/50). A summary of the samples collected is provided in **Table 3-1**.

CCME FAL guideline exceedances were observed at all two (2) sites sampled in the Brown McDade Pit area, including exceedances of fluoride (one site), dissolved copper (two sites), dissolved iron (two sites) and dissolved zinc (two sites). Field dissolved oxygen concentrations were below the minimum CCME FAL guideline level at both sites sampled in this area. Field pH measurements were observed to be outside the CCME FAL guideline range at both sampled wells, while laboratory pH was outside of the CCME FAL guideline range at one (1) location. A summary of CCME FAL guideline exceedances is provided in **Table 3-3**.

Groundwater at sample location GLL07-03 was extremely turbid (>4000 NTU) during the time of sampling. Groundwater turbidity at the other sampled location within the Brown McDade Pit area was less than 50 NTU at the time of sample (Table 3-2).

CH-P-13-02/10 was found damaged during the time of sampling. During previous sample events, bentonite was 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 in July 2015 (Hemmera, 2015a) confirmed the presence of bentonite and filter pack (filter sand) at the bottom of well. Bentonite was also observed

seeping in the top portion of the well screen (Hemmera, 2015a). The camera footage from July 2015 suggested that the issue may be the result of improper well installation. Attempts made during the September 2015 event to remove the bentonite plug were unsuccessful. Waterra tubing was lowered into the well and forced into the bentonite plug to capture a portion of the bentonite, however the bentonite was frozen at the time of the September 2015 site visit, making it difficult to capture and remove the blockage.

3.2.4 Pony Creek

Groundwater wells along Pony Creek were sampled on September 3, 2015. Samples were collected from five (5) of the seven (7) sample sites in this area during the sampling event. Two drive-point piezometers previously sampled within this area (GSI-PC-02B and MP09-02) were presumed to be destroyed as their location was undergoing placer mining earthworks (which also prevented the direct investigation of the wells). Of the five (5) wells located, three (3) were sampled directly without purging. All remaining wells were sampled according program protocols (GSI-PC-05B and MP09-08). A summary of the samples collected is provided in **Table 3-1**.

CCME FAL guideline exceedances were observed at all five (5) sites in the Pony Creek area, including exceedances of dissolved arsenic (three sites), dissolved copper (one site), and dissolved iron (three sites). Field dissolved oxygen concentrations were below the minimum CCME FAL guideline level at two (2) sites in this area. A summary of CCME FAL guidelines exceedances is provided in **Table 3-3**.

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

3.2.5 Seepage Dam

Groundwater wells in the Seepage Dam area were monitored on September 2, 2015. Samples were obtained from two (2) of the three (3) sample sites in this area during the event. Sample site W14103083BH01 was frozen during the time of sampling. All samples collected in the Seepage Dam area were collected directly without purging. A summary of the samples collected is provided in **Table 3-1**.

CCME FAL guideline exceedances were observed at both of the two (2) sites sampled in the Seepage Dam area, including exceedances of fluoride (two sites) and dissolved selenium (one site). A summary of CCME FAL guideline exceedances is provided in **Table 3-3**.

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

3.2.6 Tailings Facility

Groundwater wells in the Tailings Facility area were sampled between September 1 and September 2, 2015. Samples were obtained from eighteen (18) of the twenty-two (22) sample sites located in this area. Three sample sites were dry during the time of sample (MW09-05, MW09-11, and MW09-20), and one well had insufficient volume to collect a sample (MW09-07). Of the eighteen (18) samples collected within this area, four (4) were collected directly without purging (MP09-10, MP09-12, MP09-14, and MW09-01). All remaining wells were sampled according program protocols. A summary of the samples collected is provided in **Table 3-1**.

CCME FAL guideline exceedances were observed at all eighteen (18) sites in the Tailings Facility area, including exceedances of fluoride (nine sites), total ammonia (three sites), nitrite (two sites), free cyanide (two sites), dissolved arsenic (sixteen sites), dissolved copper (five sites), dissolved iron (twelve sites), dissolved lead (two sites), dissolved mercury (two sites), dissolved selenium (one site), dissolved silver (two sites), and dissolved zinc (seven sites). Field dissolved oxygen concentrations were below the minimum CCME FAL guideline level at sixteen (16) sampled sites within this area. Field and laboratory pH measurements were each observed to be outside of the CCME FAL guideline range at two (2) sample locations. A summary of CCME FAL guideline exceedances is provided in **Table 3-3**.

Groundwater at sample location MP09-10 was extremely turbid (>4000 NTU) during sampling. Samples collected from location MW09-24 were moderately turbid (64.2 NTU). Where measured, groundwater turbidity at all other sample locations within the Tailings Facility area was less than 50 NTU at the time of sample (**Table 3-2**).

Although samples were obtained from well MW09-01 during the September 2015 sampling event, groundwater at this location is extremely turbid (by observation only, turbidity was not measured as this well was direct sampled). As documented in previous reports (Hemmera, 2015a), this well has a large gash/opening at the top of PVC. Tailings likely enter the well through this opening during periods of high water. Intended repairs on this well were not performed during September 2015 field event as it was discovered on site that the diameter of this well is slightly different than the standard 2 inch diameter, as previously believed, however the opening at the top of PVC was temporarily sealed during the September 2015 site visit using nitrile gloves and electrical tape.

3.3 QUALITY ASSURANCE AND QUALITY CONTROL RESULTS

Five (5) duplicate groundwater samples were collected during the September 2015 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.

3.3.1 Field and Travel Blanks

All travel blank analytical results were reported as less than the RDL with the exception of ammonia which was recorded in both travel blanks (0.019 mg/L and 0.0107 mg/L; **Table B**). The program analytical laboratory (ALS Global) indicated that the detection of low levels of ammonia should not be considered an indication of contamination as low concentrations of ammonia are occasionally in travel blanks that are prepared too early in advance of the field program. All other parameters in both travel blanks were below RDL.

A detectable concentration of dissolved strontium (0.00041 mg/L) was recorded in field blank FB15-200, the source of which is not known but could be the result of dust during the field blank filling process or a laboratory process. All other field blank analytical results were reported as less than the RDL (**Table B**).

3.3.2 Field Duplicates

3.3.2.1 GSI-DC-06B and MW15-500

Duplicate and duplicate pair analytical results show that RPD values for sulphate (53.98%) were reported above the acceptable range of variability. Field notes/measurements do not identify a potential source of contamination or suggest variability in groundwater quality during the purging process (**Table 3-2**).

All other duplicate and duplicate pair analytical results show that RPD values for samples GSI-DC-06B and MW15-500 were below the 20% RPD threshold limit (**Table B**).

3.3.2.2 MW09-16 and MW15-100

Duplicate and duplicate pair analytical results show that all RPD values for samples MW09-16 and MW15-100 were below the 20% RPD threshold limit, suggesting no contamination or bias in sampling (**Table B**).

3.3.2.3 MP09-08 and MW15-400

Duplicate and duplicate pair analytical results show that RPD values for dissolved antimony (22.05%) and arsenic (23.13%) were reported slightly above the acceptable range of variability. Field notes indicate that Pony Creek surface water (above where the drive points were located) was extremely turbid during the time of sampling. Increased turbidity is believed to have resulted from placer mining operations upstream of the sample site, and this could have potentially also influenced groundwater quality. Hemmera/ELR observed fluctuating turbidity during the sampling process at this site, which may have caused variability between duplicate and duplicate pair analytical results (**Table 3-2**).

All other duplicate and duplicate pair analytical results show that RPD values for samples MP09-08 and MW15-400 were below the 20% RPD threshold limit (**Table B**).

3.3.2.4 MP09-05 and MW15-200

Duplicate and duplicate pair analytical results show that RPD values for total Kjeldahl nitrogen (25.38%) and dissolved zinc (23.64%) were reported slightly above the acceptable range of variability. Field notes/measurements do not identify a potential source of contamination or suggest variability in groundwater quality during the purging process (**Table 3-2**).

All other duplicate and duplicate pair analytical results show that RPD values for samples MP09-05 and MW15-200 were below the 20% RPD threshold limit (**Table B**).

3.3.2.5 MW09-24 and MW15-300

Duplicate and duplicate pair analytical results show that all RPD values for samples MW09-24 and MW15-300 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 slight evidence of sampling variation during the field collection process. The minimal detections observed in the field blanks suggests that contamination during sampling was less likely the cause of variability, rather more likely the result of slight variations in groundwater quality. The results from the travel blanks did not suggest any type of contamination during transportation.

Overall, across four (4) field blanks, analytical results reported only one field blank (FB15-200) with a detectable concentration of dissolved strontium. All other field blank analytical results were reported as less than the RDL (**Table B**).

Dissolved strontium is reported in samples throughout the site, with concentrations ranging from 0.0242 mg/L and 1.39 mg/L. Low concentrations of dissolved strontium detected in field blank FB15-200 (0.00041 mg/L) may have been the result of environmental contamination. FB15-200 was prepared in the Tailings Facility area during the sampling process of site MW09-08. Field notes and conditions during the time of sample collection provide no indication for the probability of sample contamination.

Duplicate and duplicate pair analytical results show some variability in total Kjeldahl nitrogen, sulphate, as well as dissolved antimony, arsenic, and zinc. Overall, across five (5) duplicate samples, three (3) show variation with their duplicate pair. The majority of variation between duplicate and duplicate pairs was only slightly above the 20% RPD threshold, with spikes observed in no more than two parameters for each pair. The most notable variation observed was between GSI-DC-06B and MW15-500, with differences between sulphide concentrations resulting in a 53.98% RPD. All other parameters were below the 20% RPD threshold limit. Field notes/measurements do not identify a potential source of contamination or suggest variability in groundwater quality during the purging process (**Table 3-2**).

3.4 ANALYTICAL TEST OF FILTERED ALKALINITY

Filtered alkalinity samples were collected in addition to non-filtered samples to test whether acid or alkaline-generating solids maybe affecting alkalinity results. Filtered and non-filtered alkalinity were both analyzed from thirty-seven (37) sample locations (**Table 3-3**) during the September 2015 program, and were also analyzed for all QA/QC samples (duplicates, field blanks, and travel blanks). The other seven (7) of forty-four (44) sample sites did not produce sufficient groundwater volume to collect filtered alkalinity (**Table 3-1**). A summary of filtered and unfiltered alkalinity results is provided in **Table 3-3**.

Table 3-4 Comparison of Alkalinity and Filtered Alkalinity Results

Well Name	Non-Filtered Alkalinity	Filtered Alkalinity	RPD
	mg/L	mg/L	%
GSI-DC-02B	246	292	17.10
GSI-DC-05B	276	213	***25.77***
MW15-500	850	766	10.40
GSI-DC-06B	868	768	12.22
GSI-DC-07B	169	176	4.06
GSI-DC-09B	98.3	103	4.67
GSI-DC-10B	96.7	91.0	6.07
GSI-HA-01A	192	197	2.57
GSI-HA-02A	155	165	6.25
GSI-HA-04A	74.3	77.1	3.70
GSI-HA-05A	194	206	6.00
MW15-100	286	281	1.76
MW09-16	284	284	0.00
MW09-17	446	462	3.52
MW09-18	458	459	0.22
MW09-19	438	444	1.36
CH-P-13-05/50	65.5	66.7	1.82
GLL07-03	70.9	68.2	3.88
MW15-400	246	248	0.81
MP09-08	242	249	2.85
W14103083BH02	216	221	2.29
MP09-04	94.4	193	***68.62***
MW15-200	290	278	4.23
MP09-05	268	279	4.02
MP09-11	564	580	2.80
MW09-01	320	336	4.88
MW09-02	35.7	29.6	18.68
MW09-03	113	114	0.88
MW09-04	181	96.2	***61.18***
MW09-06	147	152	3.34

Well Name	Non-Filtered Alkalinity	Filtered Alkalinity	RPD
	mg/L	mg/L	%
MW09-08	119	123	3.31
MW09-21	221	223	0.90
MW09-22	131	141	7.35
MW09-23	297	299	0.67
MW15-300	353	376	6.31
MW09-24	353	379	7.10
W14103083BH03	193	<1.0	nc

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

Of the thirty-seven (37) samples above RDL (including duplicate samples), only three (3) show variation between filtered alkalinity samples and unfiltered samples (GSI-DC-05B; 25.77% RPD, MP09-04; 68.62% RPD, MW09-04; 61.18% RPD). Similar to the results observed in previous sampling programs for filtered and non-filtered alkalinity, the data do not suggest a consistent and frequent difference between the two sampling methods. Accordingly, Hemmera/ELR suggest that the collection of filtered alkalinity samples is not a required procedure for the Mount Nansen site, and that the method be discontinued.

4.0 RECOMMENDATIONS

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

1. Damaged or degraded wells should be repaired, if possible.

   Damaged or degraded wells noted during the September 2015 sampling event include the following, CH-P-13-02/10, CH-P-13-03/10, and MW09-01.

   CH-P-13-02/10 was reported as damaged during the time of sampling. During previous sample events, bentonite was 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 in July 2015 (Hemmera, 2015a) confirmed the presence of bentonite and filter pack (filter sand) at the bottom of well. Bentonite was also observed seeping in the top portion of the well screen (Hemmera, 2015a). The camera footage from July 2015 suggested that the issue may be the result of improper well installation. Attempts made during the September 2015 event to remove the bentonite plug were unsuccessful. Waterra tubing was lowered into the well to attempt to force the bentonite into the tubing to remove it, however the bentonite was found frozen in the well. It is recommended that this method be re-attempted in the late spring or summer of 2016. It should be noted that if bentonite is seeping into the top portion of the well screen, removal of the blockage may only provide a temporary fix.

   Sampling location CH-P-13-03/10 was found dry during the September 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 in July 2015 from the sample site confirmed the presence of sand at the bottom of the well. Hemmera/ELR still recommends that the well be re-developed to remove the sand when conditions allow. 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 September 2015 sampling event, groundwater at this location is extremely turbid. The well 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 was temporarily sealed during the September 2015 site visit using nitrile gloves and electrical tape. A more permanent fix should be established for this location (such as replacement of the top portion of the PVC well casing). This would require cutting the existing well and adding a coupler, PVC extension, and proper seal or j-plug. This well should also be re-developed to clear debris from the well screen. Due to low volumes and slow recharge it may be necessary to add additional water to this well in order to suspend the tailing material during the re-development process.

2. During the September 2015 and other recent sampling events, paired filtered and non-filtered alkalinity samples were collected to test whether acid or alkaline-generating solids may be affecting alkalinity results. Similar to the results observed in previous sampling programs, the data do not suggest a consistent and frequent difference between the two sampling methods. Accordingly, Hemmera/ELR suggest that the collection of filtered alkalinity samples not be a required procedure for the Mount Nansen site, and that the method be discontinued.

5.0 CLOSURE

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

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6.0 REFERENCES

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TABLES

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

		Site Location	Dome Creek									Mill Complex					
		Sample ID	GSI-DC-01B	GSI-DC-02B [14]	GSI-DC-03B	GSI-DC-05B	GSI-DC-06B	GSI-DC-07B	GSI-DC-08B	GSI-DC-09B	GSI-DC-10B	GSI-HA-01A [15]	GSI-HA-02A	GSI-HA-03A [16]	GSI-HA-04A	GSI-HA-05A	MW09-16
		Date Sampled	31/08/2015	31/08/2015	31/08/2015	01/09/2015	03/09/2015	03/09/2015	-	03/09/2015	03/09/2015	31/08/2015	31/08/2015	31/08/2015	31/08/2015	31/08/2015	31/08/2015
		ALS Work Number	L1667552	L1667552	L1667552	L1667552	L1668494	L1668494	-	L1668494	L1668494	L1667552	L1667552	L1667552	L1667552	L1667552	L1667552
		Station Status	Poor Recharge	Poor Recharge	Poor Recharge	Poor Recharge	Good	Good	Insuffcient Volume	Good	Good	Poor Recharge	Good	Poor Recharge	Good	Good	Good
Parameter	Units	CCME-FAL [1, 2, 3, 4]															
Physical Tests																	
Lab pH	pH units	6.5-9.0 [5]	-	7.94	7.68	7.89	7.55	7.13	-	6.92	6.17	7.97	6.72	7.23	7.08	7.23	7.08
Field pH	pH units	6.5-9.0 [5]	-	-	-	7.37	7.4	6.84	-	6.89	6.6	-	6.88	-	6.78	6.75	6.54
Field Temperature	C	-	-	-	-	1	2.9	2.4	-	3.5	4.2	-	3.7	-	2.8	2.6	4.5
Lab Conductivity	uS/cm	-	-	820	1200	1580	1390	1270	-	533	1210	814	921	582	340	943	1580
Field Conductivity	uS/cm	-	-	-	-	620	845	782	-	332.1	745	-	547	-	187.1	516	977
Field Specific Conductivity	uS/cm	-	-	-	-	1143	1457	1377	-	564	1238	-	921	-	325.1	902	1605
Total Hardness (as CaCO3)	mg/L	-	-	557	761	1040	844	733	-	236	642	454	530	498	179	552	1020
Field Dissolved Oxygen	mg/L	9.5 [6]	-	-	-	5.77	0.16	0.12	-	0.24	6.27	-	10.83	-	6.33	12.1	2.5
Field Oxidation - Redox Potent	mV	-	-	-	-	-94.6	-127.4	-52	-	-70	-54.2	-	-80.8	-	3.1	-51.4	298.9
Field Turbidity	NTU	-	-	-	-	183	18	15.3	-	1.29	58.6	-	0.9	-	5.69	39.7	1.79
Anions and Nutrients																	
Alkalinity, Total (CaCO3)	mg/L	-	-	246	239	276	868	169	-	98.3	96.7	192	155	108	74.3	194	284
Alkalinity, Total (CaCO3, filtered)	mg/L	-	-	292	-	213	768	176	-	103	91.0	197	165	-	77.1	206	284
Ammonia, Total (as N)	mg/L	Varies [7]	-	0.828	0.165	0.664	2.78	2.09	-	1.79	1.79	0.0363	1.09	0.501	0.132	0.748	<0.0050
Ammonia CCME-FAL [7]	mg/L	-	-	-	-	*9.070*	*7.23*	*27.32*	-	*22.24*	*40.9*	-	*22.38*	-	*30.34*	-	*45.85*
Chloride (Cl)	mg/L	-	-	0.52	<1.0	<2.5	7.3	1.3	-	<0.50	1.2	<0.50	<1.0	<0.50	<0.50	<1.0	<2.5
Fluoride (F)	mg/L	0.12	-	0.120	0.141	<0.10	0.254	0.046	-	0.087	0.057	0.132	<0.040	0.070	0.079	0.067	0.14
Nitrate (as N)	mg/L	13	-	0.417	0.011	<0.025	<0.010	0.018	-	<0.0050	<0.010	0.0081	<0.010	0.0405	<0.0050	<0.010	0.148
Nitrite (as N)	mg/L	0.06	-	0.0281	<0.0020	<0.0050	<0.0020	<0.0020	-	<0.0010	<0.0020	0.0011	<0.0020	0.0013	<0.0010	<0.0020	<0.0050
Total Kjeldahl Nitrogen	mg/L	-	-	0.735	0.481	1.37	6.02	2.75	-	2.77	3.17	0.365	1.54	1.02	1.33	1.07	0.110
Sulfate (SO4)	mg/L	-	-	218	475	731	3.07	567	-	173	608	264	366	199	92.4	340	724
Sulphide as S	mg/L	-	-	<0.020	<0.020	<0.020	0.036	<0.020	-	0.118	<0.020	<0.020	0.063	0.031	0.040	0.057	<0.020
Field Sulphide	mg/L	-	-	-	-	0.71	0.03	0.03	-	0.05	0.04	-	0.07	-	0.1	0.28	0
Anion Sum	meq/L	-	-	9.52	14.7	20.7	17.6	15.2	-	5.58	14.6	9.34	10.7	6.30	3.41	11.0	20.8
Cation Sum	meq/L	-	-	11.9	15.7	21.8	19.6	17.9	-	6.64	19.7	9.41	15.7	13.0	3.98	13.1	21.1
Cation - Anion Balance	%	-	-	11.1	3.3	2.4	5.3	8.2	-	8.7	14.9	0.4	18.8	34.7	7.7	8.8	0.7
Cyanides																	
Cyanide, Total	mg/L	-	-	<0.0050	0.0062	<0.0050	<0.0050	0.0074	-	0.0101	0.011	<0.0050	<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	-	<0.0050	<0.010	<0.0050	<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	-	<0.0050	<0.010	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Thiocyanate (SCN)	mg/L	-	-	<0.50	<0.50	<0.50	0.58	<0.50	-	0.67	0.70	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Organic/Inorganic Carbon																	
Total Inorganic Carbon	mg/L	-	-	60.9	-	53.3	186	35.9	-	19.8	15.7	41.0	32.3	39.5	16.4	44.2	62.1
Total Organic Carbon	mg/L	-	-	11.7	8.87	15.0	66.5	15.3	-	28.3	35.8	9.28	10.9	10.2	26.9	8.04	3.55

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

		Site Location	Mill Complex			Brown McDade Pit												
		Sample ID	MW09-17	MW09-18	MW09-19	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
		Date Sampled	31/08/2015	31/08/2015	31/08/2015	31/08/2015	31/08/2015	31/08/2015	02/09/2015	02/09/2015	01/09/2015	02/09/2015	03/09/2015	01/09/2015	02/09/2015	02/09/2015	02/09/2015	31/08/2015
		ALS Work Number	L1667552	L1667552	L1667552	-	-	-	-	-	L1667552	-	-	L1667552	-	-	-	-
		Station Status	Good	Good	Good	Frozen	Dry	Insufficient Volume	Frozen	Frozen	Good	Frozen	Dry	Good	Frozen	Frozen	Frozen	Damaged
Parameter	Units	CCME-FAL [1, 2, 3, 4]																
Physical Tests																		
Lab pH	pH units	6.5-9.0 [5]	7.40	7.42	6.84	-	-	-	-	-	5.98	-	-	6.66	-	-	-	-
Field pH	pH units	6.5-9.0 [5]	6.85	6.89	6.73	-	-	-	-	-	5.89	-	-	6.34	-	-	-	-
Field Temperature	C	-	0.9	0.5	2.1	-	-	-	-	-	0.8	-	-	1.5	-	-	-	-
Lab Conductivity	uS/cm	-	2570	2540	2050	-	-	-	-	-	2840	-	-	760	-	-	-	-
Field Conductivity	uS/cm	-	1230	1200	1044	-	-	-	-	-	1568	-	-	407.6	-	-	-	-
Field Specific Conductivity	uS/cm	-	2279	2256	1858	-	-	-	-	-	2915	-	-	740	-	-	-	-
Total Hardness (as CaCO3)	mg/L	-	1850	1810	1370	-	-	-	-	-	1980	-	-	407	-	-	-	-
Field Dissolved Oxygen	mg/L	9.5 [6]	1.52	0.41	0.53	-	-	-	-	-	4.8	-	-	4.86	-	-	-	-
Field Oxidation - Redox Potent	mV	-	74	73.2	-47.7	-	-	-	-	-	164.5	-	-	170.9	-	-	-	-
Field Turbidity	NTU	-	0.61	17.1	1.2	-	-	-	-	-	1.82	-	-	>4000	-	-	-	-
Anions and Nutrients																		
Alkalinity, Total (CaCO3)	mg/L	-	446	458	438	-	-	-	-	-	65.5	-	-	70.9	-	-	-	-
Alkalinity, Total (CaCO3, filtered)	mg/L	-	462	459	444	-	-	-	-	-	66.7	-	-	68.2	-	-	-	-
Ammonia, Total (as N)	mg/L	Varies [7]	<0.0050	0.0237	4.04	-	-	-	-	-	0.0368	-	-	0.0326	-	-	-	-
Ammonia CCME-FAL [7]	mg/L	-	*30.24*	*28.52*	*36.07*	-	-	-	-	-	*278.0*	-	-	*93.04*	-	-	-	-
Chloride (Cl)	mg/L	-	<5.0	<5.0	<2.5	-	-	-	-	-	<5.0	-	-	<0.50	-	-	-	-
Fluoride (F)	mg/L	0.12	<0.20	<0.20	0.14	-	-	-	-	-	0.24	-	-	0.108	-	-	-	-
Nitrate (as N)	mg/L	13	0.395	<0.050	<0.025	-	-	-	-	-	<0.050	-	-	0.499	-	-	-	-
Nitrite (as N)	mg/L	0.06	<0.010	0.011	<0.0050	-	-	-	-	-	<0.010	-	-	0.0111	-	-	-	-
Total Kjeldahl Nitrogen	mg/L	-	0.098	0.123	5.25	-	-	-	-	-	0.119	-	-	0.484	-	-	-	-
Sulfate (SO4)	mg/L	-	1360	1270	910	-	-	-	-	-	1890	-	-	328	-	-	-	-
Sulphide as S	mg/L	-	<0.020	<0.020	0.176	-	-	-	-	-	<0.020	-	-	<0.020	-	-	-	-
Field Sulphide	mg/L	-	0.01	0.05	0.18	-	-	-	-	-	0.4	-	-	0.8	-	-	-	-
Anion Sum	meq/L	-	37.2	35.6	27.7	-	-	-	-	-	40.6	-	-	8.28	-	-	-	-
Cation Sum	meq/L	-	37.6	36.9	29.7	-	-	-	-	-	43.1	-	-	8.68	-	-	-	-
Cation - Anion Balance	%	-	0.5	1.8	3.5	-	-	-	-	-	3.0	-	-	2.4	-	-	-	-
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	0.57	-	-	-	-	-	<0.50	-	-	<0.50	-	-	-	-
Organic/Inorganic Carbon																		
Total Inorganic Carbon	mg/L	-	104	105	102	-	-	-	-	-	10.7	-	-	13.8	-	-	-	-
Total Organic Carbon	mg/L	-	2.83	2.98	24.8	-	-	-	-	-	2.33	-	-	7.0	-	-	-	-

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

		Site Location	Pony Creek					Seepage Dam			Tailings Facility						
		Sample ID	GSI-PC-03B	GSI-PC-04B	GSI-PC-05B	MP09-03	MP09-08	W14103083BH01	W14103083BH02	W14103083BH04	MP09-04	MP09-05	MP09-09	MP09-10	MP09-11	MP09-12	MP09-14
		Date Sampled	03/09/2015	03/09/2015	03/09/2015	03/09/2015	03/09/2015	02/09/2015	02/09/2015	02/09/2015	01/09/2015	01/09/2015	02/09/2015	02/09/2015	02/09/2015	02/09/2015	02/09/2015
		ALS Work Number	L1668494	L1668494	L1668494	L1668494	L1668494	-	L1668494	L1668494	L1667552	L1667552	L1668494	L1668494	L1668494	L1668494	L1668494
		Station Status	Poor Recharge	Poor Recharge	Good	Poor Recharge	Good	Frozen	Poor Recharge	Poor Recharge	Good	Good	Poor Recharge	Poor Recharge	Poor Recharge	Poor Recharge	Poor Recharge
Parameter	Units	CCME-FAL[1, 2, 3, 4]															
Physical Tests																	
Lab pH	pH units	6.5-9.0 [5]	-	7.31	7.28	-	7.42	-	8.17	8.21	8.09	7.37	8.69	8.02	7.41	-	-
Field pH	pH units	6.5-9.0 [5]	-	-	6.79	-	7	-	-	-	7.07	6.64	9.57	-	7.33	7.52	-
Field Temperature	C	-	-	-	2.5	-	1.1	-	-	-	1.8	3.1	4.5	-	4.8	5.7	-
Lab Conductivity	uS/cm	-	-	377	250	-	747	-	1110	1070	2660	2000	721	77.6	1040	-	-
Field Conductivity	uS/cm	-	-	-	133.7	-	418.3	-	-	-	544	1038	396.6	-	694	166.7	-
Field Specific Conductivity	uS/cm	-	-	-	234.3	-	771	-	-	-	979	1781	652	-	1131	263.6	-
Total Hardness (as CaCO3)	mg/L	-	275	323	128	56.2	436	-	738	643	1660	1190	307	35.9	557	534	493
Field Dissolved Oxygen	mg/L	9.5 [6]	-	-	0.57	-	2.76	-	-	-	0.73	0.33	6.16	-	0.18	5.14	-
Field Oxidation - Redox Potent	mV	-	-	-	213.1	-	20.8	-	-	-	61.2	27.6	77.5	-	-125.5	-9.6	-
Field Turbidity	NTU	-	-	-	29.7	-	2.38	-	7.14	-	0.57	1.64	41.3	>4000	2	-	-
Anions and Nutrients																	
Alkalinity, Total (CaCO3)	mg/L	-	-	145	64.6	-	242	-	216	185	94.4	268	67.0	37.4	564	-	-
Alkalinity, Total (CaCO3, filtered)	mg/L	-	-	-	-	-	249	-	221	-	193	279	-	-	580	-	-
Ammonia, Total (as N)	mg/L	Varies [7]	-	-	0.0112	-	0.0288	-	<0.0050	<0.0050	7.83	6.78	4.51	0.222	13.7	-	-
Ammonia CCME-FAL [7]	mg/L	-	-	-	*30.39*	-	*21.1*	-	-	-	*16.91*	*40.85*	*0.06177*	-	*7.273*	-	-
Chloride (Cl)	mg/L	-	-	0.83	<0.50	-	<0.50	-	<1.0	<1.0	<5.0	<2.5	2.64	<0.50	1.7	-	-
Fluoride (F)	mg/L	0.12	-	0.101	0.060	-	0.075	-	0.254	0.193	0.38	<0.10	1.70	0.169	0.467	-	-
Nitrate (as N)	mg/L	13	-	0.0511	0.0228	-	<0.0050	-	0.708	2.05	<0.050	1.89	<0.0050	0.0219	<0.010	-	-
Nitrite (as N)	mg/L	0.06	-	0.0011	0.0011	-	<0.0010	-	<0.0020	<0.0020	<0.010	0.0419	0.0031	0.330	<0.0020	-	-
Total Kjeldahl Nitrogen	mg/L	-	-	-	0.384	-	0.592	-	0.238	0.388	10.8	9.22	5.32	1.42	17.1	-	-
Sulfate (SO4)	mg/L	-	-	59.9	61.1	-	185	-	445	435	1800	996	272	5.56	46.8	-	-
Sulphide as S	mg/L	-	-	-	<0.020	-	0.320	-	<0.020	-	<0.020	<0.020	0.031	-	<0.020	-	-
Field Sulphide	mg/L	-	-	-	0.12	-	0.19	-	0.02	-	0	0.05	0.12	>.8	0.35	-	-
Anion Sum	meq/L	-	-	4.18	2.57	-	8.70	-	13.6	12.9	39.3	26.2	7.17	0.90	12.3	-	-
Cation Sum	meq/L	-	-	7.42	2.72	-	9.10	-	15.2	13.4	36.8	26.7	7.95	0.84	14.9	-	-
Cation - Anion Balance	%	-	-	27.9	2.9	-	2.2	-	5.5	1.8	-3.4	0.9	5.2	-3.2	9.6	-	-
Cyanides																	
Cyanide, Total	mg/L	-	<0.0050	-	<0.0050	-	<0.0050	-	<0.0050	<0.0050	<0.0050	0.0092	2.02	1.89	<0.0050	-	-
Cyanide, Free	mg/L	0.005	<0.0050	-	<0.0050	-	<0.0050	-	<0.0050	<0.0050	<0.0050	<0.0050	1.05	0.043	<0.0050	-	-
Cyanide, Weak Acid Diss	mg/L	-	<0.0050	-	<0.0050	-	<0.0050	-	<0.0050	<0.0050	<0.0050	<0.0050	1.13	0.051	<0.0050	-	-
Thiocyanate (SCN)	mg/L	-	-	-	<0.50	-	<0.50	-	<0.50	-	<0.50	<0.50	0.83	<0.50	0.74	-	-
Organic/Inorganic Carbon																	
Total Inorganic Carbon	mg/L	-	-	-	13.6	-	52.2	-	46.0	-	18.7	58.3	9.4	-	118	-	-
Total Organic Carbon	mg/L	-	-	-	12.3	-	11.0	-	5.29	5.40	6.39	16.4	28.6	7.39	42.4	-	-

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

		Site Location	Tailings Facility													
		Sample ID	MW09-01	MW09-02	MW09-03	MW09-04	MW09-05	MW09-06	MW09-07	MW09-08	MW09-11	MW09-20	MW09-21	MW09-22	MW09-23	MW09-24	W14103083BH03
		Date Sampled	01/09/2015	01/09/2015	01/09/2015	01/09/2015	02/09/2015	02/09/2015	02/09/2015	01/09/2015	02/09/2015	01/09/2015	01/09/2015	01/09/2015	01/09/2015	02/09/2015	02/09/2015
		ALS Work Number	L1667552	L1667552	L1667552	L1667552	-	L1668494	-	L1667552	-	-	L1667552	L1667552	L1667552	L1668494	L1668494
		Station Status	Poor Recharge	Good	Good	Good	Dry	Good	Insufficient Volume	Good	Dry	Dry	Good	Good	Good	Good	Good
Parameter	Units	CCME-FAL[1, 2, 3, 4]															
Physical Tests																	
Lab pH	pH units	6.5-9.0 [5]	7.75	6.42	7.78	7.60	-	7.92	-	6.53	-	-	6.62	6.26	7.10	7.82	6.58
Field pH	pH units	6.5-9.0 [5]	7	7.16	8.11	8.39	-	7.49	-	6.72	-	-	6.82	6.21	6.94	7.19	6.53
Field Temperature	C	-	2.2	3.1	2	2.7	-	5.3	-	3.3	-	-	2.9	1.2	0.4	0.5	2.9
Lab Conductivity	uS/cm	-	2880	2840	2540	1090	-	1730	-	288	-	-	2690	1600	1890	1130	597
Field Conductivity	uS/cm	-	1668	1636	1480	1578	-	969	-	209.9	-	-	1410	807	1051	543	448
Field Specific Conductivity	uS/cm	-	2951	2808	2644	2752	-	1552	-	358.9	-	-	2440	1479	1985	1022	776
Total Hardness (as CaCO3)	mg/L	-	1540	1480	1660	662	-	1040	-	137	-	-	1640	874	1150	747	280
Field Dissolved Oxygen	mg/L	9.5 [6]	0.32	0.12	0.14	0.13	-	2.22	-	0.3	-	-	0.29	0.78	2.51	5.56	0.19
Field Oxidation - Redox Potent	mV	-	50.3	-71.6	163.4	178.5	-	42.9	-	-65.7	-	-	-66.7	12.2	32.6	194.6	-57.1
Field Turbidity	NTU	-	-	7.74	1.27	1.55	-	6.63	-	4.38	-	-	9.06	13.6	1.04	64.2	15.5
Anions and Nutrients																	
Alkalinity, Total (CaCO3)	mg/L	-	320	35.7	113	181	-	147	-	119	-	-	221	131	297	353	193
Alkalinity, Total (CaCO3, filtered)	mg/L	-	336	29.6	114	96.2	-	152	-	123	-	-	223	141	299	379	<1.0
Ammonia, Total (as N)	mg/L	Varies [7]	19.1	12.3	3.46	<0.0050	-	1.04	-	2.34	-	-	11.5	1.60	3.17	0.0075	5.53
Ammonia CCME-FAL [7]	mg/L	-	*19.2*	*12.35*	*1.534*	*0.7695*	-	*4.838*	-	*33.43*	-	-	*27.44*	*128.7*	*25.64*	*14.30*	*53.49*
Chloride (Cl)	mg/L	-	<5.0	<5.0	<5.0	<1.0	-	<2.5	-	<0.50	-	-	<5.0	<2.5	<2.5	<1.0	0.81
Fluoride (F)	mg/L	0.12	0.26	0.53	0.34	0.049	-	0.33	-	<0.20	-	-	<0.20	<0.10	0.16	<0.040	<0.40
Nitrate (as N)	mg/L	13	<0.050	<0.050	0.822	2.74	-	0.128	-	<0.0050	-	-	0.071	<0.025	<0.025	2.74	<0.0050
Nitrite (as N)	mg/L	0.06	0.010	<0.010	0.089	0.0293	-	0.0110	-	<0.0010	-	-	0.017	<0.0050	<0.0050	0.0026	<0.0010
Total Kjeldahl Nitrogen	mg/L	-	22.2	16.5	3.82	0.385	-	1.58	-	3.24	-	-	18.7	3.49	4.47	0.663	6.64
Sulfate (SO4)	mg/L	-	1540	1700	1650	435	-	939	-	28.7	-	-	1510	847	905	310	124
Sulphide as S	mg/L	-	0.044	<0.020	<0.020	<0.020	-	<0.020	-	0.080	-	-	0.032	0.030	0.038	<0.020	0.097
Field Sulphide	mg/L	-	-	-	0.01	0.02	-	0.02	-	0.08	-	-	0.01	0.08	0.26	0.14	0.1
Anion Sum	meq/L	-	38.5	36.2	36.7	12.9	-	22.5	-	2.98	-	-	35.9	20.3	24.8	13.7	6.46
Cation Sum	meq/L	-	38.4	38.7	36.1	13.7	-	22.5	-	5.74	-	-	40.7	22.2	26.7	15.3	10.6
Cation - Anion Balance	%	-	-0.1	3.3	-0.9	3.0	-	0.0	-	31.6	-	-	6.2	4.5	3.7	5.5	24.4
Cyanides																	
Cyanide, Total	mg/L	-	0.0279	0.0977	0.0127	0.0057	-	<0.0050	-	<0.0050	-	-	0.0109	0.0171	0.0756	<0.0050	<0.0050
Cyanide, Free	mg/L	0.005	<0.0050	<0.0050	<0.0050	<0.0050	-	<0.0050	-	<0.0050	-	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Cyanide, Weak Acid Diss	mg/L	-	<0.0050	0.0135	<0.0050	<0.0050	-	<0.0050	-	<0.0050	-	-	0.0053	0.0068	<0.0050	<0.0050	<0.0050
Thiocyanate (SCN)	mg/L	-	18.8	0.89	<2.5	<0.50	-	<0.50	-	0.58	-	-	0.66	<0.50	<0.50	<0.50	0.53
Organic/Inorganic Carbon																	
Total Inorganic Carbon	mg/L	-	66.5	8.05	25.2	44.7	-	31.2	-	25.7	-	-	44.4	20.7	67.3	75.7	41.0
Total Organic Carbon	mg/L	-	20.5	6.14	7.23	6.66	-	6.26	-	22.6	-	-	26.5	14.5	19.0	11.1	29.2

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

		Site Location	Dome Creek									Mill Complex					
		Sample ID	GSI-DC-01B	GSI-DC-02B [14]	GSI-DC-03B	GSI-DC-05B	GSI-DC-06B	GSI-DC-07B	GSI-DC-08B	GSI-DC-09B	GSI-DC-10B	GSI-HA-01A [15]	GSI-HA-02A	GSI-HA-03A [16]	GSI-HA-04A	GSI-HA-05A	MW09-16
		Date Sampled	31/08/2015	31/08/2015	31/08/2015	01/09/2015	03/09/2015	03/09/2015	-	03/09/2015	03/09/2015	31/08/2015	31/08/2015	31/08/2015	31/08/2015	31/08/2015	31/08/2015
		ALS Work Number	L1667552	L1667552	L1667552	L1667552	L1668494	L1668494	-	L1668494	L1668494	L1667552	L1667552	L1667552	L1667552	L1667552	L1667552
		Station Status	Poor Recharge	Poor Recharge	Poor Recharge	Poor Recharge	Good	Good	Insuffcient Volume	Good	Good	Poor Recharge	Good	Poor Recharge	Good	Good	Good
Parameter	Units	CCME-FAL [1, 2, 3, 4]															
Dissolved Metals																	
Aluminum (Al)	mg/L	Varies [8]	-	0.0065	0.0031	0.0027	0.0174	0.0103	-	0.0670	0.166	0.0044	0.0392	0.0294	0.0516	0.0210	0.0011
Aluminum CCME-FAL [8]	mg/L	-	-	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	-	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*
Antimony (Sb)	mg/L	-	-	0.00042	0.00044	0.00035	0.00042	0.00014	-	0.00023	0.00033	0.00367	0.00015	0.00040	0.00048	0.00017	0.0610
Arsenic (As)	mg/L	0.005	-	0.0122	0.00677	0.00308	0.492	0.188	-	0.0595	0.102	0.00444	0.0844	0.0406	0.0328	0.103	0.00802
Barium (Ba)	mg/L	-	-	0.0930	0.0259	0.0341	0.177	0.235	-	0.0235	0.391	0.0854	0.243	0.0771	0.0516	0.0703	0.0132
Beryllium (Be)	mg/L	-	-	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	-	0.000033	<0.000040	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020	<0.000020
Bismuth (Bi)	mg/L	-	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	<0.000050	<0.00010	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron (B)	mg/L	1.5	-	<0.010	<0.010	0.017	0.012	0.023	-	0.014	<0.020	<0.010	<0.010	<0.010	<0.010	<0.010	0.169
Cadmium (Cd)	mg/L	Varies [9]	-	0.0000555	0.000561	0.0000427	<0.0000050	<0.0000050	-	<0.0000050	<0.000010	0.0000120	<0.0000050	0.0000335	0.0000133	<0.0000050	0.0210
Cadmium CCME-FAL [9]	*mg/L*	-	-	*0.00037*	*0.00037*	*0.00037*	*0.00037*	*0.00037*	-	*0.00032*	*0.00037*	*0.00037*	*0.00037*	*0.00037*	*0.00026*	*0.00037*	*0.00037*
Calcium (Ca)	mg/L	-	-	144	188	215	202	204	-	56.0	172	118	127	123	44.5	145	235
Chromium (Cr)	mg/L	-	-	0.00037	0.00315	0.00023	0.00170	0.00029	-	0.00107	0.00194	0.00096	0.00017	0.00426	0.00017	<0.00010	<0.00010
Cobalt (Co)	mg/L	-	-	0.00168	0.00270	0.00395	0.00206	0.00209	-	0.00147	0.0248	0.00022	<0.00010	0.00057	0.00026	<0.00010	<0.00010
Copper (Cu)	mg/L	Varies [10]	-	0.00252	0.00156	0.00084	0.00021	<0.00020	-	<0.00020	<0.00040	0.00574	<0.00020	0.00052	0.00031	<0.00020	0.00547
Copper CCME-FAL [10]	mg/L	-	-	*0.004*	*0.004*	*0.004*	*0.004*	*0.004*	-	*0.004*	*0.004*	*0.004*	*0.004*	*0.004*	*0.00389*	*0.004*	*0.004*
Iron (Fe)	mg/L	0.3	-	7.57	0.404	0.903	27.4	41.7	-	15.2	90.8	0.510	83.4	49.5	4.28	29.1	<0.010
Lead (Pb)	mg/L	Varies [11]	-	<0.000050	0.000108	0.000100	<0.000050	<0.000050	-	0.000067	0.00013	<0.000050	<0.000050	0.000144	0.000102	<0.000050	0.00503
Lead CCME-FAL [11]	mg/L	-	-	*0.007*	*0.007*	*0.007*	*0.007*	*0.007*	-	*0.007*	*0.007*	*0.007*	*0.007*	*0.007*	*0.00668*	*0.007*	*0.007*
Lithium (Li)	mg/L	-	-	0.0028	0.0059	0.0035	<0.0010	0.0018	-	<0.0010	<0.0020	0.0050	<0.0010	<0.0010	0.0014	0.0029	0.0098
Magnesium (Mg)	mg/L	-	-	48.1	70.7	122	82.7	54.5	-	23.4	51.7	38.6	51.7	46.4	16.6	46.3	106
Manganese (Mn)	mg/L	-	-	1.90	2.66	4.98	3.72	3.33	-	0.706	15.5	0.0657	5.56	3.86	0.452	3.30	0.00857
Mercury (Hg)	mg/L	0.000026	0.0000081	<0.0000050	<0.0000050	<0.0000050	0.0000117	0.0000094	-	0.0000166	0.0000131	0.0000087	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)	mg/L	0.073	-	0.00249	0.00654	0.00181	0.00249	0.000309	-	0.000296	0.00100	0.000765	<0.000050	0.00190	0.000235	0.000113	0.000073
Nickel (Ni)	mg/L	Varies [12]	-	0.0114	0.0348	0.0169	0.00385	0.00081	-	0.00083	0.0065	0.00449	<0.00050	0.0115	<0.00050	<0.00050	0.00329
Nickel CCME-FAL [12]	mg/L	-	-	*0.15*	*0.15*	*0.15*	*0.15*	*0.15*	-	*0.15*	*0.15*	*0.15*	*0.15*	*0.15*	*0.149*	*0.15*	*0.15*
Phosphorus (P)	mg/L	-	-	<0.050	<0.050	<0.050	0.301	0.095	-	0.175	<0.050	<0.050	<0.050	0.067	<0.050	0.168	<0.050
Potassium (K)	mg/L	-	-	3.60	3.32	3.90	4.26	3.68	-	2.17	3.19	4.87	3.46	1.95	0.95	2.57	5.97
Selenium (Se)	mg/L	0.001	-	0.000054	0.000064	0.000086	0.000532	0.000131	-	0.000174	0.00025	<0.000050	0.000064	<0.000050	0.000072	0.000053	0.000076
Silicon (Si)	mg/L	-	-	7.47	7.82	8.75	8.89	8.85	-	7.48	8.04	5.64	8.54	7.92	8.45	8.07	5.65
Silver (Ag)	mg/L	0.0001	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000020	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000013
Sodium (Na)	mg/L	-	-	4.41	5.76	13.1	19.4	15.7	-	20.4	28.6	4.20	5.11	4.72	2.52	5.47	7.91
Strontium (Sr)	mg/L	-	-	0.293	0.427	0.706	0.988	0.667	-	0.175	0.639	0.245	0.390	0.354	0.116	0.368	0.501
Sulfur (S)	mg/L	-	-	88.4	164	250	8.55	196	-	61.3	214	78.3	125	111	33.4	115	236
Thallium (Tl)	mg/L	0.0008	-	<0.000010	0.000013	0.000014	<0.000010	<0.000010	-	<0.000010	<0.000020	0.000022	<0.000010	<0.000010	<0.000010	<0.000010	0.000239
Tin (Sn)	mg/L	-	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00020	<0.00010	<0.00010	0.00015	<0.00010	<0.00010	<0.00010
Titanium (Ti)	mg/L	-	-	<0.00030	<0.00030	<0.00030	0.00298	<0.0012	-	0.00429	0.00194	<0.00030	0.00150	0.00124	0.00143	0.00084	<0.00030
Uranium (U)	mg/L	0.015	-	0.00141	0.00129	0.00314	0.000199	0.000051	-	0.000172	0.000574	0.000969	0.000016	0.000036	0.000048	0.000043	0.00222
Vanadium (V)	mg/L	-	-	<0.00050	<0.00050	<0.00050	0.00784	0.00135	-	0.00609	0.0126	<0.00050	<0.00050	0.00060	0.00095	0.00054	<0.00050
Zinc (Zn)	mg/L	0.03	-	0.0087	0.0589	0.0101	0.0019	0.0010	-	0.0019	0.0104	0.0046	0.0021	0.0175	0.0022	0.0016	3.19
Zirconium (Zr)	mg/L	-	-	<0.00030	<0.00030	<0.00030	0.00225	0.00035	-	0.00071	0.00135	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030

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

		Site Location	Mill Complex			Brown McDade Pit												
		Sample ID	MW09-17	MW09-18	MW09-19	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
		Date Sampled	31/08/2015	31/08/2015	31/08/2015	31/08/2015	31/08/2015	31/08/2015	02/09/2015	02/09/2015	01/09/2015	02/09/2015	03/09/2015	01/09/2015	02/09/2015	02/09/2015	02/09/2015	31/08/2015
		ALS Work Number	L1667552	L1667552	L1667552	-	-	-	-	-	L1667552	-	-	L1667552	-	-	-	-
		Station Status	Good	Good	Good	Frozen	Dry	Insufficient Volume	Frozen	Frozen	Good	Frozen	Dry	Good	Frozen	Frozen	Frozen	Damaged
Parameter	Units	CCME-FAL [1, 2, 3, 4]																
Dissolved Metals																		
Aluminum (Al)	mg/L	Varies [8]	<0.0020	<0.0020	0.0110	-	-	-	-	-	0.0717	-	-	0.0048	-	-	-	-
Aluminum CCME-FAL [8]	mg/L	-	*0.1*	*0.1*	*0.1*	-	-	-	-	-	*0.005*	-	-	*0.005*	-	-	-	-
Antimony (Sb)	mg/L	-	0.00035	0.00031	0.00021	-	-	-	-	-	<0.00050	-	-	<0.00010	-	-	-	-
Arsenic (As)	mg/L	0.005	0.0193	0.0517	0.121	-	-	-	-	-	0.00400	-	-	<0.00010	-	-	-	-
Barium (Ba)	mg/L	-	0.00752	0.00843	0.0450	-	-	-	-	-	0.00547	-	-	0.0117	-	-	-	-
Beryllium (Be)	mg/L	-	<0.000040	<0.000040	<0.000020	-	-	-	-	-	0.00012	-	-	<0.000020	-	-	-	-
Bismuth (Bi)	mg/L	-	<0.00010	<0.00010	<0.000050	-	-	-	-	-	<0.00025	-	-	<0.000050	-	-	-	-
Boron (B)	mg/L	1.5	0.093	<0.020	0.150	-	-	-	-	-	<0.050	-	-	<0.010	-	-	-	-
Cadmium (Cd)	mg/L	Varies [9]	0.000013	0.000049	<0.0000050	-	-	-	-	-	0.330	-	-	0.330	-	-	-	-
Cadmium CCME-FAL [9]	*mg/L*	-	*0.00037*	*0.00037*	*0.00037*	-	-	-	-	-	*0.00037*	-	-	*0.00037*	-	-	-	-
Calcium (Ca)	mg/L	-	323	335	299	-	-	-	-	-	461	-	-	125	-	-	-	-
Chromium (Cr)	mg/L	-	<0.00020	<0.00020	0.00015	-	-	-	-	-	<0.00050	-	-	<0.00010	-	-	-	-
Cobalt (Co)	mg/L	-	<0.00020	<0.00020	0.00189	-	-	-	-	-	0.0392	-	-	0.00286	-	-	-	-
Copper (Cu)	mg/L	Varies [10]	0.00064	<0.00040	<0.00020	-	-	-	-	-	0.0993	-	-	0.00560	-	-	-	-
Copper CCME-FAL [10]	mg/L	-	*0.004*	*0.004*	*0.004*	-	-	-	-	-	*0.004*	-	-	*0.004*	-	-	-	-
Iron (Fe)	mg/L	0.3	<0.010	0.068	17.6	-	-	-	-	-	14.7	-	-	1.34	-	-	-	-
Lead (Pb)	mg/L	Varies [11]	<0.00010	<0.00010	<0.000050	-	-	-	-	-	0.00632	-	-	0.000103	-	-	-	-
Lead CCME-FAL [11]	mg/L	-	*0.007*	*0.007*	*0.007*	-	-	-	-	-	*0.007*	-	-	*0.007*	-	-	-	-
Lithium (Li)	mg/L	-	0.0187	0.0185	0.0115	-	-	-	-	-	0.0416	-	-	0.0106	-	-	-	-
Magnesium (Mg)	mg/L	-	253	237	152	-	-	-	-	-	202	-	-	23.0	-	-	-	-
Manganese (Mn)	mg/L	-	<0.00020	0.575	5.40	-	-	-	-	-	34.3	-	-	1.36	-	-	-	-
Mercury (Hg)	mg/L	0.000026	<0.0000050	<0.0000050	<0.0000050	-	-	-	-	-	<0.0000050	-	-	<0.0000050	-	-	-	-
Molybdenum (Mo)	mg/L	0.073	<0.00010	<0.00010	0.000143	-	-	-	-	-	<0.00025	-	-	0.000161	-	-	-	-
Nickel (Ni)	mg/L	Varies [12]	<0.0010	<0.0010	0.00162	-	-	-	-	-	0.0148	-	-	0.0103	-	-	-	-
Nickel CCME-FAL [12]	mg/L	-	*0.15*	*0.15*	*0.15*	-	-	-	-	-	*0.15*	-	-	*0.15*	-	-	-	-
Phosphorus (P)	mg/L	-	<0.050	<0.050	0.172	-	-	-	-	-	<0.050	-	-	<0.050	-	-	-	-
Potassium (K)	mg/L	-	7.12	7.05	8.45	-	-	-	-	-	5.06	-	-	1.68	-	-	-	-
Selenium (Se)	mg/L	0.001	0.00014	0.00017	0.00108	-	-	-	-	-	<0.00025	-	-	0.000134	-	-	-	-
Silicon (Si)	mg/L	-	5.32	5.15	10.0	-	-	-	-	-	7.79	-	-	2.24	-	-	-	-
Silver (Ag)	mg/L	0.0001	<0.000020	<0.000020	<0.000010	-	-	-	-	-	<0.000050	-	-	<0.000010	-	-	-	-
Sodium (Na)	mg/L	-	11.9	11.0	14.5	-	-	-	-	-	8.17	-	-	5.67	-	-	-	-
Strontium (Sr)	mg/L	-	0.969	0.889	1.01	-	-	-	-	-	0.543	-	-	0.152	-	-	-	-
Sulfur (S)	mg/L	-	437	434	303	-	-	-	-	-	682	-	-	113	-	-	-	-
Thallium (Tl)	mg/L	0.0008	0.000088	0.000248	<0.000010	-	-	-	-	-	0.000520	-	-	0.000120	-	-	-	-
Tin (Sn)	mg/L	-	<0.00020	<0.00020	<0.00010	-	-	-	-	-	<0.00050	-	-	<0.00010	-	-	-	-
Titanium (Ti)	mg/L	-	<0.00060	<0.00060	<0.0018	-	-	-	-	-	<0.0015	-	-	<0.00030	-	-	-	-
Uranium (U)	mg/L	0.015	0.00676	0.00628	0.000523	-	-	-	-	-	0.000671	-	-	0.000041	-	-	-	-
Vanadium (V)	mg/L	-	<0.0010	<0.0010	0.00090	-	-	-	-	-	<0.0025	-	-	<0.00050	-	-	-	-
Zinc (Zn)	mg/L	0.03	<0.0020	0.0022	0.0019	-	-	-	-	-	31.1	-	-	4.53	-	-	-	-
Zirconium (Zr)	mg/L	-	<0.00060	<0.00060	0.00035	-	-	-	-	-	<0.0015	-	-	<0.00030	-	-	-	-

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

		Site Location	Pony Creek					Seepage Dam			Tailings Facility						
		Sample ID	GSI-PC-03B	GSI-PC-04B	GSI-PC-05B	MP09-03	MP09-08	W14103083BH01	W14103083BH02	W14103083BH04	MP09-04	MP09-05	MP09-09	MP09-10	MP09-11	MP09-12	MP09-14
		Date Sampled	03/09/2015	03/09/2015	03/09/2015	03/09/2015	03/09/2015	02/09/2015	02/09/2015	02/09/2015	01/09/2015	01/09/2015	02/09/2015	02/09/2015	02/09/2015	02/09/2015	02/09/2015
		ALS Work Number	L1668494	L1668494	L1668494	L1668494	L1668494	-	L1668494	L1668494	L1667552	L1667552	L1668494	L1668494	L1668494	L1668494	L1668494
		Station Status	Poor Recharge	Poor Recharge	Good	Poor Recharge	Good	Frozen	Poor Recharge	Poor Recharge	Good	Good	Poor Recharge	Poor Recharge	Poor Recharge	Poor Recharge	Poor Recharge
Parameter	Units	CCME-FAL[1, 2, 3, 4]															
Dissolved Metals																	
Aluminum (Al)	mg/L	Varies [8]	0.0071	0.0452	0.0177	0.0146	0.0049	-	0.0021	0.0032	0.0098	0.0123	0.0057	0.0317	0.0076	0.0061	0.0031
Aluminum CCME-FAL [8]	mg/L	-	-	*0.1*	*0.1*	-	*0.1*	-	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	*0.1*	-
Antimony (Sb)	mg/L	-	0.00334	0.00082	0.00081	0.00101	0.00282	-	0.00019	0.00018	0.317	0.00033	0.0765	0.0424	0.0202	0.0427	0.00553
Arsenic (As)	mg/L	0.005	0.00274	0.0107	0.00230	0.00631	0.0328	-	0.00361	0.00353	3.38	0.00861	14.2	1.82	13.9	6.62	3.94
Barium (Ba)	mg/L	-	0.151	0.158	0.0274	0.0323	0.0632	-	0.117	0.129	0.00847	0.0535	0.00064	0.00466	0.286	0.0217	0.117
Beryllium (Be)	mg/L	-	<0.000020	<0.000020	<0.000020	<0.000020	0.000021	-	<0.000020	<0.000020	<0.000040	<0.000040	<0.000040	<0.000020	<0.000040	<0.000020	<0.000020
Bismuth (Bi)	mg/L	-	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	<0.000050	<0.000050	<0.00010	<0.00010	<0.00010	0.000113	<0.00010	<0.000050	<0.000050
Boron (B)	mg/L	1.5	<0.010	<0.010	<0.010	<0.010	<0.010	-	0.020	0.015	0.245	0.093	0.196	0.045	0.036	0.131	0.065
Cadmium (Cd)	mg/L	Varies [9]	0.000231	0.0000160	0.000132	0.0000873	<0.0000050	-	0.000345	0.00143	0.000039	0.000248	0.000950	0.000386	0.000506	0.000489	0.0000896
Cadmium CCME-FAL [9]	*mg/L*	-	*0.00037*	*0.00037*	*0.00019*	*0.000098*	*0.00037*	-	*0.00037*	*0.00037*	*0.00037*	*0.00037*	*0.00037*	*0.000068*	*0.00037*	*0.00037*	*0.00037*
Calcium (Ca)	mg/L	-	75.2	93.7	36.8	15.6	121	-	193	169	474	363	122	13.9	124	137	160
Chromium (Cr)	mg/L	-	0.00166	0.0184	0.00013	0.00047	<0.00010	-	0.00021	0.00014	<0.00020	<0.00020	<0.00020	0.00047	0.00139	0.00019	0.00056
Cobalt (Co)	mg/L	-	0.00051	0.00244	<0.00010	0.00082	0.00050	-	<0.00010	<0.00010	0.00128	0.0162	0.0456	0.00241	0.00177	0.00253	0.00118
Copper (Cu)	mg/L	Varies [10]	0.0145	0.00337	0.00200	0.00093	<0.00020	-	0.00220	0.00274	<0.00040	0.00254	0.327	0.0507	0.00044	0.00045	0.00047
Copper CCME-FAL [10]	mg/L	-	*0.004*	*0.004*	*0.00292*	*0.02*	*0.004*	-	*0.004*	*0.004*	*0.004*	*0.004*	*0.004*	*0.02*	*0.004*	*0.004*	*0.004*
Iron (Fe)	mg/L	0.3	0.085	9.79	0.018	1.48	0.519	-	<0.010	<0.010	0.011	3.03	0.213	0.328	30.6	4.19	4.12
Lead (Pb)	mg/L	Varies [11]	0.000408	0.000254	0.000105	0.000576	<0.000050	-	<0.000050	0.000053	0.00021	<0.00010	0.00037	0.0192	0.0379	0.00408	0.000441
Lead CCME-FAL [11]	mg/L	-	*0.007*	*0.007*	*0.00436*	*0.001*	*0.007*	-	*0.007*	*0.007*	*0.007*	*0.007*	*0.007*	*0.001*	*0.007*	*0.007*	*0.007*
Lithium (Li)	mg/L	-	<0.0010	0.0013	<0.0010	<0.0010	0.0042	-	0.0012	0.0012	0.0126	<0.0020	<0.0020	<0.0010	0.0030	0.0043	0.0124
Magnesium (Mg)	mg/L	-	21.1	21.6	8.87	4.23	32.4	-	62.0	53.8	115	69.8	0.78	0.28	59.9	46.9	22.8
Manganese (Mn)	mg/L	-	1.05	2.71	0.0205	0.325	1.00	-	0.0110	0.00272	6.91	6.99	0.0196	0.0691	3.44	4.38	0.344
Mercury (Hg)	mg/L	0.000026	<0.0000050	0.0000095	0.0000086	<0.0000050	<0.0000050	-	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000697	0.0000293	0.0000122	0.0000105	0.0000092
Molybdenum (Mo)	mg/L	0.073	0.00339	0.00201	0.000186	0.000392	0.00301	-	0.00125	0.000843	0.00768	0.00037	0.0200	0.000840	0.00408	0.00690	0.00876
Nickel (Ni)	mg/L	Varies [12]	0.0190	0.0236	0.00062	0.00414	0.00131	-	0.00064	0.00078	<0.0010	0.0026	0.0178	0.00238	0.0054	0.00774	0.0169
Nickel CCME-FAL [12]	mg/L	-	*0.15*	*0.15*	*0.115*	*0.025*	*0.15*	-	*0.15*	*0.15*	*0.15*	*0.15*	*0.15*	*0.025*	*0.15*	*0.15*	*0.15*
Phosphorus (P)	mg/L	-	<0.050	0.090	<0.050	<0.050	<0.050	-	<0.050	<0.050	0.089	<0.050	0.191	0.171	0.116	0.054	<0.050
Potassium (K)	mg/L	-	1.05	1.61	0.55	1.43	1.15	-	3.69	2.98	41.5	9.13	10.4	0.99	13.3	7.15	48.9
Selenium (Se)	mg/L	0.001	<0.000050	0.000051	<0.000050	<0.000050	0.000066	-	0.000830	0.00249	<0.00010	0.00014	0.00187	0.000558	0.00029	0.000096	0.000122
Silicon (Si)	mg/L	-	6.80	10.2	6.06	1.19	7.37	-	5.30	4.98	15.3	4.79	6.72	2.28	10.6	13.2	3.03
Silver (Ag)	mg/L	0.0001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000020	<0.000020	0.0110	0.000491	<0.000020	<0.000010	<0.000010
Sodium (Na)	mg/L	-	5.28	6.93	3.07	1.68	7.00	-	8.91	10.4	40.6	38.6	27.5	1.32	16.4	3.93	22.6
Strontium (Sr)	mg/L	-	0.460	0.513	0.249	0.0928	1.20	-	0.776	0.736	1.28	0.983	0.173	0.0242	1.04	0.517	0.664
Sulfur (S)	mg/L	-	34.4	32.7	21.5	3.89	65.5	-	171	151	574	335	155	2.51	16.8	47.9	137
Thallium (Tl)	mg/L	0.0008	0.000026	<0.000010	0.000011	<0.000010	<0.000010	-	<0.000010	<0.000010	0.000089	0.000058	0.000043	0.000019	0.000289	0.000182	<0.000010
Tin (Sn)	mg/L	-	<0.00010	0.00016	<0.00010	0.00012	<0.00010	-	<0.00010	<0.00010	<0.00020	<0.00020	<0.00020	0.00026	<0.00020	<0.00010	0.00013
Titanium (Ti)	mg/L	-	<0.00030	0.00143	0.00057	0.00067	0.00059	-	<0.00030	<0.00030	<0.00060	<0.00060	<0.00060	<0.00030	0.00174	0.00031	<0.00030
Uranium (U)	mg/L	0.015	0.000166	0.000075	0.000069	0.000044	0.00481	-	0.00513	0.00933	0.000235	0.00137	0.000825	0.000164	0.000424	0.00127	0.000247
Vanadium (V)	mg/L	-	<0.00050	0.00156	0.00067	<0.00050	0.00162	-	0.00093	0.00068	<0.0010	<0.0010	<0.0010	<0.00050	0.0063	0.00064	<0.00050
Zinc (Zn)	mg/L	0.03	0.0182	0.0092	0.0046	0.0285	<0.0010	-	0.0013	0.0037	0.471	0.0175	0.0125	0.0124	0.0670	0.0472	0.0126
Zirconium (Zr)	mg/L	-	<0.00030	0.00031	<0.00030	<0.00030	<0.00030	-	<0.00030	<0.00030	<0.00060	<0.00060	<0.00060	<0.00030	0.00231	0.00030	<0.00030

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

		Site Location	Tailings Facility													
		Sample ID	MW09-01	MW09-02	MW09-03	MW09-04	MW09-05	MW09-06	MW09-07	MW09-08	MW09-11	MW09-20	MW09-21	MW09-22	MW09-23	MW09-24	W14103083BH03
		Date Sampled	01/09/2015	01/09/2015	01/09/2015	01/09/2015	02/09/2015	02/09/2015	02/09/2015	01/09/2015	02/09/2015	01/09/2015	01/09/2015	01/09/2015	01/09/2015	02/09/2015	02/09/2015
		ALS Work Number	L1667552	L1667552	L1667552	L1667552	-	L1668494	-	L1667552	-	-	L1667552	L1667552	L1667552	L1668494	L1668494
		Station Status	Poor Recharge	Good	Good	Good	Dry	Good	Insufficient Volume	Good	Dry	Dry	Good	Good	Good	Good	Good
Parameter	Units	CCME-FAL[1, 2, 3, 4]															
Dissolved Metals																	
Aluminum (Al)	mg/L	Varies [8]	0.0178	0.0230	0.0168	0.0017	-	0.0046	-	0.0921	-	-	0.0774	0.0421	0.0238	0.0021	0.0727
Aluminum CCME-FAL [8]	mg/L	-	*0.1*	*0.1*	*0.1*	*0.1*	-	*0.1*	-	*0.1*	-	-	*0.1*	*0.005*	*0.1*	*0.1*	*0.1*
Antimony (Sb)	mg/L	-	0.0217	0.00377	0.420	0.00146	-	0.299	-	0.00020	-	-	0.00039	0.00016	0.00027	0.00018	0.00031
Arsenic (As)	mg/L	0.005	0.343	18.0	2.11	0.00087	-	0.131	-	0.0869	-	-	0.105	0.00674	0.0261	0.00183	0.0576
Barium (Ba)	mg/L	-	0.0202	0.00664	0.0224	0.0747	-	0.00694	-	0.143	-	-	0.215	0.0488	0.0556	0.0938	0.280
Beryllium (Be)	mg/L	-	<0.00010	<0.00010	<0.000040	<0.000020	-	<0.000040	-	0.000020	-	-	<0.000040	<0.000020	<0.000040	<0.000020	0.000025
Bismuth (Bi)	mg/L	-	<0.00025	<0.00025	<0.00010	<0.000050	-	<0.00010	-	<0.000050	-	-	<0.00010	<0.000050	<0.00010	<0.000050	<0.000050
Boron (B)	mg/L	1.5	0.094	0.057	0.200	0.013	-	0.137	-	<0.010	-	-	0.059	0.028	0.070	0.012	0.011
Cadmium (Cd)	mg/L	Varies [9]	0.00316	0.000439	0.000932	0.0000630	-	0.00581	-	<0.0000050	-	-	0.000035	0.0000964	0.000021	0.0000683	0.0000490
Cadmium CCME-FAL [9]	*mg/L*	-	*0.00037*	*0.00037*	*0.00037*	*0.00037*	-	*0.00037*	-	*0.00021*	-	-	*0.00037*	*0.00037*	*0.00037*	*0.00037*	*0.00037*
Calcium (Ca)	mg/L	-	513	469	491	160	-	333	-	40.7	-	-	497	303	291	209	74.6
Chromium (Cr)	mg/L	-	<0.00050	<0.00050	<0.00020	0.00023	-	<0.00020	-	0.00137	-	-	0.00068	0.00045	<0.00020	0.00026	0.00076
Cobalt (Co)	mg/L	-	0.0278	0.0110	0.00192	0.00018	-	0.00148	-	0.00140	-	-	0.0252	0.0138	0.0149	<0.00010	0.00077
Copper (Cu)	mg/L	Varies [10]	0.0041	<0.0010	0.00070	0.00277	-	0.00689	-	<0.00020	-	-	0.00076	0.00108	<0.00040	0.00811	<0.00020
Copper CCME-FAL [10]	mg/L	-	*0.004*	*0.004*	*0.004*	*0.004*	-	*0.004*	-	*0.00309*	-	-	*0.004*	*0.004*	*0.004*	*0.004*	*0.004*
Iron (Fe)	mg/L	0.3	1.99	44.2	0.039	<0.010	-	<0.010	-	47.5	-	-	66.0	46.2	23.5	<0.010	77.3
Lead (Pb)	mg/L	Varies [11]	0.00541	<0.00025	0.00015	<0.000050	-	0.00018	-	0.000055	-	-	<0.00010	<0.000050	<0.00010	<0.000050	0.000064
Lead CCME-FAL [11]	mg/L	-	*0.007*	*0.007*	*0.007*	*0.007*	-	*0.007*	-	*0.00475*	-	-	*0.007*	*0.007*	*0.007*	*0.007*	*0.007*
Lithium (Li)	mg/L	-	0.0080	0.0247	0.0022	<0.0010	-	0.0111	-	<0.0010	-	-	<0.0020	0.0014	<0.0020	0.0012	<0.0010
Magnesium (Mg)	mg/L	-	63.6	74.4	105	63.8	-	50.1	-	8.65	-	-	96.5	28.8	103	54.7	22.7
Manganese (Mn)	mg/L	-	22.2	32.5	17.9	0.00146	-	4.34	-	3.42	-	-	6.91	8.22	17.9	0.00108	2.03
Mercury (Hg)	mg/L	0.000026	0.0000059	<0.0000050	<0.0000050	<0.0000050	-	0.0000095	-	<0.0000050	-	-	<0.0000050	<0.0000050	<0.0000050	0.0000102	0.0000079
Molybdenum (Mo)	mg/L	0.073	0.00301	0.00461	0.00518	0.000165	-	0.00518	-	<0.000050	-	-	0.00043	0.000174	0.00230	0.000377	0.000135
Nickel (Ni)	mg/L	Varies [12]	0.0087	0.0029	<0.0010	<0.00050	-	0.0027	-	<0.00050	-	-	0.0022	0.00276	0.0017	0.00055	0.00064
Nickel CCME-FAL [12]	mg/L	-	*0.15*	*0.15*	*0.15*	*0.15*	-	*0.15*	-	*0.121*	-	-	*0.15*	*0.15*	*0.15*	*0.15*	*0.15*
Phosphorus (P)	mg/L	-	<0.050	<0.050	0.076	<0.050	-	<0.050	-	0.109	-	-	<0.050	<0.050	<0.050	<0.050	0.242
Potassium (K)	mg/L	-	15.6	78.8	28.2	1.77	-	18.5	-	1.51	-	-	15.1	4.47	8.09	1.66	1.52
Selenium (Se)	mg/L	0.001	<0.00025	<0.00025	<0.00010	0.000692	-	<0.00010	-	0.000435	-	-	0.00024	0.000323	0.00011	0.000354	0.000196
Silicon (Si)	mg/L	-	7.29	6.97	12.3	6.37	-	8.11	-	10.0	-	-	5.99	4.96	6.99	6.18	10.8
Silver (Ag)	mg/L	0.0001	0.000093	<0.000050	<0.000020	<0.000010	-	0.000043	-	<0.000010	-	-	<0.000020	0.000016	<0.000020	<0.000010	<0.000010
Sodium (Na)	mg/L	-	110	61.1	29.6	9.05	-	24.1	-	2.43	-	-	67.4	39.0	31.3	7.87	8.40
Strontium (Sr)	mg/L	-	1.10	0.924	1.31	0.527	-	0.698	-	0.172	-	-	1.39	0.885	0.784	0.681	0.268
Sulfur (S)	mg/L	-	510	602	556	146	-	315	-	12.8	-	-	527	284	308	117	42.1
Thallium (Tl)	mg/L	0.0008	0.000364	0.000196	0.000034	<0.000010	-	0.000333	-	<0.000010	-	-	<0.000020	<0.000010	<0.000020	<0.000010	<0.000010
Tin (Sn)	mg/L	-	<0.00050	<0.00050	<0.00020	<0.00010	-	<0.00020	-	<0.00010	-	-	<0.00020	<0.00010	<0.00020	<0.00010	<0.00010
Titanium (Ti)	mg/L	-	<0.0015	<0.0015	<0.00060	<0.00030	-	<0.00060	-	0.00437	-	-	<0.0045	<0.0018	<0.0015	<0.00030	0.00249
Uranium (U)	mg/L	0.015	0.00241	0.000573	0.00129	0.00152	-	0.00162	-	0.000093	-	-	0.000748	0.000592	0.00193	0.00790	0.000116
Vanadium (V)	mg/L	-	<0.0025	<0.0025	<0.0010	<0.00050	-	<0.0010	-	0.00406	-	-	0.0050	0.00125	0.0021	<0.00050	0.00212
Zinc (Zn)	mg/L	0.03	2.67	0.230	0.0029	0.0042	-	0.110	-	<0.0010	-	-	0.0054	0.0022	0.118	0.0016	0.0047
Zirconium (Zr)	mg/L	-	<0.0015	<0.0015	<0.00060	<0.00030	-	<0.00060	-	0.00087	-	-	0.00148	0.00047	0.00078	<0.00030	0.00047

Table B: QA/QC Analtical Data

		Site Location	GSI-DC-06B			MW09-16				MP09-08			
		Sample ID	MW15-500	GSI-DC-06B		FB15-100	MW15-100	MW09-16		FB15-400	MW15-400	MP09-08	
		Date Sampled	03/09/2015	03/09/2015		31/08/2015	31/08/2015	31/08/2015		03/09/2015	03/09/2015 0:00	03/09/2015	
		ALS Work Number	L1668494	L1668494	*RPD (%)* [13]	L1667552	L1667552	L1667552	*RPD (%)* [13]	L1668494	L1668494	L1668494	*RPD (%)* [13]
		Station Status	Good	Good		Good	Good	Good		Good	Good	Good	
Parameter	Units	CCME-FAL [1, 2, 3, 4]											
Physical Tests													
Lab pH	pH units	6.5-9.0 [5]	7.55	7.55	0.00	5.48	7.35	7.08	3.74	6.07	7.51	7.42	1.21
Field pH	pH units	6.5-9.0 [5]	7.4	7.4	-	-	6.54	6.54	-	-	7	7	-
Field Temperature	C	-	2.9	2.9	-	-	4.5	4.5	-	-	1.1	1.1	-
Lab Conductivity	uS/cm	-	1360	1390	2.18	<2.0	1600	1580	1.26	<2.0	750	747	0.40
Field Conductivity	uS/cm	-	845	845	-	-	977	977	-	-	418.3	418.3	-
Field Specific Conductivity	uS/cm	-	1457	1457	-	-	1605	1605	-	-	771	771	-
Total Hardness (as CaCO3)	mg/L	-	856	844	1.41	<0.50	1030	1020	0.98	<0.50	436	436	0.00
Field Dissolved Oxygen	mg/L	9.5 [6]	0.16	0.16	-	-	2.5	2.5	-	-	2.76	2.76	-
Field Oxidation - Redox Potent	mV	-	-127.4	-127.4	-	-	298.9	298.9	-	-	20.8	20.8	-
Field Turbidity	NTU	-	18	18	-	-	1.79	1.79	-	-	2.38	2.38	-
Anions and Nutrients													
Alkalinity, Total (CaCO3)	mg/L	-	850	868	2.10	<1.0	286	284	0.70	<1.0	246	242	1.64
Alkalinity, Total (CaCO3, filtered)	mg/L	-	766	768	0.26	<1.0	281	284	1.06	<1.0	248	249	0.40
Ammonia, Total (as N)	mg/L	Varies [7]	2.70	2.78	2.92	<0.0050	<0.0050	<0.0050	nc	<0.0050	0.0302	0.0288	4.75
Ammonia CCME-FAL [7]	mg/L	-	*7.23*	*7.23*	-	-	*45.85*	*45.85*	-	-	*21.1*	*21.1*	-
Chloride (Cl)	mg/L	-	7.2	7.3	1.38	<0.50	<2.5	<2.5	nc	<0.50	<0.50	<0.50	nc
Fluoride (F)	mg/L	0.12	0.250	0.254	1.59	<0.020	0.14	0.14	0.00	<0.020	0.082	0.075	8.92
Nitrate (as N)	mg/L	13	<0.010	<0.010	nc	<0.0050	0.143	0.148	3.44	<0.0050	<0.0050	<0.0050	nc
Nitrite (as N)	mg/L	0.06	<0.0020	<0.0020	nc	<0.0010	<0.0050	<0.0050	nc	<0.0010	<0.0010	<0.0010	nc
Total Kjeldahl Nitrogen	mg/L	-	5.99	6.02	0.50	<0.050	0.117	0.110	6.17	<0.050	0.536	0.592	9.93
Sulfate (SO4)	mg/L	-	5.34	3.07	***53.98***	<0.30	715	724	1.25	<0.30	185	185	0.00
Sulphide as S	mg/L	-	0.035	0.036	2.82	<0.020	<0.020	<0.020	nc	<0.020	0.321	0.320	0.31
Field Sulphide	mg/L	-	0.03	0.03	-	-	0	0	-	-	0.19	0.19	0.00
Anion Sum	meq/L	-	17.3	17.6	1.72	<0.10	20.6	20.8	0.97	<0.10	8.78	8.70	0.92
Cation Sum	meq/L	-	19.9	19.6	1.52	<0.10	21.1	21.1	0.00	<0.10	9.10	9.10	0.00
Cation - Anion Balance	%	-	6.9	5.3	26.23	0.0	1.3	0.7	60.00	0.0	1.8	2.2	20.00
Cyanides													
Cyanide, Total	mg/L	-	<0.0050	<0.0050	nc	<0.0050	<0.0050	<0.0050	nc	<0.0050	<0.0050	<0.0050	nc
Cyanide, Free	mg/L	0.005	<0.0050	<0.0050	nc	<0.0050	<0.0050	<0.0050	nc	<0.0050	<0.0050	<0.0050	nc
Cyanide, Weak Acid Diss	mg/L	-	<0.0050	<0.0050	nc	<0.0050	<0.0050	<0.0050	nc	<0.0050	<0.0050	<0.0050	nc
Thiocyanate (SCN)	mg/L	-	0.60	0.58	3.39	<0.50	<0.50	<0.50	nc	<0.50	<0.50	<0.50	nc
Organic/Inorganic Carbon													
Total Inorganic Carbon	mg/L	-	191	186	2.65	<0.50	64.2	62.1	3.33	<0.50	50.8	52.2	2.72
Total Organic Carbon	mg/L	-	68.0	66.5	2.23	<0.50	3.51	3.55	1.13	<0.50	10.3	11.0	6.57

Table B: QA/QC Analtical Data

		Site Location	GSI-DC-06B			MW09-16				MP09-08			
		Sample ID	MW15-500	GSI-DC-06B		FB15-100	MW15-100	MW09-16		FB15-400	MW15-400	MP09-08	
		Date Sampled	03/09/2015	03/09/2015		31/08/2015	31/08/2015	31/08/2015		03/09/2015	03/09/2015 0:00	03/09/2015	
		ALS Work Number	L1668494	L1668494	*RPD (%)* [13]	L1667552	L1667552	L1667552	*RPD (%)* [13]	L1668494	L1668494	L1668494	*RPD (%)* [13]
		Station Status	Good	Good		Good	Good	Good		Good	Good	Good	
Parameter	Units	CCME-FAL [1, 2, 3, 4]											
Dissolved Metals													
Aluminum (Al)	mg/L	Varies [8]	0.0178	0.0174	2.27	<0.0010	0.0011	0.0011	0.00	<0.0010	0.0045	0.0049	8.51
Aluminum CCME-FAL [8]	mg/L	-	*0.1*	*0.1*	-	-	*0.1*	*0.1*	-	-	*0.1*	*0.1*	-
Antimony (Sb)	mg/L	-	0.00038	0.00042	10.00	<0.00010	0.0591	0.0610	3.16	<0.00010	0.00226	0.00282	***22.05***
Arsenic (As)	mg/L	0.005	0.470	0.492	4.57	<0.00010	0.00818	0.00802	1.98	<0.00010	0.0260	0.0328	***23.13***
Barium (Ba)	mg/L	-	0.180	0.177	1.68	<0.000050	0.0136	0.0132	2.99	<0.000050	0.0583	0.0632	8.07
Beryllium (Be)	mg/L	-	<0.000020	<0.000020	nc	<0.000020	<0.000020	<0.000020	nc	<0.000020	<0.000020	0.000021	nc
Bismuth (Bi)	mg/L	-	<0.000050	<0.000050	nc	<0.000050	<0.000050	<0.000050	nc	<0.000050	<0.000050	<0.000050	nc
Boron (B)	mg/L	1.5	0.011	0.012	8.70	<0.010	0.157	0.169	7.36	<0.010	<0.010	<0.010	nc
Cadmium (Cd)	mg/L	Varies [9]	<0.0000050	<0.0000050	nc	<0.0000050	0.0214	0.0210	1.89	<0.0000050	<0.0000050	<0.0000050	nc
Cadmium CCME-FAL [9]	mg/L	-	*0.00037*	*0.00037*	-	-	*0.00037*	*0.00037*	-	-	*0.00037*	*0.00037*	-
Calcium (Ca)	mg/L	-	204	202	0.99	<0.050	237	235	0.85	<0.050	121	121	0.00
Chromium (Cr)	mg/L	-	0.00169	0.00170	0.59	<0.00010	<0.00010	<0.00010	nc	<0.00010	<0.00010	<0.00010	nc
Cobalt (Co)	mg/L	-	0.00209	0.00206	1.45	<0.00010	<0.00010	<0.00010	nc	<0.00010	0.00051	0.00050	1.98
Copper (Cu)	mg/L	Varies [10]	<0.00020	0.00021	nc	<0.00020	0.00553	0.00547	1.09	<0.00020	<0.00020	<0.00020	nc
Copper CCME-FAL [10]	mg/L	-	*0.004*	*0.004*	-	-	*0.004*	*0.004*	-	-	*0.004*	*0.004*	-
Iron (Fe)	mg/L	0.3	27.8	27.4	1.45	<0.010	<0.010	<0.010	nc	<0.010	0.562	0.519	7.96
Lead (Pb)	mg/L	Varies [11]	0.000080	<0.000050	nc	<0.000050	0.00484	0.00503	3.85	<0.000050	<0.000050	<0.000050	nc
Lead CCME-FAL [11]	mg/L	-	*0.007*	*0.007*	-	-	*0.007*	*0.007*	-	-	*0.007*	*0.007*	-
Lithium (Li)	mg/L	-	<0.0010	<0.0010	nc	<0.0010	0.0096	0.0098	2.06	<0.0010	0.0044	0.0042	4.65
Magnesium (Mg)	mg/L	-	83.8	82.7	1.32	<0.10	106	106	0.00	<0.10	32.5	32.4	0.31
Manganese (Mn)	mg/L	-	3.78	3.72	1.60	<0.00010	0.00819	0.00857	4.53	<0.00010	0.923	1.00	8.01
Mercury (Hg)	mg/L	0.000026	0.0000203	0.0000117	nc	<0.0000050	<0.0000050	<0.0000050	nc	<0.0000050	<0.0000050	<0.0000050	nc
Molybdenum (Mo)	mg/L	0.073	0.00247	0.00249	0.81	<0.000050	0.000065	0.000073	11.59	<0.000050	0.00320	0.00301	6.12
Nickel (Ni)	mg/L	Varies [12]	0.00367	0.00385	4.79	<0.00050	0.00335	0.00329	1.81	<0.00050	0.00185	0.00131	nc
Nickel CCME-FAL [12]	mg/L	-	*0.15*	*0.15*	-	-	*0.15*	*0.15*	-	-	*0.15*	*0.15*	-
Phosphorus (P)	mg/L	-	0.317	0.301	5.18	<0.050	<0.050	<0.050	nc	<0.050	<0.050	<0.050	nc
Potassium (K)	mg/L	-	4.28	4.26	0.47	<0.10	6.01	5.97	0.67	<0.10	1.17	1.15	1.72
Selenium (Se)	mg/L	0.001	0.000467	0.000532	13.01	<0.000050	0.000092	0.000076	19.05	<0.000050	0.000074	0.000066	11.43
Silicon (Si)	mg/L	-	9.08	8.89	2.11	<0.050	5.73	5.65	1.41	<0.050	7.43	7.37	0.81
Silver (Ag)	mg/L	0.0001	<0.000050	<0.000010	nc	<0.000010	0.000012	0.000013	8.00	<0.000010	<0.000010	<0.000010	nc
Sodium (Na)	mg/L	-	19.4	19.4	0.00	<0.050	8.01	7.91	1.26	<0.050	6.53	7.00	6.95
Strontium (Sr)	mg/L	-	1.01	0.988	2.20	<0.00020	0.494	0.501	1.41	<0.00020	1.24	1.20	3.28
Sulfur (S)	mg/L	-	7.17	8.55	17.56	<0.50	234	236	0.85	<0.50	65.9	65.5	0.61
Thallium (Tl)	mg/L	0.0008	<0.000010	<0.000010	nc	<0.000010	0.000239	0.000239	0.00	<0.000010	<0.000010	<0.000010	nc
Tin (Sn)	mg/L	-	<0.00010	<0.00010	nc	<0.00010	<0.00010	<0.00010	nc	<0.00010	<0.00010	<0.00010	nc
Titanium (Ti)	mg/L	-	0.00318	0.00298	6.49	<0.00030	<0.00030	<0.00030	nc	<0.00030	0.00047	0.00059	nc
Uranium (U)	mg/L	0.015	0.000188	0.000199	5.68	<0.000010	0.00214	0.00222	3.67	<0.000010	0.00457	0.00481	5.12
Vanadium (V)	mg/L	-	0.00810	0.00784	3.26	<0.00050	<0.00050	<0.00050	nc	<0.00050	0.00108	0.00162	nc
Zinc (Zn)	mg/L	0.03	0.0012	0.0019	nc	<0.0010	3.16	3.19	0.94	<0.0010	<0.0010	<0.0010	nc
Zirconium (Zr)	mg/L	-	0.00231	0.00225	2.63	<0.00030	<0.00030	<0.00030	nc	<0.00030	<0.00030	<0.00030	nc

Table B: QA/QC Analtical Data

		Site Location	GSI-DC-06B			MW09-16				MP09-08			
		Sample ID	MW15-500	GSI-DC-06B		FB15-100	MW15-100	MW09-16		FB15-400	MW15-400	MP09-08	
		Date Sampled	03/09/2015	03/09/2015		31/08/2015	31/08/2015	31/08/2015		03/09/2015	03/09/2015 0:00	03/09/2015	
		ALS Work Number	L1668494	L1668494	*RPD (%)* [13]	L1667552	L1667552	L1667552	*RPD (%)* [13]	L1668494	L1668494	L1668494	*RPD (%)* [13]
		Station Status	Good	Good		Good	Good	Good		Good	Good	Good	
Parameter	Units	CCME-FAL [1, 2, 3, 4]											
Total Metals													
Aluminum (Al)	mg/L	Varies [8]	-	-	-	-	-	-	-	-	-	-	-
Aluminum CCME-FAL [8]	mg/L	-	-	-	-	-	-	-	-	-	-	-	-
Antimony (Sb)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-
Arsenic (As)	mg/L	0.005	-	-	-	-	-	-	-	-	-	-	-
Barium (Ba)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-
Beryllium (Be)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-
Bismuth (Bi)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-
Boron (B)	mg/L	1.5	-	-	-	-	-	-	-	-	-	-	-
Cadmium (Cd)	mg/L	Varies [9]	-	-	-	-	-	-	-	-	-	-	-
Cadmium CCME-FAL [9]	mg/L	-	-	-	-	-	-	-	-	-	-	-	-
Calcium (Ca)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-
Chromium (Cr)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-
Cobalt (Co)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-
Copper (Cu)	mg/L	Varies	-	-	-	-	-	-	-	-	-	-	-
Copper (Cu)	mg/L	Varies [10]	-	-	-	-	-	-	-	-	-	-	-
Copper CCME-FAL [10]	mg/L	-	-	-	-	-	-	-	-	-	-	-	-
Lead (Pb)	mg/L	Varies [11]	-	-	-	-	-	-	-	-	-	-	-
Lead CCME-FAL [11]	mg/L	-	-	-	-	-	-	-	-	-	-	-	-
Lithium (Li)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-
Magnesium (Mg)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-
Manganese (Mn)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-
Mercury (Hg)	mg/L	0.000026	-	-	-	-	-	-	-	-	-	-	-
Molybdenum (Mo)	mg/L	0.073	-	-	-	-	-	-	-	-	-	-	-
Nickel (Ni)	mg/L	Varies [12]	-	-	-	-	-	-	-	-	-	-	-
Nickel CCME-FAL [12]	mg/L	-	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-
Potassium (K)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-
Selenium (Se)	mg/L	0.001	-	-	-	-	-	-	-	-	-	-	-
Silicon (Si)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-
Silver (Ag)	mg/L	0.0001	-	-	-	-	-	-	-	-	-	-	-
Sodium (Na)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-
Strontium (Sr)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-
Thallium (Tl)	mg/L	0.0008	-	-	-	-	-	-	-	-	-	-	-
Tin (Sn)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-
Titanium (Ti)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-
Uranium (U)	mg/L	0.015	-	-	-	-	-	-	-	-	-	-	-
Vanadium (V)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-
Zinc (Zn)	mg/L	0.03	-	-	-	-	-	-	-	-	-	-	-
Zirconium (Zr)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-

Table B: QA/QC Analtical Data

		Site Location	MP09-05			MW09-08		MW09-24				Travel Blanks	
		Sample ID	MW15-200	MP09-05		FB15-200	MW09-08	FB15-300	MW15-300	MW09-24		TRAVEL_BLANK	TRAVEL_BLANK
		Date Sampled	01/09/2015	01/09/2015		01/09/2015	01/09/2015	02/09/2015	02/09/2015	02/09/2015		01/09/2015	03/09/2015
		ALS Work Number	L1667552	L1667552	*RPD (%)* [13]	L1667552	L1667552	L1668494	L1668494	L1668494	*RPD (%)* [13]	L1667552	L1668494
		Station Status	Good	Good		Good	Good	Good	Good	Good			
Parameter	Units	CCME-FAL [1, 2, 3, 4]											
Physical Tests													
Lab pH	pH units	6.5-9.0 [5]	7.45	7.37	1.08	5.57	6.53	5.44	7.63	7.82	2.46	5.94	5.41
Field pH	pH units	6.5-9.0 [5]	6.64	6.64	-	-	6.72	-	7.19	7.19	-	-	-
Field Temperature	C	-	3.1	3.1	-	-	3.3	-	0.5	0.5	-	-	-
Lab Conductivity	uS/cm	-	2000	2000	0.00	<2.0	288	<2.0	1040	1130	8.29	<2.0	<2.0
Field Conductivity	uS/cm	-	1038	1038	-	-	209.9	-	543	543	-	-	-
Field Specific Conductivity	uS/cm	-	1781	1781	-	-	358.9	-	1022	1022	-	-	-
Total Hardness (as CaCO3)	mg/L	-	1180	1190	0.84	<0.50	137	<0.50	737	747	1.35	-	<0.50
Field Dissolved Oxygen	mg/L	9.5 [6]	0.33	0.33	-	-	0.3	-	5.56	5.56	-	-	-
Field Oxidation - Redox Potent	mV	-	27.6	27.6	-	-	-65.7	-	194.6	194.6	-	-	-
Field Turbidity	NTU	-	1.64	1.64	-	-	4.38	-	64.2	64.2	-	-	-
Anions and Nutrients													
Alkalinity, Total (CaCO3)	mg/L	-	290	268	7.89	<1.0	119	<1.0	353	353	0.00	<1.0	<1.0
Alkalinity, Total (CaCO3, filtered)	mg/L	-	278	279	0.36	<1.0	123	<1.0	376	379	0.79	-	-
Ammonia, Total (as N)	mg/L	Varies [7]	7.32	6.78	7.66	<0.0050	2.34	<0.0050	0.0093	0.0075	21.43	**0.0190**	**0.0107**
Ammonia CCME-FAL [7]	mg/L	-	*40.85*	*40.85*	-	-	*33.43*	-	*14.30*	*14.30*	-	-	-
Chloride (Cl)	mg/L	-	<2.5	<2.5	nc	<0.50	<0.50	<0.50	<1.0	<1.0	nc	<0.50	<0.50
Fluoride (F)	mg/L	0.12	<0.10	<0.10	nc	<0.020	<0.20	<0.020	<0.040	<0.040	nc	<0.020	<0.020
Nitrate (as N)	mg/L	13	1.72	1.89	9.42	<0.0050	<0.0050	<0.0050	2.75	2.74	0.36	<0.0050	<0.0050
Nitrite (as N)	mg/L	0.06	0.0378	0.0419	10.29	<0.0010	<0.0010	<0.0010	0.0023	0.0026	12.24	<0.0010	<0.001
Total Kjeldahl Nitrogen	mg/L	-	11.9	9.22	***25.38***	<0.050	3.24	<0.050	0.600	0.663	9.98	<0.050	<0.050
Sulfate (SO4)	mg/L	-	883	996	12.03	<0.30	28.7	<0.30	268	310	14.53	<0.30	<0.30
Sulphide as S	mg/L	-	<0.020	<0.020	nc	<0.020	0.080	<0.020	<0.020	<0.020	nc	<0.020	<0.020
Field Sulphide	mg/L	-	0.05	0.05	0.00	-	0.08	-	0.14	0.14	0.00	-	-
Anion Sum	meq/L	-	24.3	26.2	7.52	<0.10	2.98	<0.10	12.8	13.7	6.79	-	<0.10
Cation Sum	meq/L	-	26.4	26.7	1.13	<0.10	5.74	<0.10	15.1	15.3	1.32	-	<0.10
Cation - Anion Balance	%	-	4.1	0.9	128.00	0.0	31.6	0.0	8.2	5.5	39.42	-	0.0
Cyanides													
Cyanide, Total	mg/L	-	0.0095	0.0092	3.21	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	nc	<0.0050	<0.0050
Cyanide, Free	mg/L	0.005	<0.0050	<0.0050	nc	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	nc	<0.0050	<0.0050
Cyanide, Weak Acid Diss	mg/L	-	<0.0050	<0.0050	nc	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	nc	<0.0050	<0.0050
Thiocyanate (SCN)	mg/L	-	<0.50	<0.50	nc	<0.50	0.58	<0.50	<0.50	<0.50	nc	<0.50	<0.50
Organic/Inorganic Carbon													
Total Inorganic Carbon	mg/L	-	56.6	58.3	2.96	<0.50	25.7	<0.50	74.3	75.7	1.87	<0.50	<0.50
Total Organic Carbon	mg/L	-	16.1	16.4	1.85	<0.50	22.6	<0.50	11.3	11.1	1.79	<0.50	<0.50

Table B: QA/QC Analtical Data

		Site Location	MP09-05			MW09-08		MW09-24				Travel Blanks	
		Sample ID	MW15-200	MP09-05		FB15-200	MW09-08	FB15-300	MW15-300	MW09-24		TRAVEL_BLANK	TRAVEL_BLANK
		Date Sampled	01/09/2015	01/09/2015		01/09/2015	01/09/2015	02/09/2015	02/09/2015	02/09/2015		01/09/2015	03/09/2015
		ALS Work Number	L1667552	L1667552	*RPD (%)* [13]	L1667552	L1667552	L1668494	L1668494	L1668494	*RPD (%)* [13]	L1667552	L1668494
		Station Status	Good	Good		Good	Good	Good	Good	Good			
Parameter	Units	CCME-FAL [1, 2, 3, 4]											
Dissolved Metals													
Aluminum (Al)	mg/L	Varies [8]	0.0120	0.0123	2.47	<0.0010	0.0921	<0.0010	0.0023	0.0021	9.09	-	-
Aluminum CCME-FAL [8]	mg/L	-	*0.1*	*0.1*	-	-	*0.1*	-	*0.1*	*0.1*	-	-	-
Antimony (Sb)	mg/L	-	0.00031	0.00033	6.25	<0.00010	0.00020	<0.00010	0.00018	0.00018	0.00	-	-
Arsenic (As)	mg/L	0.005	0.00899	0.00861	4.32	<0.00010	0.0869	<0.00010	0.00197	0.00183	7.37	-	-
Barium (Ba)	mg/L	-	0.0535	0.0535	0.00	<0.000050	0.143	<0.000050	0.0924	0.0938	1.50	-	-
Beryllium (Be)	mg/L	-	<0.000040	<0.000040	nc	<0.000020	0.000020	<0.000020	<0.000020	<0.000020	nc	-	-
Bismuth (Bi)	mg/L	-	<0.00010	<0.00010	nc	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	nc	-	-
Boron (B)	mg/L	1.5	0.092	0.093	1.08	<0.010	<0.010	<0.010	0.012	0.012	0.00	-	-
Cadmium (Cd)	mg/L	Varies [9]	0.000257	0.000248	3.56	<0.0000050	<0.0000050	<0.0000050	0.0000674	0.0000683	1.33	-	-
Cadmium CCME-FAL [9]	mg/L	-	*0.00037*	*0.00037*	-	-	*0.00021*	-	*0.00037*	*0.00037*	-	-	-
Calcium (Ca)	mg/L	-	360	363	0.83	<0.050	40.7	<0.050	208	209	0.48	-	-
Chromium (Cr)	mg/L	-	<0.00020	<0.00020	nc	<0.00010	0.00137	<0.00010	0.00026	0.00026	0.00	-	-
Cobalt (Co)	mg/L	-	0.0162	0.0162	0.00	<0.00010	0.00140	<0.00010	<0.00010	<0.00010	nc	-	-
Copper (Cu)	mg/L	Varies [10]	0.00260	0.00254	2.33	<0.00020	<0.00020	<0.00020	0.00820	0.00811	1.10	-	-
Copper CCME-FAL [10]	mg/L	-	*0.004*	*0.004*	-	-	*0.00309*	-	*0.004*	*0.004*	-	-	-
Iron (Fe)	mg/L	0.3	3.01	3.03	0.66	<0.010	47.5	<0.010	<0.010	<0.010	nc	-	-
Lead (Pb)	mg/L	Varies [11]	0.00021	<0.00010	nc	<0.000050	0.000055	<0.000050	<0.000050	<0.000050	nc	-	-
Lead CCME-FAL [11]	mg/L	-	*0.007*	*0.007*	-	-	*0.00475*	-	*0.007*	*0.007*	-	-	-
Lithium (Li)	mg/L	-	<0.0020	<0.0020	nc	<0.0010	<0.0010	<0.0010	0.0011	0.0012	8.70	-	-
Magnesium (Mg)	mg/L	-	67.9	69.8	2.76	<0.10	8.65	<0.10	52.5	54.7	4.10	-	-
Manganese (Mn)	mg/L	-	7.05	6.99	0.85	<0.00010	3.42	<0.00010	0.00127	0.00108	16.17	-	-
Mercury (Hg)	mg/L	0.000026	<0.0000050	<0.0000050	nc	<0.0000050	<0.0000050	<0.0000050	0.0000101	0.0000102	0.99	-	-
Molybdenum (Mo)	mg/L	0.073	0.00036	0.00037	2.74	<0.000050	<0.000050	<0.000050	0.000367	0.000377	2.69	-	-
Nickel (Ni)	mg/L	Varies [12]	0.0026	0.0026	0.00	<0.00050	<0.00050	<0.00050	0.00083	0.00055	nc	-	-
Nickel CCME-FAL [12]	mg/L	-	*0.15*	*0.15*	-	-	*0.121*	-	*0.15*	*0.15*	-	-	-
Phosphorus (P)	mg/L	-	<0.050	<0.050	nc	<0.050	0.109	<0.050	<0.050	<0.050	nc	-	-
Potassium (K)	mg/L	-	9.09	9.13	0.44	<0.10	1.51	<0.10	1.66	1.66	0.00	-	-
Selenium (Se)	mg/L	0.001	0.00011	0.00014	nc	<0.000050	0.000435	<0.000050	0.000305	0.000354	14.87	-	-
Silicon (Si)	mg/L	-	4.76	4.79	0.63	<0.050	10.0	<0.050	6.15	6.18	0.49	-	-
Silver (Ag)	mg/L	0.0001	<0.000020	<0.000020	nc	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	nc	-	-
Sodium (Na)	mg/L	-	38.8	38.6	0.52	<0.050	2.43	<0.050	8.01	7.87	1.76	-	-
Strontium (Sr)	mg/L	-	0.982	0.983	0.10	<0.00020	0.172	**0.00041**	0.655	0.681	3.89	-	-
Sulfur (S)	mg/L	-	323	335	3.65	<0.50	12.8	<0.50	120	117	2.53	-	-
Thallium (Tl)	mg/L	0.0008	0.000056	0.000058	3.51	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	nc	-	-
Tin (Sn)	mg/L	-	<0.00020	<0.00020	nc	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	nc	-	-
Titanium (Ti)	mg/L	-	<0.00060	<0.00060	nc	<0.00030	0.00437	<0.00030	<0.00030	<0.00030	nc	-	-
Uranium (U)	mg/L	0.015	0.00135	0.00137	1.47	<0.000010	0.000093	<0.000010	0.00774	0.00790	2.05	-	-
Vanadium (V)	mg/L	-	<0.0010	<0.0010	nc	<0.00050	0.00406	<0.00050	<0.00050	<0.00050	nc	-	-
Zinc (Zn)	mg/L	0.03	0.0138	0.0175	***23.64***	<0.0010	<0.0010	<0.0010	0.0019	0.0016	17.14	-	-
Zirconium (Zr)	mg/L	-	<0.00060	<0.00060	nc	<0.00030	0.00087	<0.00030	<0.00030	<0.00030	nc	-	-

Table B: QA/QC Analtical Data

	Site Location	MP09-05			MW09-08		MW09-24				Travel Blanks	
	Sample ID	MW15-200	MP09-05		FB15-200	MW09-08	FB15-300	MW15-300	MW09-24		TRAVEL_BLANK	TRAVEL_BLANK
	Date Sampled	01/09/2015	01/09/2015		01/09/2015	01/09/2015	02/09/2015	02/09/2015	02/09/2015		01/09/2015	03/09/2015
	ALS Work Number	L1667552	L1667552	*RPD (%)* [13]	L1667552	L1667552	L1668494	L1668494	L1668494	*RPD (%)* [13]	L1667552	L1668494
	Station Status	Good	Good		Good	Good	Good	Good	Good			
Parameter	Units	CCME-FAL [1, 2, 3, 4]										
Total Metals												
Aluminum (Al)	mg/L	Varies [8]	-	-	-	-	-	-	-	-	-	<0.0030
Aluminum CCME-FAL [8]	mg/L	-	-	-	-	-	-	-	-	-	-	-
Antimony (Sb)	mg/L	-	-	-	-	-	-	-	-	-	-	<0.00010
Arsenic (As)	mg/L	0.005	-	-	-	-	-	-	-	-	-	<0.00010
Barium (Ba)	mg/L	-	-	-	-	-	-	-	-	-	-	<0.000050
Beryllium (Be)	mg/L	-	-	-	-	-	-	-	-	-	-	<0.000020
Bismuth (Bi)	mg/L	-	-	-	-	-	-	-	-	-	-	<0.000050
Boron (B)	mg/L	1.5	-	-	-	-	-	-	-	-	-	<0.010
Cadmium (Cd)	mg/L	Varies [9]	-	-	-	-	-	-	-	-	-	<0.0000050
Cadmium CCME-FAL [9]	mg/L	-	-	-	-	-	-	-	-	-	-	-
Calcium (Ca)	mg/L	-	-	-	-	-	-	-	-	-	-	<0.050
Chromium (Cr)	mg/L	-	-	-	-	-	-	-	-	-	-	<0.00010
Cobalt (Co)	mg/L	-	-	-	-	-	-	-	-	-	-	<0.00010
Copper (Cu)	mg/L	Varies	-	-	-	-	-	-	-	-	-	<0.00050
Copper (Cu)	mg/L	Varies [10]	-	-	-	-	-	-	-	-	-	-
Copper CCME-FAL [10]	mg/L	-	-	-	-	-	-	-	-	-	-	<0.010
Lead (Pb)	mg/L	Varies [11]	-	-	-	-	-	-	-	-	-	<0.000050
Lead CCME-FAL [11]	mg/L	-	-	-	-	-	-	-	-	-	-	-
Lithium (Li)	mg/L	-	-	-	-	-	-	-	-	-	-	<0.0010
Magnesium (Mg)	mg/L	-	-	-	-	-	-	-	-	-	-	<0.10
Manganese (Mn)	mg/L	-	-	-	-	-	-	-	-	-	-	<0.00010
Mercury (Hg)	mg/L	0.000026	-	-	-	-	-	-	-	-	-	<0.0000050
Molybdenum (Mo)	mg/L	0.073	-	-	-	-	-	-	-	-	-	<0.000050
Nickel (Ni)	mg/L	Varies [12]	-	-	-	-	-	-	-	-	-	<0.00050
Nickel CCME-FAL [12]	mg/L	-	-	-	-	-	-	-	-	-	-	-
Phosphorus (P)	mg/L	-	-	-	-	-	-	-	-	-	-	<0.050
Potassium (K)	mg/L	-	-	-	-	-	-	-	-	-	-	<0.10
Selenium (Se)	mg/L	0.001	-	-	-	-	-	-	-	-	-	<0.000050
Silicon (Si)	mg/L	-	-	-	-	-	-	-	-	-	-	<0.050
Silver (Ag)	mg/L	0.0001	-	-	-	-	-	-	-	-	-	<0.000010
Sodium (Na)	mg/L	-	-	-	-	-	-	-	-	-	-	<0.050
Strontium (Sr)	mg/L	-	-	-	-	-	-	-	-	-	-	<0.00020
Thallium (Tl)	mg/L	0.0008	-	-	-	-	-	-	-	-	-	<0.000010
Tin (Sn)	mg/L	-	-	-	-	-	-	-	-	-	-	<0.00010
Titanium (Ti)	mg/L	-	-	-	-	-	-	-	-	-	-	<0.00030
Uranium (U)	mg/L	0.015	-	-	-	-	-	-	-	-	-	<0.000010
Vanadium (V)	mg/L	-	-	-	-	-	-	-	-	-	-	<0.00050
Zinc (Zn)	mg/L	0.03	-	-	-	-	-	-	-	-	-	<0.0030
Zirconium (Zr)	mg/L	-	-	-	-	-	-	-	-	-	-	<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.

(14) Due to slow recharge and low well volumes, samples were collected from GSI-DC-02B between Aug.31 - Sept.2, 2015. Cyanides, TIC, TOC, sulphide, and filtered alkalinity were collected on Sept.2, 2015. All other parameters were collected on Aug.31, 2015.

(15) Due to slow recharge and low well volumes, samples were collected from GSI-HA-01A between Aug.31 - Sept.2, 2015. Filtered alkalinity, ammonia, cyanides, TIC, and TOC were collected on Sept.2, 2015. All other parameters were collected on Aug.31, 2015.

(16) Due to slow recharge and low well volumes, samples were collected from GSI-HA-03A between Aug.31 - Sept.2, 2015. Sulphide and TIC samples were collected on Sept.3, 2015. Ammonia, cyanides, and TOC were collected on Sept.2, 2015. All other parameters were collected on Aug.31, 2015.

Bold and underlined indicates values above RDL in Field Blank or 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 August 31, 2015.

Photo 2: View of drive point wells GSI-DC-02A and GSI-DC-02B. Photo taken on August 31, 2015.

Photo 3: View of drive point wells GSI-DC-03A and GSI-DC-03B. Photo taken on August 31, 2015.

Photo 4: View of drive point wells GSI-DC-05A and GSI-DC-05B. Photo taken on September 1, 2015.

Photo 5: View of drive point wells GSI-DC-06A and GSI-DC-06B. Photo taken on September 3, 2015.

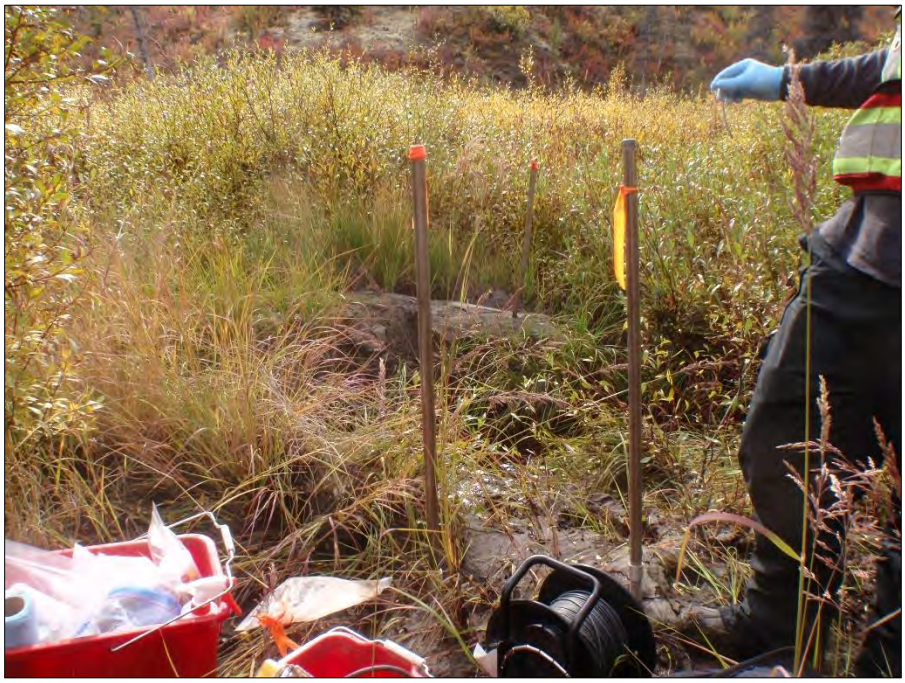

Photo 6: View of drive point wells GSI-DC-07A and GSI-DC-07B. Photo taken on September 3, 2015.

Photo 7: View of drive point wells GSI-DC-08A and GSI-DC-08B. Photo taken on September 3, 2015.

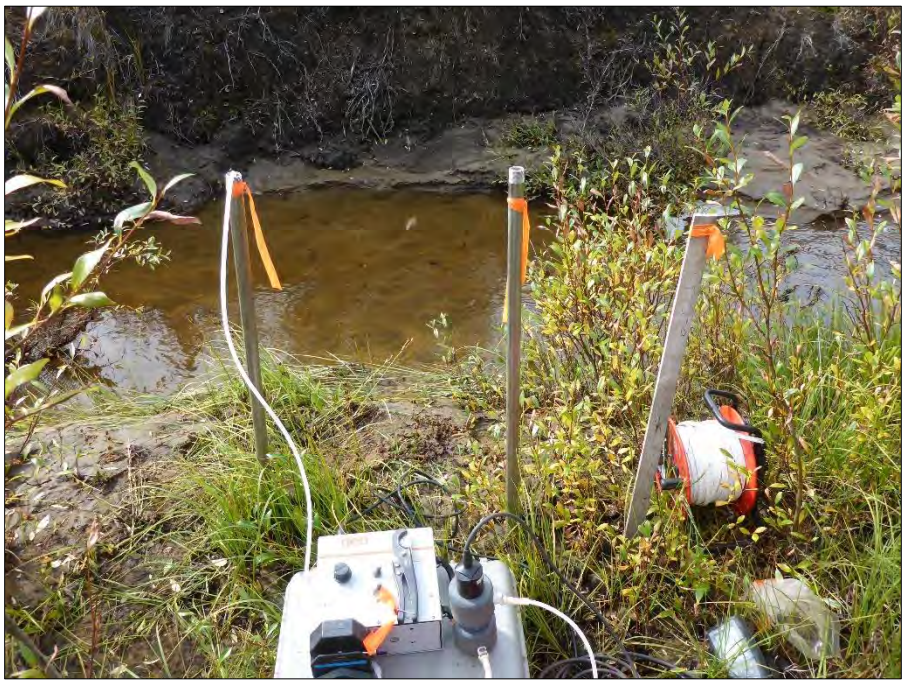

Photo 8: View of drive point wells GSI-DC-09A and GSI-DC-09B. Photo taken on September 3, 2015.

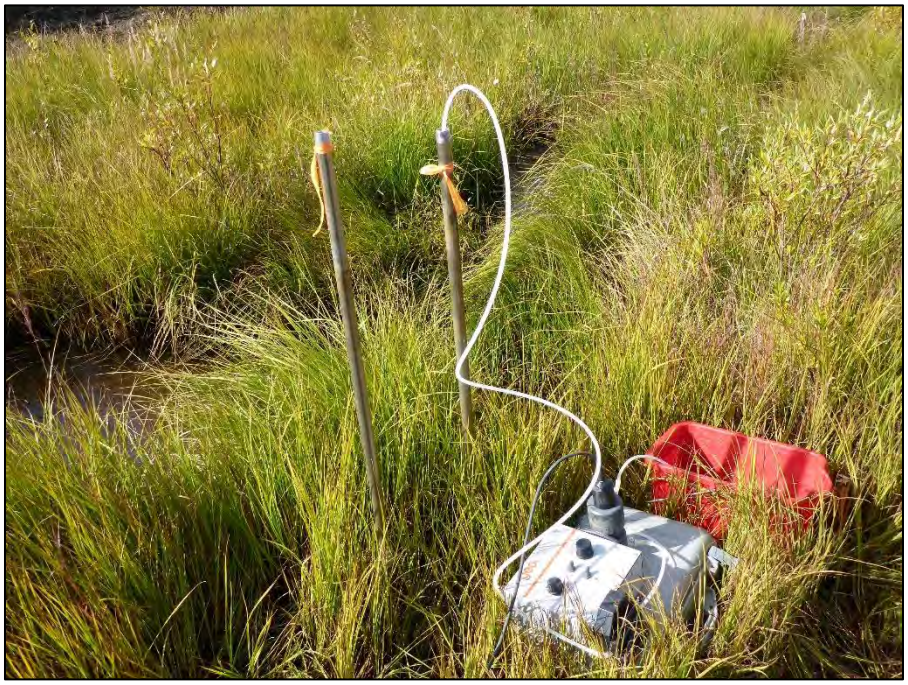

Photo 9: View of drive point wells GSI-DC-10A and GSI-DC-10B. Photo taken on September 3, 2015.

Photo 10: View of drive point well GSI-HA-01A. Photo taken on August 31, 2015.

Photo 11: View of drive point well GSI-HA-02A. Photo taken on August 31, 2015.

Photo 12: View of drive point well GSI-HA-03A. Photo taken on August 31, 2015.

Photo 13: View of drive point well GSI-HA-04A. Photo taken on August 31, 2015.

Photo 14: View of drive point well GSI-HA-05A. Photo taken on August 31, 2015.

Photo 15: View of well MW09-15. Photo taken on September 2, 2015.

Photo 16: View of well MW09-16. Photo taken on August 31, 2015.

Photo 17: View of well MW09-17. Photo taken on August 31, 2015.

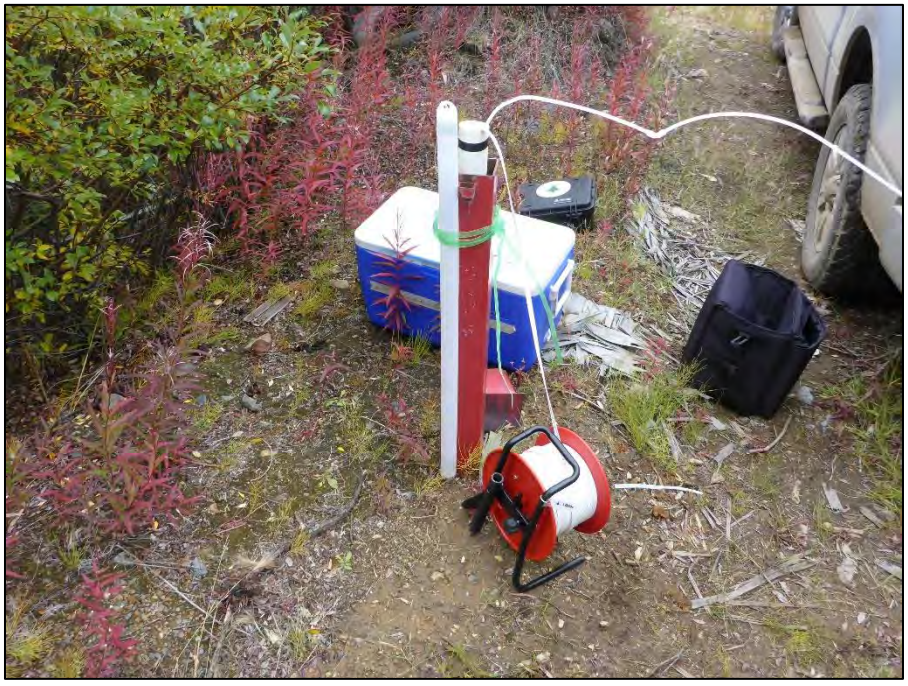

Photo 18: View of well MW09-18. Photo taken on August 31, 2015.

Photo 19: View of well MW09-19. Photo taken on August 31, 2015.

Photo 20: View of well CH-P-13-01/10. Photo taken on August 31, 2015.

Photo 21: View of wells CH-P-13-03/50 and CH-P-13-03/10. Photo taken on August 31, 2015.

Photo 22: View of wells CH-P-13-04/10 and CH-P-13-04/35. Photo taken on September 2, 2015.

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

Photo 24: View of well GLL07-01. Photo taken on September 2, 2015.

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

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

Photo 27: View of well MW09-13. Photo taken on September 2, 2015.

Photo 28: View of well MW09-14. Photo taken on September 2, 2015.

Photo 29: View of well placer mining activity on Pony Creek (previous location of GSI-PC-02A and GSI-PC-02B). Photo taken on September 2, 2015.

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

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

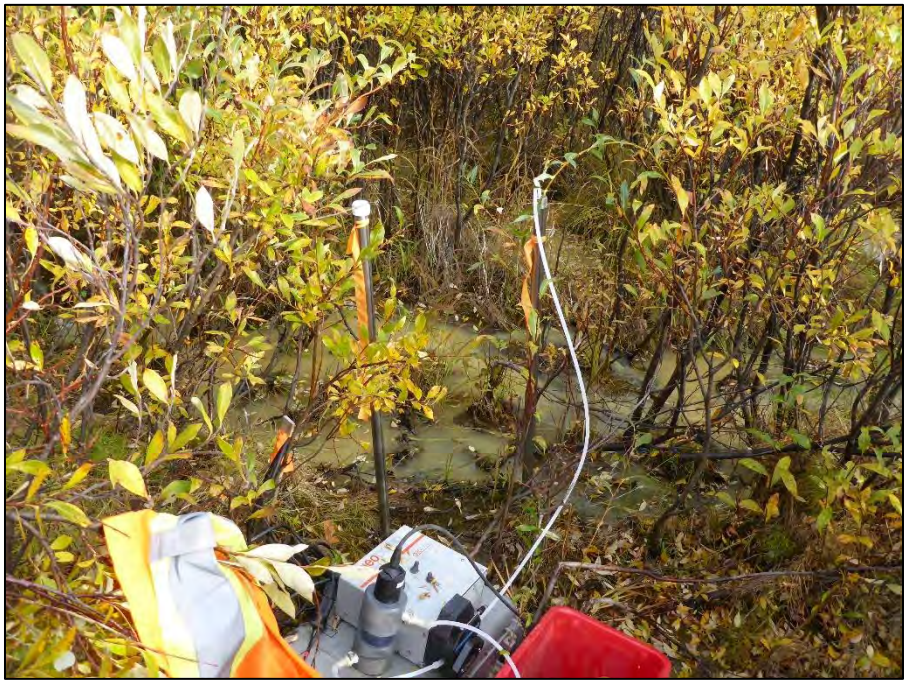

Photo 32: View of wells GSI-PC-05A and GSI-PC-05B. Photo taken on September 3, 2015.

Photo 33: View of placer mining operations on Pony Creek (previous location of well MP09-02). Photo taken on September 2, 2015.

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

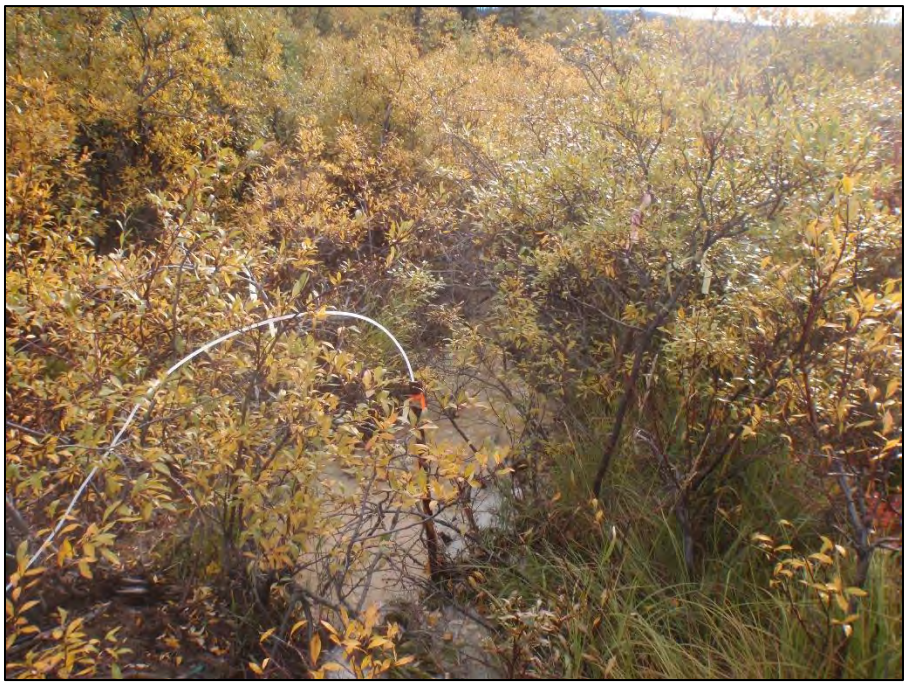

Photo 35: View of well MP09-08. Photo taken on September 3, 2015.

Photo 36: View of well W14103083BH01. Photo taken on September 2, 2015.

Photo 37: View of well W14103083BH02. Photo taken on September 2, 2015.

Photo 38: View of well W14103083BH04. Photo taken on September 2, 2015.

Photo 39: View of well MP09-04. Photo taken on September 1, 2015.

Photo 40: View of well MP09-05. Photo taken on September 1, 2015.

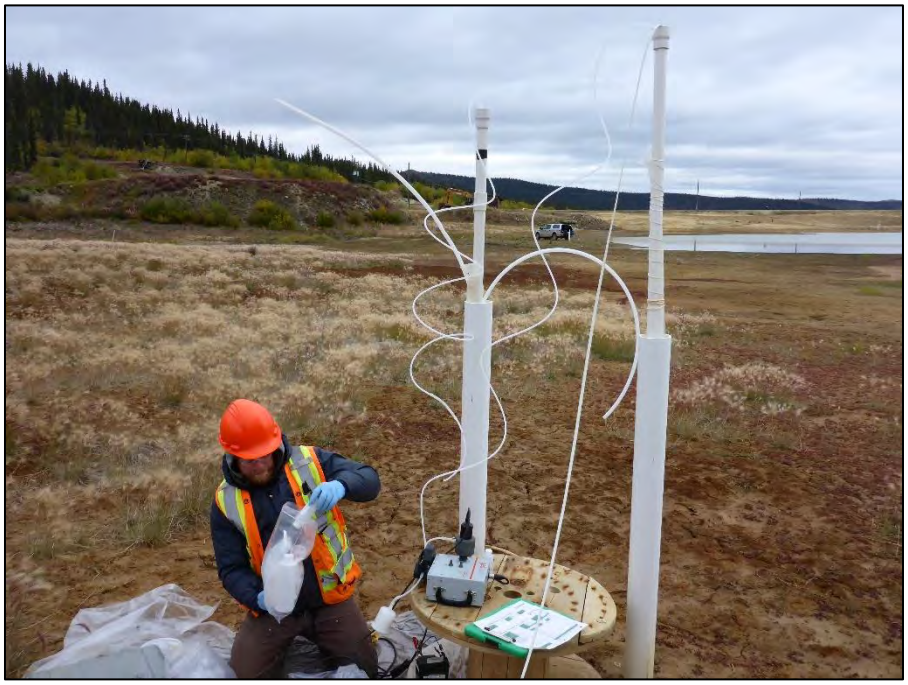

Photo 41: View of wells MP09-09 and MP09-10. Photo taken on September 2, 2015.

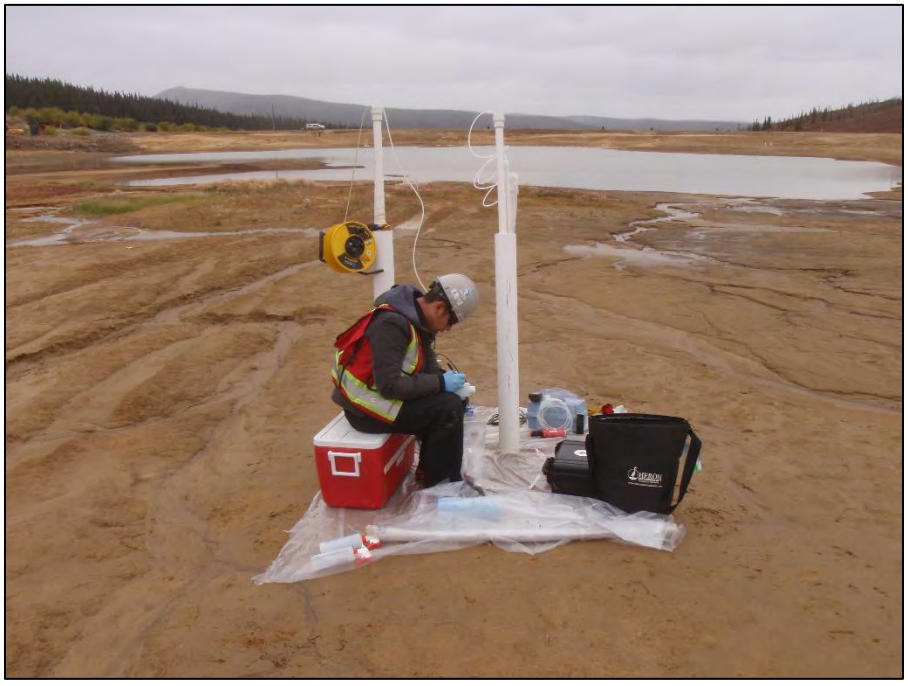

Photo 42: View of wells MP09-11 and MP09-12. Photo taken on September 2, 2015.

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

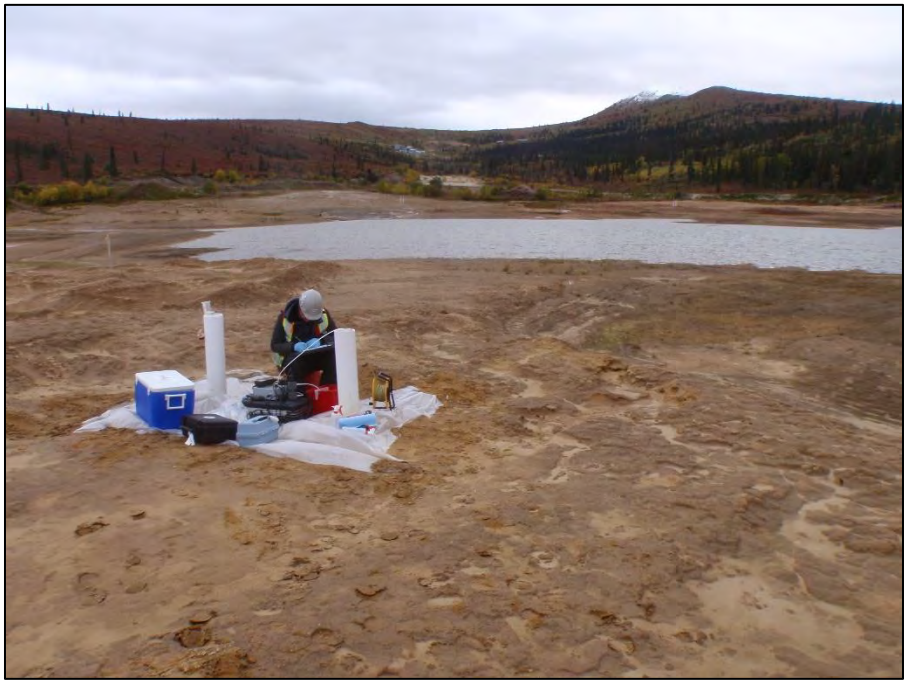

Photo 44: View of wells MW09-01 and MW09-02. Photo taken on September 1, 2015.

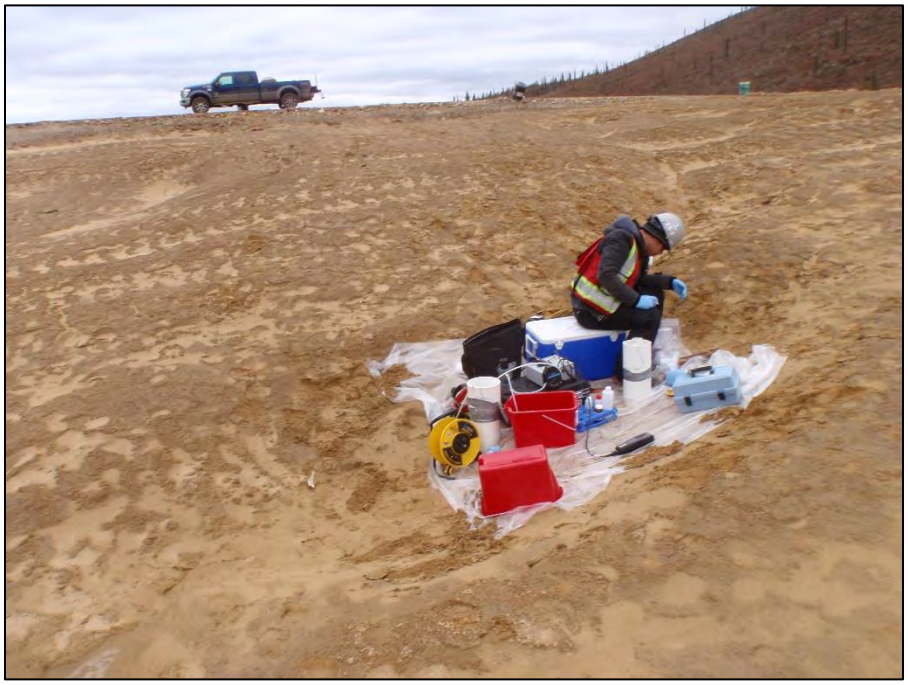

Photo 45: View of wells MW09-03 and MW09-04. Photo taken on September 1, 2015.

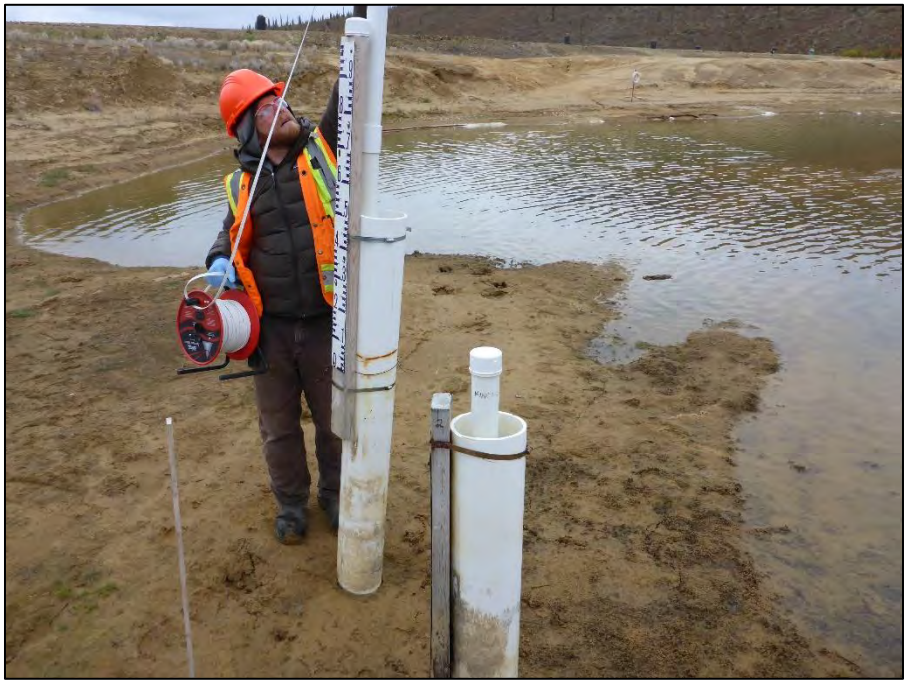

Photo 46: View of wells MW09-05 and MW09-06. Photo taken on September 2, 2015.

Photo 47: View of well MW09-07. Photo taken on September 2, 2015.

Photo 48: View of well MW09-08. Photo taken on September 1, 2015.

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

Photo 50: View of well MW09-20. Photo taken on September 1, 2015.

Photo 51: View of well MW09-21. Photo taken on September 1, 2015.

Photo 52: View of well MW09-22. Photo taken on September 1, 2015.

Photo 53: View of well MW09-23. Photo taken on September 1, 2015.

Photo 54: View of well MW09-24. Photo taken on September 2, 2015.

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

Photo 56: View of well CH-P-13-02/10. Photo taken on August 31, 2015.

APPENDIX B
Field Forms

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	CH-P-13-01/10	**Project Number:**	1343-005.11	**Date:**	Aug 31, 2015
Approximate Date Drilled:		**Client:**	GY - AAM	**Samplers:**	JH + JC
Piezometer Diameter / Screen Length:	1.5" / ?	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Cloudy, 2°C
UTM Location:	Z. 08 E. 388658 N. 688 1117	**Waypoint:**	GPS Hem Name CH-P-13-01/10	**Recovery:**	☐ Good ☐ Bad
Photos:	Cam. Hem Nos. 018 - 020	**Purge Method:**			
Duplicate Collected:	☐ Yes Name	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes Name		Not Purged		

Initial Depth to Water (m):	Frozen at 6.542m	**Purge Start Time:**	X	**Purge End Time:**	X			**Pen or YSI:**	☐ YSI Pro Plus ☐ Pen Unit		
Depth to Bottom (m):	~~6.542m~~	**Purge Interval** Time (___) min, Vol. (___) L									
Submerged Tubing Depth (m):	/	**Depth to water (m)**									
Well Stick-up Height (m):		**Temperature (°C) 3%**									
Estimated Water Volume (L):		**pH (pH Units) ±0.1**									
		Cond. (µs/cm) 3%									
		Specific Cond. (µs/cm) 3%									
		Redox (mV) 10%									
		DO (mg/L) 10%									
		DO (%) 10%									
		Appearance & Odour (Clear, Silty, HC odours, etc.)									
		Only for final readings	**Sulphide (mg/L)**								
			Turbidity (NTU)								
		Interval Purge Volume (L)									
		Cumulative Purge Volume (L):									

Direct Sample

(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 logged on YSI (24hr):		**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**

HEMMERA

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

Sample Date (Con't): Aug 31, 2015

Sample Time: Not Sampled

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

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

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

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	⊗
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 (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL (Hydrochloric)		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4 (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3 (Nitric)		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, then NaOH		
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

Well is Frozen, could not break through the ice with the water level meter

Crew Lead Sign Off (initials):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	CH-P-13-02/10	**Project Number:**	1343-005.11	**Date:**	Aug 31, 2015
Approximate Date Drilled:	?	**Client:**	GY - AAM	**Samplers:**	JH + JC
Piezometer Diameter / Screen Length:	1.5" / ?	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Cloudy / 3°C
UTM Location:	Z. 08 E. 0388926 N. 6881012	**Waypoint:**	GPS Hem Name CH-P-13-02/10*	**Recovery:**	☐ Good ☒ Bad
Photos:	Cam. Hem Nos. 021 - 029	**Purge Method:**			
Duplicate Collected:	☐ Yes Name ___	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes Name ___				

Initial Depth to Water (m):	8.120	**Purge Start Time:**		**Purge End Time:**		**Pen or YSI:**	☐ YSI Pro Plus ☐ Pen Unit		
Depth to Bottom (m):	X	**Purge Interval** Time (___) min, Vol. (___) L							
Submerged Tubing Depth (m):		**Depth to water (m)**							
Well Stick-up Height (m):	0.64	**Temperature (°C) 3%**							
Estimated Water Volume (L):	X	**pH (pH Units) ±0.1**							
		Cond. (µs/cm) 3%							
		Specific Cond. (µs/cm) 3%							
		Redox (mV) 10%							
		DO (mg/L) 10%							
		DO (%) 10%							
		Appearance & Odour (Clear, Silty, HC odours, etc.)							
		Only for final readings	**Sulphide (mg/L)**						
			Turbidity (NTU)						
		Interval Purge Volume (L)							
		Cumulative Purge Volume (L):							

Well Not Sampled

(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 logged on YSI (24hr):	X	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
		Not	Sampled		

HEMMERA

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

Sample Date (Con't): Aug 31, 2015

Sample Time: Not Sampled

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)	%	16.5
Carbon Dioxide (C02)	~~PPM~~ %	1.29%

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 (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL (Hydrochloric)		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4 (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3 (Nitric)		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, then NaOH		
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

Water level tape stopped @ 8.120m and Bentonite observed on the water level tape. used 5/8 waterra tubing to cut through the bentonite to create a hole through to the clean screen. Bentonite down the well is frozen and difficult to recover.

unsuccesful in re covering bentonite after 45 mins of attempts @ breaking through the ice. Final depth to Bentonite 8.437m. There is water at 8.115m, or a 0.3m water column that has recharged quickly after the bentonite was disturbed, likely because the bentonite is lower than the top of the screen. The water quality is very bad/silty so we will not sample this well. It may be possible to use this same methodology when the water column/bentonite is not frozen (ie. summer weather).

-Consumables used - Waterra tubing

Crew Lead Sign Off (Initials):	

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	CH-P-13-03/10	**Project Number:**	1343-005.11	**Date:**	Aug 31, 2015
Approximate Date Drilled:	?	**Client:**	GY - AAM	**Samplers:**	JH + SC
Piezometer Diameter / Screen Length:	1.5" / ?	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Cloudy 4°C
UTM Location:	Z. 08 E. 0389135 N. 6981067	**Waypoint:**	GPS Hem Name CH-P-13-03/10	**Recovery:**	☐ Good ☐ Bad
Photos:	Cam. Hem Nos. 033-035	**Purge Method:**			
Duplicate Collected:	☐ Yes Name	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☒ Yes Name	Did not Purge			

Initial Depth to Water (m):	DRY	**Purge Start Time:**	X	**Purge End Time:**	X	**Pen or YSI:**	☐ YSI Pro Plus ☐ Pen Unit				
Depth to Bottom (m):	5.019 m	**Purge Interval** Time (___) min, Vol. (___) L									
Submerged Tubing Depth (m):	N/A	**Depth to water (m)**									
Well Stick-up Height (m):	0.65m	**Temperature (°C) 3%**									
Estimated Water Volume (L):	None	**pH (pH Units) ±0.1**									
		Cond. (µs/cm) 3%									
		Specific Cond. (µs/cm) 3%									
		Redox (mV) 10%									
		DO (mg/L) 10%									
		DO (%) 10%									
		Appearance & Odour (Clear, Silty, HC odours, etc.)									
		Only for final readings	**Sulphide (mg/L)**								
			Turbidity (NTU)								
		Interval Purge Volume (L)									
		Cumulative Purge Volume (L):									

Did not Sample

(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 logged on YSI (24hr):		**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
		Did not sample			

HEMMERA

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

Sample Date (Con't): Aug 31, 2015

Sample Time: did NOT sample

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~~	1.45 %

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 (Nitric)	Did not Sample	
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL (Hydrochloric)		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4 (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3 (Nitric)		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, then NaOH		
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

- Well dry. Water level probe had sand on tip.
- Unable to remove sand from inside well because of insufficient water.
- Did not Sample

Crew Lead Sign Off (initials):	

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	CH-P-13-03/50	**Project Number:**	1343-005.11	**Date:**	Aug 31, 2015
Approximate Date Drilled:	?	**Client:**	GY - AAM	**Samplers:**	SH + JC
Piezometer Diameter / Screen Length:	1.5" / 2"	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	cloudy / 4°C
UTM Location:	Z. 08 E. 0389139 N. 6881021	**Waypoint:**	GPS Hem Name CH-P-13-03/50	**Recovery:**	☐ Good ☐ Bad
Photos:	Cam. Hem Nos. 030-032	**Purge Method:**			
Duplicate Collected:	☐ Yes Name X	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes Name	Did not purge			

Initial Depth to Water (m):	50.423	**Purge Start Time:**	X	**Purge End Time:**	X	**Pen or YSI:**	☐ YSI Pro Plus ☐ Pen Unit		
Depth to Bottom (m):	50.649	**Purge Interval** Time (___) min, Vol. (___) L							
Submerged Tubing Depth (m):	N/A	**Depth to water (m)**							
Well Stick-up Height (m):	0.59m	**Temperature (°C) 3%**							
Estimated Water Volume (L):	none	**pH (pH Units) ±0.1**							
Suspected sediment at the bottom of well as water level probe had grey silt lodged on tip of probe		**Cond. (µs/cm) 3%**							
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Specific Cond. (µs/cm) 3%**							
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**Redox (mV) 10%**							
2" casing has 0.16 USgal/ft or 2.032 l/m		**DO (mg/L) 10%**							
1" casing has 0.04 USgal/ft or 0.508 l/m		**DO (%) 10%**							
8" sand pack has 0.73 USgal/ft or 9.271 l/m		**Appearance & Odour (Clear, Silty, HC odours, etc.)**							
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Only for final readings**	**Sulphide (mg/L)**						
			Turbidity (NTU)						
		Interval Purge Volume (L)							
		Cumulative Purge Volume (L):							

Did not Sample

YSI Field Parameters Logged:	☐ Yes ☒ No	**Sample Method:**			
Time logged on YSI (24hr):		**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
		Did not	Sample		

HEMMERA

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

Sample Date (Con't): Aug 31, 2015

Sample Time: Did not sample

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~~	1.46%

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 (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL (Hydrochloric)	Not Sampled	
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4 (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3 (Nitric)		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, then NaOH		
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

- Well dry. Water level probe had ~~Silt~~ Sand on tip. It is assumed that the measured water column (50.423-50.649m) is infact just sediment at the bottom of the well. It is not possible to remove this using Hytera with insufficient water.
- Well not Sampled.

Crew Lead Sign Off (initials):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	~~DE-P7~~ CH-P-13-04/10	**Project Number:**	1343-005.11	**Date:**	SEPT 2, 2015
Approximate Date Drilled:		**Client:**	GY - AAM	**Samplers:**	AM GM
Piezometer Diameter / Screen Length:	1 3/8" ← NOTE ODD SIZE.	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	0°C / OVERCAST
UTM Location:	Z. 08V E. 0389136 N. 6881472	**Waypoint:**	GPS ___ Name _____	**Recovery:**	☐ Good ☐ Bad
Photos:	Cam. EOR Nos. ~~325~~ - 326	**Purge Method:**			
Duplicate Collected:	☐ Yes Name 0069 - 0072	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes Name _____				

Initial Depth to Water (m):	6.220 to blockage ice FROZEN	**Purge Start Time:**		**Purge End Time:**		**Pen or YSI:**	☐ YSI Pro Plus ☐ Pen Unit		
Depth to Bottom (m):		**Purge Interval Time (___) min, Vol. (___) L**							
Submerged Tubing Depth (m):		**Depth to water (m)**							
Well Stick-up Height (m):		**Temperature (°C) 3%**							
Estimated Water Volume (L):		**pH (pH Units) ±0.1**							
(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) 3%**							
		Specific Cond. (µs/cm) 3%							
		Redox (mV) 10%							
		DO (mg/L) 10%							
		DO (%) 10%							
		Appearance & Odour (Clear, Silty, HC odours, etc.)							
		Only for final readings	**Sulphide (mg/L)**						
			Turbidity (NTU)						
		Interval Purge Volume (L)							
		Cumulative Purge Volume (L):							

FROZEN

YSI Field Parameters Logged:	☐ Yes ☐ No	**Sample Method:**			
Time logged on YSI (24hr):		**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**

HEMMERA

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

Sample Date (Con't): SEPT 2 2015

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: 1 5/8 PVC CAP REQUIRED

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	Ø
Oxygen (O2)	%	20.9
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 (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL (Hydrochloric)		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH (Sodium Hydroxide)	FROZEN	
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4 (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3 (Nitric)		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, then NaOH		
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

Crew Lead Sign Off (initials):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	CH-P-13-04/35	**Project Number:**	1343-005.11	**Date:**	SEPT 2 2015
Approximate Date Drilled:	UNKNOWN.	**Client:**	GY - AAM	**Samplers:**	GMR + AN
Piezometer Diameter / Screen Length:	13/8" OD PVC / UNKNOWN	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	~1°C OVERCAST
UTM Location:	Z. 08V E. 0389136 N. 6881472	**Waypoint:**	GPS GMR Name UTMS ONLY	**Recovery:**	☐ Good ☐ Bad
Photos:	Cam. GMR Nos. ~~375~~ - ~~376~~	**Purge Method:**			
Duplicate Collected:	☐ Yes Name 0069 - 0072	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes Name				

Initial Depth to Water (m):	BLOCKED AT ~~0.562~~	**Purge Start Time:**		**Purge End Time:**					**Pen or YSI:**	☐ YSI Pro Plus ☐ Pen Unit			
Depth to Bottom (m):	Approx. 6.60. ICE.	**Purge Interval Time (___) min, Vol. (___) L**											
Submerged Tubing Depth (m):	SEE NOTES.	**Depth to water (m)**											
Well Stick-up Height (m):	NOT COLLECTED.	**Temperature (°C) 3%**				NOT SAMPLED							
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%**				BLOCKED							
(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.)**				AT 0.562 m							
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)**			LIKELY FROZEN (?)							
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 logged on YSI (24hr):		**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**

HEMMERA

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

Sample Date (Con't): SEPT 2 2014

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 A SEALED CAP. NEEDS A 4" J-PLUG OR A 1 3/8" OD SLIP CAP

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.9
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 (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL (Hydrochloric)		
2	1 L (plastic)	General Chemistry	200 ml	-	-		WELL BLOCKED
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4 (Sulfuric)		ICE?
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml		☐ HNO_3 (Nitric)		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, then NaOH		
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

VARIED THRUSH SINGING - JUVENILE.

WATER LEVEL TAPE WOULD NOT PASS BY A LIKELY BEND IN THE PVC.

~~DATUM~~ ESTIMATED DEPTH TO ICE USING CLEANED TUBING FROM 04/10.

DEPTH TO ICE ABOUT 6.60 m

Crew Lead Sign Off (initials):

water level not accurate as well had not fully recharged & after pulling water out.

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	CH-P-13-05/50	**Project Number:**	1343-005.11	**Date:**	Sept 1, 2015
Approximate Date Drilled:	?	**Client:**	GY - AAM	**Samplers:**	IH + JC
Piezometer Diameter / Screen Length:	1" / ?	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	clady, -1°C
UTM Location:	Z. 08 E. 0338014 N. 6881067	**Waypoint:**	GPS Hem Name CH-P-13-05/50	**Recovery:**	☒ Good ☐ Bad
Photos:	Cam. Hem Nos. 047 - 049	**Purge Method:**			
Duplicate Collected:	☐ Yes Name X	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes Name X	4 hydro lift			

Initial Depth to Water (m):	After removing waterra = 25.446 and rising	**Purge Start Time:**	10:19	**Purge End Time:**	10:45			**Pen or YSI:**	☐ YSI Pro Plus ☐ Pen Unit		
Depth to Bottom (m):	49.990	**Purge Interval Time (___) min, Vol. (10) L**		10:27	10:31 1	10:34	10:36	10:39			
Submerged Tubing Depth (m):	49.	**Depth to water (m)**	–	–	–	–	–	–	–		
Well Stick-up Height (m):	0.78	**Temperature (°C) 3%**	0.7	0.7	0.8	0.9	0.8	0.8	0.8		
Estimated Water Volume (L):	~~50L~~ 12.5L	**pH (pH Units) ±0.1**	6.80	6.79	5.80	5.84	5.85	5.89	5.88		
		Cond. (µs/cm) 3%	1225	1226	1599	1601	1486	1218	1569		
		Specific Cond. (µs/cm) 3%	2294	2277	2971	2976	2761	2246	2915		
		Redox (mV) 10%	216.0	177.8	172.8	169.3	167.6	166.5	164.9		
		DO (mg/L) 10%	8.30	4.43	4.10	5.19	5.03	~~5.67~~ 5.67	4.89		
		DO (%) 10%	57.0	31.0	29.7	36.7	35.4	40.1	34.3		
		Appearance & Odour (Clear, Silty, HC odours, etc.)	turbid grey	turbid grey	turbid grey	turbid grey	turbid grey	turbid grey	turbid grey		
		Only for final readings — **Sulphide (mg/L)**	–	–	–	–	–	–	0.40		
		Only for final readings — **Turbidity (NTU)**	–	–	–	–	–	–	182		
		Interval Purge Volume (L)	10L	10L	10L	10L	10L	10L	10L		
		Cumulative Purge Volume (L):	10L	20L	30L	40L	50L	60L	70		

(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 logged on YSI (24hr):	CH-P-13-05/50	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
	10:44	Hydro lift			

HEMMERA

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

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

Sample Time: 10:45

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: no J-plug

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.9
Carbon Dioxide (C02)	PPM	520

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 (Nitric)	120mL	
1b	40 ml (glass)	Dissolved Mercury	15 mL	☒ Field Filtered	☒ HCL (Hydrochloric)	40mL	
2	1 L (plastic)	General Chemistry	200 ml	-	-	500mL	
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH (Sodium Hydroxide)	145mL	
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4 (Sulfuric)	120mL	
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3 (Nitric)	120mL	
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, then NaOH	120mL	
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-	120mL	
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-	120mL	

General Notes (Condition of well or other features):

-Tubing left in well
-Conductivity not stable after 5 well volumes

Crew Lead Sign Off (initials):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GL07-1	**Project Number:**	1343-005.11	**Date:**	Sept 2/2015
Approximate Date Drilled:	?	**Client:**	GY - AAM	**Samplers:**	SH + JC
Piezometer Diameter / Screen Length:	2" / ?	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Cloudy, 1-1°C
UTM Location:	Z.08 E.0388852 N. 6881709	**Waypoint:**	GPS Hem Name GL07-1	**Recovery:**	☐ Good ☒ Bad
Photos:	Cam. Hem Nos. 100 - 102	**Purge Method:**			
Duplicate Collected:	☐ Yes Name	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes Name				

Initial Depth to Water (m):	Frozen	**Purge Start Time:**		**Purge End Time:**		**Pen or YSI:**	☐ YSI Pro Plus ☐ Pen Unit			
Depth to Bottom (m):	13.847m	**Purge Interval Time (___) min, Vol. (___) L**								
Submerged Tubing Depth (m):	—	**Depth to water (m)**								
Well Stick-up Height (m):	0.82 m	**Temperature (°C) 3%**								
Estimated Water Volume (L):	None	**pH (pH Units) ±0.1**								
		Cond. (µs/cm) 3%								
		Specific Cond. (µs/cm) 3%								
		Redox (mV) 10%								
		DO (mg/L) 10%								
		DO (%) 10%								
		Appearance & Odour (Clear, Silty, HC odours, etc.)								
		Only for final readings	**Sulphide (mg/L)**							
			Turbidity (NTU)							
		Interval Purge Volume (L)								
		Cumulative Purge Volume (L):								

Not Sampled

(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 logged on YSI (24hr):		**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
		Not Sampled			

HEMMERA

Sample Site (Con't): GLL07-01

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

Sample Time: Not sampled

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	690

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 (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL (Hydrochloric)		
2	1 L (plastic)	General Chemistry	200 ml	-	-	Not	Sampled
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4 (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3 (Nitric)		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, then NaOH		
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

- Waterra tubing frozen into well.

Crew Lead Sign Off (initials):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GLL07-02	**Project Number:**	1343-005.11	**Date:**	Sept 3, 2015
Approximate Date Drilled:	?	**Client:**	GY - AAM	**Samplers:**	JH + JC
Piezometer Diameter / Screen Length:	6" / ?	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	cloudy / -2°C
UTM Location:	Z 08 E. 389069 N. 6881705	**Waypoint:**	GPS Item Name GLL07-02	**Recovery:**	☐ Good ☒ Bad
Photos:	Cam. Item Nos. 109-111	**Purge Method:**			
Duplicate Collected:	☐ Yes Name	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes Name		Not Purged		

Initial Depth to Water (m):	Dry	**Purge Start Time:**	X	**Purge End Time:**	X	**Pen or YSI:**	☐ YSI Pro Plus ☐ Pen Unit						
Depth to Bottom (m):	7.161m	**Purge Interval** Time (___) min, Vol. (___) L											
Submerged Tubing Depth (m):	-	**Depth to water (m)**											
Well Stick-up Height (m):	1.366m	**Temperature (°C) 3%**											
Estimated Water Volume (L):	None	**pH (pH Units) ±0.1**											
		Cond. (µs/cm) 3%											
		Specific Cond. (µs/cm) 3%											
		Redox (mV) 10%											
		DO (mg/L) 10%											
		DO (%) 10%											
		Appearance & Odour (Clear, Silty, HC odours, etc.)											
		Only for final readings	**Sulphide (mg/L)**										
			Turbidity (NTU)										
		Interval Purge Volume (L)											
		Cumulative Purge Volume (L):											

Not Sampled

- (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 logged on YSI (24hr):	X	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
		Not	Sampled		

HEMMERA

Sample Site (Con't): GL07-02

Sample Date (Con't): Sept 3, 2015

Sample Time: Not Sampled

Well Head Seal: ☐ J-Plug ☐ PVC Cap ☒ Not Sealed ☒ Other Metal Cap not closed properly

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	1250

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 (Nitric)	Not Sampled	
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL (Hydrochloric)		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4 (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3 (Nitric)		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, then NaOH		
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

- Well dry
- 6" steel casing
- bailer left in well from previous events

Crew Lead Sign Off (initials):	

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GLL07-03	**Project Number:**	1343-005.11	**Date:**	Sept 1, 2015
Approximate Date Drilled:	?	**Client:**	GY - AAM	**Samplers:**	SH + JC
Piezometer Diameter / Screen Length:	Unknown / 2"	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Cloudy, -1°C
UTM Location:	Z. 08 E. 0388014 N. 6881067	**Waypoint:**	GPS Hem Name GLL07-03*	**Recovery:**	[X] Good [ ] Bad
Photos:	Cam. Hem Nos. 044-046	**Purge Method:**			
Duplicate Collected:	[ ] Yes Name	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	[ ] Yes Name	X			

Initial Depth to Water (m):	3.812	**Purge Start Time:**	9:22	**Purge End Time:**	9:49	**Pen or YSI:**	[X] YSI Pro Plus [ ] Pen Unit						
Depth to Bottom (m):	11.690	**Purge Interval Time (___) min, Vol. (5) L**	9:35	9:39	9:42	9:44	9:46	9:49					
Submerged Tubing Depth (m):	11.2	**Depth to water (m)**	7.152	-	8.195	-	9.530						
Well Stick-up Height (m):	1.10m	**Temperature (°C) 3%**	2.1	1.6	1.4	1.7	1.6	1.5					
Estimated Water Volume (L):	16L	**pH (pH Units) ±0.1**	6.55	6.32	6.40	6.29	6.29	6.31					
		Cond. (µs/cm) 3%	407.1	404.5	404.2	405.6	405.5	408.6					
		Specific Cond. (µs/cm) 3%	724.6	730.6	735.4	732.3	737.5	741.2					
		Redox (mV) 10%	247.2	249.7	247.6	214.4	198.6	175.4					
		DO (mg/L) 10%	2.23	3.66	4.03	4.90	4.24	4.54					
		DO (%) 10%	19.6	26.1	28.3	34.9	37.2	32.4					
		Appearance & Odour (Clear, Silty, HC odours, etc.)	turbid yellow	turbid yellow	turbid yellow	turbid yellow	turbid yellow	turbid yellow					
		Only for final readings — **Sulphide (mg/L)**	-	-	-	-	-	0.80	← limit				
		Only for final readings — **Turbidity (NTU)**	-	-	-	-	-	over Range					
		Interval Purge Volume (L)	15L	5L	5L	5L	5L	5L					
		Cumulative Purge Volume (L):	15L	20L	25L	30L	45L	50L					

(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:	[X] Yes [ ] No	**Sample Method:**			
Time logged on YSI (24hr):	GLL07-03	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
	09:51	X			

HEMMERA

Sample Site (Con't): GL07-03

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

Sample Time: 9:45

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: although transducer in well with small cable coming out

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.9
Carbon Dioxide (C02)	PPM	610

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 (Nitric)	120mL	
1b	40 ml (glass)	Dissolved Mercury	15 mL	☒ Field Filtered	☒ HCL (Hydrochloric)	40mL	
2	1 L (plastic)	General Chemistry	200 ml	-	-	500mL	very turbid + yellow
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☒ NaOH (Sodium Hydroxide)	145mL	
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☒ H_2SO_4 (Sulfuric)	120mL	
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☒ HNO_3 (Nitric)	120mL	
6	120 ml (plastic)	Sulphide	100 ml	-	☒ Zinc Acetate, then NaOH	120mL	
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-	120mL	
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-	120mL	

General Notes (Condition of well or other features):

- All samples collected, water was very turbid + yellow and did not change throughout sampling
- Transducer in well

Crew Lead Sign Off (initials):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GSI-DC-01A	**Project Number:**	1343-005.11	**Date:**	Aug 31, 2015
Approximate Date Drilled:	?	**Client:**	GY - AAM	**Samplers:**	JH - JC
Piezometer Diameter / Screen Length:	2 1cm / ?	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	cloudy, 0°C
UTM Location:	Z. 08 E. 0387677 N. 6881123	**Waypoint:**	GPS Hem Name GSI-DC-01A16*	**Recovery:**	☐ Good ☑ Bad
Photos:	Cam. Hem Nos. 005-007	**Purge Method:**			
Duplicate Collected:	☐ Yes Name	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes Name				

Initial Depth to Water (m):	0.924 m	**Purge Start Time:**		**Purge End Time:**					**Pen or YSI:**	☐ YSI Pro Plus ☐ Pen Unit	
Depth to Bottom (m):	1.481 m	**Purge Interval** Time (___) min, Vol. (___) L									
Submerged Tubing Depth (m):	/	**Depth to water (m)**									
Well Stick-up Height (m):	0.93 m	**Temperature (°C) 3%**									
Estimated Water Volume (L):	0.283 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)**								
			Turbidity (NTU)								
		Interval Purge Volume (L)									
		Cumulative Purge Volume (L):									

Not purged

(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 logged on YSI (24hr):		**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
			Not Sampled		

HEMMERA

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

Sample Date (Con't):

Sample Time: Not Sampled

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 ~~PID Tracer~~, no headspace values

	Units	Values
Methane (CH4)	%LEL	~ 0
Oxygen (O2)	%	~ 20.4
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 (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL (Hydrochloric)		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4 (Sulfunc)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3 (Nitric)		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, then NaOH		
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

~ Not Sampled, as per scope

Crew Lead Sign Off (initials):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GSI-DC-01B	**Project Number:**	1343-005.11	**Date:**	Aug 31, 2015
Approximate Date Drilled:	?	**Client:**	GY - AAM	**Samplers:**	JH + JC
Piezometer Diameter / Screen Length:	2.1cm / ?	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	cloudy, 0°C
UTM Location:	Z. 08 E. 0387677 N. 6881123	**Waypoint:**	GPS Hem Name GSI-DC-01AB*	**Recovery:**	☐ Good ☒ Bad
Photos:	Cam. Hem Nos. 005-007	**Purge Method:**			
Duplicate Collected:	☐ Yes Name	**Waterra**	**Peristaltic** Not purged	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes ~~Name~~				

Initial Depth to Water (m):	1.478m	**Purge Start Time:**		**Purge End Time:**				**Pen or YSI:**	☐ YSI Pro Plus ☐ Pen Unit				
Depth to Bottom (m):	~~1.599~~ 1.599m	**Purge Interval Time (___) min, Vol. (___) L**											
Submerged Tubing Depth (m):	1.55m	**Depth to water (m)**											
Well Stick-up Height (m):	0.95m	**Temperature (°C) 3%**											
Estimated Water Volume (L):	0.061L	**pH (pH Units) ±0.1**											
(1.599 - 1.478) * .508 = 0.061 L		**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):**											

Not purged

Mercury only

YSI Field Parameters Logged:	☐ Yes ☒ No	**Sample Method:**			
Time logged on YSI (24hr):		**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
			X		

HEMMERA

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

Sample Date (Con't): Aug 31, 2015

Sample Time: 09:30

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: _____

Head Space Gas Measurements + ~~PID Frozen~~, ~~no headspace values~~

	Units	Values
Methane (CH4)	%LEL	– 0
Oxygen (O2)	%	– 20.4
Carbon Dioxide (C02)	PPM	– 690

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 (Nitric)	–	–
1b	40 ml (glass)	Dissolved Mercury	15 mL	☒ Field Filtered	☒ HCL (Hydrochloric)	12 mL	
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4 (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3 (Nitric)		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, then NaOH		
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

- Used 2m of 1/4" tubing
- Used 6" of silicone
- Only removed 12mL of water

Crew Lead Sign Off (initials):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GSI-DC-02A	**Project Number:**	1343-005.11	**Date:**	Aug 31, 2015
Approximate Date Drilled:	?	**Client:**	GY - AAM	**Samplers:**	JH + JC
Piezometer Diameter / Screen Length:	2.1cm / ?	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	cloudy / 0°C
UTM Location:	Z. 08 E. 0387887 N. 6881128	**Waypoint:**	GPS Hem Name GSI-DC-02A16	**Recovery:**	☐ Good ☐ Bad
Photos:	Cam. Hem Nos. 008-010	**Purge Method:**			
Duplicate Collected:	☐ Yes Name	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes Name				

Initial Depth to Water (m):	1.493m	**Purge Start Time:**		**Purge End Time:**		**Pen or YSI:**	☐ YSI Pro Plus ☐ Pen Unit				
Depth to Bottom (m):	2.016m	**Purge Interval Time (___) min, Vol. (___) L**									
Submerged Tubing Depth (m):	/	**Depth to water (m)**									
Well Stick-up Height (m):	0.992m	**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)**								
			Turbidity (NTU)								
		Interval Purge Volume (L)									
		Cumulative Purge Volume (L):									

Not purged or sampled

(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 logged on YSI (24hr):		**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**

HEMMERA

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

Sample Date (Con't): Aug 31, 2015

Sample Time: Not Sampled

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	830

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 (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL (Hydrochloric)		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4 (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3 (Nitric)		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, then NaOH		
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

- Not Sampled as per scope

Crew Lead Sign Off (initials):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GSI-DC-02B	**Project Number:**	1343-005.11	**Date:**	Aug 31, 2015
Approximate Date Drilled:	?	**Client:**	GY - AAM	**Samplers:**	JA + JC
Piezometer Diameter / Screen Length:	2.1cm / ?	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	cloudy / 0°C
UTM Location:	Z. 08 E. 0357537 N. 6881128	**Waypoint:**	GPS Hem Name GSI-DC-02A/B*	**Recovery:**	☐ Good ☒ Bad
Photos:	Cam. Hem Nos. 008-010	**Purge Method:**			
Duplicate Collected:	☐ Yes Name	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes Name	Not	purged		

Initial Depth to Water (m):	1.849m	**Purge Start Time:**		**Purge End Time:**		**Pen or YSI:**	☐ YSI ~~Pro~~ Plus ☐ Pen Unit				
Depth to Bottom (m):	3.867m	**Purge Interval Time (___) min, Vol. (___) L**									
Submerged Tubing Depth (m):	N/A	**Depth to water (m)**									
Well Stick-up Height (m):	0.923m	**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)**								
			Turbidity (NTU)								
		Interval Purge Volume (L)									
		Cumulative Purge Volume (L):									

Direct Sample

(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 logged on YSI (24hr):		**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
			X		

HEMMERA

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

Sample Date (Con't): Aug 31, 2015

Sample Time: 10:30

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: _____

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.4
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 (Nitric)	100mL	
1b	40 ml (glass)	Dissolved Mercury	15 mL	☒ Field Filtered	☒ HCL (Hydrochloric)	20mL	
2	1 L (plastic)	General Chemistry	200 ml	-	-	200mL	turbid
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☒ NaOH (Sodium Hydroxide)	100mL	collected sept 2 @ 17:10
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☒ H_2SO_4 (Sulfuric)	120mL	
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☒ HNO_3 (Nitric)	50mL	
6	120 ml (plastic)	Sulphide	100 ml	-	☒ Zinc Acetate, then NaOH	100mL	
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-	100mL	
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☒ Field Filtered	-	70mL	

General Notes (Condition of well or other features):

- Direct sample
- Only removed 320mL before going dry
- Used 4m of ¼ tubing
- Used 6" of silicone

Sept 2, 2015
We returned to finish collecting the sample set. DTW is 2.118m stop.

Crew Lead Sign Off (initials): _____

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GSI-DC-03A	**Project Number:**	1343-005.11	**Date:**	Aug 31, 2015
Approximate Date Drilled:	?	**Client:**	GY - AAM	**Samplers:**	JA + JC
Piezometer Diameter / Screen Length:	2.1cm / ?	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Snow / -2°C
UTM Location:	Z. 08 E. 0399106 N. 6881686	**Waypoint:**	GPS Hem Name GSI-DC-03A/16*	**Recovery:**	☐ Good ☐ Bad
Photos:	Cam. Hem Nos. 041-043	**Purge Method:**			
Duplicate Collected:	☐ Yes Name ~~X~~	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes Name ~~X~~	Did not purge			

Initial Depth to Water (m):	1.179 m	**Purge Start Time:**	X	**Purge End Time:**	X	**Pen or YSI:**	☐ YSI Pro Plus ☐ Pen Unit				
Depth to Bottom (m):	1.979m	**Purge Interval Time (___) min, Vol. (___) L**									
Submerged Tubing Depth (m):	~~X~~	**Depth to water (m)**									
Well Stick-up Height (m):	0.958	**Temperature (°C) 3%**									
Estimated Water Volume (L):	0.406	**pH (pH Units) ±0.1**									
		Cond. (µs/cm) 3%									
		Specific Cond. (µs/cm) 3%									
		Redox (mV) 10%									
		DO (mg/L) 10%									
		DO (%) 10%									
		Appearance & Odour (Clear, Silty, HC odours, etc.)									
		Only for final readings	**Sulphide (mg/L)**								
			Turbidity (NTU)								
		Interval Purge Volume (L)									
		Cumulative Purge Volume (L):									

Did not purge

(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 logged on YSI (24hr):		**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
		Did not Sample			

HEMMERA

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

Sample Date (Con't): Aug 31, 2006

Sample Time: ~~17:30~~ Not Sampled

Well Head Seal: ☐ J-Plug ☐ PVC Cap ☐ Not Sealed ☒ Other Ziplock + tape

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

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

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	20.9
Oxygen (O2)	%	8
Carbon Dioxide (C02)	PPM	1.31%

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 (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL (Hydrochloric)		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH (Sodium Hydroxide)	Not Sampled	
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4 (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3 (Nitric)		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, then NaOH		
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

- Not Sampled, as per scope

Crew Lead Sign Off (initials):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GSI-DC-03B	**Project Number:**	1343-005.11	**Date:**	Aug 31, 2015
Approximate Date Drilled:		**Client:**	GY - AAM	**Samplers:**	JH + JC
Piezometer Diameter / Screen Length:	2.1cm / ?	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Cloudy / Snow / -19°C
UTM Location:	Z. 08 E. 638806 N. 6881086	**Waypoint:**	GPS Item Name GSI-DC-03B	**Recovery:**	☐ Good ☒ Bad
Photos:	Camera Nos. 041-045	**Purge Method:**			
Duplicate Collected:	☐ Yes Name	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes ☒ Name	Did Not Purge			

Initial Depth to Water (m):	1.327m	**Purge Start Time:**	X		**Purge End Time:**	X					**Pen or YSI:**	☐ YSI Pro Plus ☐ Pen Unit					
Depth to Bottom (m):	3.837m	**Purge Interval Time (___) min, Vol. (___) L**	-														
Submerged Tubing Depth (m):	3.8m	**Depth to water (m)**	Direct														
Well Stick-up Height (m):	0.962m	**Temperature (°C) 3%**															
Estimated Water Volume (L):	1.275 L	**pH (pH Units) ±0.1**															
		Cond. (µs/cm) 3%															
		Specific Cond. (µs/cm) 3%	Sample														
		Redox (mV) 10%															
		DO (mg/L) 10%															
		DO (%) 10%															
		Appearance & Odour (Clear, Silty, HC odours, etc.)															
		Only for final readings	**Sulphide (mg/L)**														
			Turbidity (NTU)														
		Interval Purge Volume (L)															
		Cumulative Purge Volume (L):															

(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 logged on YSI (24hr):		**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
			X		

HEMMERA

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

Sample Date (Con't): Aug 31, 2015

Sample Time: 17:30

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: _____

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	~~0~~
Oxygen (O2)	%	20.9
Carbon Dioxide (C02)	~~PPM~~	1.26 %

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 (Nitric)	100mL	—
1b	40 ml (glass)	Dissolved Mercury	15 mL	☒ Field Filtered	☒ HCL (Hydrochloric)	20mL	—
2	1 L (plastic)	General Chemistry	200 ml	-	-	200mL	—
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☒ NaOH (Sodium Hydroxide)	145mL	—
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☒ H_2SO_4 (Sulfuric)	120mL	—
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☒ HNO_3 (Nitric)	50mL	
6	120 ml (plastic)	Sulphide	100 ml	-	☒ Zinc Acetate, then NaOH	100mL	
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-	—	—
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-	—	—

General Notes (Condition of well or other features):

- Well is located in the middle of a stream.
- Did not purge due to sampling history
- Wet dry at 735mL

Crew Lead Sign Off (initials): _____

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GSI-DEQ5 - MP-A	**Project Number:**	1343-005.11	**Date:**	SEPT 1 2015
Approximate Date Drilled:	UNKNOWN	**Client:**	GY - AAM	**Samplers:**	GR + AN
Piezometer Diameter / Screen Length:	1" STEEL / UNKNOWN	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	~7°C OVERCAST
UTM Location:	Z. 08V E. 0388722 N. 6880831	**Waypoint:**	GPS ___ Name ___	**Recovery:**	☐ Good ☐ Bad
Photos:	Cam ELR Nos. ~~2-90 - 2-95~~ 0046 - 0049	**Purge Method:**			
Duplicate Collected:	☐ Yes Name	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes Name	/	/	/	/

Initial Depth to Water (m):	1.200	**Purge Start Time:**	/	**Purge End Time:**	/	**Pen or YSI:**	☐ YSI Pro Plus ☐ Pen Unit				
Depth to Bottom (m):	1.870 + 0.082 = 1.952	**Purge Interval Time (___) min, Vol. (___) L**									
Submerged Tubing Depth (m):	1.95 (APPROX)	**Depth to water (m)**									
Well Stick-up Height (m):	1.075	**Temperature (°C) 3%**									
Estimated Water Volume (L):	~ 0.382	**pH (pH Units) ±0.1**									
		Cond. (µs/cm) 3%									
		Specific Cond. (µs/cm) 3%									
		Redox (mV) 10%									
		DO (mg/L) 10%									
		DO (%) 10%									
		Appearance & Odour (Clear, Silty, HC odours, etc.)									
		Only for final readings	**Sulphide (mg/L)**								
			Turbidity (NTU)								
		Interval Purge Volume (L)									
		Cumulative Purge Volume (L):									

MONITOR ONLY

(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 logged on YSI (24hr):	/	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
/	/		/	/	/

HEMMERA

Sample Site (Con't): GS1-DG05A

Sample Date (Con't): — MONITOR ONLY

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: UNCERTAIN

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.9
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 (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL (Hydrochloric)		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH (Sodium Hydroxide)	MONITOR ONLY	
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4 (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3 (Nitric)		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, then NaOH		
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

PLASTIC BAG ON WELL IS CAP. BRING CAPS NEXT TIME. PHOTO #

NEEDS SCREW ON PLASTIC CAP.

Crew Lead Sign Off (initials):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GS1 - DG05B ~~UNKNOWN~~	**Project Number:**	1343-005.11	**Date:**	SEPT 1 2015
Approximate Date Drilled:	UNKNOWN	**Client:**	GY - AAM	**Samplers:**	AN GMR
Piezometer Diameter / Screen Length:	1" STEEL / UNKNOWN	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	~4° OVERCAST
UTM Location:	Z.08V E.0388722 N.6880831	**Waypoint:**	GPS ___ Name _____	**Recovery:**	☐ Good ☐ Bad
Photos:	Cam ELR Nos. ~~290~~ ~~293~~	**Purge Method:**			
Duplicate Collected:	☐ ~~Yes~~ Name 0046-0049	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ ~~Yes~~ Name _____	DIRECT SAMPLE			

Initial Depth to Water (m):	0.703	**Purge Start Time:**	9.44	**Purge End Time:**	✓	**Pen or YSI:**	☒ YSI Pro Plus ☐ Pen Unit				
Depth to Bottom (m):	2.762 + 0.082 = 2.844	**Purge Interval Time (___) min, Vol. (___) L**									
Submerged Tubing Depth (m):	✓	**Depth to water (m)**	DIRECT SAMPLED								
Well Stick-up Height (m):	0.622	**Temperature (°C) 3%**									
Estimated Water Volume (L):	1.444	**pH (pH Units) ±0.1**	TRIED TO PURGE. AFTER FIRST SAMPLE								
		Cond. (µs/cm) 3%	SET, BUT WENT DRY								
		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)**	0.71								
		Only for final readings — **Turbidity (NTU)**	183								
		Interval Purge Volume (L)									
		Cumulative Purge Volume (L):									

(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 logged on YSI (24hr):	9.46	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
4 ENOUGH IN FLOW THROUGH TO LOG THEN DRY			✓		

HEMMERA

Sample Site (Con't): GS1-OCP5-MP-#13

Sample Date (Con't): SEPT 1 2015

Sample Time: 9.15

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

Seal Replaced: ☐ J-Plug ☐ PVC Cap ☐ Not required ☐ Other ~~BEFORE BT~~

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

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	Ø
Oxygen (O2)	%	20.9
Carbon Dioxide (C02)	PPM	~~Ø~~ 1200

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 (Nitric)	100	P	
1b	40 ml (glass)	Dissolved Mercury	15 mL	☒ Field Filtered	☒ HCL (Hydrochloric)	40	P	
2	1 L (plastic)	General Chemistry	200 ml	-	-	200	P	
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☒ NaOH (Sodium Hydroxide)	100	P	
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☒ H_2SO_4 (Sulfuric)	120	F	
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☒ HNO_3 (Nitric)	50	P	
6	120 ml (plastic)	Sulphide	100 ml	-	☒ Zinc Acetate, then NaOH	100	P	
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-	100	P	
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-	100	P	

General Notes (Condition of well or other features):

Crew Lead Sign Off (initials):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GSI-DC-06A	**Project Number:**	1343-005.11	**Date:**	Sept 3, 2015
Approximate Date Drilled:	?	**Client:**	GY - AAM	**Samplers:**	JH + JC
Piezometer Diameter / Screen Length:	2.1cm / ?	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Sunny / 4°C
UTM Location:	Z. 08 E. 389788 N. 6884567	**Waypoint:**	GPS Hem Name GSI-DC-06A-D*	**Recovery:**	☐ Good ☐ Bad
Photos:	Cam. Hem Nos. 119-121	**Purge Method:**			
Duplicate Collected:	☐ Yes ~~Name~~	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes ~~Name~~		Not Purged		

Initial Depth to Water (m):	0.925m	**Purge Start Time:**	X	**Purge End Time:**	X	**Pen or YSI:**	☐ ~~YSI Pro Plus~~ ☐ Pen Unit						
Depth to Bottom (m):	2.001m	**Purge Interval Time (___) min, Vol. (___) L**											
Submerged Tubing Depth (m):	—	**Depth to water (m)**											
Well Stick-up Height (m):	0.83m	**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)**										
			Turbidity (NTU)										
		Interval Purge Volume (L)											
		Cumulative Purge Volume (L):											

Not Sampled

(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 logged on YSI (24hr):		**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
		Not Sampled			

HEMMERA

Sample Site (Con't): GSI-DC-06A

Sample Date (Con't): Sept 3, 2015

Sample Time: Not Sampled

Well Head Seal: ☐ J-Plug ☐ PVC Cap ☐ Not Sealed ☒ Other Ziplock + Tape

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	660

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 (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL (Hydrochloric)		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH (Sodium Hydroxide)	Not Sampled	
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4 (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3 (Nitric)		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, then NaOH		
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

Not Sampled. as per scope

Crew Lead Sign Off (initials):	

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GSI-DC-06B	**Project Number:**	1343-005.11	**Date:**	Sept 3, 2015
Approximate Date Drilled:	?	**Client:**	GY - AAM	**Samplers:**	JH + JC
Piezometer Diameter / Screen Length:	2.1cm / ?	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Sunny / 4°C
UTM Location:	Z. 08 E. 389783 N. 6880567	**Waypoint:**	GPS Hem Name GSI-DC-06A+B	**Recovery:**	☒ Good ☐ Bad
Photos:	Cam Hem Nos. 119-121	**Purge Method:**			
Duplicate Collected:	☒ Yes Name MW15-500	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes Name		X		

Initial Depth to Water (m):	0.059m
Depth to Bottom (m):	2.913m
Submerged Tubing Depth (m):	2.95m
Well Stick-up Height (m):	0.48m
Estimated Water Volume (L):	1.4L

(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

Purge Start Time:	13:32	**Purge End Time:**	13:47			**Pen or YSI:**	☒ YSI Pro Plus ☐ Pen Unit		
Purge Interval Time (3) min, Vol. (___) L	13:33	13:36	13:39	13:43	13:46				
Depth to water (m)	–	–	1.685	–	–				
Temperature (°C) 3%	3.4	3.4	4.9	3.2	2.9				
pH (pH Units) ±0.1	7.18	7.26	7.32	7.39	7.40				
Cond. (µs/cm) 3%	779	772	823	845	845				
Specific Cond. (µs/cm) 3%	1340	1315	1336	1448	1457				
Redox (mV) 10%	26.2	-73.9	-100.2	-122.2	-127.4				
DO (mg/L) 10%	0.94	0.23	0.23	0.18	0.16				
DO (%) 10%	6.4	1.8	1.8	1.3	1.1				
Appearance & Odour (Clear, Silty, HC odours, etc.)	turbid	less turbid	some	some	clear				
Only for final readings: Sulphide (mg/L)	–	–	–	–	0.03				
Only for final readings: Turbidity (NTU)	–	–	–	–	18				
Interval Purge Volume (L)	0.1L	0.3L	0.3L	0.3L	0.3L				
Cumulative Purge Volume (L):	0.1L	0.4L	0.7L	1.0L	1.3L				

Removed tubing to measure DTW. Water appears to recover at a noticable rate.

YSI Field Parameters Logged:	☐ Yes ☒ No	**Sample Method:**			
Time logged on YSI (24hr):		**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
			X		

HEMMERA

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

Sample Date (Con't): Sept 3, 2015

Sample Time: 13:55

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: _____

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.9
Carbon Dioxide (C02)	PPM	610

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 (Nitric)	Full	
1b	40 ml (glass)	Dissolved Mercury	15 mL	☒ Field Filtered	☒ HCL (Hydrochloric)		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☒ NaOH (Sodium Hydroxide)		turbid
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☒ H_2SO_4 (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☒ HNO_3 (Nitric)		
6	120 ml (plastic)	Sulphide	100 ml	-	☒ Zinc Acetate, then NaOH		
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☒ Field Filtered	-		

General Notes (Condition of well or other features):

- Collected duplicate MW15-500
- Used: 4m 1/4 tubing (ELR)
  - 6" silicone (ELR)

Crew Lead Sign Off (initials):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GSI-DC-07A	**Project Number:**	1343-005.11	**Date:**	Sept 3, 2015
Approximate Date Drilled:	?	**Client:**	GY - AAM	**Samplers:**	JH + JC
Piezometer Diameter / Screen Length:	2cm / ?	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Sunny / 12°C
UTM Location:	Z. 03 E. 0371003 N. 6930640	**Waypoint:**	GPS Item Name GSI-DC07A WP	**Recovery:**	☐ Good ☐ Bad
Photos:	Cam. Item Nos. 121 - 124	**Purge Method:**			
Duplicate Collected:	☐ Yes Name ~~X~~	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes ~~Name~~ X	Not purged			

Initial Depth to Water (m):	1.324m	**Purge Start Time:**	X	**Purge End Time:**	X	**Pen or YSI:**	☒ YSI Pro Plus ☐ Pen Unit				
Depth to Bottom (m):	2.001m	**Purge Interval** Time (___) min, Vol. (___) L									
Submerged Tubing Depth (m):	—	**Depth to water (m)**									
Well Stick-up Height (m):	1.03m	**Temperature (°C) 3%**									
Estimated Water Volume (L):	—	**pH (pH Units) ±0.1**									
		Cond. (µs/cm) 3%									
		Specific Cond. (µs/cm) 3%	Not Sampled								
		Redox (mV) 10%									
		DO (mg/L) 10%									
		DO (%) 10%									
		Appearance & Odour (Clear, Silty, HC odours, etc.)									
		Only for final readings	**Sulphide (mg/L)**								
			Turbidity (NTU)								
		Interval Purge Volume (L)									
		Cumulative Purge Volume (L):									

(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 logged on YSI (24hr):	X	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
		Not	Sampled		

HEMMERA

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

Sample Date (Con't): Sept 3, 2015

Sample Time: Not Sampled

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

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	520

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 (Nitric)	Not Sampled	
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL (Hydrochloric)		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4 (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3 (Nitric)		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, then NaOH		
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

Crew Lead Sign Off (initials):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GSI-DC-07B	**Project Number:**	1343-005.11	**Date:**	Sept 3 2015
Approximate Date Drilled:	?	**Client:**	GY - AAM	**Samplers:**	JH + JC
Piezometer Diameter / Screen Length:	2.1 cm / ?	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Sunny / 12°C
UTM Location:	Z.08 E0590063 N.6880640	**Waypoint:**	GPS Item Name GSI-DC-07B	**Recovery:**	☒ Good ☐ Bad
Photos:	Cam. Item Nos. 121-124	**Purge Method:**			
Duplicate Collected:	☐ Yes Name	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes Name		X		

Initial Depth to Water (m):	1.419m	**Purge Start Time:**	14:47	**Purge End Time:**	15:07	**Pen or YSI:**	☒ YSI Pro Plus ☐ Pen Unit				
Depth to Bottom (m):	3.811m	**Purge Interval Time (3) min, Vol. (___) L**	M:51	14:54	14:57	15:00	15:03	15:06			
Submerged Tubing Depth (m):	3.75	**Depth to water (m)**	-	1.425	1.420	-	-	-			
Well Stick-up Height (m):	1.00m	**Temperature (°C) 3%**	4.2	3.0	2.6	2.5	2.5	2.4			
Estimated Water Volume (L):	1.2L	**pH (pH Units) ±0.1**	7.17	6.90	6.86	6.86	6.85	6.85			
		Cond. (µs/cm) 3%	751	777	777	780	783	782			
		Specific Cond. (µs/cm) 3%	1281	1342	1357	1367	1376	1377			
		Redox (mV) 10%	-13.1	-28.9	-35.8	-42.2	-46.4	-50.4			
		DO (mg/L) 10%	0.99	0.24	0.17	0.17	0.13	0.11			
		DO (%) 10%	7.1	1.8	1.3	1.0	0.9	0.9			
		Appearance & Odour (Clear, Silty, HC odours, etc.)	turbid	less turbid	less turbid	Some. moderate	clear	clear			
		Only for final readings Sulphide (mg/L)	—	—	—	—	—	0.03			
		Only for final readings Turbidity (NTU)	—	—	—	—	—	15.3			
		Interval Purge Volume (L)	0.3L	0.5L	0.5L	0.5	0.5	0.5			
		Cumulative Purge Volume (L):	0.3L	0.8L	1.3L	1.8	2.3L	2.8			

(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 logged on YSI (24hr):	GSI-DC-07B 15:08	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
			X		

HEMMERA

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

Sample Date (Con't): Sept 3, 2015

Sample Time: 15:15

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: _____

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.6
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 (Nitric)	Full	
1b	40 ml (glass)	Dissolved Mercury	15 mL	☒ Field Filtered	☒ HCL (Hydrochloric)		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☒ NaOH (Sodium Hydroxide)		Slightly turbid
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☒ H_2SO_4 (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☒ HNO_3 (Nitric)		
6	120 ml (plastic)	Sulphide	100 ml	-	☒ Zinc Acetate, then NaOH		
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☒ Field Filtered	-		

General Notes (Condition of well or other features):

- Very good recharge
- Used - 4m 1/4" tubing (ELR)
  - 6" silicone (ELR)

Crew Lead Sign Off (initials):

1" STEEL DP CAPS. SEE 0108-~~0110~~ 0110

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	~~GS~~ GS1-DC-08A	**Project Number:**	1343-005.11	**Date:**	SEPT 3 2015
Approximate Date Drilled:	UNKNOWN	**Client:**	GY - AAM	**Samplers:**	AN + GR
Piezometer Diameter / Screen Length:	1" steel / UNKNOWN	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	~7°C OVERCAST
UTM Location:	Z 08V E 0390307 N. 6880584	**Waypoint:**	GPS GR Name UTMS ONLY	**Recovery:**	☐ Good ☒ Bad
Photos:	Cam. GR Nos. ~~348-351~~	**Purge Method:**			
Duplicate Collected:	☐ Yes Name 0104 - 107	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes Name				

Initial Depth to Water (m):	1.256	**Purge Start Time:**		**Purge End Time:**				**Pen or YSI:**	☐ YSI Pro Plus ☐ Pen Unit				
Depth to Bottom (m):	1.855	**Purge Interval** Time (___) min, Vol. (___) L											
Submerged Tubing Depth (m):		**Depth to water (m)**											
Well Stick-up Height (m):		**Temperature (°C) 3%**											
Estimated Water Volume (L):		**pH (pH Units) ±0.1**											
		Cond. (µs/cm) 3%											
		Specific Cond. (µs/cm) 3%											
		Redox (mV) 10%											
		DO (mg/L) 10%											
		DO (%) 10%											
		Appearance & Odour (Clear, Silty, HC odours, etc.)											
		Only for final readings	**Sulphide (mg/L)**										
			Turbidity (NTU)										
		Interval Purge Volume (L)											
		Cumulative Purge Volume (L):											

(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 logged on YSI (24hr):		**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**

HEMMERA

Sample Site (Con't): GS1-DC-08A

Sample Date (Con't): _____

Sample Time: _____

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

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

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

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	Ø
Oxygen (O2)	%	20.9
Carbon Dioxide (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 (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL (Hydrochloric)		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4 (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3 (Nitric)		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, then NaOH		
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

MONITOR ONLY

General Notes (Condition of well or other features):

Crew Lead Sign Off (initials):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GS1-OC-0813	**Project Number:**	1343-005.11	**Date:**	SEPT 4 2015
Approximate Date Drilled:	UNKNOWN	**Client:**	GY - AAM	**Samplers:**	GR + JH
Piezometer Diameter / Screen Length:	1" STEEL / UNKNOWN	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	~4°C OVERCAST
UTM Location:	Z. 08V E. 0390307 N. 6880584	**Waypoint:**	GPS GR Name UTMS ONLY	**Recovery:**	☐ Good ☒ Bad
Photos:	Cam GR Nos. 0104 - 0107	**Purge Method:**			
Duplicate Collected:	☐ Yes Name _____	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes Name _____		WM		

Initial Depth to Water (m):	SEPT 3 2015 0.811	**Purge Start Time:**		**Purge End Time:**					**Pen or YSI:**	☐ YSI Pro Plus ☐ Pen Unit	
Depth to Bottom (m):	2.777	**Purge Interval** Time (___) min, Vol. (___) L									
Submerged Tubing Depth (m):	—	**Depth to water (m)**									
Well Stick-up Height (m):		**Temperature (°C) 3%**									
Estimated Water Volume (L):	0.99	**pH (pH Units) ±0.1**									
SEE NOTES PREVIOUS DAY.		**Cond. (µs/cm) 3%**									
		Specific Cond. (µs/cm) 3%									
		Redox (mV) 10%									
		DO (mg/L) 10%									
		DO (%) 10%									
		Appearance & Odour (Clear, Silty, HC odours, etc.)									
		Only for final readings	**Sulphide (mg/L)**								
			Turbidity (NTU)								
		Interval Purge Volume (L)									
		Cumulative Purge Volume (L):									

DUPLICATE SAMPLE. DUPLICATE TAKEN AT THIS SITE. HAD TO PURGE THE PREVIOUS DAY.

YSI Field Parameters Logged:	☐ Yes ☒ No	**Sample Method:**			
Time logged on YSI (24hr):		**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
			X		

HEMMERA

GS1-DC-083

Sample Site (Con't): ~~Sept 4 2015~~

Sample Date (Con't): Sept 4 2015

Sample Time: 0735

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 ~~See Field Log Book~~

	Units	Values
Methane (CH4)	%LEL	Ø
Oxygen (O2)	%	20.9
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 (Nitric)	~~120~~	See below
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL (Hydrochloric)		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4 (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3 (Nitric)		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, then NaOH		
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features): TRIED TO PURGE ON SEPT 3 2015 - WELL WENT DRY RETURNED ON SEPT 4.

PHOTOS OF 1" STEEL DP CAP 108-110

Direct Sample 210 ml unfiltered + unpreserved.

VERY TURBID

WHEN CREW TRIED TO FILTER, THE FILTERED WATER WAS STILL TURBID. 5-6 FILTERS WERE USED. DP LIKELY IN VERY FINE SILT OR CLAYS.

Crew Lead Sign Off (initials):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GS1-OC-09A	**Project Number:**	1343-005.11	**Date:**	SEPT 3 2015
Approximate Date Drilled:	UNKNOWN	**Client:**	GY - AAM	**Samplers:**	GR + AN
Piezometer Diameter / Screen Length:	1" STEEL / UNKNOWN	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	~10 °C SUNNY W/ CLOUD
UTM Location:	Z. 08V E. 0390612 N. 6880490	**Waypoint:**	GPS GR Name UTMS ONLY	**Recovery:**	☐ Good ☐ Bad
Photos:	Cam. ECR Nos. ~~343~~ -347	**Purge Method:**			
Duplicate Collected:	☐ Yes Name 0099-103	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes Name		X		

Initial Depth to Water (m):	1.152	**Purge Start Time:**		**Purge End Time:**		**Pen or YSI:**	☐ YSI Pro Plus ☐ Pen Unit				
Depth to Bottom (m):	1.853	**Purge Interval Time (___) min, Vol. (___) L**									
Submerged Tubing Depth (m):		**Depth to water (m)**									
Well Stick-up Height (m):	0.885	**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)**								
			Turbidity (NTU)								
		Interval Purge Volume (L)									
		Cumulative Purge Volume (L):									

MONITOR ONLY

(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 logged on YSI (24hr):		**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
			X		

HEMMERA

Sample Site (Con't): GS1-OC-09A

Sample Date (Con't): SEPT 3 2015

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)	%	20.7
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 (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL (Hydrochloric)		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4 (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3 (Nitric)		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, then NaOH		
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

MONITOR ONLY

General Notes (Condition of well or other features):

Crew Lead Sign Off (initials):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GSI-DC-093	**Project Number:**	1343-005.11	**Date:**	SEPT 3 2015
Approximate Date Drilled:	UNKNOWN	**Client:**	GY - AAM	**Samplers:**	GR + AN
Piezometer Diameter / Screen Length:	1" STEEL / UNKNOWN	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	~10°C SUNNY w/ CLOUDS
UTM Location:	Z. 08V E. ~~688~~ 0390612 N. 6880490	**Waypoint:**	GPS GR Name UTMS ONLY	**Recovery:**	☒ Good ☐ Bad
Photos:	Cam. ELR Nos. ~~345-347~~ 0099-103	**Purge Method:**			
Duplicate Collected:	☐ Yes Name /	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes Name /		X		

Initial Depth to Water (m):	1.202	**Purge Start Time:**	1424	**Purge End Time:**	1444	**Pen or YSI:**	☒ YSI Pro Plus ☐ Pen Unit					
Depth to Bottom (m):	1.855	**Purge Interval Time (3) min, Vol. (___) L**	1427	1430	1434	~~1438~~	1444					
Submerged Tubing Depth (m):	1.85	**Depth to water (m)**	—									
Well Stick-up Height (m):	0.894	**Temperature (°C) 3%**	5.1	4.7	4.3	3.7	3.5					
Estimated Water Volume (L):	0.331	**pH (pH Units) ±0.1**	6.73	6.80	6.85	6.87	6.88					
0.653 × 0.508 = 331 ml		**Cond. (µs/cm) 3%**	435.2	411.9	392.4	369.8	339.4					
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Specific Cond. (µs/cm) 3%**	696.2	672.6	649.9	622.5	575.6					
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**Redox (mV) 10%**	-48.2	-55.6	-61.5	-65.4	-69.3					
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 (mg/L) 10%**	0.43	0.34	0.29	0.27	0.24					
		DO (%) 10%	3.4	2.7	2.2	2.0	1.9					
		Appearance & Odour (Clear, Silty, HC odours, etc.)	CLEAR SLIGHT SULFUR ODOUR	CLEAR → ODOUR →	→	→	→					
		Only for final readings — **Sulphide (mg/L)**					0.05					
		Only for final readings — **Turbidity (NTU)**					1.29					
		Interval Purge Volume (L)	~~0.2~~ 0.02	0.3	0.3	0.4	0.8					
		Cumulative Purge Volume (L):	0.2	0.5	0.8	1.2	2					

YSI Field Parameters Logged:	☒ Yes ☐ No	**Sample Method:**			
Time logged on YSI (24hr):	1446	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
	~~1446~~		X VERY SLOW		

HEMMERA

Sample Site (Con't): GS1-DC-09B

Sample Date (Con't): SEPT 3 2015

Sample Time: 14-50.

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: Good

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.7
Carbon Dioxide (C02)	PPM	~~2700~~ 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 (Nitric)	FULL	
1b	40 ml (glass)	Dissolved Mercury	15 mL	☒ Field Filtered	☒ HCL (Hydrochloric)		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☒ NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☒ H_2SO_4 (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☒ HNO_3 (Nitric)		
6	120 ml (plastic)	Sulphide	100 ml	-	☒ Zinc Acetate, then NaOH		
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☒ Field Filtered	-		

General Notes (Condition of well or other features):

9 FT PERI TUBING (ELR)

6" SILICONE (ELR)

Crew Lead Sign Off (initials):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GSI-DC-10A	**Project Number:**	1343-005.11	**Date:**	SEPT 3 2015
Approximate Date Drilled:	UNKNOWN	**Client:**	GY - AAM	**Samplers:**	GR + AN
Piezometer Diameter / Screen Length:	1" STEEL / UNKNOWN	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	~7°C SUNNY.
UTM Location:	Z 08V E 0390861 N. 6880451	**Waypoint:**	GPS GR Name UTMS ONLY	**Recovery:**	☐ Good ☐ Bad
Photos:	Cam. ELC Nos. ~~374-375~~ 0095-0098	**Purge Method:**			
Duplicate Collected:	☐ Yes Name	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes Name		✓		

Initial Depth to Water (m):	1.101	**Purge Start Time:**		**Purge End Time:**			**Pen or YSI:**	☐ YSI Pro Plus ☐ Pen Unit									
Depth to Bottom (m):	1.850	**Purge Interval** Time (___) min, Vol. (___) L															
Submerged Tubing Depth (m):		**Depth to water (m)**															
Well Stick-up Height (m):	1.155	**Temperature (°C) 3%**															
Estimated Water Volume (L):	0.380	**pH (pH Units) ±0.1**															
0.749		**Cond. (µs/cm) 3%**															
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Specific Cond. (µs/cm) 3%**															
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**Redox (mV) 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		**DO (mg/L) 10%**															
		DO (%) 10%															
		Appearance & Odour (Clear, Silty, HC odours, etc.)															
		Only for final readings	**Sulphide (mg/L)**														
			Turbidity (NTU)														
		Interval Purge Volume (L)															
		Cumulative Purge Volume (L):															

MONITOR ONLY.

YSI Field Parameters Logged:	☐ Yes ☐ No	**Sample Method:**			
Time logged on YSI (24hr):		**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**

HEMMERA

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

Sample Date (Con't): 3 SEPT 2015

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: UNCERTAIN SEAL

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	Ø
Oxygen (O2)	%	20.9
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 (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL (Hydrochloric)		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH (Sodium Hydroxide)		MONITOR
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4 (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3 (Nitric)		ONLY
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, then NaOH		
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

Crew Lead Sign Off (initials):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GSI-DC-10B	**Project Number:**	1343-005.11	**Date:**	SEPT 3 2015
Approximate Date Drilled:	UNKNOWN	**Client:**	GY - AAM	**Samplers:**	GR + AN
Piezometer Diameter / Screen Length:	1" STEEL / UNKNOWN	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	~7°C SUNNY
UTM Location:	Z. 08V E. 0390861 N. 6880451	**Waypoint:**	GPS GR Name UTMS ONLY	**Recovery:**	☒ Good ☐ Bad
Photos:	Cam. ELR Nos. ~~339~~ - ~~342~~	**Purge Method:**			
Duplicate Collected:	☐ Yes Name 0095 - 0098	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes Name		✓		

Initial Depth to Water (m):	1.025	**Purge Start Time:**	1306	**Purge End Time:**		1326		**Pen or YSI:**	☒ YSI Pro Plus ☐ Pen Unit			
Depth to Bottom (m):	3.698	**Purge Interval Time (~~25~~) min, Vol. (___) L**		1311	1316	1319	1322	1325				
Submerged Tubing Depth (m):	3.69	**Depth to water (m)**		~~2.01~~	✓	✓	✓	✓				
Well Stick-up Height (m):	1.135	**Temperature (°C) 3%**		~~2.1 6.53~~	3.9	4.3	4.3	4.1				
Estimated Water Volume (L):	~1.35	**pH (pH Units) ±0.1**		~~6.54~~	6.55	6.59	6.59	6.59				
2.673 x 0.508 = 1.35		**Cond. (µs/cm) 3%**		740	756	760	753	745				
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Specific Cond. (µs/cm) 3%**		1316	1266	1257	1247	1240				
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**Redox (mV) 10%**		-60.4	-62.5	-61.2	-58.5	-55.0				
2" casing has 0.16 USgal/ft or 2.032 l/m		**DO (mg/L) 10%**		0.97	4.42	5.98	6.25	6.11				
1" casing has 0.04 USgal/ft or 0.508 l/m		**DO (%) 10%**		7.0	34.9	46.2	47.9	47.0				
8" sand pack has 0.73 USgal/ft or 9.271 l/m		**Appearance & Odour (Clear, Silty, HC odours, etc.)**		TURBID BROWN/GRAY	LESS TURBID L. GRAY	LESS TURBID →		CLEAR				
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Only for final readings**	**Sulphide (mg/L)**					0.04				
			Turbidity (NTU)					58.6				
		Interval Purge Volume (L)		1	1	.100	.100					
		Cumulative Purge Volume (L):		1	2	2.1	2.2					

YSI Field Parameters Logged:	☒ Yes ☐ No	**Sample Method:**			
Time logged on YSI (24hr):	1327	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
			X VERY SLOW		

HEMMERA

Sample Site (Con't): GS1-DC-10B

Sample Date (Con't): SEPT 3 2015

Sample Time: 1301

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

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

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

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	Ø
Oxygen (O2)	%	20.9
Carbon Dioxide (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 (Nitric)	FULL	
1b	40 ml (glass)	Dissolved Mercury	15 mL	☒ Field Filtered	☒ HCL (Hydrochloric)		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☒ NaOH (Sodium Hydroxide)		VERY SLOW FLOW RATE
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☒ H_2SO_4 (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☒ HNO_3 (Nitric)		
6	120 ml (plastic)	Sulphide	100 ml	-	☒ Zinc Acetate, then NaOH		
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☒ Field Filtered	-		

General Notes (Condition of well or other features):

15 ft Peri (ELR)

6" Silicone (ELR)

Crew Lead Sign Off (initials):	

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GSI - HA - 01A	**Project Number:**	1343-005.11	**Date:**	Aug 31 2015
Approximate Date Drilled:	?	**Client:**	GY - AAM	**Samplers:**	JH + JC
Piezometer Diameter / Screen Length:	2.5cm / ?	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	cloudy, 0°C
UTM Location:	Z. 08 E. 0387843 N. 6881132	**Waypoint:**	GPS Item Name GSI-HA-01A*	**Recovery:**	☐ Good ☒ Bad
Photos:	Cam. Item Nos. 011 - 013	**Purge Method:**			
Duplicate Collected:	☐ Yes Name	**Waterra**	~~Peristaltic~~	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes ~~Name~~			~~Disp. Bailer~~	

Initial Depth to Water (m):	2.173m	**Purge Start Time:**		**Purge End Time:**		**Pen or YSI:**	☐ YSI Pro Plus ☐ Pen Unit										
Depth to Bottom (m):	~~3.10~~ 3.128m	**Purge Interval Time (___) min, Vol. (___) L**															
Submerged Tubing Depth (m):	3.05	**Depth to water (m)**															
Well Stick-up Height (m):	1.24m	**Temperature (°C) 3%**	Direct														
Estimated Water Volume (L):		**pH (pH Units) ±0.1**															
		Cond. (µs/cm) 3%	Sample														
		Specific Cond. (µs/cm) 3%															
		Redox (mV) 10%															
		DO (mg/L) 10%															
		DO (%) 10%															
		Appearance & Odour (Clear, Silty, HC odours, etc.)															
		Only for final readings	**Sulphide (mg/L)**														
			Turbidity (NTU)														
		Interval Purge Volume (L)															
		Cumulative Purge Volume (L):															

(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 logged on YSI (24hr):		**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
			X		

HEMMERA

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

Sample Date (Con't): Aug 31, 2015

Sample Time: 10:55

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: _____

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.5
Carbon Dioxide (C02)	PPM	1150

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 (Nitric)	100mL	
1b	40 ml (glass)	Dissolved Mercury	15 mL	☒ Field Filtered	☒ HCL (Hydrochloric)	15mL	
2	1 L (plastic)	General Chemistry	200 ml	-	-	200mL	sulphur odour
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☒ NaOH (Sodium Hydroxide)	100mL	Sept 2, 2015
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☒ H_2SO_4 (Sulfuric)	120mL	-
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☒ HNO_3 (Nitric)	50mL	-
6	120 ml (plastic)	Sulphide	100 ml	-	☒ Zinc Acetate, then NaOH	100mL	-
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-	100mL	-
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☒ Field Filtered	-	100mL	-

General Notes (Condition of well or other features):

- Direct sample
- Only removed 315 mL of water

Returned to well Sept 2, 2015 @ 17:15. DTW = 2.141 m btop
We managed to complete the sample set.

Crew Lead Sign Off (initials): _____

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GSI-HA-02A*	**Project Number:**	1343-005.11	**Date:**	Aug 31/2015
Approximate Date Drilled:	UNKNOWN	**Client:**	GY - AAM	**Samplers:**	AN, GR
Piezometer Diameter / Screen Length:	1"/unknown	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	overcast windy ~0°C.
UTM Location:	Z08V E0387859 N. 6881130	**Waypoint:**	GPS GMR Name ~~GSI-HA-02~~	**Recovery:**	☐ Good ☒ Bad
Photos:	Cam. ELR Nos. 0025-0028	**Purge Method:**			
Duplicate Collected:	☐ Yes Name	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes Name		✓		

Initial Depth to Water (m):	1.905	**Purge Start Time:**	9:14	**Purge End Time:**	9-52	**Pen or YSI:**	☒ YSI Pro Plus ☐ Pen Unit				
Depth to Bottom (m):	~~3~~ + 8.2 = 3.82	**Purge Interval Time (~5) min, Vol. (___) L**	9:19	9:19	9:24	9:29	9:35	9:41	9:45	9:52	
Submerged Tubing Depth (m):	~3.6	**Depth to water (m)**									
Well Stick-up Height (m):	1.53	**Temperature (°C) 3%**	3.9	3.7	3.7	3.7	3.6	3.6	3.7		
Estimated Water Volume (L):	~~0~~.97	**pH (pH Units) ±0.1**	6.70	6.76	6.80	6.83	6.85	6.86	6.86		
1.915 x 0.508 = 0.97 L		**Cond. (µs/cm) 3%**	620	615	606	609	604	597	603		
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Specific Cond. (µs/cm) 3%**	1039	1037	1028	1026	1026	1009	1015		
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**Redox (mV) 10%**	-50.8	-59.2	-65.2	-70.4	-73.3	-76.9	-80.3		
2" casing has 0.16 USgal/ft or 2.032 l/m		**DO (mg/L) 10%**	9.99	10.63	10.71	10.69	10.73	10.77	10.75		
1" casing has 0.04 USgal/ft or 0.508 l/m		**DO (%) 10%**	76.5	80.8	81.2	81.2	81.5	81.8	81.9		
8" sand pack has 0.73 USgal/ft or 9.271 l/m		**Appearance & Odour (Clear, Silty, HC odours, etc.)**	Sulphur odour clear	same	Same.	Same	—	—	—		
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Only for final readings: Sulphide (mg/L)**							0.07		
		Only for final readings: Turbidity (NTU)							0.90		
		Interval Purge Volume (L)	440ml	310	300	300	300	300	350		
		Cumulative Purge Volume (L):	440	750	1050	~~1350~~ 1350	1650	1950	2300	3100	

* 800 mL collected during Direct Sample Added to purge vol. to make cum. purge vol. total 3100 mL.

YSI Field Parameters Logged:	☒ Yes ☐ No	**Sample Method:**			
Time logged on YSI (24hr):	09-54	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
			✓		

HEMMERA

Sample Site (Con't): GS1-HA-02A *

Sample Date (Con't): AUG 31 2015

Sample Time: ~~8:48~~ 9:50 *

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	Ø
Oxygen (O2)	%	20.7
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 (Nitric)	120	
1b	40 ml (glass)	Dissolved Mercury	15 mL	☒ Field Filtered	☒ HCL (Hydrochloric)	30	
2	0.5 ~~lit~~ (plastic)	General Chemistry	200 ml	-	-	250	
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☒ NaOH (Sodium Hydroxide)	100	
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☒ H_2SO_4 (Sulfuric)	120	
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☒ HNO_3 (Nitric)	50	
6	120 ml (plastic)	Sulphide	100 ml	-	☒ Zinc Acetate, then NaOH	100.	
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☒ Field Filtered	-		

General Notes (Condition of well or other features):

Direct Sampled. - TURBID WATER COLLECTED.
Sulphur odour.
AFTER DIRECT SAMPLE, THERE SEEMED TO BE GOOD RECHARGE SO CONTINUED TO PURGE AND COLLECTED. FULL SET CAS
Did not collect field sulphide @ time of sample. Reagents were not in field kit. Will return to collect @ later time.

Crew Lead Sign Off (initials): _____

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GSI-HA-03A	**Project Number:**	1343-005.11	**Date:**	Aug 31, 2015
Approximate Date Drilled:	?	**Client:**	GY - AAM	**Samplers:**	JF + JC
Piezometer Diameter / Screen Length:	~~2"~~ / 2.1cm / ?	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	cloudy, -1°C
UTM Location:	Z. 08 E. 0351787 N. 6881129	**Waypoint:**	GPS Hem Name GSI-HA-03A*	**Recovery:**	☐ Good ☒ Bad
Photos:	Cam. Hem Nos. 002 - 004	**Purge Method:**			
Duplicate Collected:	☐ Yes Name ~~☒~~	Waterra	Peristaltic	Disp. Bailer	Other
Field Blank Collected:	☐ Yes Name ~~☒~~		~~X~~		

Initial Depth to Water (m):	1.099m	**Purge Start Time:**	/	**Purge End Time:**	/	**Pen or YSI:**	☐ YSI Pro Plus ☐ Pen Unit				
Depth to Bottom (m):	2.192m	**Purge Interval Time (___) min, Vol. (___) L**									
Submerged Tubing Depth (m):	2.100m	**Depth to water (m)**									
Well Stick-up Height (m):	0.985m	**Temperature (°C) 3%**									
Estimated Water Volume (L):	0.555L	**pH (pH Units) ±0.1**									
2.192 − 1.099 / 1.093 − x 0.508		**Cond. (µs/cm) 3%**									
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Specific Cond. (µs/cm) 3%**									
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**Redox (mV) 10%**									
2" casing has 0.16 USgal/ft or 2.032 l/m		**DO (mg/L) 10%**									
1" casing has 0.04 USgal/ft or 0.508 l/m		**DO (%) 10%**									
8" sand pack has 0.73 USgal/ft or 9.271 l/m		**Appearance & Odour (Clear, Silty, HC odours, etc.)**									
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Only for final readings**	**Sulphide (mg/L)**								
			Turbidity (NTU)								
		Interval Purge Volume (L)									
		Cumulative Purge Volume (L):									

Direct Sample

YSI Field Parameters Logged:	☐ Yes ~~☒~~ No	**Sample Method:**			
Time logged on YSI (24hr):		Waterra	Peristaltic	Disp. Bailer	Other
			X		

HEMMERA

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

Sample Date (Con't): Aug 31, 2015

Sample Time: 08:41

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	~~610~~ 610

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 (Nitric)	100ml	Aug 31, 2015
1b	40 ml (glass)	Dissolved Mercury	15 mL	☒ Field Filtered	☒ HCL (Hydrochloric)	20 ml	↓
2	1 L (plastic)	General Chemistry	200 ml	-	-	175ml	↓
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☒ NaOH (Sodium Hydroxide)	100mL	Sept 2, 2015
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☒ H_2SO_4 (Sulfuric)	120mL	↓
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☒ HNO_3 (Nitric)	50mL	↓
6	120 ml (plastic)	Sulphide	100 ml	-	☒ Zinc Acetate, then NaOH	100mL	Sept 3, 2015
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-	120mL	↓
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-	—	—

General Notes (Condition of well or other features):

- Well dry after 295mL of purging
- Direct sample only
- Used 2.5m of ¼ inch tubing
- used 1' of silicone

Returned to well Sept 2, 2015 DTW = 1.244m btoc
were able to direct sample Cyanide, Ammonia + SCN before well went dry.
time 17:33

Returned to well Sept 3, 2015 DTW = m btoc
were able to direct sample sulphide + TIC ~~before~~ before well went dry. time 17:15

Crew Lead Sign Off (initials): _____

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GSI-HA-04A *	**Project Number:**	1343-005.11	**Date:**	AUG 31 2015
Approximate Date Drilled:	unknown.	**Client:**	GY - AAM	**Samplers:**	GMR + AN
Piezometer Diameter / Screen Length:	1" STEEL	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	~4°C OVERCAST OK THIS TIME
UTM Location:	Z. 08V E. 0387917 N. 6881132	**Waypoint:**	GPS ___ Name _____	**Recovery:**	☐ Good ☐ Bad
Photos:	Cam. ELK Nos. ~~276~~ - ~~277~~	**Purge Method:**			
Duplicate Collected:	☐ Yes Name 0032 - 0034	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☑ Yes Name		✓		

Initial Depth to Water (m):	0.942	**Purge Start Time:**	13:22	**Purge End Time:**	1336	**Pen or YSI:**	☒ YSI Pro Plus ☐ Pen Unit		
Depth to Bottom (m):	2.116	**Purge Interval Time (3) min, Vol. (___) L**	13:25	13:28	13:33	13:36			
Submerged Tubing Depth (m):		**Depth to water (m)**							
Well Stick-up Height (m):		**Temperature (°C) 3%**	2.9	2.8	2.8	2.8			
Estimated Water Volume (L):	~ 0.587	**pH (pH Units) ±0.1**	6.82	6.79	6.78	6.77			
		Cond. (µs/cm) 3%	187.6	187.7	186.6	186.1			
		Specific Cond. (µs/cm) 3%	325.0	325.0	324.3	324.1			
		Redox (mV) 10%	-2.1	2.8	1.4	0.4			
		DO (mg/L) 10%	1.20	4.31	7.42	3.22			
		DO (%) 10%	7.7	32.2	54.9	20.8			
		Appearance & Odour (Clear, Silty, HC odours, etc.)	light brown sulphur odour.						
		Only for final readings Sulphide (mg/L)				0.10			
		Only for final readings Turbidity (NTU)				5.69			
		Interval Purge Volume (L)	.700	.400	600	200			
		Cumulative Purge Volume (L):	1.5	1.9	2.5	2.7			

(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 logged on YSI (24hr):	13:30 #1	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
	13:37 #2		✓		

↑ use this data.

HEMMERA

Sample Site (Con't): GS1 - HA - 04A *

Sample Date (Con't): AUG 31 2015

Sample Time: 1340

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	4280

* used multi RAE unit. older unit. Values seem off.

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 (Nitric)	FULL	
1b	40 ml (glass)	Dissolved Mercury	15 mL	☒ Field Filtered	☒ HCL (Hydrochloric)		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☒ NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☒ H_2SO_4 (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☒ HNO_3 (Nitric)		
6	120 ml (plastic)	Sulphide	100 ml	-	☒ Zinc Acetate, then NaOH		
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☒ Field Filtered	-		

General Notes (Condition of well or other features):

6" PERI TUBING
6" SILICON

GET A FULL BOTTLE SET AFTER PURGING.
1ST SET THROWN AWAY

Crew Lead Sign Off (initials): _____

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GY-PC-03B	**Project Number:**	1343-005.11	**Date:**	Sept 3, 2015
Approximate Date Drilled:	?	**Client:**	GY - AAM	**Samplers:**	SH + JC
Piezometer Diameter / Screen Length:	2.1cm / ?	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	cloudy -1°C
UTM Location:	Z. 03 E. 381256 N. 6881706	**Waypoint:**	GPS Hen Name GY-PC-03B	**Recovery:**	☐ Good ☒ Bad
Photos:	Cam. Hen Nos. 115-118	**Purge Method:**			
Duplicate Collected:	☐ Yes Name ~~X~~	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes ~~Name~~ X		Direct Sample		

Initial Depth to Water (m):	1.385m	**Purge Start Time:**	X	**Purge End Time:**	X	**Pen or YSI:**	☐ YSI Pro Plus ☒ ~~Pen~~ Unit				
Depth to ~~Bottom~~ Ice (m):	2.022m	**Purge Interval Time (___) min, Vol. (___) L**									
Submerged Tubing Depth (m):	1.95m	**Depth to water (m)**									
Well Stick-up Height (m):	0.99m	**Temperature (°C) 3%**			Direct Sample						
Estimated Water Volume (L):	0.3L	**pH (pH Units) ±0.1**									
		Cond. (µs/cm) 3%									
		Specific Cond. (µs/cm) 3%									
		Redox (mV) 10%									
		DO (mg/L) 10%									
		DO (%) 10%									
		Appearance & Odour (Clear, Silty, HC odours, etc.)									
		Only for final readings	**Sulphide (mg/L)**								
			Turbidity (NTU)								
		Interval Purge Volume (L)									
		Cumulative Purge Volume (L):									

(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 logged on YSI (24hr):		**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
			X		

HEMMERA

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

Sample Date (Con't): Sept 3, 2015

Sample Time: 11:10

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

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

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

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.9
Carbon Dioxide (C02)	PPM	580

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 (Nitric)	100mL	
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☒ HCL (Hydrochloric)	20mL	
2	1 L (plastic)	General Chemistry	200 ml	-	-	—	
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☒ NaOH (Sodium Hydroxide)	100mL	
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4 (Sulfuric)	—	
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3 (Nitric)	—	
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, then NaOH	—	
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-	—	
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-	—	

General Notes (Condition of well or other features):

- There is ¼" tubing frozen into well. This, I suspect the waters column is sitting on ice. We are sampling with new tubing. Water quality is clear.
- Well next to Pony Creek which is extremely silty, likely from upstream Placer mine operations.
- used - 3m of ¼" tubing (ELR)
  - 6" Silicone (ELF)

- We were only able to remove 220mL. This was insufficient for the gen. chem. analysis so we filled cyanide instead.

Crew Lead Sign Off (initials):	

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GSI-PC-04A	**Project Number:**	1343-005.11	**Date:**	SEPT 3 2015
Approximate Date Drilled:	UNKNOWN	**Client:**	GY - AAM	**Samplers:**	GR + AN
Piezometer Diameter / Screen Length:	1" STEEL / UNKNOWN	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	~5°C PARTLY CLOUDY.
UTM Location:	Z 08V E 0389584 N. 6881657	**Waypoint:**	GPS GR Name GTMS ONLY	**Recovery:**	☐ Good ☐ Bad
Photos:	Cam. ELR Nos. ~~324~~ - ~~325~~	**Purge Method:**			
Duplicate Collected:	☒ Yes Name 0088 - 0091	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes Name				

Initial Depth to Water (m):	0.917	**Purge Start Time:**		**Purge End Time:**		**Pen or YSI:**	☐ YSI Pro Plus ☐ Pen Unit				
Depth to Bottom (m):	0.930 depth to ice.	**Purge Interval** Time (___) min, Vol. (___) L									
Submerged Tubing Depth (m):		**Depth to water (m)**									
Well Stick-up Height (m):	0.903	**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)**								
			Turbidity (NTU)								
		Interval Purge Volume (L)									
		Cumulative Purge Volume (L):									

MONITOR ONLY

(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 logged on YSI (24hr):		**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**

HEMMERA

Sample Site (Con't): GS1-PC-04A

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: PLASTIC BAG.

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.9
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 (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL (Hydrochloric)		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4 (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3 (Nitric)		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, then NaOH		
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

NEEDS NEW 1" SCREW CAP.

Crew Lead Sign Off (initials):	

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GSI-PC-043	**Project Number:**	1343-005.11	**Date:**	SEPT 3 2015
Approximate Date Drilled:	UNKNOWN	**Client:**	GY - AAM	**Samplers:**	GR + AN
Piezometer Diameter / Screen Length:	1" STEEL / UNKNOWN	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	~5°C PART CLOUDY
UTM Location:	Z. 08V E. 0389584 N. 6881657	**Waypoint:**	GPS GR Name UTMs ONLY	**Recovery:**	☐ Good ☒ Bad
Photos:	Cam ECR Nos. ~~332 - 336~~	**Purge Method:**			
Duplicate Collected:	☐ Yes Name 0088 - 0091	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes Name		DIRECT SAMPLED		

Initial Depth to Water (m):	1.355	**Purge Start Time:**		**Purge End Time:**				**Pen or YSI:**	☐ YSI Pro Plus ☐ Pen Unit						
Depth to ~~Bottom~~ (m): ICE (?)	1.589 DEPTH TO ICE (?)	**Purge Interval Time (___) min, Vol. (___) L**													
Submerged Tubing Depth (m):		**Depth to water (m)**													
Well Stick-up Height (m):	0.985	**Temperature (°C) 3%**	DIRECT												
Estimated Water Volume (L):		**pH (pH Units) ±0.1**													
0.234 X 0.508 = 0.118 ml		**Cond. (µs/cm) 3%**	SAMPLED												
(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)**	INSUFFICIENT VOLUME TO COLLECT												
8" sand pack has 0.73 USgal/ft or 9.271 l/m		**Only for final readings** **Turbidity (NTU)**	INSUFFICIENT VOLUME TO COLLECT												
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 logged on YSI (24hr):		**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
			DIRECT SAMPLED		

HEMMERA

Sample Site (Con't): GS1-PC-04B

Sample Date (Con't): SEPT 3 2015

Sample Time: 10:50

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)	%	20.9
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 (Nitric)	100 P	COLLECTED WATER
1b	40 ml (glass)	Dissolved Mercury	15 mL	☒ Field Filtered	☒ HCL (Hydrochloric)	15 P	BELIEVED TO BE
2	1 L (plastic)	General Chemistry	200 ml	-	-	200 P	MELTWATER ABOVE ICE
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH (Sodium Hydroxide)	NOT COLLECTED	
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4 (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3 (Nitric)		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, then NaOH		
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

DIRECT SAMPLED

6 FT PERI (HEMMERA)

8" SILICONE (ECR)

Crew Lead Sign Off (initials):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GSI-PC-05A	**Project Number:**	1343-005.11	**Date:**	SEPT 3 2015
Approximate Date Drilled:	UNKNOWN	**Client:**	GY - AAM	**Samplers:**	GR + AN
Piezometer Diameter / Screen Length:	1" STEEL / UNKNOWN 0389710	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	~3°C OVERCAST
UTM Location:	Z. 08V E. ~~388460~~ N. 6881659	**Waypoint:**	GPS ~~Garmin~~ Name UTMS ONLY	**Recovery:**	☐ Good ☐ Bad
Photos:	Cam. EOR Nos. 0084-0087	**Purge Method:**			
Duplicate Collected:	☐ Yes Name _____	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes Name _____				

Initial Depth to Water (m):	1.251	**Purge Start Time:**		**Purge End Time:**				**Pen or YSI:**	☐ YSI Pro Plus ☐ Pen Unit		
Depth to Bottom (m):	1.850	**Purge Interval** Time (___) min, Vol. (___) L									
Submerged Tubing Depth (m):		**Depth to water (m)**									
Well Stick-up Height (m):	0.910	**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)**								
			Turbidity (NTU)								
		Interval Purge Volume (L)									
		Cumulative Purge Volume (L):									

MONITOR ONLY

(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 logged on YSI (24hr):		**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**

HEMMERA

Sample Site (Con't): GS1-PC-05A

Sample Date (Con't): SEPT 3 2015

Sample Time: —

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

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

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

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	Ø
Oxygen (O2)	%	20.9
Carbon Dioxide (C02)	PPM	400

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 (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL (Hydrochloric)	MONITORING ONLY	
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4 (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3 (Nitric)		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, then NaOH		
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

NEEDS 1" SCREW CAP

Crew Lead Sign Off (initials):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GSI-PC-05B*	**Project Number:**	1343-005.11	**Date:**	SEPT 3 2015
Approximate Date Drilled:	UNKNOWN	**Client:**	GY - AAM	**Samplers:**	GR + AN
Piezometer Diameter / Screen Length:	1" STEEL	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	~3°C OVERCAST
UTM Location:	Z 08V E 0389710 N 6881659	**Waypoint:**	GPS GMR Name UTMS ONLY	**Recovery:**	☒ Good ☐ Bad
Photos:	Cam EHR Nos. ~~329/331~~	**Purge Method:**			
Duplicate Collected:	☐ Yes Name 0084-0087	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes Name		/		

Initial Depth to Water (m):	2.485	**Purge Start Time:**	9:24	**Purge End Time:**	9:36	**Pen or YSI:**	☒ YSI Pro Plus ☐ Pen Unit				
Depth to Bottom (m):	3.710	**Purge Interval Time (3) min, Vol. (___) L**	9:24	9:27	9:31	9:35					
Submerged Tubing Depth (m):		**Depth to water (m)**	/	/	/						
Well Stick-up Height (m):	0.910	**Temperature (°C) 3%**	2.4	2.4	2.5	2.5					
Estimated Water Volume (L):	0.622	**pH (pH Units) ±0.1**	6.59	6.53	6.60	6.70					
1.225 / 0.508 = 0.622		**Cond. (µs/cm) 3%**	135.8	134.6	134.0	133.5					
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Specific Cond. (µs/cm) 3%**	238.7	236.7	235.2	~~218.0~~ 234.3					
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**Redox (mV) 10%**	232.3	233.0	226.0	218.0					
2" casing has 0.16 USgal/ft or 2.032 l/m		**DO (mg/L) 10%**	0.75	0.54	0.44	0.41					
1" casing has 0.04 USgal/ft or 0.508 l/m		**DO (%) 10%**	5.2	4.0	3.3	3.0					
8" sand pack has 0.73 USgal/ft or 9.271 l/m		**Appearance & Odour (Clear, Silty, HC odours, etc.)**	slightly turbid	→	→	CLEARER					
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Only for final readings** — **Sulphide (mg/L)**				0.12					
		Only for final readings — **Turbidity (NTU)**				29.7					
		Interval Purge Volume (L)	1	0.5	0.5	0.5					
		Cumulative Purge Volume (L):	1.8	2.3	2.8	3.3					

YSI Field Parameters Logged:	☒ Yes ☐ No	**Sample Method:**	↑ Includes DS vol.		
Time logged on YSI (24hr):	9:38	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
			X		

HEMMERA

Sample Site (Con't): GS1-PC-05B *

Sample Date (Con't): SEPT 3 2015

Sample Time: 9-45

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

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.9
Carbon Dioxide (C02)	PPM	400

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 (Nitric)	FULL	
1b	40 ml (glass)	Dissolved Mercury	15 mL	☒ Field Filtered	☒ HCL (Hydrochloric)		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☒ NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☒ H_2SO_4 (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☒ HNO_3 (Nitric)		
6	120 ml (plastic)	Sulphide	100 ml	-	☒ Zinc Acetate, then NaOH		
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☒ Field Filtered	-		

General Notes (Condition of well or other features):

TURBID AT START THEN CLEARED UP.
PLACER MINING CR. UPSTREAM. SURFACE WATER VERY TURBID.
COLLECTED A DIRECT SAMPLE INITIALLY THEN FULL PURGE AND FULL SAMPLE SET. 6" SILICON(ELR) 15 FT PERI TUBING-(HEMMERA)

Crew Lead Sign Off (initials):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MP09-03	**Project Number:**	1343-005.11	**Date:**	Sept 3, 2015
Approximate Date Drilled:		**Client:**	GY - AAM	**Samplers:**	JH + JC
Piezometer Diameter / Screen Length:	2.1cm / ?	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	cloudy / -4°C
UTM Location:	Z 08 E 393956 N. 6381739	**Waypoint:**	GPS km Name MP09-03	**Recovery:**	☐ Good ☒ Bad
Photos:	Cam. km Nos. 106-108	**Purge Method:**			
Duplicate Collected:	☐ Yes Name	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes Name		Do not purge		

Initial Depth to Water (m):	1.651	**Purge Start Time:**	X		**Purge End Time:**	X			**Pen or YSI:**	☒ YSI Pro Plus ☐ Pen Unit			
Depth to Bottom (m):	1.987m	**Purge Interval Time (___) min, Vol. (___) L**											
Submerged Tubing Depth (m):	1.90	**Depth to water (m)**			Direct								
Well Stick-up Height (m):	0.73	**Temperature (°C) 3%**											
Estimated Water Volume (L):	0.1L	**pH (pH Units) ±0.1**											
		Cond. (µs/cm) 3%											
		Specific Cond. (µs/cm) 3%			Sample								
		Redox (mV) 10%											
		DO (mg/L) 10%											
		DO (%) 10%											
		Appearance & Odour (Clear, Silty, HC odours, etc.)											
		Only for final readings	**Sulphide (mg/L)**										
			Turbidity (NTU)										
		Interval Purge Volume (L)											
		Cumulative Purge Volume (L):											

(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 logged on YSI (24hr):	X	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
			X		

HEMMERA

Sample Site (Con't): MW09-03

Sample Date (Con't): Sept 3, 2015

Sample Time: 08:30

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

Seal Replaced: ☐ J-Plug ☐ PVC Cap ☐ Not required ☐ Other Don't have Drive point caps

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	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 (Nitric)	100mL	
1b	40 ml (glass)	Dissolved Mercury	15 mL	☒ Field Filtered	☒ HCL (Hydrochloric)	15mL	
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4 (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3 (Nitric)		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, then NaOH		
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

- well has 5/8th tubing frozen/stuck. 1/4" sample tubing within 5/8th
- fork creek water extremely silty (see photo 107) caused by upstream placer mine operation.
- Used ~6" silicone
- Only able to remove 115mL of water.

Crew Lead Sign Off (initials): _____

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MP09-04	**Project Number:**	1343-005.11	**Date:**	SEPT 1, 2015
Approximate Date Drilled:	UNKNOWN	**Client:**	GY - AAM	**Samplers:**	AN + GR
Piezometer Diameter / Screen Length:	1.5" / UNKNOWN	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	2°C OVERCAST.
UTM Location:	Z.08V E.0389574 N. 6880610	**Waypoint:**	GPS GMR Name ~~WAYPOINTS~~ 004	**Recovery:**	☒ Good ☐ Bad
Photos:	Cam: ELR Nos. ~~303 - 305~~	**Purge Method:**			
Duplicate Collected:	☐ Yes Name 0059-0061	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes Name /		✓		

Initial Depth to Water (m):	2.071	**Purge Start Time:**	15:~~49~~ 55	**Purge End Time:**	1559	**Pen or YSI:**	☒ YSI Pro Plus ☐ Pen Unit			
Depth to Bottom (m):	3.00 +0.082 = 3.082	**Purge Interval Time (~5) min, Vol. (___) L**	1540	1548	1553	1558				
Submerged Tubing Depth (m):	3.08	**Depth to water (m)**	2.150	2.130	2.120	2.12				
Well Stick-up Height (m):	1.245	**Temperature (°C) 3%**	1.7	1.7	1.8	1.8				
Estimated Water Volume (L):	1.51 APPROX	**pH (pH Units) ±0.1**	7.26	7.11	7.09	7.07				
3.082 − 2.071 = 1.011 x 1.5 = ~ 1.51		**Cond. (µs/cm) 3%**	573	550	549	545				
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Specific Cond. (µs/cm) 3%**	1032	993	985	908				
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**Redox (mV) 10%**	30.8	49.3	55.7	60.2				
2" casing has 0.16 USgal/ft or 2.032 l/m		**DO (mg/L) 10%**	0.98	~~0.72~~	0.68	0.71				
1" casing has 0.04 USgal/ft or 0.508 l/m		**DO (%) 10%**	6.9	5.3	4.8	5.2				
8" sand pack has 0.73 USgal/ft or 9.271 l/m		**Appearance & Odour (Clear, Silty, HC odours, etc.)** NO ODOUR.	CLEAR	→	▷	→				
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Only for final readings** Sulphide (mg/L)				0.00				
		Only for final readings Turbidity (NTU)				0.57				
		Interval Purge Volume (L)	1	1	1	1				
		Cumulative Purge Volume (L):	1	2	3	4				

YSI Field Parameters Logged:	☒ Yes ☐ No	**Sample Method:**			
Time logged on YSI (24hr):	1600	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
			X		

HEMMERA

Sample Site (Con't): MP09 -04

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

Sample Time: 16:02

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	1200.

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 (Nitric)	FULL	
1b	40 ml (glass)	Dissolved Mercury	15 mL	☒ Field Filtered	☒ HCL (Hydrochloric)		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☒ NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☒ H_2SO_4 (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☒ HNO_3 (Nitric)		
6	120 ml (plastic)	Sulphide	100 ml	-	☒ Zinc Acetate, then NaOH		
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☒ Field Filtered	-		

General Notes (Condition of well or other features):

(4.5mm) 14ft PERI TUBING

6" SILICON.

Crew Lead Sign Off (initials):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MP09-05	**Project Number:**	1343-005.11	**Date:**	SEPT 1 2015
Approximate Date Drilled:	UNKNOWN	**Client:**	GY - AAM	**Samplers:**	GR + AN
Piezometer Diameter / Screen Length:	1 3/8" PVC / UNKNOWN	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	-1°C OVERCAST.
UTM Location:	Z. 08V E. 0389~~5~~4 N. 6880596	**Waypoint:**	GPS GMR Name UTMS ONLY	**Recovery:**	☒ Good ☐ Bad
Photos:	Cam. ELR Nos. ~~289~~ - 289	**Purge Method:**			
Duplicate Collected:	☒ Yes Name MW15-200	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes Name ~~0053-0055~~		X		

Initial Depth to Water (m):	1.367	**Purge Start Time:**	12-36	**Purge End Time:**	12-53	**Pen or YSI:**	☒ YSI Pro Plus ☐ Pen Unit					
Depth to Bottom (m):	1.758 + 0.082	**Purge Interval Time (~5) min, Vol. (___) L**		12-41	12-47	12-52						
Submerged Tubing Depth (m):	~1.8	**Depth to water (m)**		1.45	1.44	1.45						
Well Stick-up Height (m):	1.09	**Temperature (°C) 3%**		3.1	3.1	3.2						
Estimated Water Volume (L):	~0.236	**pH (pH Units) ±0.1**		6.64	6.64	6.64						
1.832 - 1.367 = 0.465 × 0.508		**Cond. (µs/cm) 3%**		1025	1032	1038						
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Specific Cond. (µs/cm) 3%**		1763	1776	1779						
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**Redox (mV) 10%**		26.2	27.3	27.6						
2" casing has 0.16 USgal/ft or 2.032 l/m		**DO (mg/L) 10%**		0.54	0.37	0.34						
1" casing has 0.04 USgal/ft or 0.508 l/m		**DO (%) 10%**		4.0	2.6	2.6						
8" sand pack has 0.73 USgal/ft or 9.271 l/m		**Appearance & Odour (Clear, Silty, HC odours, etc.)**		CLEAR	CLEAR →							
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Only for final readings**	**Sulphide (mg/L)**			0.05						
			Turbidity (NTU)			1.64						
		Interval Purge Volume (L)		1	1	1						
		Cumulative Purge Volume (L):		1	2	3						

YSI Field Parameters Logged:	☒ Yes ☐ No	**Sample Method:**			
Time logged on YSI (24hr):	12-55	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
			X		

HEMMERA

Sample Site (Con't): MPC19-05

Sample Date (Con't): SEPT 1 2015

Sample Time: ~~SEPT 1 2015~~ 12:56

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	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 (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☒ Field Filtered	☒ HCL (Hydrochloric)		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☒ NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☒ H_2SO_4 (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☒ HNO_3 (Nitric)		
6	120 ml (plastic)	Sulphide	100 ml	-	☒ Zinc Acetate, then NaOH		
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-	FULL	
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☒ Field Filtered	-		

General Notes (Condition of well or other features):

6" SLUGGN

6" PERI. T.

Crew Lead Sign Off (initials):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MP09-08	**Project Number:**	1343-005.11	**Date:**	Sept 3, 2015
Approximate Date Drilled:	?	**Client:**	GY - AAM	**Samplers:**	JH + SC
Piezometer Diameter / Screen Length:	2.1cm / ?	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	cloudy / -2°C
UTM Location:	Z. 08 E. 359160 N. 6983718	**Waypoint:**	GPS Hem Name MP09-08	**Recovery:**	☒ Good ☐ Bad
Photos:	Cam. Hem Nos. 112-114	**Purge Method:**			
Duplicate Collected:	☒ Yes Name MW15-400	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☒ Yes Name FB15-400		X		

Initial Depth to Water (m):	1.61m	**Purge Start Time:**	09:25	**Purge End Time:**	09:40	**Pen or YSI:**	☒ YSI Pro Plus ☐ Pen Unit					
Depth to Bottom (m):	1.963m	**Purge Interval Time (3) min, Vol. (___) L**	09:26	09:29	09:32	09:33	09:36	09:39				
Submerged Tubing Depth (m):	1.90m	**Depth to water (m)**	–	–	–	–	–	–				
Well Stick-up Height (m):	0.9m	**Temperature (°C) 3%**	1.7	1.6	1.2	1.0	1.0	1.1				
Estimated Water Volume (L):	0.1L	**pH (pH Units) ±0.1**	5.90	6.49	6.80	6.87	6.91	6.98				
		Cond. (µs/cm) 3%	424.2	420.6	418.7	417.2	416.4	418.5				
		Specific Cond. (µs/cm) 3%	766.5	766.3	767.2	766.6	769.4	769.8				
		Redox (mV) 10%	175.3	119.3	73.4	54.1	42.4	23.2				
		DO (mg/L) 10%	1.09	0.43	0.24	0.25	0.27	0.34				
		DO (%) 10%	7.1	3.1	1.7	1.7	1.9	16.9				
		Appearance & Odour (Clear, Silty, HC odours, etc.)	Black organic	fluid	less turbid	some	some	some				
		Only for final readings Sulphide (mg/L)	–	–	–	–	–	0.19				
		Only for final readings Turbidity (NTU)	–	–	–	–	–	2.38				
		Interval Purge Volume (L)	0.2L	0.3L	0.3L	0.3L	0.3L	0.3L				
		Cumulative Purge Volume (L):	0.2L	0.5L	0.8L	1.1L	1.4	1.7L				

(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 logged on YSI (24hr):	MP09-08	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
	09:42		X		

HEMMERA

Sample Site (Con't): MP09-08

Sample Date (Con't): Sept 3, 2015

Sample Time: 9:45

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

Seal Replaced: ☐ J-Plug ☐ PVC Cap ☐ Not required ☐ Other No caps for piezometer

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

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.7
Carbon Dioxide (C02)	PPM	640

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 (Nitric)	120mL	
1b	40 ml (glass)	Dissolved Mercury	15 mL	☒ Field Filtered	☒ HCL (Hydrochloric)	40mL	
2	1 L (plastic)	General Chemistry	200 ml	-	-	500mL	
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☒ NaOH (Sodium Hydroxide)	145mL	slightly turbid
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☒ H_2SO_4 (Sulfuric)	120mL	
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☒ HNO_3 (Nitric)	120mL	
6	120 ml (plastic)	Sulphide	100 ml	-	☒ Zinc Acetate, then NaOH	120mL	
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-	120mL	
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☒ Field Filtered	-	120mL	

General Notes (Condition of well or other features):

- Used - 4m of ELR ¼" tubing
  - 6" silicone (ELR)
  - 1 waterra filter
- Well installed in Pony Creek. Pony Creek water is extremely silty, likely caused by upstream placer mine operation.
- Temp + D.O. not stabilizing. Collecting sample anyways 17 well volumes have been purged
- Well is being drawn down faster than recharge so we are turning the pump off after every sample bottle to allow recharge. Turbidity increases significantly when water is drawn down too low.

Crew Lead Sign Off (Initials):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MPC9-09 * ~~MPC9~~	**Project Number:**	1343-005.11	**Date:**	SEPT 2-2015
Approximate Date Drilled:	UNKNOWN	**Client:**	GY - AAM	**Samplers:**	GMR - BN
Piezometer Diameter / Screen Length:	1.25" / UNKNOWN	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	~2°C OVERCAST 0.1k
UTM Location:	Z08V E.0389237 N. 6880682	**Waypoint:**	GPS GMR Name UTMs ONLY	**Recovery:**	☐ Good ☒ Bad SLOW
Photos:	Cam: GR Nos. ~~325 - 326~~	**Purge Method:**			
Duplicate Collected:	☐ Yes Name 0081 - 0083	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes Name		✓		

Initial Depth to Water (m):	3.510	**Purge Start Time:**	1402	**Purge End Time:**	1429.	**Pen or YSI:**	☒ YSI Pro Plus ☐ Pen Unit				
Depth to Bottom (m):	5.650	**Purge Interval Time (___) min, Vol. (___) L**	1407	1414	~~1419~~	1426					
Submerged Tubing Depth (m):	5.60	**Depth to water (m)**				4.445					
Well Stick-up Height (m):	2.46	**Temperature (°C) 3%**	4.7	4.3	4.3	4.4					
Estimated Water Volume (L):	~ 1.087	**pH (pH Units) ±0.1**	9.25	9.45	9.55	9.56					
		Cond. (µs/cm) 3%	399.6	392.1	391.6	394.6					
		Specific Cond. (µs/cm) 3%	654.1	648.1	648.0	651.4					
		Redox (mV) 10%	63.1	71.0	72.0	76.1					
		DO (mg/L) 10%	3.89	5.31	5.75	5.98					
		DO (%) 10%	20.9	40.9	43.9	46.2					
		Appearance & Odour (Clear, Silty, HC odours, etc.)	SLIGHTLY TURBID	~~CLEAR~~ →	→	→					
		Only for final readings Sulphide (mg/L)				0.12					
		Only for final readings Turbidity (NTU)				41.3					
		Interval Purge Volume (L)	1	1	1	1					
		Cumulative Purge Volume (L):	1	2	3	4					

(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 logged on YSI (24hr):	14-29-29	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
			✓		

HEMMERA

Sample Site (Con't): MP09-09 *

Sample Date (Con't): SEPT 2 2015

Sample Time: 14-30

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: TAPED SLOT IN PVC

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.9
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 (Nitric)	FULL	
1b	40 ml (glass)	Dissolved Mercury	15 mL	☑ Field Filtered	☑ HCL (Hydrochloric)		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☑ NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☑ H_2SO_4 (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☑ HNO_3 (Nitric)		
6	120 ml (plastic)	Sulphide	100 ml	-	☑ Zinc Acetate, then NaOH		
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☑ Field Filtered	-		

General Notes (Condition of well or other features):

18 FT PERI
6" SILICON

~~14-30~~
1x IN-LINE FILTER

Crew Lead Sign Off (initials):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MP-09-09 BLANK	**Project Number:**	1343-005.11	**Date:**	SEPT 2 2015
Approximate Date Drilled:	UNKNOWN	**Client:**	GY - AAM	**Samplers:**	AN + GMR
Piezometer Diameter / Screen Length:	1.5" / UNKNOWN	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	~2°C OVERCAST
UTM Location:	Z. 08V E. 038923 N. 6880682	**Waypoint:**	GPS GMR Name UTMS ONLY	**Recovery:**	☐ Good ☒ Bad
Photos:	Cam: GMR Nos. ~~325 - 327~~	**Purge Method:**			
Duplicate Collected:	☐ Yes Name 0081 - 0083	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes Name		WP		

| | | | | |

SEE NEW SHEET.
MP09-09*

HEMMERA

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

Sample Date (Con't): SEPT 2 2015

Sample Time: 13-42

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: TAPE ADDED TO SLOT IN PVC.

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	Ø
Oxygen (O2)	%	20.9
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 (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL (Hydrochloric)		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4 (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3 (Nitric)		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, then NaOH		
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

18 FT PERI
6" SILICON
1X IN-LINE FILTER

Crew Lead Sign Off (initials):	

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MP-09-10 ~~Artesian~~	**Project Number:**	1343-005.11	**Date:**	SEPT 2 2015
Approximate Date Drilled:	UNKNOWN	**Client:**	GY - AAM	**Samplers:**	GMR + AN
Piezometer Diameter / Screen Length:	1.5" / unknown.	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	~20c OVERCAST
UTM Location:	Z. 08V E. 0389237 N. 6880682	**Waypoint:**	GPS ~~Grid~~ Name UTM 5 END	**Recovery:**	☐ Good ☒ Bad
Photos:	Cam. EOR Nos. ~~325 - 327~~	**Purge Method:**			
Duplicate Collected:	☐ ~~Yes~~ Name 0081 - 0083	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ ~~Yes~~ Name		NAN		

Initial Depth to Water (m):	3.265	**Purge Start Time:**		**Purge End Time:**		**Pen or YSI:**	☐ YSI Pro Plus ☐ Pen Unit						
Depth to Bottom (m):	4.320	**Purge Interval Time (___) min, Vol. (___) L**											
Submerged Tubing Depth (m):	4.3.	**Depth to water (m)**											
Well Stick-up Height (m):	2.20	**Temperature (°C) 3%**											
Estimated Water Volume (L):	0.737	**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)**	0.80 "LIMIT" flashing on unit.									
			Turbidity (NTU)	"OVER RANGE" (Displayed on unit).									
		Interval Purge Volume (L)											
		Cumulative Purge Volume (L):											

DIRECT SAMPLED 1315

Very turbid sample.

(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 logged on YSI (24hr):	/	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
			X		

HEMMERA

Sample Site (Con't): MP-09-10 ~~Dup~~

Sample Date (Con't): SEPT 2 2015

Sample Time: 1313

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: TAPE ADDED TO SLOT IN PVC.

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.9
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 (Nitric)	FULL	
1b	40 ml (glass)	Dissolved Mercury	15 mL	☒ Field Filtered	☒ HCL (Hydrochloric)	↓ FULL	
2	1 L (plastic)	General Chemistry	200 ml	-	-	200	
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☒ NaOH (Sodium Hydroxide)	100	
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☒ H_2SO_4 (Sulfuric)	120 (FULL)	
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☒ HNO_3 (Nitric)	~~WAS~~ 50	
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, then NaOH	Ø	NOT COLLECTED.
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-	Ø	
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-	Ø	

General Notes (Condition of well or other features):

20 ft PERI.T. 1X IN-LINE FILTER (PERI)

6" ~~FIT~~ SILICON

Crew Lead Sign Off (initials):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09-11	**Project Number:**	1343-005.11	**Date:**	Sept 2, 2015
Approximate Date Drilled:	?	**Client:**	GY - AAM	**Samplers:**	JH + JC
Piezometer Diameter / Screen Length:	1.5" / ?	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	snow / -2°C
UTM Location:	Z.08 E.0389214 N.6880612	**Waypoint:**	GPS Hem Name MW09-11*	**Recovery:**	☐ Good ☒ Bad
Photos:	Cam. Hem Nos. 085-087	**Purge Method:**			
Duplicate Collected:	☐ Yes Name X	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes Name X		X		

Initial Depth to Water (m):	2.150m	**Purge Start Time:**	11:46	**Purge End Time:**	12:13	**Pen or YSI:**	☒ YSI Pro Plus ☐ Pen Unit				
Depth to Bottom (m):	4.960m	**Purge Interval Time (5) min, Vol. (___) L**	11:48	11:53	11:58	12:03	12:08	12:13			
Submerged Tubing Depth (m):	4.6 m	**Depth to water (m)**	~	2.673	2.613	2.516	2.86	-			
Well Stick-up Height (m):	1.90m	**Temperature (°C) 3%**	5.2	5.3	5.2	4.8	5.0	4.8			
Estimated Water Volume (L):	5.6L	**pH (pH Units) ±0.1**	7.18	7.29	7.31	7.33	7.32	7.32			
		Cond. (µs/cm) 3%	536	567	645	686	667	689			
		Specific Cond. (µs/cm) 3%	861	905	1038	1114	1074	1127			
		Redox (mV) 10%	57.9	48.1	93.3	111.3	114.5	123.4			
		DO (mg/L) 10%	0.97	0.19	0.17	0.42	0.13	0.18			
		DO (%) 10%	7.5	1.5	1.3	3.2	1.0	1.3			
		Appearance & Odour (Clear, Silty, HC odours, etc.)	turbid brown	less turbid brown	same	same	turbid	turbid			
		Only for final readings: Sulphide (mg/L)	—	—	-	-	-	0.35			
		Only for final readings: Turbidity (NTU)	—	-	-	-	-	200			
		Interval Purge Volume (L)	0.3	0.7	0.4	0.6	0.5	0.5			
		Cumulative Purge Volume (L):	0.3	1.0	1.4	2.0	2.1	2.6			

(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 logged on YSI (24hr):	MP09-11	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
	12:13		X		

HEMMERA

Sample Site (Con't): MP09-11

Sample Date (Con't): Sept 2, 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: _____

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	11
Oxygen (O2)	%	20.4
Carbon Dioxide (C02)	PPM	~~Zero~~ 3100

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 (Nitric)	120	
1b	40 ml (glass)	Dissolved Mercury	15 mL	☒ Field Filtered	☒ HCL (Hydrochloric)	40	
2	1 L (plastic)	General Chemistry	200 ml	-	-	1L	
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☒ NaOH (Sodium Hydroxide)	145	
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☒ H_2SO_4 (Sulfuric)	120	
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☒ HNO_3 (Nitric)	120	
6	120 ml (plastic)	Sulphide	100 ml	-	☒ Zinc Acetate, then NaOH	120	
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-	120	
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☒ Field Filtered	-	120	

General Notes (Condition of well or other features):

-used ~6m ¼ tubing
-6" silicone
-1 Waterra Filter (for metals)

-Water is turbid in this well, despite continuously raising the tubing off the bottom. Otherwise well in good condition.

-[redacted]

Crew Lead Sign Off (initials):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MP09-12	**Project Number:**	1343-005.11	**Date:**	Sept 2, 2015
Approximate Date Drilled:	?	**Client:**	GY - AAM	**Samplers:**	JH + JC
Piezometer Diameter / Screen Length:	1.5" / ?	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	snow / -2°C
UTM Location:	Z. 08 E. 0389221 N. 6980614	**Waypoint:**	GPS Hem Name MP09-12*	**Recovery:**	☐ Good ☒ Bad
Photos:	Cam. Hem Nos. ~~088~~-090	**Purge Method:**			
Duplicate Collected:	☐ Yes Name	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes Name ~~X~~		X		

Initial Depth to Water (m):	2.184 m	**Purge Start Time:**	12:34	**Purge End Time:**	12:48	**Pen or YSI:**	☒ YSI Pro Plus ☐ Pen Unit					
Depth to Bottom (m):	4.209 m	**Purge Interval Time (5) min, Vol. (___) L**	12:36	12:41	12:46	12:~~47~~48	12~~:49~~					
Submerged Tubing Depth (m):	3.9 m	**Depth to water (m)**	–	2.90	3.885	3	well not recharging. Switch to Direct Sample.					
Well Stick-up Height (m):	1.85 m	**Temperature (°C) 3%**	5.8	5.7	5.7	5.7						
Estimated Water Volume (L):	4.2 L	**pH (pH Units) ±0.1**	7.32	7.37	7.40	7.32						
		Cond. (µs/cm) 3%	423.5	463.1	194.1	166.7						
		Specific Cond. (µs/cm) 3%	666.7	636.1	304.7	263.6						
		Redox (mV) 10%	14.9	21.7	0.7	-9.6						
		DO (mg/L) 10%	1.40	2.45	4.92	5.14						
		DO (%) 10%	11.3	20.3	39.4	40.8						
		Appearance & Odour (Clear, Silty, HC odours, etc.)	turbid light brown	same	same	less turbid						
		Only for final readings Sulphide (mg/L)	–	–	–							
		Only for final readings Turbidity (NTU)	–	–	–							
		Interval Purge Volume (L)	0.4	0.4	0.4	0.2						
		Cumulative Purge Volume (L):	0.4	0.8 L	1.2 L	1.4 L						

(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 logged on YSI (24hr):	12:48	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
	MP09-12		X		

HEMMERA

Sample Site (Con't): MP09-12

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

Sample Time: 12:59

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: There is a 2mm aperture 95th 8cm below TOP. I wrapped electrical tape around it to re-seal it.

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	~~0~~
Oxygen (O2)	%	20.6
Carbon Dioxide (C02)	PPM	700

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 (Nitric)	100mL	
1b	40 ml (glass)	Dissolved Mercury	15 mL	☒ Field Filtered	☒ HCL (Hydrochloric)	20mL	
2	1 L (plastic)	General Chemistry	200 ml	-	-	-	
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH (Sodium Hydroxide)	-	
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4 (Sulfuric)	-	
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3 (Nitric)	-	
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, then NaOH	-	
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-	-	
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-	-	

General Notes (Condition of well or other features):

-While purging we realized that the well wasn't recharging, We switched to direct sample. The water was extremely silty. We used 15 Filters to produce 120mL of Filtered water. Future sampling should direct sample with bailer.

-Used: -6m 1/4
-6" Silicone

Crew Lead Sign Off (initials):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MP09-14	**Project Number:**	1343-005.11	**Date:**	Sept 2, 2015
Approximate Date Drilled:	?	**Client:**	GY - AAM	**Samplers:**	JH + JC
Piezometer Diameter / Screen Length:	2.1cm / ?	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	cloudy / -2°C
UTM Location:	Z. 08 E. 0389143 N. 6880711	**Waypoint:**	GPS Hem Name MP09-14S	**Recovery:**	☐ Good ☐ Bad
Photos:	Cam. Hem Nos. 094-096	**Purge Method:**			
Duplicate Collected:	☐ Yes Name	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes Name		X		

Initial Depth to Water (m):	1.149 m	**Purge Start Time:**	X	**Purge End Time:**	X	**Pen or YSI:**	☐ YSI Pro Plus ☑ Pen Unit			
Depth to Bottom (m):	1.609 m	**Purge Interval Time (___) min, Vol. (___) L**								
Submerged Tubing Depth (m):	1.55 m	**Depth to water (m)**								
Well Stick-up Height (m):	1.0 m	**Temperature (°C) 3%**								
Estimated Water Volume (L):	0.25 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)**							
			Turbidity (NTU)							
		Interval Purge Volume (L)								
		Cumulative Purge Volume (L):								

Direct Sample

(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 logged on YSI (24hr):	X	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
			X		

HEMMERA

Sample Site (Con't): MP09-14

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

Sample Time: 15:42

Well Head Seal: ☐ J-Plug ☐ PVC Cap ☐ Not Sealed ☒ Other Plastic Bag wrapped with Flagging tape.

Seal Replaced: ☐ J-Plug ☐ PVC Cap ☐ Not required ☒ Other ~~with~~ rewrapped with nitrile glove and Plastic Bag

Well properly sealed for gas monitoring: ☐ Yes ☒ No Details: only plastic Bag may have leaks

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.6
Carbon Dioxide (C02)	PPM	720

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 (Nitric)	Insufficient volume 35 ml	
1b	40 ml (glass)	Dissolved Mercury	15 mL	☒ Field Filtered	☒ HCL (Hydrochloric)	35 ml	Turbid with Black specks
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4 (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3 (Nitric)		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, then NaOH		
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

Consumables used
- 3m 1/4" peristaltic tube used.
- 6" Silicon

only 60ml of sample pulled from well

Crew Lead Sign Off (initials):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09-01	**Project Number:**	1343-005.11	**Date:**	Sept 1 2015
Approximate Date Drilled:	?	**Client:**	GY - AAM	**Samplers:**	JH+JC
Piezometer Diameter / Screen Length:	1.5" / ?	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	1°C Windy
UTM Location:	Z.08 E.0389395 N.6880558	**Waypoint:**	GPS Hem Name MW09-01*	**Recovery:**	☐ Good ☒ Bad
Photos:	Cam. Hem Nos. 069-071	**Purge Method:**			
Duplicate Collected:	☐ Yes Name	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes Name		X		

Initial Depth to Water (m):	~~5.02~~ 6.685 m	**Purge Start Time:**	16:30	**Purge End Time:**	16:36	**Pen or YSI:**	☒ YSI Pro Plus ☐ Pen Unit			
Depth to Bottom (m):	9.215 m	**Purge Interval Time (___) min, Vol. (___) L**	16:31	16:34	16:37					
Submerged Tubing Depth (m):	8.0 m	**Depth to water (m)**	7.052	7.340						
Well Stick-up Height (m):	0.79 m	**Temperature (°C) 3%**	2.4	2.7	Well is not					
Estimated Water Volume (L):	1.8L	**pH (pH Units) ±0.1**	6.93	6.98	recharging.					
Lots of sludge at bottom of well. Estimated top of sludge is 8.5m ∴ (8.5-6.7) X 1 = 1.8L		**Cond. (µs/cm) 3%**	1687	1668						
		Specific Cond. (µs/cm) 3%	2961	2949	Switching to					
		Redox (mV) 10%	93.3	74.5						
		DO (mg/L) 10%	1.53	0.40	Direct				Sample	
		DO (%) 10%	9.5	2.9						
		Appearance & Odour (Clear, Silty, HC odours, etc.)	very silty	less silty						
		Only for final readings Sulphide (mg/L)	—	—						
		Only for final readings Turbidity (NTU)	—	—						
		Interval Purge Volume (L)	250mL	250mL						
		Cumulative Purge Volume (L):	.25L	.25L						

(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 logged on YSI (24hr):	16:40	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
	MW09-1		X		

HEMMERA

Sample Site (Con't): MW09-01

Sample Date (Con't): Sept 1 2015

Sample Time: 17:10

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

Seal Replaced: ☐ J-Plug ☐ PVC Cap ☒ Not required (Cap is ok) ☐ Other _____

Well properly sealed for gas monitoring: ☐ Yes ☒ No Details: 1.5" well has gash cut into the side. Vapours can escape.

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.7
Carbon Dioxide (C02)	PPM	580

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 (Nitric)	120 mL	
1b	40 ml (glass)	Dissolved Mercury	15 mL	☒ Field Filtered	☒ HCL (Hydrochloric)	15 mL	
2	1 L (plastic)	General Chemistry	200 ml	-	-	200 mL	Silty
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☒ NaOH (Sodium Hydroxide)	100 mL	
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☒ H_2SO_4 (Sulfuric)	120 mL	
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☒ HNO_3 (Nitric)	50 mL	
6	120 ml (plastic)	Sulphide	100 ml	-	☒ Zinc Acetate, then NaOH	100 mL	
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-	100 mL	Very Silty
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☒ Field Filtered	-	100 mL	

General Notes (Condition of well or other features):

This well has a large gash 20cm below top of pipe. It is believed that during high water, tailing water + sludge enters the well. There appears to be 0.7m of sludge at the bottom of the well, based on the feel of the water level tape. We lowered new tubing into the well and set it at 80m b top. We purged .5L and realized the well was not recharging so we switched to direct sample. ~~The sand~~ To permanently fix this well, we need to cut the protective 6" casing off below the gash, then cut the 1.5" well below the gash and add a new piece of 1.5" pvc with a cuplor, then use a 6" cuplor to reconnect the protective case. As a temporary fix, I have sealed the gash with nitrile gloves and electrical tape. I have also developed the well with waterra and a footvalve + surge block to remove as much sediment as possible. Because of the small water column and slow recharge, this well will take several purging events to properly clean out. An option would be to add ~1 water into the well to get the solids into suspension, then pump it out using waterra.

I've managed to remove a few centimeters of sediment, but am

- 10 m ¼" tubing
- Used ~10 m waterra
- 1 Footvalve
- 1 Surge block
- 1/2 Silicone

Crew Lead Sign Off (initials):	

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09-02	**Project Number:**	1343-005.11	**Date:**	Sept 1 2015
Approximate Date Drilled:	?	**Client:**	GY - AAM	**Samplers:**	SH + JC
Piezometer Diameter / Screen Length:	2" / ?	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	1°C Windy.
UTM Location:	Z. 08 E. 0389393 N. 6880558	**Waypoint:**	GPS hon Name MW09-02	**Recovery:**	☒ Good ☐ Bad
Photos:	Cam. hon Nos. 066-068	**Purge Method:**			
Duplicate Collected:	☐ Yes Name	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes Name		X		

Initial Depth to Water (m):	3.021	**Purge Start Time:**	15:49	**Purge End Time:**				**Pen or YSI:**	☒ YSI Pro Plus ☐ Pen Unit	
Depth to Bottom (m):	4.715	**Purge Interval Time (3) min, Vol. (___) L**		15:50	15:53	15:56	15:58	16:02	16:05	16:08
Submerged Tubing Depth (m):	4.5	**Depth to water (m)**			3.385		3.650		3.920	
Well Stick-up Height (m):	0.69	**Temperature (°C) 3%**		3.2	3.0	3.0	3.0	3.1	3.1	3.1
Estimated Water Volume (L):	3.4	**pH (pH Units) ±0.1**		7.40	7.30	7.29	7.27	7.24	7.21	7.17
		Cond. (µs/cm) 3%		1546	1630	1619	1614	1618	1624	1632
		Specific Cond. (µs/cm) 3%		2829	2814	2793	2777	2782	2790	2802
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Redox (mV) 10%**		-30.3	-30.6	-50.8	-54.9	-69.9	-71.2	-71.6
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**DO (mg/L) 10%**		0.64	0.20	0.17	0.13	0.13	0.12	0.11
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%**		4.4	1.5	1.3	1.0	0.9	0.9	0.8
		Appearance & Odour (Clear, Silty, HC odours, etc.)		clear orange	clear orangish	clear orange	clear orange	clear orange	milky clear	more clear
		Only for final readings	**Sulphide (mg/L)**							
			Turbidity (NTU)							7.74
		Interval Purge Volume (L)		0.4	0.4	0.5	0.6	0.7	0.5	0.5
		Cumulative Purge Volume (L):		0.4	0.8	1.3	1.9	2.6	3.1	3.6

YSI Field Parameters Logged:	☒ Yes ☐ No	**Sample Method:**			
Time logged on YSI (24hr):	16:09	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
			X		

HEMMERA

Sample Site (Con't): MW09-02

Sample Date (Con't): Sept 1 2015

Sample Time: 16:15

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: _____

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.5
Carbon Dioxide (C02)	PPM	1050

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 (Nitric)	120	
1b	40 ml (glass)	Dissolved Mercury	15 mL	☒ Field Filtered	☒ HCL (Hydrochloric)	40	
2	1 L (plastic)	General Chemistry	200 ml	-	-	1L	
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☒ NaOH (Sodium Hydroxide)	145	
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☒ H_2SO_4 (Sulfuric)	120	
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☒ HNO_3 (Nitric)	120	
6	120 ml (plastic)	Sulphide	100 ml	-	☒ Zinc Acetate, then NaOH	120	
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-	120	
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-	120	

General Notes (Condition of well or other features): - Full parameters, purge and sample set collected.

Consumables
- 6" Silicon tubing

Crew Lead Sign Off (initials):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09-03	**Project Number:**	1343-005.11	**Date:**	Sept 1 2015
Approximate Date Drilled:	?	**Client:**	GY - AAM	**Samplers:**	SH + JC
Piezometer Diameter / Screen Length:	2" / ?	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	-1°C Windy
UTM Location:	Z 08 E. 0389427 N. 6880568	**Waypoint:**	GPS Hem Name MW09-03	**Recovery:**	☒ Good ☐ Bad
Photos:	Cam. Hem Nos. ~~060~~ 060-062	**Purge Method:**			
Duplicate Collected:	☐ Yes Name ~~X~~	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes Name ~~X~~		X		

Initial Depth to Water (m):	6.449	**Purge Start Time:**	14:20	**Purge End Time:**			**Pen or YSI:**	☒ YSI Pro Plus ☐ Pen Unit		
Depth to Bottom (m):	9.925	**Purge Interval Time (3) min, Vol. (___) L**	14:22	14:25	14:28	14:31	14:34	14:37		
Submerged Tubing Depth (m):	9.6	**Depth to water (m)**			6.681		6.708	6.711	6.711	
Well Stick-up Height (m):	0.37m	**Temperature (°C) 3%**	2.6	1.9	1.9	1.9	1.9	1.9		
Estimated Water Volume (L):	7L	**pH (pH Units) ±0.1**	5.97	7.87	8.23	8.29	8.26	8.15		
		Cond. (µs/cm) 3%	1545	1496	1486	1482	1480	1476		
		Specific Cond. (µs/cm) 3%	2717	2672	2657	2652	2650	2645		
		Redox (mV) 10%	213.0	196.6	184.4	175.6	171.3	166.6		
		DO (mg/L) 10%	0.77	0.28	0.20	0.17	0.16	0.13		
		DO (%) 10%	4.8	2.0	1.4	1.2	1.2	1.2		
		Appearance & Odour (Clear, Silty, HC odours, etc.)	clear Colourless	Same.	Same.	Same.	Same.	Same.		
		Only for final readings Sulphide (mg/L)						0.01		
		Only for final readings Turbidity (NTU)						1.27		
		Interval Purge Volume (L)	0.4	0.4	0.4	0.4	0.4	0.5		
		Cumulative Purge Volume (L):	0.4	0.8	1.2	1.6	2.0	2.5		

(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 logged on YSI (24hr):	14:38	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
			X		

HEMMERA

Sample Site (Con't): MW09-03

Sample Date (Con't): Sept 1 2015

Sample Time: 14:45

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

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.7
Carbon Dioxide (C02)	PPM	630

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 (Nitric)	120	
1b	40 ml (glass)	Dissolved Mercury	15 mL	☒ Field Filtered	☒ HCL (Hydrochloric)	40	
2	1 L (plastic)	General Chemistry	200 ml	-	-	1L	
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☒ NaOH (Sodium Hydroxide)	145	
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☒ H_2SO_4 (Sulfuric)	120	
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☒ HNO_3 (Nitric)	120	
6	120 ml (plastic)	Sulphide	100 ml	-	☒ Zinc Acetate, then NaOH	120	
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-	120	
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☒ Field Filtered	-	120	

General Notes (Condition of well or other features): - Full readings, purge and Sample set collected

Consumables used
- 6" Silicon.

- Transducer in well

Crew Lead Sign Off (initials):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09-05	**Project Number:**	1343-005.11	**Date:**	2nd SEPT. 2015
Approximate Date Drilled:	UNKNOWN	**Client:**	GY - AAM	**Samplers:**	AN - GMR
Piezometer Diameter / Screen Length:	2" PVC / UNKNOWN	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	10°C / OVERCAST
UTM Location:	Z08V E. 389944 N. 6880656	**Waypoint:**	GPS GMR Name UTMS ONLY	**Recovery:**	☐ Good ☒ Bad
Photos:	Cam. ELR Nos. 317 - 320	**Purge Method:**			
Duplicate Collected:	☐ Yes Name 0073-0076	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes Name		N/A		

Initial Depth to Water (m):	Ø DRY	**Purge Start Time:**		**Purge End Time:**				**Pen or YSI:**	☐ YSI Pro Plus ☐ Pen Unit										
Depth to Bottom (m):	7.560	**Purge Interval Time (___) min, Vol. (___) L**																	
Submerged Tubing Depth (m):	/	**Depth to water (m)**																	
Well Stick-up Height (m):	1.22	**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)**																
			Turbidity (NTU)																
		Interval Purge Volume (L)																	
		Cumulative Purge Volume (L):																	

DRY WELL

(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 logged on YSI (24hr):		**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**

HEMMERA

Sample Site (Con't): MW09-05

Sample Date (Con't): Sept 2 2015

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	Ø
Oxygen (O2)	%	19.1
Carbon Dioxide (C02)	PPM	1500

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 (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL (Hydrochloric)		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH (Sodium Hydroxide)	DRY	
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4 (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3 (Nitric)	WELL	
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, then NaOH		
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

Crew Lead Sign Off (initials):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09 - 06	**Project Number:**	1343-005.11	**Date:**	SEPT 2 2015
Approximate Date Drilled:	UNKNOWN	**Client:**	GY - AAM	**Samplers:**	GMR + AN
Piezometer Diameter / Screen Length:	2" / UNKNOWN	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	0°C OVERCAST SNOW
UTM Location:	Z08V E. 389414 N. 6880656	**Waypoint:**	GPS GMR Name UTMS ONLY	**Recovery:**	☒ Good ☐ Bad
Photos:	Cam. GMR Nos. 317 - 320	**Purge Method:**			
Duplicate Collected:	☐ Yes Name 0073 - 0076	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes Name		✓		

Initial Depth to Water (m):	3.640	**Purge Start Time:**	1045	**Purge End Time:**	1112	**Pen or YSI:**	☒ YSI Pro Plus ☐ Pen Unit				
Depth to Bottom (m):	5.990	**Purge Interval Time (5) min, Vol. (___) L**	1050	1055	1100	1105	1110				
Submerged Tubing Depth (m):		**Depth to water (m)**	3.97	4.20	4.28	4.37	4.47				
Well Stick-up Height (m):	2.085	**Temperature (°C) 3%**	5.8	5.3	5.2	5.4	5.4				
Estimated Water Volume (L):		**pH (pH Units) ±0.1**	7.27	7.41	7.46	7.48	7.49				
		Cond. (µs/cm) 3%	957	960	962	969	970				
		Specific Cond. (µs/cm) 3%	1513	1540	1545	1550	1553				
		Redox (mV) 10%	13.3	25.4	32.6	39.2	42.6				
		DO (mg/L) 10%	2.12	2.19	2.21	2.26	2.26				
		DO (%) 10%	16.9	17.3	17.8	17.9	17.9				
		Appearance & Odour (Clear, Silty, HC odours, etc.)	CLEAR	CLEAR	CLEAR	CLEAR	CLEAR				
		Only for final readings Sulphide (mg/L)					0.02				
		Only for final readings Turbidity (NTU)					6.63				
		Interval Purge Volume (L)	0.800	300	400	300	300				
		Cumulative Purge Volume (L):	0.800	1100	1.5	1.8	2100				

(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 logged on YSI (24hr):	1112	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
			✓		

HEMMERA

Sample Site (Con't): MW09-06

Sample Date (Con't): SEPT 2 2015

Sample Time: 11-14

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	800.

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 (Nitric)	FULL	
1b	40 ml (glass)	Dissolved Mercury	15 mL	☒ Field Filtered	☒ HCL (Hydrochloric)		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☒ NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☒ H_2SO_4 (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☒ HNO_3 (Nitric)		
6	120 ml (plastic)	Sulphide	100 ml	-	☒ Zinc Acetate, then NaOH		
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☒ Field Filtered	-		

General Notes (Condition of well or other features):

24 FT PERI

6" SILICON

VERY SLOW PUMPING RATE

Crew Lead Sign Off (initials):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09-07	**Project Number:**	1343-005.11	**Date:**	SEPT 2 2015
Approximate Date Drilled:	?	**Client:**	GY - AAM	**Samplers:**	GR + AN
Piezometer Diameter / Screen Length:	2" PVC Thinner Flush Sched 20	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	~2°C / OVERCAST LIGHT RAIN/SNOW
UTM Location:	Z. 08V E. 0389325 N. 6880700	**Waypoint:**	GPS GR Name UTMs ONLY	**Recovery:**	☐ Good ☒ Bad
Photos:	Cam. GR Nos. 321-324	**Purge Method:**			
Duplicate Collected:	☐ Yes Name / 0077-0080	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes Name	12-3c	✓ ATTEMPTED.		

Initial Depth to Water (m):	3.372	**Purge Start Time:**		**Purge End Time:**					**Pen or YSI:**	☐ YSI Pro Plus ☐ Pen Unit		
Depth to Bottom (m):	3.405	**Purge Interval** Time (___) min, Vol. (___) L										
Submerged Tubing Depth (m):	/	**Depth to water (m)**										
Well Stick-up Height (m):	1.34	**Temperature (°C) 3%**										
Estimated Water Volume (L):	0.066	**pH (pH Units) ±0.1**										
0.033 x 2 = 0.066		**Cond. (µs/cm) 3%**										
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Specific Cond. (µs/cm) 3%**										
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**Redox (mV) 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		**DO (mg/L) 10%**										
		DO (%) 10%										
		Appearance & Odour (Clear, Silty, HC odours, etc.)										
		Only for final readings	**Sulphide (mg/L)**									
			Turbidity (NTU)									
		Interval Purge Volume (L)										
		Cumulative Purge Volume (L):										

INSUFFICIENT VOLUME. (66 mL)

YSI Field Parameters Logged:	☐ Yes ☒ No	**Sample Method:**			
Time logged on YSI (24hr):		**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**

HEMMERA

Sample Site (Con't): MW09-07

Sample Date (Con't): SEPT 2 2015

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	Ø
Oxygen (O2)	%	20.9
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 (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL (Hydrochloric)		
2	1 L (plastic)	General Chemistry	200 ml	-	-	INSUFFICIENT VOLUME.	
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4 (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3 (Nitric)		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, then NaOH		
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

INSUFFICIENT VOLUME. 66ml

2 FT PERI

6" SILICON.

Crew Lead Sign Off (initials):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09-08	**Project Number:**	1343-005.11	**Date:**	SEPT 1 2015
Approximate Date Drilled:	UNKNOWN	**Client:**	GY - AAM	**Samplers:**	GMR + AN
Piezometer Diameter / Screen Length:	2" PVC / UNKNOWN	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	-1°C OVERCAST
UTM Location:	Z. 08V E 0389620 N. 6880577	**Waypoint:**	GPS ___ Name UTMS ONLY	**Recovery:**	☒ Good ☐ Bad
Photos:	Cam. ELR Nos. ~~309~~ - ~~311~~	**Purge Method:**			
Duplicate Collected:	☐ Yes Name ~~0065~~ - 0067	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☒ Yes Name ~~MW~~ FB15-200		✓		

Initial Depth to Water (m):	~~1.120~~ 1.120	**Purge Start Time:**	1641	**Purge End Time:**	1659	**Pen or YSI:**	☒ YSI Pro Plus ☐ Pen Unit				
Depth to Bottom (m):	3.845 +0.082 = 3.927	**Purge Interval Time (~5) min, Vol. (___) L**	1646	1651	1657						
Submerged Tubing Depth (m):	3.92	**Depth to water (m)**	1.214	~~1.209~~ 1.209	1.205						
Well Stick-up Height (m):	1.13	**Temperature (°C) 3%**	3.2	3.2	3.3						
Estimated Water Volume (L):	~5.61	**pH (pH Units) ±0.1**	6.75	6.74	6.72						
3.927 - 1.120 x 2 = 5.61		**Cond. (µs/cm) 3%**	215.5	212.6	210.7						
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Specific Cond. (µs/cm) 3%**	371.8	363.6	360.0						
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**Redox (mV) 10%**	-58.1	-61.4	-65.2						
2" casing has 0.16 USgal/ft or 2.032 l/m		**DO (mg/L) 10%**	0.32	0.30	0.31						
1" casing has 0.04 USgal/ft or 0.508 l/m		**DO (%) 10%**	2.4	2.2	2.3						
8" sand pack has 0.73 USgal/ft or 9.271 l/m		**Appearance & Odour (Clear, Silty, HC odours, etc.)**	CLEAR SLIGHT SULPHUR	→	→						
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Only for final readings** — **Sulphide (mg/L)**			0.08						
		Only for final readings — **Turbidity (NTU)**			4.38						
		Interval Purge Volume (L)	1.5	1.5	2.5						
		Cumulative Purge Volume (L):	1.5	3	5.5						

YSI Field Parameters Logged:	☒ Yes ☐ No	**Sample Method:**			
Time logged on YSI (24hr):	1659	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
			✓		

HEMMERA

Sample Site (Con't): MW09-08

Sample Date (Con't): SEPT 1 2015

Sample Time: 16-59 SLITS EXTEND BEYOND CAP

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

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

Well properly sealed for gas monitoring: ☒ Yes ☒ No Details: SLITS. PARTIAL?

Head Space Gas Measurements

	Units	Values
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 (Nitric)	FULL	
1b	40 ml (glass)	Dissolved Mercury	15 mL	☒ Field Filtered	☒ HCL (Hydrochloric)		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☒ NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☒ H_2SO_4 (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☒ HNO_3 (Nitric)		
6	120 ml (plastic)	Sulphide	100 ml	-	☒ Zinc Acetate, then NaOH		
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☒ Field Filtered	-		

General Notes (Condition of well or other features):

6" SILICON

6" PERI T.

ELECTRICAL TAPE AROUND SLITS IN CASING.

Crew Lead Sign Off (initials):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09-11	**Project Number:**	1343-005.11	**Date:**	Sept 2, 2015
Approximate Date Drilled:	?	**Client:**	GY - AAM	**Samplers:**	SH + JC
Piezometer Diameter / Screen Length:	2" / ?	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	cloudy -1°C
UTM Location:	Z.08 E.0389040 N.6886215	**Waypoint:**	GPS Hem Name MW09-11*	**Recovery:**	☐ Good ☒ Bad
Photos:	Cam. Hem Nos. 097-099	**Purge Method:**			
Duplicate Collected:	☐ Yes Name	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes Name				

Initial Depth to Water (m):	Dry	**Purge Start Time:**	X	**Purge End Time:**	X
Depth to Bottom (m):	4.894 m	**Pen or YSI:**	☐ YSI Pro Plus ☒ Pen Unit		
Submerged Tubing Depth (m):	/	**Purge Interval Time (___) min, Vol. (___) L**			
Well Stick-up Height (m):	0.81 m	**Depth to water (m)**			
Estimated Water Volume (L):	/	**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)**		
			Turbidity (NTU)		
		Interval Purge Volume (L)			
		Cumulative Purge Volume (L):			

Did not Sample

(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 logged on YSI (24hr):		**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
		Did not	Sample		

HEMMERA

Sample Site (Con't): MW09-11

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

Sample Time: did not sample

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	2030

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 (Nitric)	Did Not Sample	
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL (Hydrochloric)		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4 (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3 (Nitric)		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, then NaOH		
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

- Well Dry
- Old bailer left in well.

Crew Lead Sign Off (initials):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09 - 13	**Project Number:**	1343-005.11	**Date:**	SEPT 2 2015
Approximate Date Drilled:	UNKNOWN	**Client:**	GY - AAM	**Samplers:**	GMR + AN
Piezometer Diameter / Screen Length:	2" PVC	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	~ 4°C OVERCAST
UTM Location:	Z. 08V E. 0389016 N. 6881661	**Waypoint:**	GPS GMR Name UTMs ONLY	**Recovery:**	☐ Good ☒ Bad
Photos:	Cam. GMR Nos. 0892 - 0094	**Purge Method:**			
Duplicate Collected:	☐ Yes Name	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes Name				

Initial Depth to Water (m):	~~8.960~~	**Purge Start Time:**		**Purge End Time:**		**Pen or YSI:**	☐ YSI Pro Plus ☐ Pen Unit				
Depth to ~~Bottom~~ (m): DEPTH TO ICE	8.960 TO ICE	**Purge Interval Time (___) min, Vol. (___) L**									
Submerged Tubing Depth (m):	—	**Depth to water (m)**									
Well Stick-up Height (m):	—	**Temperature (°C) 3%**									
Estimated Water Volume (L):	—	**pH (pH Units) ±0.1**									
		Cond. (µs/cm) 3%									
		Specific Cond. (µs/cm) 3%									
		Redox (mV) 10%									
		DO (mg/L) 10%									
		DO (%) 10%									
		Appearance & Odour (Clear, Silty, HC odours, etc.)									
		Only for final readings	**Sulphide (mg/L)**								
			Turbidity (NTU)								
		Interval Purge Volume (L)									
		Cumulative Purge Volume (L):									

FROZEN

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

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

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

YSI Field Parameters Logged:	☐ Yes ☒ No	**Sample Method:**			
Time logged on YSI (24hr):		**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**

HEMMERA

Sample Site (Con't): MW09-13

Sample Date (Con't): SEPT 2 2015

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: But FROZEN

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	Ø
Oxygen (O2)	%	20.9
Carbon Dioxide (C02)	PPM	400

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 (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL (Hydrochloric)		
2	1 L (plastic)	General Chemistry	200 ml	-	-		FROZEN
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH_3)	120 ml	-	☐ H_2SO_4 (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3 (Nitric)		
6	120 ml (plastic)	Sulphide	100 ml	-	☒ Zinc Acetate, then NaOH		
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

Crew Lead Sign Off (initials):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09-14	**Project Number:**	1343-005.11	**Date:**	SEPT 2 2015
Approximate Date Drilled:	UNKNOWN	**Client:**	GY - AAM	**Samplers:**	GMR + AN
Piezometer Diameter / Screen Length:	2" PVC / UNKNOWN	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	~4°C OVERCAST
UTM Location:	Z. 08V E. 0389008 N. 6881661	**Waypoint:**	GPS CLR Name UTM5	**Recovery:**	☐ Good ☒ Bad
Photos:	Cam CLR Nos. 0092 - 0094	**Purge Method:**			
Duplicate Collected:	☐ Yes / Name	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes Name				

Initial Depth to Water (m):	3.270	**Purge Start Time:**		**Purge End Time:**		**Pen or YSI:**	☐ YSI Pro Plus ☐ Pen Unit					
Depth to Bottom (m):	DEPTH TO ICE 6.520 DEPTH TO ICE	**Purge Interval Time (___) min, Vol. (___) L**										
Submerged Tubing Depth (m):		**Depth to water (m)**										
Well Stick-up Height (m):		**Temperature (°C) 3%**										
Estimated Water Volume (L):		**pH (pH Units) ±0.1**										
		Cond. (µs/cm) 3%										
		Specific Cond. (µs/cm) 3%										
		Redox (mV) 10%										
		DO (mg/L) 10%										
		DO (%) 10%										
		Appearance & Odour (Clear, Silty, HC odours, etc.)										
		Only for final readings	**Sulphide (mg/L)**									
			Turbidity (NTU)									
		Interval Purge Volume (L)										
		Cumulative Purge Volume (L):										

FROZEN

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

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

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

YSI Field Parameters Logged:	☐ Yes ☒ No	**Sample Method:**			
Time logged on YSI (24hr):		**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**

HEMMERA

Sample Site (Con't): MW09-14

Sample Date (Con't): SEPT 2 2015

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: BUT FROZEN.

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	ϕ
Oxygen (O2)	%	20.9
Carbon Dioxide (C02)	PPM	400

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 (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL (Hydrochloric)		
2	1 L (plastic)	General Chemistry	200 ml	-	-		FROZEN.
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4 (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3 (Nitric)		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, then NaOH		
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

Crew Lead Sign Off (initials):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09-15	**Project Number:**	1343-005.11	**Date:**	Sept 7, 2015
Approximate Date Drilled:	?	**Client:**	GY - AAM	**Samplers:**	JH + JC
Piezometer Diameter / Screen Length:	2" / ?	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Cloudy 1-1°C
UTM Location:	Z. 08 E. 0388625 N. 6881724	**Waypoint:**	GPS Hem Name MW09-15	**Recovery:**	☐ Good ☒ Bad
Photos:	Cam: Hem Nos. 103-105	**Purge Method:**			
Duplicate Collected:	☐ Yes Name X	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes Name		Not Purged		

Initial Depth to Water (m):	Frozen	**Purge Start Time:**		**Purge End Time:**				**Pen or YSI:**	☐ YSI Pro Plus ☐ Pen Unit		
Depth to Bottom (m):	14.087	**Purge Interval** Time (___) min, Vol. (___) L									
Submerged Tubing Depth (m):	/	**Depth to water (m)**									
Well Stick-up Height (m):		**Temperature (°C) 3%**									
Estimated Water Volume (L):	None	**pH (pH Units) ±0.1**									
		Cond. (µs/cm) 3%									
		Specific Cond. (µs/cm) 3%									
		Redox (mV) 10%									
		DO (mg/L) 10%									
		DO (%) 10%									
		Appearance & Odour (Clear, Silty, HC odours, etc.)									
		Only for final readings	**Sulphide (mg/L)**								
			Turbidity (NTU)								
		Interval Purge Volume (L)									
		Cumulative Purge Volume (L):									

Not Sampled

(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 logged on YSI (24hr):		**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
		Not	Sampled		

HEMMERA

Sample Site (Con't): MW09-15

Sample Date (Con't): Sept 2, 25

Sample Time: Not Sampled

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)	%	19.5
Carbon Dioxide (C02)	PPM	2970

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 (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL (Hydrochloric)		
2	1 L (plastic)	General Chemistry	200 ml	-	-	Not	Sampled
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4 (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3 (Nitric)		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, then NaOH		
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

- Well frozen
- There is a transducer frozen in the well.

Crew Lead Sign Off (initials):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09-16	**Project Number:**	1343-005.11	**Date:**	Aug 31, 2015
Approximate Date Drilled:	?	**Client:**	GY - AAM	**Samplers:**	JH + JC
Piezometer Diameter / Screen Length:	2" / ?	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	cloudy 0°C
UTM Location:	Z.08 E. 0387994 N. 6881097	**Waypoint:**	GPS Hem Name MW09-16+	**Recovery:**	☒ Good ☐ Bad
Photos:	Cam. Hem Nos. 014 - 016	**Purge Method:**			
Duplicate Collected:	☒ Yes Name MW15-100	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☒ Yes Name FB15-100		X		

Initial Depth to Water (m):	1.846 m	**Purge Start Time:**	11:44	**Purge End Time:**	12:07	**Pen or YSI:**	☒ YSI Pro Plus ☐ Pen Unit			
Depth to Bottom (m):	2.722 m	**Purge Interval Time (___) min, Vol. (___) L**	11:45	11:50	11:55	12:00	12:05			
Submerged Tubing Depth (m):	2.65	**Depth to water (m)**	–	1.844	–	1.846	1.846			
Well Stick-up Height (m):	1.31	**Temperature (°C) 3%**	4.4	4.6	4.6	4.6	4.5			
Estimated Water Volume (L):	1.752 m	**pH (pH Units) ±0.1**	5.78	6.40	6.49	6.54	6.55			
(2.722 - 1.846) * 2 = 1.752		**Cond. (µs/cm) 3%**	1019	983	981	980	977			
		Specific Cond. (µs/cm) 3%	1670	1610	1609	1606	1605			
		Redox (mV) 10%	307.4	300.9	299.0	298.5	298.8			
		DO (mg/L) 10%	3.16	2.45	2.44	2.44	2.50			
		DO (%) 10%	25.7	19.2	19.0	19.0	19.3			
		Appearance & Odour (Clear, Silty, HC odours, etc.)	clear	clear	clear	clear	clear			
		Only for final readings Sulphide (mg/L)	–	–	–	–	0.00			
		Only for final readings Turbidity (NTU)	–	–	–	–	1.79			
		Interval Purge Volume (L)	.1L	~~.6L~~ .5	~~1.1L~~ .5	~~1.6L~~ .5	~~2.1L~~ .5L			
		Cumulative Purge Volume (L):	.1L	.6L	1.1L	1.6L	2.1L			

(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 logged on YSI (24hr):	MW09-16	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
	12:07		X		

HEMMERA

Sample Site (Con't): MW09-16

Sample Date (Con't): Aug 31, 2015

Sample Time: 12:10

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: wl 2 slits 3" down from T.O.P <1mm aperture

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	19.5
Carbon Dioxide (C02)	PPM	3420

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 (Nitric)	120 mL	
1b	40 ml (glass)	Dissolved Mercury	15 mL	☒ Field Filtered	☒ HCL (Hydrochloric)	40 mL	
2	1 L (plastic)	General Chemistry	200 ml	-	-	1L	
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☒ NaOH (Sodium Hydroxide)	145 mL	
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☒ H_2SO_4 (Sulfuric)	120 mL	
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☒ HNO_3 (Nitric)	120 mL	
6	120 ml (plastic)	Sulphide	100 ml	-	☒ Zinc Acetate, then NaOH	120 mL	
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-	120 mL	
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☒ Field Filtered	-	120 mL	

General Notes (Condition of well or other features):

- Collected Dup (MW15-100) + Field blank (~~FB~~ FB15-100) ← 25-Aug-2015 batch
- Well in good condition
- Used 6" silicone

Crew Lead Sign Off (initials):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09-17	**Project Number:**	1343-005.11	**Date:**	AUG 31 2015
Approximate Date Drilled:	UNKNOWN	**Client:**	GY - AAM	**Samplers:**	GR + AN
Piezometer Diameter / Screen Length:	2" PVC	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	7°C OVERCAST
UTM Location:	Z: 8V E. 0388078 N. 6880970	**Waypoint:**	GPS GMR Name UTMS ONLY	**Recovery:**	☒ Good ☐ Bad
Photos:	Cam. GR Nos. ~~0033 - 0034~~	**Purge Method:**			
Duplicate Collected:	☐ Yes Name 0035 - 0037	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes Name		✓		

Initial Depth to Water (m):	5.303	**Purge Start Time:**	1501	**Purge End Time:**	1522	**Pen or YSI:**	☒ YSI Pro Plus ☐ Pen Unit			
Depth to Bottom (m):	5.625 + 0.082 = 5.707	**Purge Interval Time (5) min, Vol. (___) L**	1506	1511	1516	1522				
Submerged Tubing Depth (m):	5-6 APPROX	**Depth to water (m)**	5.31	5.31	→	→				
Well Stick-up Height (m):	0.965	**Temperature (°C) 3%**	0.9	0.9	0.9	0.9				
Estimated Water Volume (L):	0.808	**pH (pH Units) ±0.1**	6.78	6.8	6.82	6.84				
0.404 x 2 = 0.808		**Cond. (µs/cm) 3%**	1194	1212	1217	1225				
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Specific Cond. (µs/cm) 3%**	2210	2246	2269	2269				
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**Redox (mV) 10%**	57.2	65.2	69.6	73.5				
2" casing has 0.16 USgal/ft or 2.032 l/m		**DO (mg/L) 10%**	1.55	1.47	1.57	1.54				
1" casing has 0.04 USgal/ft or 0.508 l/m		**DO (%) 10%**	11.1	10.4	11.2	10.9				
8" sand pack has 0.73 USgal/ft or 9.271 l/m		**Appearance & Odour (Clear, Silty, HC odours, etc.)**	CLEAR	→	→					
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Only for final readings** Sulphide (mg/L)				0.01				
		Only for final readings Turbidity (NTU)				0.61				
		Interval Purge Volume (L)	2	2	1	1				
		Cumulative Purge Volume (L):	2	4	5	6				

YSI Field Parameters Logged:	☒ Yes ☐ No	**Sample Method:**			
Time logged on YSI (24hr):	1524	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
			X		

HEMMERA

Sample Site (Con't): MW09-17

Sample Date (Con't): AUG 31 2015

Sample Time: 1525

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

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

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

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.9
Carbon Dioxide (C02)	PPM	~~0~~ 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 (Nitric)	FULL	
1b	40 ml (glass)	Dissolved Mercury	15 mL	☒ Field Filtered	☒ HCL (Hydrochloric)		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☒ NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☒ H_2SO_4 (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☒ HNO_3 (Nitric)		
6	120 ml (plastic)	Sulphide	100 ml	-	☒ Zinc Acetate, then NaOH		
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☒ Field Filtered	-		

General Notes (Condition of well or other features):

2 ft PERISTALTIC
8" SILICON.

Crew Lead Sign Off (initials):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09-18	**Project Number:**	1343-005.11	**Date:**	Aug. 31/2015
Approximate Date Drilled:	UNKNOWN	**Client:**	GY - AAM	**Samplers:**	AN, GR.
Piezometer Diameter / Screen Length:	2" / unknown.	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Overcast ~4°C
UTM Location:	Z 08V E 0388055 N. 6880983	**Waypoint:**	GPS GMR Name UTM-S ONLY	**Recovery:**	☒ Good ☐ Bad
Photos:	Cam EUR Nos. ~~282 - 284~~ 0038 - 0040	**Purge Method:**			
Duplicate Collected:	☐ Yes ☒ Name	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes ☒ Name		✓		

Initial Depth to Water (m):	4.635	**Purge Start Time:**	1600	**Purge End Time:**	1615	**Pen or YSI:**	☒ YSI Pro Plus ☐ Pen Unit				
Depth to Bottom (m):	7.713 + 0.082 = 7.795	**Purge Interval** Time (5) min, Vol. (___) L	1605	1610	1615						
Submerged Tubing Depth (m):	~7.79	**Depth to water (m)**	4.640	→							
Well Stick-up Height (m):	0.88	**Temperature (°C) 3%**	0.5	0.5	0.5						
Estimated Water Volume (L):	6.32	**pH (pH Units) ±0.1**	6.92	6.90	6.90						
3.16 x 2		**Cond. (µs/cm) 3%**	1208	1202	1210						
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Specific Cond. (µs/cm) 3%**	2267	2259	2266						
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**Redox (mV) 10%**	60.6	67.2	72.8						
2" casing has 0.16 USgal/ft or 2.032 l/m		**DO (mg/L) 10%**	0.40	0.40	0.44						
1" casing has 0.04 USgal/ft or 0.508 l/m		**DO (%) 10%**	2.8	2.9	3.0						
8" sand pack has 0.73 USgal/ft or 9.271 l/m		**Appearance & Odour (Clear, Silty, HC odours, etc.)**	BROWN TURBID	→							
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Only for final readings** **Sulphide (mg/L)**			0.05						
		Only for final readings **Turbidity (NTU)**			17.1						
		Interval Purge Volume (L)	1	2	2						
		Cumulative Purge Volume (L):	1	3	5						

YSI Field Parameters Logged:	☒ Yes ☐ No	**Sample Method:**			
Time logged on YSI (24hr):	1617	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
			✓		

HEMMERA

Sample Site (Con't): MW09-18

Sample Date (Con't): AUG 31, 2015

Sample Time: 1617

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

Seal Replaced: ☐ J-Plug ☐ PVC Cap ☐ Not required ☐ Other TAPE ADDED TO TOP (ELECTRICAL)

Well properly sealed for gas monitoring: ☐ Yes ☐ No UNCERTAIN Details: SLOTS EXTENDED BEYOND CAP. TAPE ADDED.

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.9
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 (Nitric)	FULL	
1b	40 ml (glass)	Dissolved Mercury	15 mL	☒ Field Filtered	☒ HCL (Hydrochloric)		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☒ NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☒ H_2SO_4 (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☒ HNO_3 (Nitric)		
6	120 ml (plastic)	Sulphide	100 ml	-	☒ Zinc Acetate, then NaOH		
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☒ Field Filtered	-		

General Notes (Condition of well or other features):

2 FT PERISTALTIC

8" SILICON

TURBID SAMPLE. ELECTRICAL TAPE ADDED TO TOP OF WELL. AS SEAL.

Crew Lead Sign Off (initials):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09 - 19	**Project Number:**	1343-005.11	**Date:**	AUG 31 2015
Approximate Date Drilled:	UNKNOWN	**Client:**	GY - AAM	**Samplers:**	GR + AN
Piezometer Diameter / Screen Length:	2" PVC / UNKNOWN	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	~7°C OVERCAST
UTM Location:	Z. 08 E. 0388030 N. 6881018	**Waypoint:**	GPS GMR Name UTMS ONLY	**Recovery:**	☒ Good ☐ Bad
Photos:	Cam. ELR Nos. ~~285 - 287~~ 0641 - 0643	**Purge Method:**			BAT SUBMERSIBLE
Duplicate Collected:	☐ Yes Name	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes Name		✓		

Initial Depth to Water (m):	2.580	**Purge Start Time:**	17:03	**Purge End Time:**	1739	**Pen or YSI:**	☒ YSI Pro Plus ☐ Pen Unit			
Depth to Bottom (m):	5.891 INCL 0.082	**Purge Interval Time (5) min, Vol. (___) L**	17:08	16:14	17:19	17:24	17:29	17:34	17:39	
Submerged Tubing Depth (m):	~ 5.88	**Depth to water (m)**	2.885	3.09	3.15	3.18	3.18	→	→	
Well Stick-up Height (m):	0.99	**Temperature (°C) 3%**	2.9	2.7	2.5	2.3	2.2	2.1	2.1	
Estimated Water Volume (L):	~ 6.62	**pH (pH Units) ±0.1**	6.85	6.77	6.76	6.75	6.75	6.74	6.74	
		Cond. (µs/cm) 3%	1074	1053	1037	1031	1028	1030	1043	
		Specific Cond. (µs/cm) 3%	1858	1836	1821	1819	1819	1831	1856	
		Redox (mV) 10%	-27.7	-35.8	-39.7	-42.1	-44.7	-46.6	-47.7	
		DO (mg/L) 10%	0.58	0.45	0.41	0.44	0.45	0.49	0.53	
		DO (%) 10%	4.3	3.5	3.1	3.2	3.5	3.6	3.8	
		Appearance & Odour (Clear, Silty, HC odours, etc.)	CLEAR SULPHUR ODOUR	CLEAR →	→	→	→	→	→	
		Only for final readings — **Sulphide (mg/L)**							0.18	
		Only for final readings — **Turbidity (NTU)**							1.20	
		Interval Purge Volume (L)	2	1	1	1	1	1	1	
		Cumulative Purge Volume (L):	2	3	4	5	6	7	8	

(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 logged on YSI (24hr):	1740	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
			✓		

HEMMERA

Sample Site (Con't): MW09-19

Sample Date (Con't): AUG 31 2015

Sample Time: 1740

Well Head Seal: ☐ J-Plug ☒ PVC Cap ☒ Not Sealed ☐ Other SOME SLOTS, CAP DOESN'T QUITE COVER SLOTS.

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

Well properly sealed for gas monitoring: ☐ Yes ☒ No Details: ELECTRICAL TAPE ADDED. TO COVER SLOTS.

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.9
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 (Nitric)	FULL	
1b	40 ml (glass)	Dissolved Mercury	15 mL	☒ Field Filtered	☒ HCL (Hydrochloric)		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☒ NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☒ H_2SO_4 (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☒ HNO_3 (Nitric)		
6	120 ml (plastic)	Sulphide	100 ml	-	☒ Zinc Acetate, then NaOH		
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☒ Field Filtered	-		

General Notes (Condition of well or other features):

6" SILICON

2 ft PERISTALTIC

TAPE ADDED TO TOP OF PIPE AS SEAL

NEED TO KEEP FLOW RATE SLOW ON PUMP.

Crew Lead Sign Off (initials):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09 - 20	**Project Number:**	1343-005.11	**Date:**	SEPT 1 2015
Approximate Date Drilled:	UNKNOWN	**Client:**	GY - AAM	**Samplers:**	GMR + AN
Piezometer Diameter / Screen Length:	2" PVC / UNKNOWN	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	-1°C OVERCAST
UTM Location:	z08V E. 0389593 N. 6880582.5	**Waypoint:**	GPS GR Name UTM5 ONLY	**Recovery:**	☐ Good ☒ Bad
Photos:	Cam GR Nos. ~~306~~ - ~~308~~	**Purge Method:**			
Duplicate Collected:	☐ Yes Name 0062 - 0064	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes Name				

Initial Depth to Water (m):	DRY	**Purge Start Time:**		**Purge End Time:**		**Pen or YSI:**	☐ YSI Pro Plus ☐ Pen Unit				
Depth to Bottom (m):	3.605	**Purge Interval Time (___) min, Vol. (___) L**									
Submerged Tubing Depth (m):	—	**Depth to water (m)**									
Well Stick-up Height (m):	0.950	**Temperature (°C) 3%**									
Estimated Water Volume (L):	— DRY	**pH (pH Units) ±0.1**									
		Cond. (µs/cm) 3%									
		Specific Cond. (µs/cm) 3%									
		Redox (mV) 10%									
		DO (mg/L) 10%									
		DO (%) 10%									
		Appearance & Odour (Clear, Silty, HC odours, etc.)									
		Only for final readings	**Sulphide (mg/L)**								
			Turbidity (NTU)								
		Interval Purge Volume (L)									
		Cumulative Purge Volume (L):									

DRY WELL

(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 logged on YSI (24hr):		**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**

HEMMERA

Sample Site (Con't): MW09-20

Sample Date (Con't): SEPT 1 2015

Sample Time: DRY

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

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

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

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	Ø
Oxygen (O2)	%	20.9
Carbon Dioxide (C02)	PPM	1100

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 (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL (Hydrochloric)		
2	1 L (plastic)	General Chemistry	200 ml	-	-	DRY WELL	
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4 (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3 (Nitric)		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, then NaOH		
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

General Notes (Condition of well or other features):

Crew Lead Sign Off (initials):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09 - ~~02~~ 21	**Project Number:**	1343-005.11	**Date:**	SEPT 1 2015
Approximate Date Drilled:	UNKNOWN	**Client:**	GY - AAM	**Samplers:**	GMR + AN
Piezometer Diameter / Screen Length:	2" PVC / UNKNOWN	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	0°C OVERCAST LIGHT SNOW
UTM Location:	Z 08V E. 0389335 N. 6880576	**Waypoint:**	GPS GMR Name UTMs ONLY	**Recovery:**	☒ Good ☐ Bad
Photos:	Cam ELR Nos. ~~307~~ - ~~307~~	**Purge Method:**			
Duplicate Collected:	☐ ~~Yes~~ Name ~~0056~~ - 0058	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes Name		✓		

Initial Depth to Water (m):	1.715	**Purge Start Time:**	1355	**Purge End Time:**	1416	**Pen or YSI:**	☒ YSI Pro Plus ☐ Pen Unit				
Depth to Bottom (m):	3.520 + 0.082 = 3.602	**Purge Interval Time (5) min, Vol. (___) L**	1359	1404	1409	1414					
Submerged Tubing Depth (m):	3.6 (APPROX)	**Depth to water (m)**	1.85	1.86	1.86	1.88					
Well Stick-up Height (m):	0.817	**Temperature (°C) 3%**	2.9	2.9	2.9	2.9					
Estimated Water Volume (L):	3.77	**pH (pH Units) ±0.1**	6.82	6.83	6.83	6.83					
~~3.620~~ 3.602 − 1.715 = 1.887 × 2		**Cond. (µs/cm) 3%**	1288	1324	1353	1394					
(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume		**Specific Cond. (µs/cm) 3%**	2226	2291	2340	2415					
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		**Redox (mV) 10%**	-57.5	-62.0	-65.3	-68.2					
2" casing has 0.16 USgal/ft or 2.032 l/m		**DO (mg/L) 10%**	0.49	0.35	0.34	0.29					
1" casing has 0.04 USgal/ft or 0.508 l/m		**DO (%) 10%**	3.16	2.6	2.4	2.3					
8" sand pack has 0.73 USgal/ft or 9.271 l/m		**Appearance & Odour (Clear, Silty, HC odours, etc.)** NO ODOUR.	~~CLEAR~~ LIGHT BROWN	~~SAME~~ SAME	SAME	LITTLE CLEARER					
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		**Only for final readings** — **Sulphide (mg/L)**				0.01					
		Only for final readings — **Turbidity (NTU)**				9.06					
		Interval Purge Volume (L)	1	1	1	2					
		Cumulative Purge Volume (L):	1	2	3	5					

YSI Field Parameters Logged:	☒ Yes ☐ No	**Sample Method:**			
Time logged on YSI (24hr):	14.18	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
			✓		

HEMMERA

Sample Site (Con't): MW09 - ~~02~~ 21

Sample Date (Con't): SEPT 1 - 2015

Sample Time: 14-20.

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: WIRE UNDER CAP. CAP HAS SLOTS. (LEVEL LOGGER)

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.9
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 (Nitric)	FULL	
1b	40 ml (glass)	Dissolved Mercury	15 mL	☒ Field Filtered	☒ HCL (Hydrochloric)		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☒ NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☒ H_2SO_4 (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☒ HNO_3 (Nitric)		
6	120 ml (plastic)	Sulphide	100 ml	-	☒ Zinc Acetate, then NaOH		
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☒ Field Filtered	-		

General Notes (Condition of well or other features):

SOLINST LEVEL LOGGER PULLED AT 13-50. REPLACED AT 14-32.

6" SILICON TUBING

2 FT PERI.

Crew Lead Sign Off (initials):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09-22	**Project Number:**	1343-005.11	**Date:**	SEPT 1 2015
Approximate Date Drilled:	UNKNOWN	**Client:**	GY - AAM	**Samplers:**	GR + AN
Piezometer Diameter / Screen Length:	2" PVC / UNKNOWN	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	~ 3-4°C OVERCAST.
UTM Location:	Z. 08V E. 0389498 N. 6880552	**Waypoint:**	GPS GMR Name UTM5 ON 4	**Recovery:**	☒ Good ☐ Bad
Photos:	Cam GLR Nos. ~~297 - 298~~	**Purge Method:**			
Duplicate Collected:	☐ Yes Name 0050 - 0052	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes Name		✓		

Initial Depth to Water (m):	4.158	**Purge Start Time:**	10-58	**Purge End Time:**	11-22	**Pen or YSI:**	☒ YSI Pro Plus ☐ Pen Unit			
Depth to Bottom (m):	5.195 + 0.082 = 5.277	**Purge Interval Time (~5) min, Vol. (___) L**	11-03	11-09	11-15	11-21				
Submerged Tubing Depth (m):	~5.27	**Depth to water (m)**	4.409	4.535	4.652	4.77				
Well Stick-up Height (m):	0.86	**Temperature (°C) 3%**	1.3	1.3	1.3	1.2				
Estimated Water Volume (L):	~ 2.24	**pH (pH Units) ±0.1**	6.37	6.25	6.22	6.21				
1.119 x 2 = 2.24 L		**Cond. (µs/cm) 3%**	826	823	817	809				
		Specific Cond. (µs/cm) 3%	1510	1505	1494	1481				
		Redox (mV) 10%	5.3	10.3	11.2	~~13.2~~				
		DO (mg/L) 10%	0.63	0.66	0.66	0.73				
		DO (%) 10%	4.6	4.8	4.7	5.3				
		Appearance & Odour (Clear, Silty, HC odours, etc.)	CLEAR	→	→	→				
		Only for final readings Sulphide (mg/L)				0.08				
		Only for final readings Turbidity (NTU)				13.6				
		Interval Purge Volume (L)	1	1	1	1				
		Cumulative Purge Volume (L):	1	2	3	4				

(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 logged on YSI (24hr):	11:24	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
			✓		

HEMMERA

Sample Site (Con't): MW09-22

Sample Date (Con't): SEPT 1 2015

Sample Time: 11-24

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	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 (Nitric)	FULL	
1b	40 ml (glass)	Dissolved Mercury	15 mL	☒ Field Filtered	☒ HCL (Hydrochloric)		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☒ NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☒ H_2SO_4 (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☒ HNO_3 (Nitric)		
6	120 ml (plastic)	Sulphide	100 ml	-	☒ Zinc Acetate, then NaOH		
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☒ Field Filtered	-		

General Notes (Condition of well or other features):

6" SILICON

3 FT PERI TUBING

Crew Lead Sign Off (initials):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09-23	**Project Number:**	1343-005.11	**Date:**	Sept 1, 2015
Approximate Date Drilled:	?	**Client:**	GY - AAM	**Samplers:**	JH + JC
Piezometer Diameter / Screen Length:	2" / ?	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	cloudy -5°C
UTM Location:	Z. 08 E. 0584462 N. 6880558	**Waypoint:**	GPS 4m Name MW09-23	**Recovery:**	☒ Good ☐ Bad
Photos:	Cam. 4m Nos. 050 - 052	**Purge Method:**			
Duplicate Collected:	☐ Yes ~~Name~~	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes ~~Name~~	hydrolift			

Initial Depth to Water (m):	12.692	**Purge Start Time:**	12:00	**Purge End Time:**	12:20	**Pen or YSI:**	☒ YSI Pro Plus ☐ Pen Unit						
Depth to Bottom (m):	15.822	**Purge Interval Time (___) min, Vol. (3) L**		12:03 3	12:05 3	12:08 3	12:11 3	12:15 3	12:18 3	12:20 3			
Submerged Tubing Depth (m):		**Depth to water (m)**		12.985	–	12.995	12.995	12.995	12.995	12.995			
Well Stick-up Height (m):	0.019m	**Temperature (°C) 3%**		0.3	0.4	0.4	0.4	0.4	0.4	0.4			
Estimated Water Volume (L):	6.26L	**pH (pH Units) ±0.1**		6.25	6.70	6.85	6.89	6.91	6.95	6.94			
		Cond. (µs/cm) 3%		863	919	988	1018	1035	1048	1051			
		Specific Cond. (µs/cm) 3%		1630	1736	1865	1922	1955	1978	1985			
		Redox (mV) 10%		125.5	87.9	60.7	52.5	36.4	33.3	32.6			
		DO (mg/L) 10%		2.74	2.60	3.30	2.68	2.97	3.26	2.51			
		DO (%) 10%		15.7	18.1	23.0	18.8	13.6	22.4	17.3			
		Appearance & Odour (Clear, Silty, HC odours, etc.)		Turbid grey	slightly turbid grey	Silty turbid grey	clearing up slightly	Same.	Same clearer	Same.			
		Only for final readings	**Sulphide (mg/L)**	–	–	–	–	–	–	0.26			
			Turbidity (NTU)	–	–	–	–	–	–	104			
		Interval Purge Volume (L)		3	6	9	12	15	18	21			
		Cumulative Purge Volume (L):		3	3	3	3	3	3	3			

(DTB – DTW) x 2 (for 2" well diameter) = 1 well volume 6.3L

(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 logged on YSI (24hr):		**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
		Hydrolift			

HEMMERA

Sample Site (Con't): MW09-23

Sample Date (Con't): Sept 1, 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: _____

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.5
Carbon Dioxide (C02)	PPM	660

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 (Nitric)	120mL	
1b	40 ml (glass)	Dissolved Mercury	15 mL	☒ Field Filtered	☒ HCL (Hydrochloric)	40mL	
2	1 L (plastic)	General Chemistry	200 ml	-	-	500mL	
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☒ NaOH (Sodium Hydroxide)	145mL	
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☒ H_2SO_4 (Sulfuric)	120mL	
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☒ HNO_3 (Nitric)	120mL	
6	120 ml (plastic)	Sulphide	100 ml	-	☒ Zinc Acetate, then NaOH	120mL	
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-	120mL	
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☒ Field Filtered	-	120mL	

General Notes (Condition of well or other features):

-D.O. did not stabilize, # sample collected anyways after 3 vol volumes

Crew Lead Sign Off (initials):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	MW09-24	**Project Number:**	1343-005.11	**Date:**	Sept 2-2015
Approximate Date Drilled:	?	**Client:**	GY - AAM	**Samplers:**	JH + JL
Piezometer Diameter / Screen Length:	2" / ?	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	-2°C Windy
UTM Location:	Z. 08 E. 0389659 N. 6880626	**Waypoint:**	GPS Hem Name MW09-24	**Recovery:**	☒ Good ☐ Bad
Photos:	Cam. Hem Nos. 082-084	**Purge Method:**			
Duplicate Collected:	☒ Yes Name MW15-300	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☒ Yes Name FB 15-300	X			

Initial Depth to Water (m):	9.575 m	**Purge Start Time:**	9:56.	**Purge End Time:**	10:20	**Pen or YSI:**	☒ YSI Pro Plus ☐ Pen Unit				
Depth to Bottom (m):	11.207 m	**Purge Interval** Time (___) min, Vol. (___) L	10:00	10:06	10:09	10:14	10:19				
Submerged Tubing Depth (m):	10.5 m	**Depth to water (m)**	9.67	9.62.	9.67		9.65				
Well Stick-up Height (m):	0.69 m	**Temperature (°C) 3%**	1.1	1.1	0.6	0.5	0.5				
Estimated Water Volume (L):	3.264 L	**pH (pH Units) ±0.1**	6.85	7.08	7.10	7.06	7.19				
		Cond. (µs/cm) 3%	555	589	595	656	543				
		Specific Cond. (µs/cm) 3%	1020	1082	1115	1238	1022				
		Redox (mV) 10%	207.5	192.0	191.2	193.6	194.6				
		DO (mg/L) 10%	4.16	5.56	4.13	3.89	5.36				
		DO (%) 10%	35.87	39.3	30.9	32.7	37.2				
		Appearance & Odour (Clear, Silty, HC odours, etc.)	Silty Dark brown	Sandy	clearing up	Clear Silty at bottom	Sand.				
		Only for final readings Sulphide (mg/L)	—	-	-	—	0.14				
		Only for final readings Turbidity (NTU)	—	-	-	—	64.2				
		Interval Purge Volume (L)	3	5	5	7	5				
		Cumulative Purge Volume (L):	3	8	13	20	25				

(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 logged on YSI (24hr):	10:20	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
		X			

HEMMERA

Sample Site (Con't): MW09-24

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

Sample Time: 10:30.

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: Water in well, but seal still good

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.9
Carbon Dioxide (C02)	PPM	1480

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 (Nitric)	120mL	
1b	40 ml (glass)	Dissolved Mercury	15 mL	☒ Field Filtered	☒ HCL (Hydrochloric)	40mL	
2	1 L (plastic)	General Chemistry	200 ml	-	-	1L	
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☒ NaOH (Sodium Hydroxide)	145mL	
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☒ H_2SO_4 (Sulfuric)	120mL	
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☒ HNO_3 (Nitric)	120mL	
6	120 ml (plastic)	Sulphide	100 ml	-	☒ Zinc Acetate, then NaOH	120mL	
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-	120mL	
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☒ Field Filtered	-	120mL	

General Notes (Condition of well or other features):

This well seems to have a broken screen. Sand continuously re-enters the well while pursing. It is possible to purge faster than the sand infiltration rate, as the water appears to clear up while purging. However, once purge stops, sand re-enters the well. We were able to purge + sample using waterra which minimized the amount of sand/turbidity in the samples. We also sampled .7m of the bottom of the well.

-Consumables used :- 12m Waterra
- 1 foot valve

Crew Lead Sign Off (initials):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	W14103083 BH01	**Project Number:**	1343-005.11	**Date:**	Sept 2 2015
Approximate Date Drilled:	?	**Client:**	GY - AAM	**Samplers:**	SH JC
Piezometer Diameter / Screen Length:	2"/?	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	
UTM Location:	Z. 08 E. 0389521 N. 6980668	**Waypoint:**	GPS hem Name BH01	**Recovery:**	☐ Good ☒ Bad
Photos:	Cam. hem Nos. 78 - 80	**Purge Method:**			
Duplicate Collected:	☐ Yes Name	**Waterra**	**Peristaltic** Not Purged	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes Name				

Initial Depth to Water (m):	Dry / Frozen	**Purge Start Time:**		**Purge End Time:**		**Pen or YSI:**	☐ YSI Pro Plus ☐ Pen Unit				
Depth to Bottom (m):	6.535	**Purge Interval** Time (___) min, Vol. (___) L									
Submerged Tubing Depth (m):		**Depth to water (m)**									
Well Stick-up Height (m):	0.60	**Temperature (^{0}C) 3%**									
Estimated Water Volume (L):	0	**pH (pH Units) ±0.1**									
		Cond. (µs/cm) 3%									
		Specific Cond. (µs/cm) 3%									
		Redox (mV) 10%									
		DO (mg/L) 10%									
		DO (%) 10%									
		Appearance & Odour (Clear, Silty, HC odours, etc.)									
		Only for final readings	**Sulphide (mg/L)**								
			Turbidity (NTU)								
		Interval Purge Volume (L)									
		Cumulative Purge Volume (L):									

Did not Sample

(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 logged on YSI (24hr):		**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**

HEMMERA

Sample Site (Con't): WI4/103083 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: Wellhus wires and cables coming out of the well opening

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.7
Carbon Dioxide (C02)	PPM	3000

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 (Nitric)		
1b	40 ml (glass)	Dissolved Mercury	15 mL	☐ Field Filtered	☐ HCL (Hydrochloric)		
2	1 L (plastic)	General Chemistry	200 ml	-	-		
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☐ NaOH (Sodium Hydroxide)		
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☐ H_2SO_4 (Sulfuric)		
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☐ HNO_3 (Nitric)		
6	120 ml (plastic)	Sulphide	100 ml	-	☐ Zinc Acetate, then NaOH		
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-		
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☐ Field Filtered	-		

NONE

General Notes (Condition of well or other features):

Crew Lead Sign Off (initials): _____

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	WI4103083 BH02.	**Project Number:**	1343-005.11	**Date:**	Sept 2 2015
Approximate Date Drilled:	?	**Client:**	GY - AAM	**Samplers:**	JH + JC
Piezometer Diameter / Screen Length:	2" / ?	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Cloudy -1°C
UTM Location:	Z. 08 E. 0389563 N. 6880665	**Waypoint:**	GPS 4m Name BH02	**Recovery:**	☐ Good ☒ Bad
Photos:	Cam. 4m Nos. 74-76	**Purge Method:**			
Duplicate Collected:	☐ Yes Name ~~_____~~	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes Name _____		Not Purged		

Initial Depth to Water (m):	6.234	**Purge Start Time:**		**Purge End Time:**			**Pen or YSI:**	☐ YSI Pro Plus ☐ Pen Unit			
Depth to Bottom (m):	6.726	**Purge Interval Time (___) min, Vol. (___) L**		8:30							
Submerged Tubing Depth (m):	6.682	**Depth to water (m)**									
Well Stick-up Height (m):	0.78	**Temperature (°C) 3%**									
Estimated Water Volume (L):	1.0L	**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)**	0.02							
			Turbidity (NTU)	7.14							
		Interval Purge Volume (L)		—	—	—					
		Cumulative Purge Volume (L):		—	—	—					

Direct Sample

(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 logged on YSI (24hr):		**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
			X		

HEMMERA

Sample Site (Con't): W1410308 3BH02

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

Sample Time: 8:30

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: Well has cables and other wires coming out of the well casing.

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.6
Carbon Dioxide (C02)	PPM	750

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 (Nitric)	100 mL	clear
1b	40 ml (glass)	Dissolved Mercury	15 mL	☒ Field Filtered	☒ HCL (Hydrochloric)	15 mL	
2	1 L (plastic)	General Chemistry	200 ml	-	-	200 mL	
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☒ NaOH (Sodium Hydroxide)	100 mL	
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☒ H_2SO_4 (Sulfuric)	120 mL	
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☒ HNO_3 (Nitric)	50 mL	
6	120 ml (plastic)	Sulphide	100 ml	-	☒ Zinc Acetate, then NaOH	100 mL	
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-	100 mL	
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☒ Field Filtered	-	100 mL	↓

General Notes (Condition of well or other features):

- This well has 2 cables attached to it and no J-plug as a result. I suspect the DTB is just DTIce with some standing water above, which we are sampling. We had enough left over water to run field sulphides + turbidity, but not enough for YSI parameters as there is no observed recharge.
- Used 6" silicone

Crew Lead Sign Off (initials):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	W14103083 BH03	**Project Number:**	1343-005.11	**Date:**	Sept 2, 2015
Approximate Date Drilled:	?	**Client:**	GY - AAM	**Samplers:**	JH + JC
Piezometer Diameter / Screen Length:	2" / ?	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	cloudy / -2°C
UTM Location:	Z. 08 E. 0389131 N. 6880729	**Waypoint:**	GPS Name BH03*	**Recovery:**	☒ Good ☐ Bad
Photos:	Cam. Ken Nos. 091-093	**Purge Method:**			
Duplicate Collected:	☐ Yes Name X	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes Name X		X		

Initial Depth to Water (m):	1.755m
Depth to Bottom (m):	4.534m
Submerged Tubing Depth (m):	4.2
Well Stick-up Height (m):	0.76m
Estimated Water Volume (L):	5.6L

(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

Purge Start Time: 14:16 **Purge End Time:** 14:44 **Pen or YSI:** ☒ YSI Pro Plus ☐ Pen Unit

Purge Interval Time (5) min, Vol. (___) L	14:17	14:22	14:27	14:32	14:37	14:42		
Depth to water (m)	-	1.780	1.780	1.780	1.780	1.780		
Temperature (°C) 3%	3.2	2.7	2.5	2.5	2.6	2.8		
pH (pH Units) ±0.1	6.48	6.50	6.52	6.52	6.53	6.52		
Cond. (µs/cm) 3%	735	537	469.8	444.8	440.3	446.4		
Specific Cond. (µs/cm) 3%	1282	951	834.3	779.4	769.1	775.1		
Redox (mV) 10%	84.8	-30	-33.3	-44.3	-51.2	-55.6		
DO (mg/L) 10%	1.37	0.20	0.15	0.21	0.19	0.18		
DO (%) 10%	7.9	1.5	1.2	1.5	1.6	1.3		
Appearance & Odour (Clear, Silty, HC odours, etc.)	turbid	turbid	clearing up	same	same	same		
Only for final readings Sulphide (mg/L)	-	-	-	-	-	0.10		
Only for final readings Turbidity (NTU)	-	-	-	-	-	15.5		
Interval Purge Volume (L)	0.2	0.8	0.9	0.8	0.8	0.9		
Cumulative Purge Volume (L):	0.2	1L	1.9	2.7	3.4	4.3		

YSI Field Parameters Logged:	☒ Yes ☐ No	**Sample Method:**			
Time logged on YSI (24hr):	14:44	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
			X	-	

HEMMERA

Sample Site (Con't): WH1030838Hoz

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

Sample Time: 14:50

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: Cables in well, no J-plug

Head Space Gas Measurements

	Units	Values
Methane (CH4)	%LEL	0
Oxygen (O2)	%	20.5
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 (Nitric)	120mL	
1b	40 ml (glass)	Dissolved Mercury	15 mL	☒ Field Filtered	☒ HCL (Hydrochloric)	40mL	
2	1 L (plastic)	General Chemistry	200 ml	-	-	500mL	slightly turbid
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☒ NaOH (Sodium Hydroxide)	145mL	↓
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☒ H_2SO_4 (Sulfuric)	120mL	
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☒ HNO_3 (Nitric)	120mL	
6	120 ml (plastic)	Sulphide	100 ml	-	☒ Zinc Acetate, then NaOH	120mL	
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-	120mL	↓
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☒ Field Filtered	-	120mL	

General Notes (Condition of well or other features):

used - 5m ¼ tubing
- 6" silicone

Crew Lead Sign Off (initials):

HEMMERA

GROUNDWATER SAMPLE COLLECTION SHEET

Sample Site:	GSI-HA-05A *	**Project Number:**	1343-005.11	**Date:**	Aug. 30/2015
Approximate Date Drilled:	unknown.	**Client:**	GY - AAM	**Samplers:**	AN, GR
Piezometer Diameter / Screen Length:	1"/unknown.	**Project Name:**	Mount Nansen 2015 GW Sampling Program	**Weather/Temperature:**	Overcast. ~4°C.
UTM Location:	Z08V E. 0387891 N. 6881115	**Waypoint:**	GPS ___ Name _____	**Recovery:**	☐ Good ☒ Bad
Photos:	Cam GR Nos. ~~223~~ - ~~225~~ 0029 - 0031	**Purge Method:**			
Duplicate Collected:	☐ Yes Name	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
Field Blank Collected:	☐ Yes Name		X		

Initial Depth to Water (m):	1.268	**Purge Start Time:**	11:21	**Purge End Time:**	11:37	**Pen or YSI:**	☒ YSI Pro Plus ☐ Pen Unit			
Depth to Bottom (m):	2.192	**Purge Interval Time (3) min, Vol. (___) L**	11:24	11:27	11:30	11:34				
Submerged Tubing Depth (m):	~2.0	**Depth to water (m)**								
Well Stick-up Height (m):	1.058	**Temperature (°C) 3%**	2.8	2.6	2.6	2.6				
Estimated Water Volume (L):	~0.462	**pH (pH Units) ±0.1**	6.73	6.74	6.76	6.75				
		Cond. (µs/cm) 3%	521	518	517	516				
		Specific Cond. (µs/cm) 3%	908	905	904	902				
		Redox (mV) 10%	-39.9	-46.5	-49.8	-51.4				
		DO (mg/L) 10%	4.36	0.63	0.53	1.72				
		DO (%) 10%	31.6	4.6	3.8	12.1				
		Appearance & Odour (Clear, Silty, HC odours, etc.)	slight sulphur odour.							
		Only for final readings: Sulphide (mg/L)	Vol. includes DS vol. collected		prior to purge.	0.28				
		Only for final readings: Turbidity (NTU)	↓			39.7				
		Interval Purge Volume (L)	1.4	100	150	400				
		Cumulative Purge Volume (L):	1.4	1.5	1.65	2.05				

(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 logged on YSI (24hr):	11:37	**Waterra**	**Peristaltic**	**Disp. Bailer**	**Other**
			X		

HEMMERA

Sample Site (Con't): GS1-HA-05A

Sample Date (Con't): AUG 31 2015

Sample Time: ~~11:50~~ 11:37

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	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 (Nitric)	120	
1b	40 ml (glass)	Dissolved Mercury	15 mL	☒ Field Filtered	☒ HCL (Hydrochloric)	40	
2	1 L (plastic)	General Chemistry	200 ml	-	-	~400ml	
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	-	☒ NaOH (Sodium Hydroxide)	145	
4	120 ml (glass)	Ammonia (NH3)	120 ml	-	☒ H_2SO_4 (Sulfuric)	120	
5	120 ml (plastic)	Thiocyanate (SCN)	50 ml	-	☒ HNO_3 (Nitric)	120	
6	120 ml (plastic)	Sulphide	100 ml	-	☒ Zinc Acetate, then NaOH	120	
7	120 ml (glass amber)	Total Inorganic Carbon (TIC)	100 ml	-	-	120	
8	120 ml (plastic)	Dissolved Alkalinity	100 ml	☒ Field Filtered	-	120	

General Notes (Condition of well or other features):

DIRECT SAMPLED THEN ~~TOOK~~ ~~2ND~~ ~~FULL~~ PURGED. ~~TOOK~~ COLLECTED FULL SECOND SET OF SAMPLES (GEN CHEM 400ml).

6" PERI TUBING & 6" ~~&~~ SILICON

Crew Lead Sign Off (initials):	

APPENDIX C
Laboratory Reports

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

Date Received: 03-SEP-15
Report Date: 09-NOV-15 10:38 (MT)
Version: FINAL REV. 3

Client Phone: 867-456-4865

Certificate of Analysis

Lab Work Order #: L1667552

Project P.O. #:	NOT SUBMITTED
Job Reference:	1343-005.11
C of C Numbers:	1-1346-005.11, 2-1346-005.11, 3-1346-005.11
Legal Site Desc:	

Comments: 9-NOV-2015 This report replaces the previous version and contains additional analyses, as requested.

Brent Mack, B.Sc.
Account Manager

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L1667552-1	L1667552-2	L1667552-3	L1667552-4	L1667552-5
Description	Water	Water	Water	Water	Water
Sampled Date	31-AUG-15	31-AUG-15	31-AUG-15	31-AUG-15	31-AUG-15
Sampled Time	17:50	10:30	10:55	08:41	09:30
Client ID	GSI-DC-03B	GSI-DC-02B	GSI-HA-01A	GSI-HA-03A	GSI-DC-01B
Grouping / **Analyte**					
WATER					
Physical Tests					
Conductivity (uS/cm)	1200	820	814	582	
Hardness (as CaCO3) (mg/L)	761	557	454	498	
pH (pH)	7.68	7.94	7.97	7.23	
Anions and Nutrients					
Alkalinity, Total (as CaCO3) (mg/L)	239	246	192	108	
Ammonia, Total (as N) (mg/L)	0.165				
Chloride (Cl) (mg/L)	<1.0 DLA	0.52	<0.50	<0.50	
Fluoride (F) (mg/L)	0.141	0.120	0.132	0.070	
Nitrate (as N) (mg/L)	0.011	0.417	0.0081	0.0405	
Nitrite (as N) (mg/L)	<0.0020 DLA	0.0281	0.0011	0.0013	
Total Kjeldahl Nitrogen (mg/L)	0.481	0.735	0.365	1.02	
Sulfate (SO4) (mg/L)	475	218	264	199	
Sulphide as S (mg/L)	<0.020				
Anion Sum (meq/L)	14.7	9.52	9.34	6.30	
Cation Sum (meq/L)	15.7	11.9	9.41	13.0	
Cation - Anion Balance (%)	3.3	11.1	0.4	34.7	
Cyanides					
Cyanide, Weak Acid Diss (mg/L)	<0.0050				
Cyanide, Total (mg/L)	0.0062				
Thiocyanate (SCN) (mg/L)	<0.50				
Cyanide, Free (mg/L)	<0.0050				
Organic / Inorganic Carbon					
Total Inorganic Carbon (mg/L)					
Total Organic Carbon (mg/L)	8.87				
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	L1667552-6 Water 31-AUG-15 12:10 MW09-16	L1667552-7 Water 31-AUG-15 09:50 GSI-HA-02A	L1667552-8 Water 31-AUG-15 11:37 GSI-HA-05A	L1667552-9 Water 31-AUG-15 16:17 MW09-18	L1667552-10 Water 31-AUG-15 15:25 MW09-17
WATER						
Physical Tests	Conductivity (uS/cm)	1580	921	943	2540	2570
	Hardness (as CaCO3) (mg/L)	1020	530	552	1810	1850
	pH (pH)	7.08	6.72	7.23	7.42	7.40
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	284	155	194	458	446
	Ammonia, Total (as N) (mg/L)	<0.0050	1.09	0.748	0.0237	<0.0050
	Chloride (Cl) (mg/L)	<2.5 DLA	<1.0 DLA	<1.0 DLA	<5.0 DLA	<5.0 DLA
	Fluoride (F) (mg/L)	0.14	<0.040 DLA	0.067	<0.20 DLA	<0.20
	Nitrate (as N) (mg/L)	0.148	<0.010 DLA	<0.010 DLA	<0.050	0.395 DLA
	Nitrite (as N) (mg/L)	<0.0050	<0.0020	<0.0020	0.011	<0.010
	Total Kjeldahl Nitrogen (mg/L)	0.110	1.54	1.07	0.123	0.098
	Sulfate (SO4) (mg/L)	724	366	340	1270	1360
	Sulphide as S (mg/L)	<0.020	0.063	0.057	<0.020	<0.020
	Anion Sum (meq/L)	20.8	10.7	11.0	35.6	37.2
	Cation Sum (meq/L)	21.1	15.7	13.1	36.9	37.6
	Cation - Anion Balance (%)	0.7	18.8	8.8	1.8	0.5
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	<0.50	<0.50
	Cyanide, Free (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Organic / Inorganic Carbon	Total Inorganic Carbon (mg/L)	62.1	32.3	44.2	105	104
	Total Organic Carbon (mg/L)	3.55	10.9	8.04	2.98	2.83
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	L1667552-11	L1667552-12	L1667552-13	L1667552-14	L1667552-15
	Description	Water	Water	Water	Water	Water
	Sampled Date	31-AUG-15	31-AUG-15	31-AUG-15	31-AUG-15	01-SEP-15
	Sampled Time	17:40	13:40	12:10	12:10	17:10
	Client ID	MW09-19	GSI-HA-04A	MW15-100	FB15-100	MWO9-01
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	2050	340	1600	<2.0	2880
	Hardness (as CaCO3) (mg/L)	1370	179	1030	<0.50	1540
	pH (pH)	6.84	7.08	7.35	5.48	7.75
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	438	74.3	286	<1.0	320
	Ammonia, Total (as N) (mg/L)	4.04	0.132	<0.0050	<0.0050	19.1
	Chloride (Cl) (mg/L)	<2.5 DLA	<0.50	<2.5 DLA	<0.50	<5.0 DLA
	Fluoride (F) (mg/L)	0.14	0.079	0.14	<0.020	0.26
	Nitrate (as N) (mg/L)	<0.025 DLA	<0.0050	0.143	<0.0050	<0.050 DLA
	Nitrite (as N) (mg/L)	<0.0050 DLA	<0.0010	<0.0050 DLA	<0.0010	0.010
	Total Kjeldahl Nitrogen (mg/L)	5.25	1.33	0.117	<0.050	22.2
	Sulfate (SO4) (mg/L)	910	92.4	715	<0.30	1540
	Sulphide as S (mg/L)	0.176	0.040	<0.020	<0.020	0.044
	Anion Sum (meq/L)	27.7	3.41	20.6	<0.10	38.5
	Cation Sum (meq/L)	29.7	3.98	21.1	<0.10	38.4
	Cation - Anion Balance (%)	3.5	7.7	1.3	0.0	-0.1
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	0.0279
	Thiocyanate (SCN) (mg/L)	0.57	<0.50	<0.50	<0.50	18.8
	Cyanide, Free (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Organic / Inorganic Carbon	Total Inorganic Carbon (mg/L)	102	16.4	64.2	<0.50	66.5
	Total Organic Carbon (mg/L)	24.8	26.9	3.51	<0.50	20.5
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	Sample ID Description Sampled Date Sampled Time Client ID	L1667552-16 Water 01-SEP-15 16:15 MWO9-02	L1667552-17 Water 01-SEP-15 14:45 MWO9-03	L1667552-18 Water 01-SEP-15 15:32 MWO9-04	L1667552-19 Water 01-SEP-15 09:45 GLL07-3	L1667552-20 Water 01-SEP-15 10:45 CH-P-13-05/50
WATER							
Physical Tests	Conductivity (uS/cm)		2840	2540	1090	760	2840
	Hardness (as CaCO3) (mg/L)		1480	1660	662	407	1980
	pH (pH)		6.42	7.78	7.60	6.66	5.98
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)		35.7	113	181	70.9	65.5
	Ammonia, Total (as N) (mg/L)		12.3	3.46	<0.0050	0.0326	0.0368
	Chloride (Cl) (mg/L)		<5.0 DLA	<5.0 DLA	<1.0 DLA	<0.50	<5.0 DLA
	Fluoride (F) (mg/L)		0.53	0.34	0.049	0.108	0.24
	Nitrate (as N) (mg/L)		<0.050 DLA	0.822	2.74	0.499	<0.050 DLA
	Nitrite (as N) (mg/L)		<0.010 DLA	0.089	0.0293	0.0111	<0.010 DLA
	Total Kjeldahl Nitrogen (mg/L)		16.5	3.82	0.385	0.484	0.119
	Sulfate (SO4) (mg/L)		1700	1650	435	328	1890
	Sulphide as S (mg/L)		<0.020	<0.020	<0.020	<0.020	<0.020
	Anion Sum (meq/L)		36.2	36.7	12.9	8.28	40.6
	Cation Sum (meq/L)		38.7	36.1	13.7	8.68	43.1
	Cation - Anion Balance (%)		3.3	-0.9	3.0	2.4	3.0
Cyanides	Cyanide, Weak Acid Diss (mg/L)		0.0135	<0.0050	<0.0050	<0.0050	<0.0050
	Cyanide, Total (mg/L)		0.0977	0.0127	0.0057	<0.0050	<0.0050
	Thiocyanate (SCN) (mg/L)		0.89	<2.5 DLM	<0.50	<0.50	<0.50
	Cyanide, Free (mg/L)		<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Organic / Inorganic Carbon	Total Inorganic Carbon (mg/L)		8.05	25.2	44.7	13.8	10.7
	Total Organic Carbon (mg/L)		6.14	7.23	6.66	7.0	2.33
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	L1667552-21 Water 01-SEP-15 12:15 MWO9-23	L1667552-22 Water 01-SEP-15 11:24 MWO9-22	L1667552-23 Water 01-SEP-15 09:15 GSI-DC-5B	L1667552-24 Water 01-SEP-15 12:56 MP09-05	L1667552-25 Water 01-SEP-15 14:20 MWO9-21
WATER						
Physical Tests	Conductivity (uS/cm)	1890	1600	1580	2000	2690
	Hardness (as CaCO3) (mg/L)	1150	874	1040	1190	1640
	pH (pH)	7.10	6.26	7.89	7.37	6.62
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	297	131	276	268	221
	Ammonia, Total (as N) (mg/L)	3.17 DLA	1.60 DLA	0.664 DLA	6.78 DLA	11.5 DLA
	Chloride (Cl) (mg/L)	<2.5	<2.5	<2.5	<2.5	<5.0
	Fluoride (F) (mg/L)	0.16 DLA	<0.10 DLA	<0.10 DLA	<0.10 DLA	<0.20 DLA
	Nitrate (as N) (mg/L)	<0.025 DLA	<0.025 DLA	<0.025 DLA	1.89	0.071
	Nitrite (as N) (mg/L)	<0.0050	<0.0050	<0.0050	0.0419	0.017
	Total Kjeldahl Nitrogen (mg/L)	4.47	3.49	1.37	9.22	18.7
	Sulfate (SO4) (mg/L)	905	847	731	996	1510
	Sulphide as S (mg/L)	0.038	0.030	<0.020	<0.020	0.032
	Anion Sum (meq/L)	24.8	20.3	20.7	26.2	35.9
	Cation Sum (meq/L)	26.7	22.2	21.8	26.7	40.7
	Cation - Anion Balance (%)	3.7	4.5	2.4	0.9	6.2
Cyanides	Cyanide, Weak Acid Diss (mg/L)	<0.0050	0.0068	<0.0050	<0.0050	0.0053 CNP
	Cyanide, Total (mg/L)	0.0756	0.0171	<0.0050	0.0092	0.0109 CNP
	Thiocyanate (SCN) (mg/L)	<0.50	<0.50	<0.50	<0.50	0.66
	Cyanide, Free (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050 CNP
Organic / Inorganic Carbon	Total Inorganic Carbon (mg/L)	67.3	20.7	53.3	58.3	44.4
	Total Organic Carbon (mg/L)	19.0	14.5	15.0	16.4	26.5
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	L1667552-26	L1667552-27	L1667552-28	L1667552-29	L1667552-30
	Description	Water	Water	Water	Water	Water
	Sampled Date	01-SEP-15	01-SEP-15	01-SEP-15	01-SEP-15	
	Sampled Time	16:59	12:56	16:02	14:45	
	Client ID	MWO9-08	MW15-200	MP09-04	FB15-200	TRIP BLANK
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	288	2000	2660	<2.0	<2.0
	Hardness (as CaCO3) (mg/L)	137	1180	1660	<0.50	<0.50
	pH (pH)	6.53	7.45	8.09	5.57	5.94
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	119	290	94.4	<1.0	<1.0
	Ammonia, Total (as N) (mg/L)	2.34	7.32 DLA	7.83 DLA	<0.0050	0.0190
	Chloride (Cl) (mg/L)	<0.50 DLM	<2.5 DLA	<5.0 DLA	<0.50	<0.50
	Fluoride (F) (mg/L)	<0.20	<0.10	0.38	<0.020	<0.020
	Nitrate (as N) (mg/L)	<0.0050	1.72	<0.050 DLA	<0.0050	<0.0050
	Nitrite (as N) (mg/L)	<0.0010	0.0378	<0.010 DLA	<0.0010	<0.0010
	Total Kjeldahl Nitrogen (mg/L)	3.24	11.9	10.8	<0.050	<0.050
	Sulfate (SO4) (mg/L)	28.7	883	1800	<0.30	<0.30
	Sulphide as S (mg/L)	0.080	<0.020	<0.020	<0.020	<0.020
	Anion Sum (meq/L)	2.98	24.3	39.3	<0.10	
	Cation Sum (meq/L)	5.74	26.4	36.8	<0.10	
	Cation - Anion Balance (%)	31.6	4.1	-3.4	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	0.0095	<0.0050	<0.0050	<0.0050
	Thiocyanate (SCN) (mg/L)	0.58	<0.50	<0.50	<0.50	<0.50
	Cyanide, Free (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Organic / Inorganic Carbon	Total Inorganic Carbon (mg/L)	25.7	56.6	18.7	<0.50	<0.50
	Total Organic Carbon (mg/L)	22.6	16.1	6.39	<0.50	<0.50
Total Metals	Aluminum (Al)-Total (mg/L)					<0.0030
	Antimony (Sb)-Total (mg/L)					<0.00010
	Arsenic (As)-Total (mg/L)					<0.00010
	Barium (Ba)-Total (mg/L)					<0.000050
	Beryllium (Be)-Total (mg/L)					<0.000020
	Bismuth (Bi)-Total (mg/L)					<0.000050
	Boron (B)-Total (mg/L)					<0.010
	Cadmium (Cd)-Total (mg/L)					<0.0000050
	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

	Sample ID	L1667552-31	L1667552-32	L1667552-33	L1667552-34	L1667552-35
	Description	Water	Water	Water	Water	Water
	Sampled Date	31-AUG-15	31-AUG-15	31-AUG-15	31-AUG-15	31-AUG-15
	Sampled Time	12:10	09:50	11:37	16:17	15:25
	Client ID	MW09-16-DISS.ALK.	GSI-HA-02A-DISS.ALK.	GSI-HA-05A-DISS.ALK.	MW09-18-DISS.ALK.	MW09-17-DISS.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)	284	165	206	459	462
	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	L1667552-36	L1667552-37	L1667552-38	L1667552-39	L1667552-40
Description	Water	Water	Water	Water	Water
Sampled Date	31-AUG-15	31-AUG-15	31-AUG-15	31-AUG-15	01-SEP-15
Sampled Time	17:40	13:40	12:10	12:10	17:10
Client ID	MW09-19-DISS.ALK.	GSI-HA-04A-DISS.ALK.	MW15-100-DISS.ALK.	FB15-100-DISS.ALK.	MW09-01-DISS.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)	444	77.1	281	<1.0	336
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	L1667552-41	L1667552-42	L1667552-43	L1667552-44	L1667552-45
	Description	Water	Water	Water	Water	Water
	Sampled Date	01-SEP-15	01-SEP-15	01-SEP-15	01-SEP-15	01-SEP-15
	Sampled Time	16:15	14:45	15:32	09:45	10:45
	Client ID	MW09-02-DISS.ALK.	MW09-03-DISS.ALK.	MW09-04-DISS.ALK.	GLL07-3-DISS.ALK.	CH-P-13-05/50-DISS.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)	29.6	114	96.2	68.2	66.7
	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	L1667552-46	L1667552-47	L1667552-48	L1667552-49	L1667552-50
	Description	Water	Water	Water	Water	Water
	Sampled Date	01-SEP-15	01-SEP-15	01-SEP-15	01-SEP-15	01-SEP-15
	Sampled Time	12:15	11:24	09:15	12:56	14:20
	Client ID	MW09-23-DISS.ALK.	MW09-22-DISS.ALK.	GSI-DC-5B-DISS.ALK.	MP09-05-DISS.ALK.	MW09-21-DISS.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)	299	141	213	279	223
	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	L1667552-51	L1667552-52	L1667552-53	L1667552-54	
	Description	Water	Water	Water	Water	
	Sampled Date	01-SEP-15	01-SEP-15	01-SEP-15	01-SEP-15	
	Sampled Time	16:59	12:56	16:02	14:45	
	Client ID	MW09-08-DISS.ALK.	MW15-200-DISS.ALK.	MP09-04-DISS.ALK.	FB15-200-DISS.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)	123	278	193	<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

Sample ID	L1667552-1	L1667552-2	L1667552-3	L1667552-4	L1667552-5
Description	Water	Water	Water	Water	Water
Sampled Date	31-AUG-15	31-AUG-15	31-AUG-15	31-AUG-15	31-AUG-15
Sampled Time	17:50	10:30	10:55	08:41	09:30
Client ID	GSI-DC-03B	GSI-DC-02B	GSI-HA-01A	GSI-HA-03A	GSI-DC-01B
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	FIELD	FIELD	FIELD	FIELD	FIELD
Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	
Aluminum (Al)-Dissolved (mg/L)	0.0031	0.0065	0.0044	0.0294	
Antimony (Sb)-Dissolved (mg/L)	0.00044	0.00042	0.00367	0.00040	
Arsenic (As)-Dissolved (mg/L)	0.00677	0.0122	0.00444	0.0406	
Barium (Ba)-Dissolved (mg/L)	0.0259	0.0930	0.0854	0.0771	
Beryllium (Be)-Dissolved (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	
Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	
Boron (B)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	
Cadmium (Cd)-Dissolved (mg/L)	0.000561	0.0000555	0.0000120	0.0000335	
Calcium (Ca)-Dissolved (mg/L)	188	144	118	123	
Chromium (Cr)-Dissolved (mg/L)	0.00315	0.00037	0.00096	0.00426	
Cobalt (Co)-Dissolved (mg/L)	0.00270	0.00168	0.00022	0.00057	
Copper (Cu)-Dissolved (mg/L)	0.00156	0.00252	0.00574	0.00052	
Iron (Fe)-Dissolved (mg/L)	0.404	7.57	0.510	49.5	
Lead (Pb)-Dissolved (mg/L)	0.000108	<0.000050	<0.000050	0.000144	
Lithium (Li)-Dissolved (mg/L)	0.0059	0.0028	0.0050	<0.0010	

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1667552-6 Water 31-AUG-15 12:10 MW09-16	L1667552-7 Water 31-AUG-15 09:50 GSI-HA-02A	L1667552-8 Water 31-AUG-15 11:37 GSI-HA-05A	L1667552-9 Water 31-AUG-15 16:17 MW09-18	L1667552-10 Water 31-AUG-15 15:25 MW09-17
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)	0.0011	0.0392	0.0210	<0.0020 DLA	<0.0020 DLA
	Antimony (Sb)-Dissolved (mg/L)	0.0610	0.00015	0.00017	0.00031	0.00035
	Arsenic (As)-Dissolved (mg/L)	0.00802	0.0844	0.103	0.0517	0.0193
	Barium (Ba)-Dissolved (mg/L)	0.0132	0.243	0.0703	0.00843	0.00752
	Beryllium (Be)-Dissolved (mg/L)	<0.000020	<0.000020	<0.000020	<0.000040 DLA	<0.000040 DLA
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.00010 DLA	<0.00010 DLA
	Boron (B)-Dissolved (mg/L)	0.169	<0.010	<0.010	<0.020 DLA	0.093
	Cadmium (Cd)-Dissolved (mg/L)	0.0210	<0.0000050	<0.0000050	0.000049	0.000013
	Calcium (Ca)-Dissolved (mg/L)	235	127	145	335	323
	Chromium (Cr)-Dissolved (mg/L)	<0.00010	0.00017	<0.00010	<0.00020 DLA	<0.00020 DLA
	Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00020 DLA	<0.00020 DLA
	Copper (Cu)-Dissolved (mg/L)	0.00547	<0.00020	<0.00020	<0.00040 DLA	0.00064
	Iron (Fe)-Dissolved (mg/L)	<0.010	83.4	29.1	0.068	<0.010
	Lead (Pb)-Dissolved (mg/L)	0.00503	<0.000050	<0.000050	<0.00010 DLA	<0.00010 DLA
	Lithium (Li)-Dissolved (mg/L)	0.0098	<0.0010	0.0029	0.0185	0.0187

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1667552-11 Water 31-AUG-15 17:40 MW09-19	L1667552-12 Water 31-AUG-15 13:40 GSI-HA-04A	L1667552-13 Water 31-AUG-15 12:10 MW15-100	L1667552-14 Water 31-AUG-15 12:10 FB15-100	L1667552-15 Water 01-SEP-15 17:10 MWO9-01
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)	0.0110	0.0516	0.0011	<0.0010	0.0178
	Antimony (Sb)-Dissolved (mg/L)	0.00021	0.00048	0.0591	<0.00010	0.0217
	Arsenic (As)-Dissolved (mg/L)	0.121	0.0328	0.00818	<0.00010	0.343
	Barium (Ba)-Dissolved (mg/L)	0.0450	0.0516	0.0136	<0.000050	0.0202
	Beryllium (Be)-Dissolved (mg/L)	<0.000020	<0.000020	<0.000020	<0.000020	<0.00010 DLA
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.00025 DLA
	Boron (B)-Dissolved (mg/L)	0.150	<0.010	0.157	<0.010	0.094
	Cadmium (Cd)-Dissolved (mg/L)	<0.0000050	0.0000133	0.0214	<0.0000050	0.00316
	Calcium (Ca)-Dissolved (mg/L)	299	44.5	237	<0.050	513
	Chromium (Cr)-Dissolved (mg/L)	0.00015	0.00017	<0.00010	<0.00010	<0.00050 DLA
	Cobalt (Co)-Dissolved (mg/L)	0.00189	0.00026	<0.00010	<0.00010	0.0278
	Copper (Cu)-Dissolved (mg/L)	<0.00020	0.00031	0.00553	<0.00020	0.0041
	Iron (Fe)-Dissolved (mg/L)	17.6	4.28	<0.010	<0.010	1.99
	Lead (Pb)-Dissolved (mg/L)	<0.000050	0.000102	0.00484	<0.000050	0.00541
	Lithium (Li)-Dissolved (mg/L)	0.0115	0.0014	0.0096	<0.0010	0.0080

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1667552-16 Water 01-SEP-15 16:15 MWO9-02	L1667552-17 Water 01-SEP-15 14:45 MWO9-03	L1667552-18 Water 01-SEP-15 15:32 MWO9-04	L1667552-19 Water 01-SEP-15 09:45 GLL07-3	L1667552-20 Water 01-SEP-15 10:45 CH-P-13-05/50
WATER						
Total Metals	Magnesium (Mg)-Total (mg/L)					
	Manganese (Mn)-Total (mg/L)					
	Mercury (Hg)-Total (mg/L)					
	Molybdenum (Mo)-Total (mg/L)					
	Nickel (Ni)-Total (mg/L)					
	Phosphorus (P)-Total (mg/L)					
	Potassium (K)-Total (mg/L)					
	Selenium (Se)-Total (mg/L)					
	Silicon (Si)-Total (mg/L)					
	Silver (Ag)-Total (mg/L)					
	Sodium (Na)-Total (mg/L)					
	Strontium (Sr)-Total (mg/L)					
	Sulfur (S)-Total (mg/L)					
	Thallium (Tl)-Total (mg/L)					
	Tin (Sn)-Total (mg/L)					
	Titanium (Ti)-Total (mg/L)					
	Uranium (U)-Total (mg/L)					
	Vanadium (V)-Total (mg/L)					
	Zinc (Zn)-Total (mg/L)					
	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)	0.0230	0.0168	0.0017	0.0048	0.0717
	Antimony (Sb)-Dissolved (mg/L)	0.00377	0.420	0.00146	<0.00010	<0.00050 DLA
	Arsenic (As)-Dissolved (mg/L)	18.0	2.11	0.00087	<0.00010	0.00400
	Barium (Ba)-Dissolved (mg/L)	0.00664	0.0224	0.0747	0.0117	0.00547
	Beryllium (Be)-Dissolved (mg/L)	<0.00010 DLA	<0.000040 DLA	<0.000020	<0.000020	0.00012
	Bismuth (Bi)-Dissolved (mg/L)	<0.00025 DLA	<0.00010 DLA	<0.000050	<0.000050	<0.00025 DLA
	Boron (B)-Dissolved (mg/L)	0.057	0.200	0.013	<0.010	<0.050 DLA
	Cadmium (Cd)-Dissolved (mg/L)	0.000439	0.000932	0.0000630	0.330	0.330
	Calcium (Ca)-Dissolved (mg/L)	469	491	160	125	461
	Chromium (Cr)-Dissolved (mg/L)	<0.00050 DLA	<0.00020 DLA	0.00023	<0.00010	<0.00050 DLA
	Cobalt (Co)-Dissolved (mg/L)	0.0110	0.00192	0.00018	0.00286	0.0392
	Copper (Cu)-Dissolved (mg/L)	<0.0010 DLA	0.00070	0.00277	0.00560	0.0993
	Iron (Fe)-Dissolved (mg/L)	44.2	0.039	<0.010	1.34	14.7
	Lead (Pb)-Dissolved (mg/L)	<0.00025 DLA	0.00015	<0.000050	0.000103	0.00632
	Lithium (Li)-Dissolved (mg/L)	0.0247	0.0022	<0.0010	0.0106	0.0416

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1667552-21	L1667552-22	L1667552-23	L1667552-24	L1667552-25
	Description	Water	Water	Water	Water	Water
	Sampled Date	01-SEP-15	01-SEP-15	01-SEP-15	01-SEP-15	01-SEP-15
	Sampled Time	12:15	11:24	09:15	12:56	14:20
	Client ID	MWO9-23	MWO9-22	GSI-DC-5B	MP09-05	MWO9-21
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	FIELD	FIELD	FIELD	FIELD	FIELD
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	0.0238	0.0421	0.0027	0.0123	0.0774
	Antimony (Sb)-Dissolved (mg/L)	0.00027	0.00016	0.00035	0.00033	0.00039
	Arsenic (As)-Dissolved (mg/L)	0.0261	0.00674	0.00308	0.00861	0.105
	Barium (Ba)-Dissolved (mg/L)	0.0556	0.0488	0.0341	0.0535	0.215
	Beryllium (Be)-Dissolved (mg/L)	<0.000040 DLA	<0.000020	<0.000020	<0.000040 DLA	<0.000040 DLA
	Bismuth (Bi)-Dissolved (mg/L)	<0.00010 DLA	<0.000050	<0.000050	<0.00010 DLA	<0.00010 DLA
	Boron (B)-Dissolved (mg/L)	0.070	0.028	0.017	0.093	0.059
	Cadmium (Cd)-Dissolved (mg/L)	0.000021	0.0000964	0.0000427	0.000248	0.000035
	Calcium (Ca)-Dissolved (mg/L)	291	303	215	363	497
	Chromium (Cr)-Dissolved (mg/L)	<0.00020 DLA	0.00045	0.00023	<0.00020 DLA	0.00068
	Cobalt (Co)-Dissolved (mg/L)	0.0149	0.0138	0.00395	0.0162	0.0252
	Copper (Cu)-Dissolved (mg/L)	<0.00040 DLA	0.00108	0.00084	0.00254	0.00076
	Iron (Fe)-Dissolved (mg/L)	23.5	46.2	0.903	3.03	66.0
	Lead (Pb)-Dissolved (mg/L)	<0.00010 DLA	<0.000050	0.000100	<0.00010 DLA	<0.00010 DLA
	Lithium (Li)-Dissolved (mg/L)	<0.0020 DLA	0.0014	0.0035	<0.0020 DLA	<0.0020 DLA

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1667552-26 Water 01-SEP-15 16:59 MWO9-08	L1667552-27 Water 01-SEP-15 12:56 MW15-200	L1667552-28 Water 01-SEP-15 16:02 MP09-04	L1667552-29 Water 01-SEP-15 14:45 FB15-200	L1667552-30 Water TRIP BLANK
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)	0.0921	0.0120	0.0098	<0.0010	
	Antimony (Sb)-Dissolved (mg/L)	0.00020	0.00031	0.317	<0.00010	
	Arsenic (As)-Dissolved (mg/L)	0.0869	0.00899	3.38	<0.00010	
	Barium (Ba)-Dissolved (mg/L)	0.143	0.0535	0.00847	<0.000050	
	Beryllium (Be)-Dissolved (mg/L)	0.000020	<0.000040 DLA	<0.000040 DLA	<0.000020	
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.00010 DLA	<0.00010 DLA	<0.000050	
	Boron (B)-Dissolved (mg/L)	<0.010	0.092	0.245	<0.010	
	Cadmium (Cd)-Dissolved (mg/L)	<0.0000050	0.000257	0.000039	<0.0000050	
	Calcium (Ca)-Dissolved (mg/L)	40.7	360	474	<0.050	
	Chromium (Cr)-Dissolved (mg/L)	0.00137	<0.00020 DLA	<0.00020 DLA	<0.00010	
	Cobalt (Co)-Dissolved (mg/L)	0.00140	0.0162	0.00128	<0.00010	
	Copper (Cu)-Dissolved (mg/L)	<0.00020	0.00260	<0.00040 DLA	<0.00020	
	Iron (Fe)-Dissolved (mg/L)	47.5	3.01	0.011	<0.010	
	Lead (Pb)-Dissolved (mg/L)	0.000055	0.00021	0.00021	<0.000050	
	Lithium (Li)-Dissolved (mg/L)	<0.0010	<0.0020 DLA	0.0126	<0.0010	

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1667552-31	L1667552-32	L1667552-33	L1667552-34	L1667552-35
	Description	Water	Water	Water	Water	Water
	Sampled Date	31-AUG-15	31-AUG-15	31-AUG-15	31-AUG-15	31-AUG-15
	Sampled Time	12:10	09:50	11:37	16:17	15:25
	Client ID	MW09-16-DISS.ALK.	GSI-HA-02A-DISS.ALK.	GSI-HA-05A-DISS.ALK.	MW09-18-DISS.ALK.	MW09-17-DISS.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)					

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1667552-36	L1667552-37	L1667552-38	L1667552-39	L1667552-40
	Description	Water	Water	Water	Water	Water
	Sampled Date	31-AUG-15	31-AUG-15	31-AUG-15	31-AUG-15	01-SEP-15
	Sampled Time	17:40	13:40	12:10	12:10	17:10
	Client ID	MW09-19-DISS.ALK.	GSI-HA-04A-DISS.ALK.	MW15-100-DISS.ALK.	FB15-100-DISS.ALK.	MW09-01-DISS.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)					

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1667552-41	L1667552-42	L1667552-43	L1667552-44	L1667552-45
	Description	Water	Water	Water	Water	Water
	Sampled Date	01-SEP-15	01-SEP-15	01-SEP-15	01-SEP-15	01-SEP-15
	Sampled Time	16:15	14:45	15:32	09:45	10:45
	Client ID	MW09-02-DISS.ALK.	MW09-03-DISS.ALK.	MW09-04-DISS.ALK.	GLL07-3-DISS.ALK.	CH-P-13-05/50-DISS.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)					

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1667552-46	L1667552-47	L1667552-48	L1667552-49	L1667552-50
	Description	Water	Water	Water	Water	Water
	Sampled Date	01-SEP-15	01-SEP-15	01-SEP-15	01-SEP-15	01-SEP-15
	Sampled Time	12:15	11:24	09:15	12:56	14:20
	Client ID	MW09-23-DISS.ALK.	MW09-22-DISS.ALK.	GSI-DC-5B-DISS.ALK.	MP09-05-DISS.ALK.	MW09-21-DISS.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	L1667552-51	L1667552-52	L1667552-53	L1667552-54	
	Description	Water	Water	Water	Water	
	Sampled Date	01-SEP-15	01-SEP-15	01-SEP-15	01-SEP-15	
	Sampled Time	16:59	12:56	16:02	14:45	
	Client ID	MW09-08-DISS.ALK.	MW15-200-DISS.ALK.	MP09-04-DISS.ALK.	FB15-200-DISS.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)					

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L1667552-1	L1667552-2	L1667552-3	L1667552-4	L1667552-5
Description	Water	Water	Water	Water	Water
Sampled Date	31-AUG-15	31-AUG-15	31-AUG-15	31-AUG-15	31-AUG-15
Sampled Time	17:50	10:30	10:55	08:41	09:30
Client ID	GSI-DC-03B	GSI-DC-02B	GSI-HA-01A	GSI-HA-03A	GSI-DC-01B
Grouping / **Analyte**					
WATER					
Dissolved Metals Magnesium (Mg)-Dissolved (mg/L)	70.7	48.1	38.6	46.4	
Manganese (Mn)-Dissolved (mg/L)	2.66	1.90	0.0657	3.86	
Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	0.0000087	<0.0000050	0.0000081
Molybdenum (Mo)-Dissolved (mg/L)	0.00654	0.00249	0.000765	0.00190	
Nickel (Ni)-Dissolved (mg/L)	0.0348	0.0114	0.00449	0.0115	
Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	0.067	
Potassium (K)-Dissolved (mg/L)	3.32	3.60	4.87	1.95	
Selenium (Se)-Dissolved (mg/L)	0.000064	0.000054	<0.000050	<0.000050	
Silicon (Si)-Dissolved (mg/L)	7.82	7.47	5.64	7.92	
Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
Sodium (Na)-Dissolved (mg/L)	5.76	4.41	4.20	4.72	
Strontium (Sr)-Dissolved (mg/L)	0.427	0.293	0.245	0.354	
Sulfur (S)-Dissolved (mg/L)	164	88.4	78.3	111	
Thallium (Tl)-Dissolved (mg/L)	0.000013	<0.000010	0.000022	<0.000010	
Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	0.00015	
Titanium (Ti)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	0.00124	
Uranium (U)-Dissolved (mg/L)	0.00129	0.00141	0.000969	0.000036	
Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	0.00060	
Zinc (Zn)-Dissolved (mg/L)	0.0589	0.0087	0.0046	0.0175	
Zirconium (Zr)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	<0.00030	

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1667552-6 Water 31-AUG-15 12:10 MW09-16	L1667552-7 Water 31-AUG-15 09:50 GSI-HA-02A	L1667552-8 Water 31-AUG-15 11:37 GSI-HA-05A	L1667552-9 Water 31-AUG-15 16:17 MW09-18	L1667552-10 Water 31-AUG-15 15:25 MW09-17
WATER						
Dissolved Metals	Magnesium (Mg)-Dissolved (mg/L)	106	51.7	46.3	237	253
	Manganese (Mn)-Dissolved (mg/L)	0.00857	5.56	3.30	0.575	DLA <0.00020
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)	0.000073	<0.000050	0.000113	DLA <0.00010	DLA <0.00010
	Nickel (Ni)-Dissolved (mg/L)	0.00329	<0.00050	<0.00050	DLA <0.0010	DLA <0.0010
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	0.168	<0.050	<0.050
	Potassium (K)-Dissolved (mg/L)	5.97	3.46	2.57	7.05	7.12
	Selenium (Se)-Dissolved (mg/L)	0.000076	0.000064	0.000053	0.00017	0.00014
	Silicon (Si)-Dissolved (mg/L)	5.65	8.54	8.07	5.15	5.32
	Silver (Ag)-Dissolved (mg/L)	0.000013	<0.000010	<0.000010	DLA <0.000020	DLA <0.000020
	Sodium (Na)-Dissolved (mg/L)	7.91	5.11	5.47	11.0	11.9
	Strontium (Sr)-Dissolved (mg/L)	0.501	0.390	0.368	0.889	0.969
	Sulfur (S)-Dissolved (mg/L)	236	125	115	434	437
	Thallium (Tl)-Dissolved (mg/L)	0.000239	<0.000010	<0.000010	0.000248	0.000088
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	DLA <0.00020	DLA <0.00020
	Titanium (Ti)-Dissolved (mg/L)	<0.00030	0.00150	0.00084	DLA <0.00060	DLA <0.00060
	Uranium (U)-Dissolved (mg/L)	0.00222	0.000016	0.000043	0.00628	0.00676
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	0.00054	DLA <0.0010	DLA <0.0010
	Zinc (Zn)-Dissolved (mg/L)	3.19	0.0021	0.0016	0.0022	DLA <0.0020
	Zirconium (Zr)-Dissolved (mg/L)	<0.00030	<0.00030	<0.00030	DLA <0.00060	DLA <0.00060

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L1667552-11	L1667552-12	L1667552-13	L1667552-14	L1667552-15
Description	Water	Water	Water	Water	Water
Sampled Date	31-AUG-15	31-AUG-15	31-AUG-15	31-AUG-15	01-SEP-15
Sampled Time	17:40	13:40	12:10	12:10	17:10
Client ID	MW09-19	GSI-HA-04A	MW15-100	FB15-100	MWO9-01
Grouping / **Analyte**					
WATER					
Dissolved Metals Magnesium (Mg)-Dissolved (mg/L)	152	16.6	106	<0.10	63.6
Manganese (Mn)-Dissolved (mg/L)	5.40	0.452	0.00819	<0.00010	22.2
Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	0.0000059
Molybdenum (Mo)-Dissolved (mg/L)	0.000143	0.000235	0.000065	<0.000050	0.00301
Nickel (Ni)-Dissolved (mg/L)	0.00162	<0.00050	0.00335	<0.00050	0.0087
Phosphorus (P)-Dissolved (mg/L)	0.172	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Dissolved (mg/L)	8.45	0.95	6.01	<0.10	15.6
Selenium (Se)-Dissolved (mg/L)	0.00108	0.000072	0.000092	<0.000050	<0.00025 DLA
Silicon (Si)-Dissolved (mg/L)	10.0	8.45	5.73	<0.050	7.29
Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	0.000012	<0.000010	0.000093
Sodium (Na)-Dissolved (mg/L)	14.5	2.52	8.01	<0.050	110
Strontium (Sr)-Dissolved (mg/L)	1.01	0.116	0.494	<0.00020	1.10
Sulfur (S)-Dissolved (mg/L)	303	33.4	234	<0.50	510
Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	0.000239	<0.000010	0.000364
Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00050 DLA
Titanium (Ti)-Dissolved (mg/L)	<0.0018 DLM	0.00143	<0.00030	<0.00030	<0.0015 DLA
Uranium (U)-Dissolved (mg/L)	0.000523	0.000048	0.00214	<0.000010	0.00241
Vanadium (V)-Dissolved (mg/L)	0.00090	0.00095	<0.00050	<0.00050	<0.0025 DLA
Zinc (Zn)-Dissolved (mg/L)	0.0019	0.0022	3.16	<0.0010	2.67
Zirconium (Zr)-Dissolved (mg/L)	0.00035	<0.00030	<0.00030	<0.00030	<0.0015 DLA

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1667552-16 Water 01-SEP-15 16:15 MWO9-02	L1667552-17 Water 01-SEP-15 14:45 MWO9-03	L1667552-18 Water 01-SEP-15 15:32 MWO9-04	L1667552-19 Water 01-SEP-15 09:45 GLL07-3	L1667552-20 Water 01-SEP-15 10:45 CH-P-13-05/50
WATER						
Dissolved Metals	Magnesium (Mg)-Dissolved (mg/L)	74.4	105	63.8	23.0	202
	Manganese (Mn)-Dissolved (mg/L)	32.5	17.9	0.00146	1.36	34.3
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)	0.00461	0.00518	0.000165	0.000161	DLA <0.00025
	Nickel (Ni)-Dissolved (mg/L)	0.0029	DLA <0.0010	<0.00050	0.0103	0.0148
	Phosphorus (P)-Dissolved (mg/L)	<0.050	0.076	<0.050	<0.050	<0.050
	Potassium (K)-Dissolved (mg/L)	78.8	28.2	1.77	1.68	5.06
	Selenium (Se)-Dissolved (mg/L)	DLA <0.00025	DLA <0.00010	0.000692	0.000134	DLA <0.00025
	Silicon (Si)-Dissolved (mg/L)	6.97	12.3	6.37	2.24	7.79
	Silver (Ag)-Dissolved (mg/L)	DLA <0.000050	DLA <0.000020	<0.000010	<0.000010	DLA <0.000050
	Sodium (Na)-Dissolved (mg/L)	61.1	29.6	9.05	5.67	8.17
	Strontium (Sr)-Dissolved (mg/L)	0.924	1.31	0.527	0.152	0.543
	Sulfur (S)-Dissolved (mg/L)	602	556	146	113	682
	Thallium (Tl)-Dissolved (mg/L)	0.000196	0.000034	<0.000010	0.000120	0.000520
	Tin (Sn)-Dissolved (mg/L)	DLA <0.00050	DLA <0.00020	<0.00010	<0.00010	DLA <0.00050
	Titanium (Ti)-Dissolved (mg/L)	DLA <0.0015	DLA <0.00060	<0.00030	<0.00030	DLA <0.0015
	Uranium (U)-Dissolved (mg/L)	0.000573	0.00129	0.00152	0.000041	0.000671
	Vanadium (V)-Dissolved (mg/L)	DLA <0.0025	DLA <0.0010	<0.00050	<0.00050	DLA <0.0025
	Zinc (Zn)-Dissolved (mg/L)	0.230	0.0029	0.0042	4.53	31.1
	Zirconium (Zr)-Dissolved (mg/L)	DLA <0.0015	DLA <0.00060	<0.00030	<0.00030	DLA <0.0015

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1667552-21 Water 01-SEP-15 12:15 MWO9-23	L1667552-22 Water 01-SEP-15 11:24 MWO9-22	L1667552-23 Water 01-SEP-15 09:15 GSI-DC-5B	L1667552-24 Water 01-SEP-15 12:56 MP09-05	L1667552-25 Water 01-SEP-15 14:20 MWO9-21
WATER						
Dissolved Metals	Magnesium (Mg)-Dissolved (mg/L)	103	28.8	122	69.8	96.5
	Manganese (Mn)-Dissolved (mg/L)	17.9	8.22	4.98	6.99	6.91
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Molybdenum (Mo)-Dissolved (mg/L)	0.00230	0.000174	0.00181	0.00037	0.00043
	Nickel (Ni)-Dissolved (mg/L)	0.0017	0.00276	0.0169	0.0026	0.0022
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Dissolved (mg/L)	8.09	4.47	3.90	9.13	15.1
	Selenium (Se)-Dissolved (mg/L)	0.00011	0.000323	0.000086	0.00014	0.00024
	Silicon (Si)-Dissolved (mg/L)	6.99	4.96	8.75	4.79	5.99
	Silver (Ag)-Dissolved (mg/L)	<0.000020 DLA	0.000016	<0.000010	<0.000020 DLA	<0.000020 DLA
	Sodium (Na)-Dissolved (mg/L)	31.3	39.0	13.1	38.6	67.4
	Strontium (Sr)-Dissolved (mg/L)	0.784	0.885	0.706	0.983	1.39
	Sulfur (S)-Dissolved (mg/L)	308	284	250	335	527
	Thallium (Tl)-Dissolved (mg/L)	<0.000020 DLA	<0.000010	0.000014	0.000058	<0.000020 DLA
	Tin (Sn)-Dissolved (mg/L)	<0.00020 DLA	<0.00010	<0.00010	<0.00020 DLA	<0.00020 DLA
	Titanium (Ti)-Dissolved (mg/L)	<0.0015 DLM	<0.0018 DLM	<0.00030	<0.00060 DLA	<0.0045 DLM
	Uranium (U)-Dissolved (mg/L)	0.00193	0.000592	0.00314	0.00137	0.000748
	Vanadium (V)-Dissolved (mg/L)	0.0021	0.00125	<0.00050	<0.0010 DLA	0.0050
	Zinc (Zn)-Dissolved (mg/L)	0.118	0.0022	0.0101	0.0175	0.0054
	Zirconium (Zr)-Dissolved (mg/L)	0.00078	0.00047	<0.00030	<0.00060 DLA	0.00148

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1667552-26 Water 01-SEP-15 16:59 MWO9-08	L1667552-27 Water 01-SEP-15 12:56 MW15-200	L1667552-28 Water 01-SEP-15 16:02 MP09-04	L1667552-29 Water 01-SEP-15 14:45 FB15-200	L1667552-30 Water TRIP BLANK
WATER						
Dissolved Metals	Magnesium (Mg)-Dissolved (mg/L)	8.65	67.9	115	<0.10	
	Manganese (Mn)-Dissolved (mg/L)	3.42	7.05	6.91	<0.00010	
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	
	Molybdenum (Mo)-Dissolved (mg/L)	<0.000050	0.00036	0.00768	<0.000050	
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	0.0026	<0.0010 DLA	<0.00050	
	Phosphorus (P)-Dissolved (mg/L)	0.109	<0.050	0.089	<0.050	
	Potassium (K)-Dissolved (mg/L)	1.51	9.09	41.5	<0.10	
	Selenium (Se)-Dissolved (mg/L)	0.000435	0.00011	<0.00010 DLA	<0.000050	
	Silicon (Si)-Dissolved (mg/L)	10.0	4.76	15.3	<0.050	
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000020 DLA	<0.000020 DLA	<0.000010	
	Sodium (Na)-Dissolved (mg/L)	2.43	38.8	40.6	<0.050	
	Strontium (Sr)-Dissolved (mg/L)	0.172	0.982	1.28	<0.00020	
	Sulfur (S)-Dissolved (mg/L)	12.8	323	574	<0.50	
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	0.000056	0.000089	<0.000010	
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00020 DLA	<0.00020 DLA	<0.00010	
	Titanium (Ti)-Dissolved (mg/L)	0.00437	<0.00060 DLA	<0.00060 DLA	<0.00030	
	Uranium (U)-Dissolved (mg/L)	0.000093	0.00135	0.000235	<0.000010	
	Vanadium (V)-Dissolved (mg/L)	0.00406	<0.0010 DLA	<0.0010 DLA	<0.00050	
	Zinc (Zn)-Dissolved (mg/L)	<0.0010	0.0138	0.471	<0.0010	
	Zirconium (Zr)-Dissolved (mg/L)	0.00087	<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	L1667552-31	L1667552-32	L1667552-33	L1667552-34	L1667552-35
	Description	Water	Water	Water	Water	Water
	Sampled Date	31-AUG-15	31-AUG-15	31-AUG-15	31-AUG-15	31-AUG-15
	Sampled Time	12:10	09:50	11:37	16:17	15:25
	Client ID	MW09-16-DISS.ALK.	GSI-HA-02A-DISS.ALK.	GSI-HA-05A-DISS.ALK.	MW09-18-DISS.ALK.	MW09-17-DISS.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	L1667552-36	L1667552-37	L1667552-38	L1667552-39	L1667552-40
	Description	Water	Water	Water	Water	Water
	Sampled Date	31-AUG-15	31-AUG-15	31-AUG-15	31-AUG-15	01-SEP-15
	Sampled Time	17:40	13:40	12:10	12:10	17:10
	Client ID	MW09-19-DISS.ALK.	GSI-HA-04A-DISS.ALK.	MW15-100-DISS.ALK.	FB15-100-DISS.ALK.	MW09-01-DISS.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	L1667552-41	L1667552-42	L1667552-43	L1667552-44	L1667552-45
	Description	Water	Water	Water	Water	Water
	Sampled Date	01-SEP-15	01-SEP-15	01-SEP-15	01-SEP-15	01-SEP-15
	Sampled Time	16:15	14:45	15:32	09:45	10:45
	Client ID	MW09-02-DISS.ALK.	MW09-03-DISS.ALK.	MW09-04-DISS.ALK.	GLL07-3-DISS.ALK.	CH-P-13-05/50-DISS.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	L1667552-46	L1667552-47	L1667552-48	L1667552-49	L1667552-50
	Description	Water	Water	Water	Water	Water
	Sampled Date	01-SEP-15	01-SEP-15	01-SEP-15	01-SEP-15	01-SEP-15
	Sampled Time	12:15	11:24	09:15	12:56	14:20
	Client ID	MW09-23-DISS.ALK.	MW09-22-DISS.ALK.	GSI-DC-5B-DISS.ALK.	MP09-05-DISS.ALK.	MW09-21-DISS.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	L1667552-51	L1667552-52	L1667552-53	L1667552-54	
	Description	Water	Water	Water	Water	
	Sampled Date	01-SEP-15	01-SEP-15	01-SEP-15	01-SEP-15	
	Sampled Time	16:59	12:56	16:02	14:45	
	Client ID	MW09-08-DISS.ALK.	MW15-200-DISS.ALK.	MP09-04-DISS.ALK.	FB15-200-DISS.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.

Reference Information

Qualifiers for Individual Samples Listed:

Sample Number	Client Sample ID	Qualifier	Description
L1667552-30	TRIP BLANK	WSMT	Water sample(s) for total mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.

QC Samples with Qualifiers & Comments:

QC Type Description	Parameter	Qualifier	Applies to Sample Number(s)
Method Blank	Conductivity	B	L1667552-27
Duplicate	Beryllium (Be)-Dissolved	DLA	L1667552-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -26, -27, -28, -29, -3, -4, -6, -7, -8, -9
Duplicate	Bismuth (Bi)-Dissolved	DLA	L1667552-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -26, -27, -28, -29, -3, -4, -6, -7, -8, -9
Duplicate	Chromium (Cr)-Dissolved	DLA	L1667552-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -26, -27, -28, -29, -3, -4, -6, -7, -8, -9
Duplicate	Titanium (Ti)-Dissolved	DLA	L1667552-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -26, -27, -28, -29, -3, -4, -6, -7, -8, -9
Duplicate	Vanadium (V)-Dissolved	DLA	L1667552-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -26, -27, -28, -29, -3, -4, -6, -7, -8, -9
Duplicate	Zirconium (Zr)-Dissolved	DLA	L1667552-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -26, -27, -28, -29, -3, -4, -6, -7, -8, -9
Matrix Spike	Fluoride (F)	K	L1667552-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -3, -4, -6, -7, -8, -9
Matrix Spike	Sulfate (SO4)	MS-B	L1667552-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -3, -4, -6, -7, -8, -9
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L1667552-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -26, -27, -28, -29, -3, -4, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1667552-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -26, -27, -28, -29, -3, -4, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1667552-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -26, -27, -28, -29, -3, -4, -6, -7, -8, -9
Matrix Spike	Total Kjeldahl Nitrogen	MS-B	L1667552-1, -10, -11, -12, -13, -14, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -26, -27, -28, -29, -3, -30, -4, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1667552-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -26, -27, -28, -29, -3, -4, -6, -7, -8, -9
Matrix Spike	Silicon (Si)-Dissolved	MS-B	L1667552-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -26, -27, -28, -29, -3, -4, -6, -7, -8, -9
Matrix Spike	Sulfur (S)-Dissolved	MS-B	L1667552-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -26, -27, -28, -29, -3, -4, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1667552-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -26, -27, -28, -29, -3, -4, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1667552-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -26, -27, -28, -29, -3, -4, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1667552-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -26, -27, -28, -29, -3, -4, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1667552-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -26, -27, -28, -29, -3, -4, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1667552-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -26, -27, -28, -29, -3, -4, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1667552-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19,

Reference Information

	Parameter	Qualifier	Applies to Sample Number(s)
			-2, -20, -21, -22, -23, -24, -25, -26, -27, -28, -29, -3, -4, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1667552-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -26, -27, -28, -29, -3, -4, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1667552-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -26, -27, -28, -29, -3, -4, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1667552-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -26, -27, -28, -29, -3, -4, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1667552-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -26, -27, -28, -29, -3, -4, -6, -7, -8, -9
Matrix Spike	Sulfate (SO4)	MS-B	L1667552-26, -27, -28, -29, -30
Matrix Spike	Total Organic Carbon	MS-B	L1667552-10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -22, -28, -29, -30, -6, -7, -8, -9
Matrix Spike	Total Organic Carbon	MS-B	L1667552-10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -22, -28, -29, -30, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1667552-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -26, -27, -28, -29, -3, -4, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1667552-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -24, -25, -26, -27, -28, -29, -3, -4, -6, -7, -8, -9
Matrix Spike	Total Inorganic Carbon	MS-B	L1667552-10, -11, -12, -13, -14, -17, -18, -19, -20, -21, -22, -23, -24, -25, -26, -27, -28, -29, -30, -6, -8, -9
Matrix Spike	Total Inorganic Carbon	MS-B	L1667552-7
Matrix Spike	Total Inorganic Carbon	MS-B	L1667552-7
Matrix Spike	Total Inorganic Carbon	MS-B	L1667552-15, -16
Matrix Spike	Aluminum (Al)-Total	MS-B	L1667552-30
Matrix Spike	Manganese (Mn)-Total	MS-B	L1667552-30
Matrix Spike	Sodium (Na)-Total	MS-B	L1667552-30
Matrix Spike	Strontium (Sr)-Total	MS-B	L1667552-30

Qualifiers for Individual Parameters Listed:

Qualifier	Description
B	Method Blank exceeds ALS DQO. All associated sample results are at least 5 times greater than blank levels and are considered reliable.
CNP	Cyanide test sample appears to have been preserved, but pH was <10 at time of testing. Results may be biased low, particularly for Free CN species.
DLA	Detection Limit adjusted for required dilution
DLM	Detection Limit Adjusted due to sample matrix effects.
K	Matrix Spike recovery outside ALS DQO due to sample matrix effects.
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-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

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

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

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

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

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

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

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
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

1-1346-005.11 2-1346-005.11 3-1346-005.11

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

L1667552-COFC

COC Number: 1 - 1343-005.11

Page 1 of 3

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

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 #:	1343-005.11	GL Account:	Routing Code:
PO / AFE:		Activity Code:	
LSD:		Location:	
ALS Lab Work Order # (lab use only)		ALS Contact:	Sampler: RM, JC, AN, MN

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 Balance	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
	GCI-DC-03B	31/08/2015	17:30	Water	R	R	R	R	R	R	R	R	R					7
	GCI-DC-02B	31/08/2015	10:30	Water	R	R	R	R	R									3
	GSI-HA-01A	31/08/2015	10:55	Water	R	R	R	R	R									3
	GSI-HA-03A	31/08/2015	8:41	Water	R	R	R	R	R									3
	GSI-DC-01B	31/08/2015	9:30	Water		R												1
	MW09-16	31/08/2015	12:10	Water	R	R	R	R	R	R	R	R	R	R	R			9
	GSI-HA-02A*	31/08/2015	9:50	Water	R	R	R	R	R	R	R	R	R	R	R			X9
	GSI-HA-05A*	31/08/2015	11:37	Water	R	R	R	R	R	R	R	R	R	R	R			9
	MW09-18	31/08/2015	16:17	Water	R	R	R	R	R	R	R	R	R	R	R			9
	MW09-17	31/08/2015	15:25	Water	R	R	R	R	R	R	R	R	R	R	R			9
	MW09-19	31/08/2015	17:40	Water	R	R	R	R	R	R	R	R	R	R	R			9
	GSI-HA-04A*	31/08/2015	13:40	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)	SAMPLE CONDITION AS RECEIVED (lab use only)
Are samples taken from a Regulated DW System? ☐ Yes ☑ No	- See attached parameter sheet for list of full parameters and metals required.	Frozen ☐ SIF Observations Yes ☐ No ☐
Are samples for human drinking water use? ☐ Yes ☑ No	Heidi to send confirmation email about Sample ID # for GCI-DC-03B.	Ice packs Yes ☐ No ☐ Custody seal intact Yes ☐ No ☐
		Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C					FINAL COOLER TEMPERATURES °C		
6.0	4.7	7.1	3.3	4.1			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Justin Hains	Date: Sept 2/15	Time: 8:00	Received by:	Date: 3Sep15	Time: 1000	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION WHITE - LABORATORY COPY YELLOW - CLIENT COPY

NA-FM-0326c v09 Front/04 January 2014

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

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L1667552-COFC

COC Number: 1 - 1343-005.11

Page 1 of 3

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
Phone:	867-456-4865	Select Distribution:	☑ EMAIL ☐ MAIL ☐ FAX	E2 ☐ Same day or weekend emergency - contact ALS to confirm TAT and surcharge
		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	Email 1 or Fax	nsandys@hemmera.com
Company:	Hemmera Environchem Inc.	Email 2	chris@elr.ca
Contact:	Natasha Sandys		

Project Information		Oil and Gas Required Fields (client use)	
ALS Quote #:	Q50588	Approver ID:	Cost Center:
Job #:	1343-005.11	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 (F/P)	Dissolved Mercury (F/P)	Nitrate, Nitrite, Total Kjeldahl N (TKN)	Cl, Fl, Sulfate, conductivity, pH, alkalinity	Anion Sum, Cation Sum, Cation/Anion Balan	Cyanide - Weak Acid Diss., Total, Free (P)	Ammonia N (total), Total Organic Carbon (P)	Thiocyanate (SCN) (P)	Sulphide as S (P)	Total Inorganic Carbon	Dissolved Alkalinity (F)			Number of Containers
	MW15-100	31/08/2015	12:10	Water	R	R	R	R	R	R	R	R	R	R	R			9
	FB15-100	31/08/2015	12:10	Water	R	R	R	R	R	R	R	R	R	R	R			9
	MW09-01	01-Sep-15	17:10	Water	R	R	R	R	R	R	R	R	R	R	R			9
	MW09-02	01-Sep-15	16:15	Water	R	R	R	R	R	R	R	R	R	R	R			9
	MW09-03	01-Sep-15	14:45	Water	R	R	R	R	R	R	R	R	R	R	R			9
	MW09-04	01-Sep-15	15:32	Water	R	R	R	R	R	R	R	R	R	R	R			9
	GLI.07-3	01-Sep-15	9:45	Water	R	R	R	R	R	R	R	R	R	R	R			9
	CH-P-13-05/50	01-Sep-15	10:45	Water	R	R	R	R	R	R	R	R	R	R	R			9
	MW09-23	01-Sep-15	12:15	Water	R	R	R	R	R	R	R	R	R	R	R			9
	MW09-22	01-Sep-15	11:24	Water	R	R	R	R	R	R	R	R	R	R	R			9
	GSI-DC-5B	01-Sep-15	9:15	Water	R	R	R	R	R	R	R	R	R	R	R			9
	MP09-05	01-Sep-15	12:56	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		
6.6	4.7	7.1	3.3	4.1		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Justin Harms	Date: Sept 2, 15	Time: 8:00	Received by:	Date: Sept 15	Time: 1000	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

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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.

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

Chain of Custody (COC) / Analytical Request Form

ALS Environmental

Canada Toll Free: 1 800 668 9878

www.alsglobal.com

L1667552-COFC

COC Number: 1 - 1343-005.11

Page 1 of 3

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	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 #:	1343-005.11	GL Account:	Routing Code:
PO / AFE:		Activity Code:	
LSD:		Location:	
ALS Lab Work Order # (lab use only)		ALS Contact:	Sampler: RM, JC, AN, MN

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
	GCI-DC-03B	31/08/2015	17:30	Water	R	R	R	R	R	R	R	R	R					7
	GCI-DC-02B	31/08/2015	10:30	Water	R	R	R	R	R									3
	GSI-HA-01A	31/08/2015	10:55	Water	R	R	R	R	R									3
	GSI-HA-03A	31/08/2015	8:41	Water	R	R	R	R	R									3
	GSI-DC-01B	31/08/2015	9:30	Water		R												1
	MW09-16	31/08/2015	12:10	Water	R	R	R	R	R	R	R	R	R	R	R			9
	GSI-HA-02A*	31/08/2015	9:50	Water	R	R	R	R	R	R	R	R	R	R	R			x9
	GSI-HA-05A*	31/08/2015	11:37	Water	R	R	R	R	R	R	R	R	R	R	R			9
	MW09-18	31/08/2015	16:17	Water	R	R	R	R	R	R	R	R	R	R	R			9
	MW09-17	31/08/2015	15:25	Water	R	R	R	R	R	R	R	R	R	R	R			9
	MW09-19	31/08/2015	17:40	Water	R	R	R	R	R	R	R	R	R	R	R			9
	GSI-HA-04A*	31/08/2015	13:40	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	Heidi to send confirmation email about Sample ID # for GCI-DC-03B.

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		
6.0	4.7	7.1	3.3	4.1		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Justin Hains	Date: Sept 2/15	Time: 8:00	Received by:	Date: 3Sep15	Time: 1000	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

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ALS-FM-0326e v08 Front/04 January 2014

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

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

Date Received: 04-SEP-15
Report Date: 29-OCT-15 14:30 (MT)
Version: FINAL REV. 2

Client Phone: 867-456-4865

Certificate of Analysis

Lab Work Order #: L1668494

Project P.O. #:	NOT SUBMITTED
Job Reference:	1343-005.11
C of C Numbers:	1-1343-005.11-2-2, 1-1343-005.11-2-3, 1-1343-055.11-2-1
Legal Site Desc:	

Comments: 29-OCT-2015 This report replaces and supersedes previously sent report. This report includes modified sample id for ALS identified sample L1668494-14.

Brent Mack, B.Sc.
Account Manager

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1668494-1	L1668494-2	L1668494-3	L1668494-4	L1668494-6
	Description	Water	Water	Water	Water	Water
	Sampled Date	02-SEP-15	02-SEP-15	02-SEP-15	02-SEP-15	02-SEP-15
	Sampled Time	17:45	17:33	17:10	15:42	14:50
	Client ID	GSI-HA-01A	GSI-HA-03A	GSI-DC-02B	MP09-14	W14103083BH03
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)					597
	Hardness (as CaCO3) (mg/L)				493	280
	pH (pH)					6.58
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)					193
	Ammonia, Total (as N) (mg/L)	0.0363	0.501	0.828		5.53
	Chloride (Cl) (mg/L)					0.81
	Fluoride (F) (mg/L)					<0.40 DLM
	Nitrate (as N) (mg/L)					<0.0050
	Nitrite (as N) (mg/L)					<0.0010
	Total Kjeldahl Nitrogen (mg/L)					6.64
	Sulfate (SO4) (mg/L)					124
	Sulphide as S (mg/L)	<0.020		<0.020		0.097
	Anion Sum (meq/L)					6.46
	Cation Sum (meq/L)					10.6
	Cation - Anion Balance (%)					24.4
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		0.53
	Cyanide, Free (mg/L)	<0.0050	<0.0050	<0.0050		<0.0050
Organic / Inorganic Carbon	Total Inorganic Carbon (mg/L)	41.0		60.9		41.0
	Total Organic Carbon (mg/L)	9.28	10.2	11.7		29.2
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	L1668494-7	L1668494-8	L1668494-9	L1668494-10	L1668494-11
Description	Water	Water	Water	Water	Water
Sampled Date	02-SEP-15	02-SEP-15	02-SEP-15	02-SEP-15	02-SEP-15
Sampled Time	12:59	12:15	10:30	08:45	08:30
Client ID	MP09-12	MP09-11	MW09-24	W14103083BH04	W14103083BH02
Grouping / **Analyte**					
WATER					
Physical Tests Conductivity (uS/cm)		1040	1130	1070	1110
Hardness (as CaCO3) (mg/L)	534	557	747	643	738
pH (pH)		7.41	7.82	8.21	8.17
Anions and Nutrients Alkalinity, Total (as CaCO3) (mg/L)		564	353	185	216
Ammonia, Total (as N) (mg/L)		13.7	0.0075	<0.0050	<0.0050
Chloride (Cl) (mg/L)		1.7	<1.0	<1.0 DLA	<1.0 DLA
Fluoride (F) (mg/L)		0.467	<0.040	0.193	0.254
Nitrate (as N) (mg/L)		<0.010 DLA	2.74	2.05	0.708
Nitrite (as N) (mg/L)		<0.0020 DLA	0.0026	<0.0020 DLA	<0.0020 DLA
Total Kjeldahl Nitrogen (mg/L)		17.1	0.663	0.388	0.238
Sulfate (SO4) (mg/L)		46.8	310	435	445
Sulphide as S (mg/L)		<0.020	<0.020		<0.020
Anion Sum (meq/L)		12.3	13.7	12.9	13.6
Cation Sum (meq/L)		14.9	15.3	13.4	15.2
Cation - Anion Balance (%)		9.6	5.5	1.8	5.5
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)		0.74	<0.50		<0.50
Cyanide, Free (mg/L)		<0.0050	<0.0050	<0.0050	<0.0050
Organic / Inorganic Carbon Total Inorganic Carbon (mg/L)		118	75.7		46.0
Total Organic Carbon (mg/L)		42.4	11.1	5.40	5.29
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	L1668494-12	L1668494-13	L1668494-14	L1668494-15	L1668494-16
Description	Water	Water	Water	Water	Water
Sampled Date	02-SEP-15	02-SEP-15	02-SEP-15	03-SEP-15	03-SEP-15
Sampled Time	11:14	14:30	13:13	17:15	15:15
Client ID	MW09-06	MP09-09*	MP09-10	GSI-HA-03A	GSI-DC-07B
Grouping / **Analyte**					
WATER					
Physical Tests Conductivity (uS/cm)	1730	721	77.6		1270
Hardness (as CaCO3) (mg/L)	1040	307	35.9		733
pH (pH)	7.92	8.69	8.02		7.13
Anions and Nutrients Alkalinity, Total (as CaCO3) (mg/L)	147	67.0	37.4		169
Ammonia, Total (as N) (mg/L)	1.04	4.51	0.222		2.09
Chloride (Cl) (mg/L)	<2.5 DLA	2.64	<0.50		1.3
Fluoride (F) (mg/L)	0.33	1.70	0.169		0.046
Nitrate (as N) (mg/L)	0.128	<0.0050	0.0219		0.018
Nitrite (as N) (mg/L)	0.0110	0.0031	0.330		<0.0020 DLA
Total Kjeldahl Nitrogen (mg/L)	1.58	5.32	1.42		2.75
Sulfate (SO4) (mg/L)	939	272	5.56		567
Sulphide as S (mg/L)	<0.020	0.031		0.031	<0.020
Anion Sum (meq/L)	22.5	7.17	0.90		15.2
Cation Sum (meq/L)	22.5	7.95	0.84		17.9
Cation - Anion Balance (%)	0.0	5.2	-3.2		8.2
Cyanides Cyanide, Weak Acid Diss (mg/L)	<0.0050	1.13	0.051		<0.0050
Cyanide, Total (mg/L)	<0.0050	2.02	1.89		0.0074
Thiocyanate (SCN) (mg/L)	<0.50	0.83	<0.50		<0.50
Cyanide, Free (mg/L)	<0.0050	1.05	0.043		<0.0050
Organic / Inorganic Carbon Total Inorganic Carbon (mg/L)	31.2	9.4		39.5	35.9
Total Organic Carbon (mg/L)	6.26	28.6	7.39		15.3
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	L1668494-17	L1668494-18	L1668494-19	L1668494-20	L1668494-21
	Description	Water	Water	Water	Water	Water
	Sampled Date	03-SEP-15	03-SEP-15	03-SEP-15	03-SEP-15	03-SEP-15
	Sampled Time	13:55	13:55	09:45	09:45	09:45
	Client ID	GSI-DC-06B	MW15-500	MP09-08	MW15-400	FB15-400
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)	1390	1360	747	750	<2.0
	Hardness (as CaCO3) (mg/L)	844	856	436	436	<0.50
	pH (pH)	7.55	7.55	7.42	7.51	6.07
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	868	850	242	246	<1.0
	Ammonia, Total (as N) (mg/L)	2.78	2.70	0.0288	0.0302	<0.0050
	Chloride (Cl) (mg/L)	7.3	7.2	<0.50	<0.50	<0.50
	Fluoride (F) (mg/L)	0.254	0.250	0.075	0.082	<0.020
	Nitrate (as N) (mg/L)	<0.010 DLA	<0.010 DLA	<0.0050	<0.0050	<0.0050
	Nitrite (as N) (mg/L)	<0.0020 DLA	<0.0020 DLA	<0.0010	<0.0010	<0.0010
	Total Kjeldahl Nitrogen (mg/L)	6.02	5.99	0.592	0.536	<0.050
	Sulfate (SO4) (mg/L)	3.07	5.34	185	185	<0.30
	Sulphide as S (mg/L)	0.036	0.035	0.320	0.321	<0.020
	Anion Sum (meq/L)	17.6	17.3	8.70	8.78	<0.10
	Cation Sum (meq/L)	19.6	19.9	9.10	9.10	<0.10
	Cation - Anion Balance (%)	5.3	6.9	2.2	1.8	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)	0.58	0.60	<0.50	<0.50	<0.50
	Cyanide, Free (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Organic / Inorganic Carbon	Total Inorganic Carbon (mg/L)	186	191	52.2	50.8	<0.50
	Total Organic Carbon (mg/L)	66.5	68.0	11.0	10.3	<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	L1668494-22 Water 03-SEP-15 11:10 GSI-PC-03B	L1668494-23 Water 03-SEP-15 08:30 MP09-03	L1668494-24 Water 03-SEP-15 14:50 GSI-DC-09B	L1668494-25 Water 03-SEP-15 13:01 GSI-DC-10B	L1668494-26 Water 03-SEP-15 10:50 GSI-PC-04B
WATER						
Physical Tests	Conductivity (uS/cm)			533	1210	377
	Hardness (as CaCO3) (mg/L)	275	56.2	236	642	323
	pH (pH)			6.92	6.17	7.31
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)			98.3	96.7	145
	Ammonia, Total (as N) (mg/L)			1.79	1.79	
	Chloride (Cl) (mg/L)			<0.50	1.2	0.83
	Fluoride (F) (mg/L)			0.087	0.057	0.101
	Nitrate (as N) (mg/L)			<0.0050	<0.010 DLA	0.0511
	Nitrite (as N) (mg/L)			<0.0010	<0.0020 DLA	0.0011
	Total Kjeldahl Nitrogen (mg/L)			2.77	3.17	
	Sulfate (SO4) (mg/L)			173	608	59.9
	Sulphide as S (mg/L)			0.118	<0.020	
	Anion Sum (meq/L)			5.58	14.6	4.18
	Cation Sum (meq/L)			6.64	19.7	7.42
	Cation - Anion Balance (%)			8.7	14.9	27.9
Cyanides	Cyanide, Weak Acid Diss (mg/L)	<0.0050		<0.0050	<0.010 DLM	
	Cyanide, Total (mg/L)	<0.0050		0.0101	0.011	
	Thiocyanate (SCN) (mg/L)			0.67	0.70	
	Cyanide, Free (mg/L)	<0.0050		<0.0050	<0.010 DLM	
Organic / Inorganic Carbon	Total Inorganic Carbon (mg/L)			19.8	15.7	
	Total Organic Carbon (mg/L)			28.3	35.8	
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	L1668494-27 Water 03-SEP-15 17:15 GSI-PC-05B*	L1668494-28 Water 03-SEP-15 TRAVEL BLANK	L1668494-29 Water 02-SEP-15 10:30 MW15-300	L1668494-30 Water 02-SEP-15 10:30 FB15-300	L1668494-31 Water 02-SEP-15 17:45 GSI-HA-01A - DISSOLVED ALKALINITY
WATER						
Physical Tests	Conductivity (uS/cm)	250	<2.0	1040	<2.0	
	Hardness (as CaCO3) (mg/L)	128	<0.50	737	<0.50	
	pH (pH)	7.28	5.41	7.63	5.44	
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	64.6	<1.0	353	<1.0	197
	Ammonia, Total (as N) (mg/L)	0.0112	0.0107 RRV	0.0093	<0.0050	
	Chloride (Cl) (mg/L)	<0.50	<0.50	<1.0 DLA	<0.50	
	Fluoride (F) (mg/L)	0.060	<0.020	<0.040 DLA	<0.020	
	Nitrate (as N) (mg/L)	0.0228	<0.0050	2.75	<0.0050	
	Nitrite (as N) (mg/L)	0.0011	<0.001	0.0023	<0.0010	
	Total Kjeldahl Nitrogen (mg/L)	0.384	<0.050	0.600	<0.050	
	Sulfate (SO4) (mg/L)	61.1	<0.30	268	<0.30	
	Sulphide as S (mg/L)	<0.020	<0.020	<0.020	<0.020	
	Anion Sum (meq/L)	2.57	<0.10	12.8	<0.10	
	Cation Sum (meq/L)	2.72	<0.10	15.1	<0.10	
	Cation - Anion Balance (%)	2.9	0.0	8.2	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)	13.6	<0.50	74.3	<0.50	
	Total Organic Carbon (mg/L)	12.3	<0.50	11.3	<0.50	
Total Metals	Aluminum (Al)-Total (mg/L)		<0.0030			
	Antimony (Sb)-Total (mg/L)		<0.00010			
	Arsenic (As)-Total (mg/L)		<0.00010			
	Barium (Ba)-Total (mg/L)		<0.000050			
	Beryllium (Be)-Total (mg/L)		<0.000020			
	Bismuth (Bi)-Total (mg/L)		<0.000050			
	Boron (B)-Total (mg/L)		<0.010			
	Cadmium (Cd)-Total (mg/L)		<0.0000050			
	Calcium (Ca)-Total (mg/L)		<0.050			
	Chromium (Cr)-Total (mg/L)		<0.00010			
	Cobalt (Co)-Total (mg/L)		<0.00010			
	Copper (Cu)-Total (mg/L)		<0.00050			
	Iron (Fe)-Total (mg/L)		<0.010			
	Lead (Pb)-Total (mg/L)		<0.000050			
	Lithium (Li)-Total (mg/L)		<0.0010			

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1668494-32	L1668494-33	L1668494-34	L1668494-35	L1668494-36
	Description	Water	Water	Water	Water	Water
	Sampled Date	02-SEP-15	02-SEP-15	02-SEP-15	02-SEP-15	02-SEP-15
	Sampled Time	17:10	14:50	12:15	10:30	08:30
	Client ID	GSI-DC-02B - DISSOLVED ALKALINITY	W14103083BH03 - DISSOLVED ALKALINITY	MP09-11 - DISSOLVED ALKALINITY	MW09-24 - DISSOLVED ALKALINITY	W14103083BH02 - DISSOLVED ALKALINITY
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)					
	Hardness (as CaCO3) (mg/L)					
	pH (pH)					
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	292	<1.0	580	379	221
	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	L1668494-37	L1668494-38	L1668494-39	L1668494-40	L1668494-41
	Description	Water	Water	Water	Water	Water
	Sampled Date	02-SEP-15	02-SEP-15	03-SEP-15	03-SEP-15	03-SEP-15
	Sampled Time	11:14	14:30	15:15	13:55	13:22
	Client ID	MW09-06 - DISSOLVED ALKALINITY	MP09-09* - DISSOLVED ALKALINITY	GSI-DC-07B - DISSOLVED ALKALINITY	GSI-DC-06B - DISSOLVED ALKALINITY	MW15-500 - DISSOLVED ALKALINITY
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)					
	Hardness (as CaCO3) (mg/L)					
	pH (pH)					
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	152	67.6	176	768	766
	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	L1668494-42	L1668494-43	L1668494-44	L1668494-45	L1668494-46
	Description	Water	Water	Water	Water	Water
	Sampled Date	03-SEP-15	03-SEP-15	03-SEP-15	03-SEP-15	03-SEP-15
	Sampled Time	09:45	09:45	09:45	14:50	13:01
	Client ID	MP09-08 - DISSOLVED ALKALINITY	MW15-400 - DISSOLVED ALKALINITY	FB15-400 - DISSOLVED ALKALINITY	GSI-DC-09B - DISSOLVED ALKALINITY	GSI-DC-10B - DISSOLVED ALKALINITY
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)					
	Hardness (as CaCO3) (mg/L)					
	pH (pH)					
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	249	248	<1.0	103	91.0
	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

	Sample ID	L1668494-47	L1668494-48	L1668494-49		
	Description	Water	Water	Water		
	Sampled Date	03-SEP-15	02-SEP-15	02-SEP-15		
	Sampled Time	09:45	10:30	10:30		
	Client ID	GSI-PC-05B* - DISSOLVED ALKALINITY	MW15-300 - DISSOLVED ALKALINITY	FB15-300 - DISSOLVED ALKALINITY		
Grouping	**Analyte**					
WATER						
Physical Tests	Conductivity (uS/cm)					
	Hardness (as CaCO3) (mg/L)					
	pH (pH)					
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	64.5	376	<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

	Sample ID	L1668494-1	L1668494-2	L1668494-3	L1668494-4	L1668494-6
	Description	Water	Water	Water	Water	Water
	Sampled Date	02-SEP-15	02-SEP-15	02-SEP-15	02-SEP-15	02-SEP-15
	Sampled Time	17:45	17:33	17:10	15:42	14:50
	Client ID	GSI-HA-01A	GSI-HA-03A	GSI-DC-02B	MP09-14	W14103083BH03
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				FIELD	FIELD
	Dissolved Metals Filtration Location				FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)				0.0031	0.0727
	Antimony (Sb)-Dissolved (mg/L)				0.00553	0.00031
	Arsenic (As)-Dissolved (mg/L)				3.94	0.0576
	Barium (Ba)-Dissolved (mg/L)				0.117	0.280
	Beryllium (Be)-Dissolved (mg/L)				<0.000020	0.000025
	Bismuth (Bi)-Dissolved (mg/L)				<0.000050	<0.000050
	Boron (B)-Dissolved (mg/L)				0.065	0.011
	Cadmium (Cd)-Dissolved (mg/L)				0.0000896	0.0000490
	Calcium (Ca)-Dissolved (mg/L)				160	74.6
	Chromium (Cr)-Dissolved (mg/L)				0.00056	0.00076
	Cobalt (Co)-Dissolved (mg/L)				0.00118	0.00077
	Copper (Cu)-Dissolved (mg/L)				0.00047	<0.00020
	Iron (Fe)-Dissolved (mg/L)				4.12	77.3
	Lead (Pb)-Dissolved (mg/L)				0.000441	0.000064
	Lithium (Li)-Dissolved (mg/L)				0.0124	<0.0010

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1668494-7	L1668494-8	L1668494-9	L1668494-10	L1668494-11
	Description	Water	Water	Water	Water	Water
	Sampled Date	02-SEP-15	02-SEP-15	02-SEP-15	02-SEP-15	02-SEP-15
	Sampled Time	12:59	12:15	10:30	08:45	08:30
	Client ID	MP09-12	MP09-11	MW09-24	W14103083BH04	W14103083BH02
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	FIELD	FIELD	FIELD	FIELD	FIELD
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	0.0061	0.0076	0.0021	0.0032	0.0021
	Antimony (Sb)-Dissolved (mg/L)	0.0427	0.0202	0.00018	0.00018	0.00019
	Arsenic (As)-Dissolved (mg/L)	6.62	13.9	0.00183	0.00353	0.00361
	Barium (Ba)-Dissolved (mg/L)	0.0217	0.286	0.0938	0.129	0.117
	Beryllium (Be)-Dissolved (mg/L)	<0.000020	<0.000040 DLA	<0.000020	<0.000020	<0.000020
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.00010 DLA	<0.000050	<0.000050	<0.000050
	Boron (B)-Dissolved (mg/L)	0.131	0.036	0.012	0.015	0.020
	Cadmium (Cd)-Dissolved (mg/L)	0.000489	0.000506	0.0000683	0.00143	0.000345
	Calcium (Ca)-Dissolved (mg/L)	137	124	209	169	193
	Chromium (Cr)-Dissolved (mg/L)	0.00019	0.00139	0.00026	0.00014	0.00021
	Cobalt (Co)-Dissolved (mg/L)	0.00253	0.00177	<0.00010	<0.00010	<0.00010
	Copper (Cu)-Dissolved (mg/L)	0.00045	0.00044	0.00811	0.00274	0.00220
	Iron (Fe)-Dissolved (mg/L)	4.19	30.6	<0.010	<0.010	<0.010
	Lead (Pb)-Dissolved (mg/L)	0.00408	0.0379	<0.000050	0.000053	<0.000050
	Lithium (Li)-Dissolved (mg/L)	0.0043	0.0030	0.0012	0.0012	0.0012

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1668494-12 Water 02-SEP-15 11:14 MW09-06	L1668494-13 Water 02-SEP-15 14:30 MP09-09*	L1668494-14 Water 02-SEP-15 13:13 MP09-10	L1668494-15 Water 03-SEP-15 17:15 GSI-HA-03A	L1668494-16 Water 03-SEP-15 15:15 GSI-DC-07B
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
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD		FIELD
	Aluminum (Al)-Dissolved (mg/L)	0.0046	0.0057	0.0317		0.0103
	Antimony (Sb)-Dissolved (mg/L)	0.299	0.0765	0.0424		0.00014
	Arsenic (As)-Dissolved (mg/L)	0.131	14.2	1.82		0.188
	Barium (Ba)-Dissolved (mg/L)	0.00694	0.00064	0.00466		0.235
	Beryllium (Be)-Dissolved (mg/L)	<0.000040 DLA	<0.000040 DLA	<0.000020		<0.000020
	Bismuth (Bi)-Dissolved (mg/L)	<0.00010 DLA	<0.00010 DLA	0.000113		<0.000050
	Boron (B)-Dissolved (mg/L)	0.137	0.196	0.045		0.023
	Cadmium (Cd)-Dissolved (mg/L)	0.00581	0.000950	0.000386		<0.0000050
	Calcium (Ca)-Dissolved (mg/L)	333	122	13.9		204
	Chromium (Cr)-Dissolved (mg/L)	<0.00020 DLA	<0.00020 DLA	0.00047		0.00029
	Cobalt (Co)-Dissolved (mg/L)	0.00148	0.0456	0.00241		0.00209
	Copper (Cu)-Dissolved (mg/L)	0.00689	0.327	0.0507		<0.00020
	Iron (Fe)-Dissolved (mg/L)	<0.010	0.213	0.328		41.7
	Lead (Pb)-Dissolved (mg/L)	0.00018	0.00037	0.0192		<0.000050
	Lithium (Li)-Dissolved (mg/L)	0.0111	<0.0020 DLA	<0.0010		0.0018

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1668494-17	L1668494-18	L1668494-19	L1668494-20	L1668494-21
	Description	Water	Water	Water	Water	Water
	Sampled Date	03-SEP-15	03-SEP-15	03-SEP-15	03-SEP-15	03-SEP-15
	Sampled Time	13:55	13:55	09:45	09:45	09:45
	Client ID	GSI-DC-06B	MW15-500	MP09-08	MW15-400	FB15-400
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	FIELD	FIELD	FIELD	FIELD	FIELD
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	0.0174	0.0178	0.0049	0.0045	<0.0010
	Antimony (Sb)-Dissolved (mg/L)	0.00042	0.00038	0.00282	0.00226	<0.00010
	Arsenic (As)-Dissolved (mg/L)	0.492	0.470	0.0328	0.0260	<0.00010
	Barium (Ba)-Dissolved (mg/L)	0.177	0.180	0.0632	0.0583	<0.000050
	Beryllium (Be)-Dissolved (mg/L)	<0.000020	<0.000020	0.000021	<0.000020	<0.000020
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
	Boron (B)-Dissolved (mg/L)	0.012	0.011	<0.010	<0.010	<0.010
	Cadmium (Cd)-Dissolved (mg/L)	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
	Calcium (Ca)-Dissolved (mg/L)	202	204	121	121	<0.050
	Chromium (Cr)-Dissolved (mg/L)	0.00170	0.00169	<0.00010	<0.00010	<0.00010
	Cobalt (Co)-Dissolved (mg/L)	0.00206	0.00209	0.00050	0.00051	<0.00010
	Copper (Cu)-Dissolved (mg/L)	0.00021	<0.00020	<0.00020	<0.00020	<0.00020
	Iron (Fe)-Dissolved (mg/L)	27.4	27.8	0.519	0.562	<0.010
	Lead (Pb)-Dissolved (mg/L)	<0.000050	0.000080	<0.000050	<0.000050	<0.000050
	Lithium (Li)-Dissolved (mg/L)	<0.0010	<0.0010	0.0042	0.0044	<0.0010

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1668494-22	L1668494-23	L1668494-24	L1668494-25	L1668494-26
	Description	Water	Water	Water	Water	Water
	Sampled Date	03-SEP-15	03-SEP-15	03-SEP-15	03-SEP-15	03-SEP-15
	Sampled Time	11:10	08:30	14:50	13:01	10:50
	Client ID	GSI-PC-03B	MP09-03	GSI-DC-09B	GSI-DC-10B	GSI-PC-04B
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	FIELD	FIELD	FIELD	FIELD	FIELD
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	0.0071	0.0146	0.0670	0.166	0.0452
	Antimony (Sb)-Dissolved (mg/L)	0.00334	0.00101	0.00023	0.00033	0.00082
	Arsenic (As)-Dissolved (mg/L)	0.00274	0.00631	0.0595	0.102	0.0107
	Barium (Ba)-Dissolved (mg/L)	0.151	0.0323	0.0235	0.391	0.158
	Beryllium (Be)-Dissolved (mg/L)	<0.000020	<0.000020	0.000033	<0.000040 DLA	<0.000020
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050	<0.000050	<0.000050	<0.00010 DLA	<0.000050
	Boron (B)-Dissolved (mg/L)	<0.010	<0.010	0.014	<0.020 DLA	<0.010
	Cadmium (Cd)-Dissolved (mg/L)	0.000231	0.0000873	<0.0000050	<0.000010 DLA	0.0000160
	Calcium (Ca)-Dissolved (mg/L)	75.2	15.6	56.0	172	93.7
	Chromium (Cr)-Dissolved (mg/L)	0.00166	0.00047	0.00107	0.00194	0.0184
	Cobalt (Co)-Dissolved (mg/L)	0.00051	0.00082	0.00147	0.0248	0.00244
	Copper (Cu)-Dissolved (mg/L)	0.0145	0.00093	<0.00020	<0.00040 DLA	0.00337
	Iron (Fe)-Dissolved (mg/L)	0.085	1.48	15.2	90.8	9.79
	Lead (Pb)-Dissolved (mg/L)	0.000408	0.000576	0.000067	0.00013	0.000254
	Lithium (Li)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0010	<0.0020 DLA	0.0013

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1668494-27 Water 03-SEP-15 17:15 GSI-PC-05B*	L1668494-28 Water 03-SEP-15 TRAVEL BLANK	L1668494-29 Water 02-SEP-15 10:30 MW15-300	L1668494-30 Water 02-SEP-15 10:30 FB15-300	L1668494-31 Water 02-SEP-15 17:45 GSI-HA-01A - DISSOLVED ALKALINITY
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	
	Dissolved Metals Filtration Location	FIELD		FIELD	FIELD	
	Aluminum (Al)-Dissolved (mg/L)	0.0177		0.0023	<0.0010	
	Antimony (Sb)-Dissolved (mg/L)	0.00081		0.00018	<0.00010	
	Arsenic (As)-Dissolved (mg/L)	0.00230		0.00197	<0.00010	
	Barium (Ba)-Dissolved (mg/L)	0.0274		0.0924	<0.000050	
	Beryllium (Be)-Dissolved (mg/L)	<0.000020		<0.000020	<0.000020	
	Bismuth (Bi)-Dissolved (mg/L)	<0.000050		<0.000050	<0.000050	
	Boron (B)-Dissolved (mg/L)	<0.010		0.012	<0.010	
	Cadmium (Cd)-Dissolved (mg/L)	0.000132		0.0000674	<0.0000050	
	Calcium (Ca)-Dissolved (mg/L)	36.8		208	<0.050	
	Chromium (Cr)-Dissolved (mg/L)	0.00013		0.00026	<0.00010	
	Cobalt (Co)-Dissolved (mg/L)	<0.00010		<0.00010	<0.00010	
	Copper (Cu)-Dissolved (mg/L)	0.00200		0.00820	<0.00020	
	Iron (Fe)-Dissolved (mg/L)	0.018		<0.010	<0.010	
	Lead (Pb)-Dissolved (mg/L)	0.000105		<0.000050	<0.000050	
	Lithium (Li)-Dissolved (mg/L)	<0.0010		0.0011	<0.0010	

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1668494-32	L1668494-33	L1668494-34	L1668494-35	L1668494-36
	Description	Water	Water	Water	Water	Water
	Sampled Date	02-SEP-15	02-SEP-15	02-SEP-15	02-SEP-15	02-SEP-15
	Sampled Time	17:10	14:50	12:15	10:30	08:30
	Client ID	GSI-DC-02B - DISSOLVED ALKALINITY	W14103083BH03 - DISSOLVED ALKALINITY	MP09-11 - DISSOLVED ALKALINITY	MW09-24 - DISSOLVED ALKALINITY	W14103083BH02 - DISSOLVED ALKALINITY
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	L1668494-37	L1668494-38	L1668494-39	L1668494-40	L1668494-41
	Description	Water	Water	Water	Water	Water
	Sampled Date	02-SEP-15	02-SEP-15	03-SEP-15	03-SEP-15	03-SEP-15
	Sampled Time	11:14	14:30	15:15	13:55	13:22
	Client ID	MW09-06 - DISSOLVED ALKALINITY	MP09-09* - DISSOLVED ALKALINITY	GSI-DC-07B - DISSOLVED ALKALINITY	GSI-DC-06B - DISSOLVED ALKALINITY	MW15-500 - DISSOLVED ALKALINITY
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	L1668494-42	L1668494-43	L1668494-44	L1668494-45	L1668494-46
	Description	Water	Water	Water	Water	Water
	Sampled Date	03-SEP-15	03-SEP-15	03-SEP-15	03-SEP-15	03-SEP-15
	Sampled Time	09:45	09:45	09:45	14:50	13:01
	Client ID	MP09-08 - DISSOLVED ALKALINITY	MW15-400 - DISSOLVED ALKALINITY	FB15-400 - DISSOLVED ALKALINITY	GSI-DC-09B - DISSOLVED ALKALINITY	GSI-DC-10B - DISSOLVED ALKALINITY
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)					

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1668494-47	L1668494-48	L1668494-49		
	Description	Water	Water	Water		
	Sampled Date	03-SEP-15	02-SEP-15	02-SEP-15		
	Sampled Time	09:45	10:30	10:30		
	Client ID	GSI-PC-05B* - DISSOLVED ALKALINITY	MW15-300 - DISSOLVED ALKALINITY	FB15-300 - DISSOLVED ALKALINITY		
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	L1668494-1	L1668494-2	L1668494-3	L1668494-4	L1668494-6
Description	Water	Water	Water	Water	Water
Sampled Date	02-SEP-15	02-SEP-15	02-SEP-15	02-SEP-15	02-SEP-15
Sampled Time	17:45	17:33	17:10	15:42	14:50
Client ID	GSI-HA-01A	GSI-HA-03A	GSI-DC-02B	MP09-14	W14103083BH03
Grouping **Analyte**					
WATER					
Dissolved Metals Magnesium (Mg)-Dissolved (mg/L)				22.8	22.7
Manganese (Mn)-Dissolved (mg/L)				0.344	2.03
Mercury (Hg)-Dissolved (mg/L)				0.0000092	0.0000079
Molybdenum (Mo)-Dissolved (mg/L)				0.00876	0.000135
Nickel (Ni)-Dissolved (mg/L)				0.0169	0.00064
Phosphorus (P)-Dissolved (mg/L)				<0.050	0.242
Potassium (K)-Dissolved (mg/L)				48.9	1.52
Selenium (Se)-Dissolved (mg/L)				0.000122	0.000196
Silicon (Si)-Dissolved (mg/L)				3.03	10.8
Silver (Ag)-Dissolved (mg/L)				<0.000010	<0.000010
Sodium (Na)-Dissolved (mg/L)				22.6	8.40
Strontium (Sr)-Dissolved (mg/L)				0.664	0.268
Sulfur (S)-Dissolved (mg/L)				137	42.1
Thallium (Tl)-Dissolved (mg/L)				<0.000010	<0.000010
Tin (Sn)-Dissolved (mg/L)				0.00013	<0.00010
Titanium (Ti)-Dissolved (mg/L)				<0.00030	0.00249
Uranium (U)-Dissolved (mg/L)				0.000247	0.000116
Vanadium (V)-Dissolved (mg/L)				<0.00050	0.00212
Zinc (Zn)-Dissolved (mg/L)				0.0126	0.0047
Zirconium (Zr)-Dissolved (mg/L)				<0.00030	0.00047

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L1668494-7	L1668494-8	L1668494-9	L1668494-10	L1668494-11
Description	Water	Water	Water	Water	Water
Sampled Date	02-SEP-15	02-SEP-15	02-SEP-15	02-SEP-15	02-SEP-15
Sampled Time	12:59	12:15	10:30	08:45	08:30
Client ID	MP09-12	MP09-11	MW09-24	W14103083BH04	W14103083BH02
Grouping / **Analyte**					
WATER					
Dissolved Metals Magnesium (Mg)-Dissolved (mg/L)	46.9	59.9	54.7	53.8	62.0
Manganese (Mn)-Dissolved (mg/L)	4.38	3.44	0.00108	0.00272	0.0110
Mercury (Hg)-Dissolved (mg/L)	0.0000105	0.0000122	0.0000102	<0.0000050	<0.0000050
Molybdenum (Mo)-Dissolved (mg/L)	0.00690	0.00408	0.000377	0.000843	0.00125
Nickel (Ni)-Dissolved (mg/L)	0.00774	0.0054	0.00055	0.00078	0.00064
Phosphorus (P)-Dissolved (mg/L)	0.054	0.116	<0.050	<0.050	<0.050
Potassium (K)-Dissolved (mg/L)	7.15	13.3	1.66	2.98	3.69
Selenium (Se)-Dissolved (mg/L)	0.000096	0.00029	0.000354	0.00249	0.000830
Silicon (Si)-Dissolved (mg/L)	13.2	10.6	6.18	4.98	5.30
Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000020 DLA	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved (mg/L)	3.93	16.4	7.87	10.4	8.91
Strontium (Sr)-Dissolved (mg/L)	0.517	1.04	0.681	0.736	0.776
Sulfur (S)-Dissolved (mg/L)	47.9	16.8	117	151	171
Thallium (Tl)-Dissolved (mg/L)	0.000182	0.000289	<0.000010	<0.000010	<0.000010
Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00020 DLA	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved (mg/L)	0.00031	0.00174	<0.00030	<0.00030	<0.00030
Uranium (U)-Dissolved (mg/L)	0.00127	0.000424	0.00790	0.00933	0.00513
Vanadium (V)-Dissolved (mg/L)	0.00064	0.0063	<0.00050	0.00068	0.00093
Zinc (Zn)-Dissolved (mg/L)	0.0472	0.0670	0.0016	0.0037	0.0013
Zirconium (Zr)-Dissolved (mg/L)	0.00030	0.00231	<0.00030	<0.00030	<0.00030

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L1668494-12	L1668494-13	L1668494-14	L1668494-15	L1668494-16
Description	Water	Water	Water	Water	Water
Sampled Date	02-SEP-15	02-SEP-15	02-SEP-15	03-SEP-15	03-SEP-15
Sampled Time	11:14	14:30	13:13	17:15	15:15
Client ID	MW09-06	MP09-09*	MP09-10	GSI-HA-03A	GSI-DC-07B
Grouping / **Analyte**					
WATER					
Dissolved Metals Magnesium (Mg)-Dissolved (mg/L)	50.1	0.78	0.28		54.5
Manganese (Mn)-Dissolved (mg/L)	4.34	0.0196	0.0691		3.33
Mercury (Hg)-Dissolved (mg/L)	0.0000095	0.0000697	0.0000293		0.0000094
Molybdenum (Mo)-Dissolved (mg/L)	0.00518	0.0200	0.000840		0.000309
Nickel (Ni)-Dissolved (mg/L)	0.0027	0.0178	0.00238		0.00081
Phosphorus (P)-Dissolved (mg/L)	<0.050	0.191	0.171		0.095
Potassium (K)-Dissolved (mg/L)	18.5	10.4	0.99		3.68
Selenium (Se)-Dissolved (mg/L)	<0.00010 DLA	0.00187	0.000558		0.000131
Silicon (Si)-Dissolved (mg/L)	8.11	6.72	2.28		8.85
Silver (Ag)-Dissolved (mg/L)	0.000043	0.0110	0.000491		<0.000010
Sodium (Na)-Dissolved (mg/L)	24.1	27.5	1.32		15.7
Strontium (Sr)-Dissolved (mg/L)	0.698	0.173	0.0242		0.667
Sulfur (S)-Dissolved (mg/L)	315	155	2.51		196
Thallium (Tl)-Dissolved (mg/L)	0.000333	0.000043	0.000019		<0.000010
Tin (Sn)-Dissolved (mg/L)	<0.00020 DLA	<0.00020 DLA	0.00026		<0.00010
Titanium (Ti)-Dissolved (mg/L)	<0.00060 DLA	<0.00060 DLA	<0.00030		<0.0012 DLM
Uranium (U)-Dissolved (mg/L)	0.00162	0.000825	0.000164		0.000051
Vanadium (V)-Dissolved (mg/L)	<0.0010 DLA	<0.0010 DLA	<0.00050		0.00135
Zinc (Zn)-Dissolved (mg/L)	0.110	0.0125	0.0124		0.0010
Zirconium (Zr)-Dissolved (mg/L)	<0.00060 DLA	<0.00060 DLA	<0.00030		0.00035

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L1668494-17	L1668494-18	L1668494-19	L1668494-20	L1668494-21
Description	Water	Water	Water	Water	Water
Sampled Date	03-SEP-15	03-SEP-15	03-SEP-15	03-SEP-15	03-SEP-15
Sampled Time	13:55	13:55	09:45	09:45	09:45
Client ID	GSI-DC-06B	MW15-500	MP09-08	MW15-400	FB15-400
Grouping **Analyte**					
WATER					
Dissolved Metals Magnesium (Mg)-Dissolved (mg/L)	82.7	83.8	32.4	32.5	<0.10
Manganese (Mn)-Dissolved (mg/L)	3.72	3.78	1.00	0.923	<0.00010
Mercury (Hg)-Dissolved (mg/L)	0.0000117	0.0000203	<0.0000050	<0.0000050	<0.0000050
Molybdenum (Mo)-Dissolved (mg/L)	0.00249	0.00247	0.00301	0.00320	<0.000050
Nickel (Ni)-Dissolved (mg/L)	0.00385	0.00367	0.00131	0.00185	<0.00050
Phosphorus (P)-Dissolved (mg/L)	0.301	0.317	<0.050	<0.050	<0.050
Potassium (K)-Dissolved (mg/L)	4.26	4.28	1.15	1.17	<0.10
Selenium (Se)-Dissolved (mg/L)	0.000532	0.000467	0.000066	0.000074	<0.000050
Silicon (Si)-Dissolved (mg/L)	8.89	9.08	7.37	7.43	<0.050
Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000050 DLM	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved (mg/L)	19.4	19.4	7.00	6.53	<0.050
Strontium (Sr)-Dissolved (mg/L)	0.988	1.01	1.20	1.24	<0.00020
Sulfur (S)-Dissolved (mg/L)	8.55	7.17	65.5	65.9	<0.50
Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved (mg/L)	0.00298	0.00318	0.00059	0.00047	<0.00030
Uranium (U)-Dissolved (mg/L)	0.000199	0.000188	0.00481	0.00457	<0.000010
Vanadium (V)-Dissolved (mg/L)	0.00784	0.00810	0.00162	0.00108	<0.00050
Zinc (Zn)-Dissolved (mg/L)	0.0019	0.0012	<0.0010	<0.0010	<0.0010
Zirconium (Zr)-Dissolved (mg/L)	0.00225	0.00231	<0.00030	<0.00030	<0.00030

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1668494-22 Water 03-SEP-15 11:10 GSI-PC-03B	L1668494-23 Water 03-SEP-15 08:30 MP09-03	L1668494-24 Water 03-SEP-15 14:50 GSI-DC-09B	L1668494-25 Water 03-SEP-15 13:01 GSI-DC-10B	L1668494-26 Water 03-SEP-15 10:50 GSI-PC-04B
WATER						
Dissolved Metals	Magnesium (Mg)-Dissolved (mg/L)	21.1	4.23	23.4	51.7	21.6
	Manganese (Mn)-Dissolved (mg/L)	1.05	0.325	0.706	15.5	2.71
	Mercury (Hg)-Dissolved (mg/L)	<0.0000050	<0.0000050	0.0000166	0.0000131	0.0000095
	Molybdenum (Mo)-Dissolved (mg/L)	0.00339	0.000392	0.000296	0.00100	0.00201
	Nickel (Ni)-Dissolved (mg/L)	0.0190	0.00414	0.00083	0.0065	0.0236
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	0.175	<0.050	0.090
	Potassium (K)-Dissolved (mg/L)	1.05	1.43	2.17	3.19	1.61
	Selenium (Se)-Dissolved (mg/L)	<0.000050	<0.000050	0.000174	0.00025	0.000051
	Silicon (Si)-Dissolved (mg/L)	6.80	1.19	7.48	8.04	10.2
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000020 DLA	<0.000010
	Sodium (Na)-Dissolved (mg/L)	5.28	1.68	20.4	28.6	6.93
	Strontium (Sr)-Dissolved (mg/L)	0.460	0.0928	0.175	0.639	0.513
	Sulfur (S)-Dissolved (mg/L)	34.4	3.89	61.3	214	32.7
	Thallium (Tl)-Dissolved (mg/L)	0.000026	<0.000010	<0.000010	<0.000020 DLA	<0.000010
	Tin (Sn)-Dissolved (mg/L)	<0.00010	0.00012	<0.00010	<0.00020 DLA	0.00016
	Titanium (Ti)-Dissolved (mg/L)	<0.00030	0.00067	0.00429	0.00194	0.00143
	Uranium (U)-Dissolved (mg/L)	0.000166	0.000044	0.000172	0.000574	0.000075
	Vanadium (V)-Dissolved (mg/L)	<0.00050	<0.00050	0.00609	0.0126	0.00156
	Zinc (Zn)-Dissolved (mg/L)	0.0182	0.0285	0.0019	0.0104	0.0092
	Zirconium (Zr)-Dissolved (mg/L)	<0.00030	<0.00030	0.00071	0.00135	0.00031

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Grouping	Analyte	L1668494-27 Water 03-SEP-15 17:15 GSI-PC-05B*	L1668494-28 Water 03-SEP-15 TRAVEL BLANK	L1668494-29 Water 02-SEP-15 10:30 MW15-300	L1668494-30 Water 02-SEP-15 10:30 FB15-300	L1668494-31 Water 02-SEP-15 17:45 GSI-HA-01A - DISSOLVED ALKALINITY
WATER						
Dissolved Metals	Magnesium (Mg)-Dissolved (mg/L)	8.87		52.5	<0.10	
	Manganese (Mn)-Dissolved (mg/L)	0.0205		0.00127	<0.00010	
	Mercury (Hg)-Dissolved (mg/L)	0.0000086		0.0000101	<0.0000050	
	Molybdenum (Mo)-Dissolved (mg/L)	0.000186		0.000367	<0.000050	
	Nickel (Ni)-Dissolved (mg/L)	0.00062		0.00083	<0.00050	
	Phosphorus (P)-Dissolved (mg/L)	<0.050		<0.050	<0.050	
	Potassium (K)-Dissolved (mg/L)	0.55		1.66	<0.10	
	Selenium (Se)-Dissolved (mg/L)	<0.000050		0.000305	<0.000050	
	Silicon (Si)-Dissolved (mg/L)	6.06		6.15	<0.050	
	Silver (Ag)-Dissolved (mg/L)	<0.000010		<0.000010	<0.000010	
	Sodium (Na)-Dissolved (mg/L)	3.07		8.01	<0.050	
	Strontium (Sr)-Dissolved (mg/L)	0.249		0.655	0.00041	
	Sulfur (S)-Dissolved (mg/L)	21.5		120	<0.50	
	Thallium (Tl)-Dissolved (mg/L)	0.000011		<0.000010	<0.000010	
	Tin (Sn)-Dissolved (mg/L)	<0.00010		<0.00010	<0.00010	
	Titanium (Ti)-Dissolved (mg/L)	0.00057		<0.00030	<0.00030	
	Uranium (U)-Dissolved (mg/L)	0.000069		0.00774	<0.000010	
	Vanadium (V)-Dissolved (mg/L)	0.00067		<0.00050	<0.00050	
	Zinc (Zn)-Dissolved (mg/L)	0.0046		0.0019	<0.0010	
	Zirconium (Zr)-Dissolved (mg/L)	<0.00030		<0.00030	<0.00030	

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L1668494-32	L1668494-33	L1668494-34	L1668494-35	L1668494-36
	Description	Water	Water	Water	Water	Water
	Sampled Date	02-SEP-15	02-SEP-15	02-SEP-15	02-SEP-15	02-SEP-15
	Sampled Time	17:10	14:50	12:15	10:30	08:30
	Client ID	GSI-DC-02B - DISSOLVED ALKALINITY	W14103083BH03 - DISSOLVED ALKALINITY	MP09-11 - DISSOLVED ALKALINITY	MW09-24 - DISSOLVED ALKALINITY	W14103083BH02 - DISSOLVED ALKALINITY
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	L1668494-37	L1668494-38	L1668494-39	L1668494-40	L1668494-41
	Description	Water	Water	Water	Water	Water
	Sampled Date	02-SEP-15	02-SEP-15	03-SEP-15	03-SEP-15	03-SEP-15
	Sampled Time	11:14	14:30	15:15	13:55	13:22
	Client ID	MW09-06 - DISSOLVED ALKALINITY	MP09-09* - DISSOLVED ALKALINITY	GSI-DC-07B - DISSOLVED ALKALINITY	GSI-DC-06B - DISSOLVED ALKALINITY	MW15-500 - DISSOLVED ALKALINITY
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	L1668494-42	L1668494-43	L1668494-44	L1668494-45	L1668494-46
	Description	Water	Water	Water	Water	Water
	Sampled Date	03-SEP-15	03-SEP-15	03-SEP-15	03-SEP-15	03-SEP-15
	Sampled Time	09:45	09:45	09:45	14:50	13:01
	Client ID	MP09-08 - DISSOLVED ALKALINITY	MW15-400 - DISSOLVED ALKALINITY	FB15-400 - DISSOLVED ALKALINITY	GSI-DC-09B - DISSOLVED ALKALINITY	GSI-DC-10B - DISSOLVED ALKALINITY
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	L1668494-47	L1668494-48	L1668494-49		
	Description	Water	Water	Water		
	Sampled Date	03-SEP-15	02-SEP-15	02-SEP-15		
	Sampled Time	09:45	10:30	10:30		
	Client ID	GSI-PC-05B* - DISSOLVED ALKALINITY	MW15-300 - DISSOLVED ALKALINITY	FB15-300 - DISSOLVED ALKALINITY		
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)
Method Blank	Conductivity	B	L1668494-10, -11, -12, -13, -14, -16, -17, -18, -6, -8, -9
Matrix Spike	Total Kjeldahl Nitrogen	MS-B	L1668494-10, -11, -12, -13, -14, -16, -17, -18, -19, -20, -21, -24, -25, -27, -28, -29, -30, -6, -8, -9
Matrix Spike	Total Kjeldahl Nitrogen	MS-B	L1668494-10, -11, -12, -13, -14, -16, -17, -18, -19, -20, -21, -24, -25, -27, -28, -29, -30, -6, -8, -9
Matrix Spike	Sulfate (SO4)	MS-B	L1668494-10, -11, -12, -13, -14, -16, -17, -18, -19, -20, -21, -24, -25, -26, -27, -29, -30, -6, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1668494-10, -11, -12, -13, -14, -16, -17, -18, -19, -20, -21, -22, -23, -24, -25, -26, -27, -29, -30, -4, -6, -7, -8, -9
Matrix Spike	Iron (Fe)-Dissolved	MS-B	L1668494-10, -11, -12, -13, -14, -16, -17, -18, -19, -20, -21, -22, -23, -24, -25, -26, -27, -29, -30, -4, -6, -7, -8, -9
Matrix Spike	Magnesium (Mg)-Dissolved	MS-B	L1668494-10, -11, -12, -13, -14, -16, -17, -18, -19, -20, -21, -22, -23, -24, -25, -26, -27, -29, -30, -4, -6, -7, -8, -9
Matrix Spike	Silicon (Si)-Dissolved	MS-B	L1668494-10, -11, -12, -13, -14, -16, -17, -18, -19, -20, -21, -22, -23, -24, -25, -26, -27, -29, -30, -4, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1668494-10, -11, -12, -13, -14, -16, -17, -18, -19, -20, -21, -22, -23, -24, -25, -26, -27, -29, -30, -4, -6, -7, -8, -9
Matrix Spike	Boron (B)-Dissolved	MS-B	L1668494-10, -11, -12, -13, -14, -16, -17, -18, -19, -20, -21, -22, -23, -24, -25, -26, -27, -29, -30, -4, -6, -7, -8, -9
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L1668494-10, -11, -12, -13, -14, -16, -17, -18, -19, -20, -21, -22, -23, -24, -25, -26, -27, -29, -30, -4, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1668494-10, -11, -12, -13, -14, -16, -17, -18, -19, -20, -21, -22, -23, -24, -25, -26, -27, -29, -30, -4, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1668494-10, -11, -12, -13, -14, -16, -17, -18, -19, -20, -21, -22, -23, -24, -25, -26, -27, -29, -30, -4, -6, -7, -8, -9
Matrix Spike	Total Organic Carbon	MS-B	L1668494-1, -2, -3
Matrix Spike	Total Organic Carbon	MS-B	L1668494-1, -2, -3
Matrix Spike	Arsenic (As)-Dissolved	MS-B	L1668494-10, -11, -12, -13, -14, -16, -17, -18, -19, -20, -21, -22, -23, -24, -25, -26, -27, -29, -30, -4, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1668494-10, -11, -12, -13, -14, -16, -17, -18, -19, -20, -21, -22, -23, -24, -25, -26, -27, -29, -30, -4, -6, -7, -8, -9
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L1668494-10, -11, -12, -13, -14, -16, -17, -18, -19, -20, -21, -22, -23, -24, -25, -26, -27, -29, -30, -4, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1668494-10, -11, -12, -13, -14, -16, -17, -18, -19, -20, -21, -22, -23, -24, -25, -26, -27, -29, -30, -4, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1668494-10, -11, -12, -13, -14, -16, -17, -18, -19, -20, -21, -22, -23, -24, -25, -26, -27, -29, -30, -4, -6, -7, -8, -9
Matrix Spike	Total Organic Carbon	MS-B	L1668494-10, -11, -12, -13, -14, -16, -17, -18, -19, -20, -21, -24, -25, -27, -28, -29, -30, -6, -8, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1668494-10, -11, -12, -13, -14, -16, -17, -18, -19, -20, -21, -22, -23, -24, -25, -26, -27, -29, -30, -4, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1668494-10, -11, -12, -13, -14, -16, -17, -18, -19, -20, -21, -22, -23, -24, -25, -26, -27, -29, -30, -4, -6, -7, -8, -9
Matrix Spike	Total Inorganic Carbon	MS-B	L1668494-1, -11, -12, -13, -15, -16, -17, -18, -19, -20, -21, -24, -25, -27, -28, -29, -3, -30, -6, -8, -9
Matrix Spike	Total Inorganic Carbon	MS-B	L1668494-1, -11, -12, -13, -15, -16, -17, -18, -19, -20, -21, -24, -25, -27, -28, -29, -3, -30, -6, -8, -9
Matrix Spike	Arsenic (As)-Dissolved	MS-B	L1668494-10, -11, -12, -13, -14, -16, -17, -18, -19, -20, -21, -22, -23, -24, -25, -26, -27, -29, -30, -4, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1668494-10, -11, -12, -13, -14, -16, -17, -18, -19, -20, -21, -22, -23, -24, -25, -26, -27, -29, -30, -4, -6, -7, -8, -9
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L1668494-10, -11, -12, -13, -14, -16, -17, -18, -19, -20, -21, -22, -23, -24, -25, -26, -27, -29, -30, -4, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1668494-10, -11, -12, -13, -14, -16, -17, -18, -19, -20, -21, -22, -23, -24, -25, -26, -27, -29, -30, -4, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1668494-10, -11, -12, -13, -14, -16, -17, -18, -19, -20, -21, -22, -23, -24, -25, -26, -27, -29, -30, -4, -6, -7, -8, -9
Matrix Spike	Molybdenum (Mo)-Dissolved	MS-B	L1668494-10, -11, -12, -13, -14, -16, -17, -18, -19, -20, -21, -22, -23, -24, -25, -26, -27, -29, -30, -4, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1668494-10, -11, -12, -13, -14, -16, -17, -18, -19, -20, -21, -22, -23, -24, -25, -26, -27, -29, -30, -4, -6, -7, -8, -9
Matrix Spike	Silicon (Si)-Dissolved	MS-B	L1668494-10, -11, -12, -13, -14, -16, -17, -18, -19, -20, -21, -22, -23, -24, -25, -26, -27, -29, -30, -4, -6, -7, -8, -9

Reference Information

	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Sulfur (S)-Dissolved	MS-B	L1668494-10, -11, -12, -13, -14, -16, -17, -18, -19, -20, -21, -22, -23, -24, -25, -26, -27, -29, -30, -4, -6, -7, -8, -9
Matrix Spike	Aluminum (Al)-Total	MS-B	L1668494-28
Matrix Spike	Barium (Ba)-Total	MS-B	L1668494-28
Matrix Spike	Manganese (Mn)-Total	MS-B	L1668494-28
Matrix Spike	Sodium (Na)-Total	MS-B	L1668494-28
Matrix Spike	Strontium (Sr)-Total	MS-B	L1668494-28

Qualifiers for Individual Parameters Listed:

Qualifier	Description
B	Method Blank exceeds ALS DQO. All associated sample results are at least 5 times greater than blank levels and are considered reliable.
DLA	Detection Limit adjusted for required dilution
DLM	Detection Limit Adjusted due to sample matrix effects.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRV	Reported Result Verified By Repeat Analysis

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-TITR-VA	Water	Alkalinity Species by Titration	APHA 2320 Alkalinity

This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Reference Information

electrode.

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

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

HARDNESS-CALC-VA Water Hardness APHA 2340B

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

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

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

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

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

IONBALANCE-VA Water Ion Balance Calculation APHA 1030E

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

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

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

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

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

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

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

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves filtration (EPA Method 3005A) and analysis by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

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

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

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

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

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

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

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

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

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

NO2-L-IC-N-WR Water Nitrite in Water by IC (Low Level) EPA 300.1 (mod)

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

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

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

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

Reference Information

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

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

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

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

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

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

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

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

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

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, or filtration (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

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

S2-T-COL-VA Water Total Sulphide by Colorimetric APHA 4500-S2 Sulphide

This analysis is carried out using procedures adapted from APHA Method 4500-S2 "Sulphide". Sulphide is determined using the methlyene blue colourimetric method.

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

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

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

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

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

1-1343-005.11-2-2 1-1343-005.11-2-3 1-1343-055.11-2-1

Reference Information

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

L1668494-COFC

COC Number: 1 - 1343-005.11-2

Page 1 of 3

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 [redacted] 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	Same as Report To ☑ Yes ☐ No	Invoice Distribution	Analysis Request
	Copy of Invoice with Report ☐ Yes ☑ No	Select Invoice Distribution: ☑ EMAIL ☑ MAIL ☐ FAX	Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below
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 #:	1343-005.11	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 Coor (This description will appear on the	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			
	GSI-HA-01A	02/09/2015	17:45	Water						R	R	R	R	R	R			6
	GSI-HA-03A	02/09/2015	17:33	Water						R	R	R						3
	GSI-DC-02B	02/09/2015	17:10	Water						R	R	R	R	R	R			6
	MP09-14	02/09/2015	15:42	Water	R	R												2
	W14103083BH03	02/09/2015	14:50	Water	R	R	R	R	R	R	R	R	R	R	R			9
	MP09-12	02/09/2015	12:59	Water	R	R												2
	MP09-11	02/09/2015	12:15	Water	R	R	R	R	R	R	R	R	R	R	R			9
	MW09-24	02/09/2015	10:30	Water	R	R	R	R	R	R	R	R	R	R	R			9
	W14103083BH04	02/09/2015	8:45	Water	R	R	R	R	R	R	R							5
	W14103083BH02	02/09/2015	8:30	Water	R	R	R	R	R	R	R	R	R	R	R			9
	MW09-06	02/09/2015	11:14	Water	R	R	R	R	R	R	R	R	R	R	R			9
	MP09-09*	02/09/2015	14:30	Water	R	R	R	R	R	R	R	R	R	R	R			9

Short Holding Time

Rush Processing

Drinking Water (DW) Samples[1] (client use)	Special Instructions / Specify Criteria to add on report (client Use)	SAMPLE CONDITION AS RECEIVED (lab use only)
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 MP09-14 Dissolved Metals has low quantity.	Frozen ☐ SIF Observations Yes ☐ No ☐ Ice packs Yes ☐ No ☐ Custody seal intact Yes ☐ No ☐ Cooling Initiated ☐

INITIAL COOLER TEMPERATURES °C			FINAL COOLER TEMPERATURES °C		
4.5, 3.2	4.2, 4.2		8.2	10	6.5

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Julia Harris	Date: 01/09/15	Time: 13:10	Received by: [signature]	Date: 4 Sept 15	Time: 1320	Received by: PAUL	Date: SEP 5	Time: 12:52

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

NA-FM-0328e 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.

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

Chain of Custody (COC) / Analytical Request Form

ALS Environmental
www.alsglobal.com

Canada Toll Free: 1 800 668 9878

L1668494-COFC

COC Number: 1 - 1343-005.11-2

Page 3 of 3

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 ☐
		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	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 #:	1343-005.11	GL Account:	Routing Code:
PO / AFE:		Activity Code:	
LSD:		Location:	

ALS Lab Work Order # (lab use only):

ALS Contact:

Sampler: RM, JC, AN, MN

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
	MW09-10	02/09/2015	13:13	Water	R	R	R	R	R	R	R	R						6
	GSI-HA-03A	03/09/2015	17:15	Water									R	R				2
	GSI-DC-07B	03/09/2015	15:15	Water	R	R	R	R	R	R	R	R	R	R	R			9
	GSI-DC-06B	03/09/2015	13:55	Water	R	R	R	R	R	R	R	R	R	R	R			9
	MW15-500	03/09/2015	13:55	Water	R	R	R	R	R	R	R	R	R	R	R			9
	MP09-08	03/09/2015	9:45	Water	R	R	R	R	R	R	R	R	R	R	R			9
	MW15-400	03/09/2015	9:45	Water	R	R	R	R	R	R	R	R	R	R	R			9
	FB15-400	03/09/2015	9:45	Water	R	R	R	R	R	R	R	R	R	R	R			9
	GSI-PC-03B	03/09/2015	11:10	Water	R	R				R								3
	MP09-03	03/09/2015	8:30	Water	R	R												2
	GSI-DC-09B	03/09/2015	14:50	Water	R	R	R	R	R	R	R	R	R	R	R			9
	GSI-DC-10B	03/09/2015	13:01	Water	R	R	R	R	R	R	R	R	R	R	R			9

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

Are samples taken from a Regulated DW System?
☐ Yes ☑ No

Are samples for human drinking water use?
☐ Yes ☑ No

Special Instructions / Specify Criteria to add on report (client Use)

- See attached parameter sheet for 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		
45.32	42.42				

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Justin Hains	Date: 04/09/15	Time: 13:10	Received by: Shyamo	Date: 9Sep15	Time: 1320	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

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

ALS Environmental

www.alsglobal.com

Chain of Custody (COC) / Analytical Request Form

Canada Toll Free: 1 800 668 9878

L1668494-COFC

COC Number: 1 - 1343-005.11-2

Page 3 of 3

Report To		Report Format / Distribution	Select Service Level Below (Rush Turnaround Time (TAT) is not available for all tests)
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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
Phone:	867-456-4865	Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	E2 ☐ Same day or weekend emergency - contact ALS to confirm TAT and surcharge
		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	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 #:	1343-005.11	GL Account:	Routing Code:
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LSD:		Location:	

ALS Lab Work Order # (lab use only)

ALS Contact:

Sampler: RM, JC, AN, MN

Analysis Request

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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, Calion/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
	GSI-PC-04B	03/09/2015	10:50	Water	R	R	R	R	R									3
	GSI-PC-05B*	03/09/2015	9:45	Water	R	R	R	R	R	R	R	R	R	R	R			9
	Travel Blank	03/09/2015			R	R	R	R	R	R	R	R	R	R	R			9
	MW15-300	02/09/2015	10:30	Water	R	R	R	R	R	R	R	R	R	R	R			9
	FB15-300	02/09/2015	10:30	Water	R	R	R	R	R	R	R	R	R	R	R			9

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

Are samples taken from a Regulated DW System?
☐ Yes ☑ No

Are samples for human drinking water use?
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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		
4.5	3.2	4.2	4.2		

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (lab use only)			FINAL SHIPMENT RECEPTION (lab use only)		
Released by: Justin Harris	Date: 04/09/15	Time: 13:10	Received by:	Date: 4 Sept 15	Time: 1320	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

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NA-FM-0328r-v09 Front/04 January 2014

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

APPENDIX D

Response to Comments Received on Draft Report

Response to Comments from Draft Report Version (as Received January, 2016)

Comment No.	Page	Comment	Response
1	10	What does this mean; briefly elaborate why this minimizes field parameter variability.	A description of the benefits of using flow-through cells for field parameter collection has been added to the text (Section 2.4).
2	18	GENERAL COMMENT FOR SECTION: Please include a bit more specifics when discussing the results; specifically, please identify the number of stations for each parameter where an exceedance has occurred in each area (i.e. avoids the ambiguity of stating “one or more”). You could also include the specific stations where exceedance has occurred; although this is not absolutely necessary.	An additional table has been added to the report summarizing CCME FAL guideline exceedances (refer to Table 3-3). The text in Section 3.2 has also been updated to provide more detail concerning the number of exceedances reported within each area/site.
3	21	What was this condition and why did it prevent repair?	The text in Section 3.2.6 has been updated. Well repairs could not be completed at site MW09-01 due to a mis-calculation as to the required materials (diameter of PVC).
4	22	Where the measured values so small that even a small (practical) difference may be reported as being largely different in the RPD analysis? If so please indicate.	After review the information listed in Section 3.3.2.1 was found to be correct. Sulfate concentrations in this duplicate and duplicate pair were 5.34 and 3.07 mg/L. Although these values are considered relatively low for the program, concentrations are well above the RDL (0.03 mg/L). RPD values for this pair are expected to be within the acceptable range of variability (<20%).
5	22	Were samples collected below the 50 NTU (i.e. as indicated in Section 3.2.4)?	Groundwater at this site was relatively clear during the time of sampling (2.38 NTU). Field notes indicate that Pony Creek surface water was significantly more turbid compared to previous site visits, likely due to the placer mining operation directly upstream. Field notes also indicate a variation in sample turbidity during the purging process. Surface water turbidity and purge water variability may have contributed to RPD variability between the duplicate and duplicate pair, despite sample turbidity being within acceptable limits.
6	22	Where the measured values so small that even a small (practical) difference may be reported as being largely different in the RPD analysis? If so please indicate.	TKN and dissolved zinc concentrations were high enough above the detection limits that the RPD values were considered valid for these samples.
7	26	Please include brief discussion of this scope/purpose in the introduction and/or methods section.	We have provided a discussion of the scope and purpose of filtered alkalinity testing is provided in the methods Section 2.5.
8	27	Include recommendation for not collecting filtered alkalinity.	Recommendations have been updated. A recommendation to discontinue the collection of filtered alkalinity samples at the Mount Nansen site has been added to the text.