

MOUNT NANSEN OCTOBER 2014 GROUNDWATER MONITORING AND SAMPLING

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1.0 INTRODUCTION

Hemmera Envirochem Inc. ("Hemmera") and Ecological Logistics & Research Ltd. (Hemmera/ELR) were retained by the Government of Yukon (GY), Assessment and Abandoned Mines (AAM) to conduct a groundwater monitoring and sampling program at the Mount Nansen Site in October of 2014. This report summarizes the activities conducted, the field conditions encountered, and the *in-situ* and laboratory analytical results for the program.

1.1 SITE LOCATION

The Mount Nansen Site (the Site) is located approximately 45 kilometres (km) west of the Town of Carmacks (70 km by road). This Type II abandoned mine site consists of three (3) primary areas of existing infrastructure: the Brown McDade Pit, a Mill Complex, and a Tailings Facility (**Figure 1-1**). Previously installed groundwater sampling stations exist throughout much of the Site, a subset of which were sampled during the October 2014 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 included the coordination and execution of the fall groundwater monitoring and sampling program, analysis of groundwater samples, and the presentation of results in a summary report. This report provides a summary of the monitoring and sampling activities, a description of methodologies, a summary of field *in-situ* and laboratory analytical results including a comparison to applicable guidelines, and recommendations relating to sample procedures and monitoring well condition. This report does not provide an interpretation of the results, nor does it provide recommendations relating to groundwater quality at the Site.

Groundwater sampling at the Site was conducted over a four (4) day period, between October 7 and 10, 2014. Sampling was conducted by a team of four (4) field staff from Hemmera/ELR (Glenn Rudman, Rusto Martinka, Andrew Brown, and Jonathan Lowey). A total of 65 groundwater wells were included in the October sampling event (**Table 1-1**).

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. Wells were purged and groundwater samples were collected for laboratory analysis. A detailed description of the sampling methods and measured groundwater quality parameters is provided in **Section 2**, below.

1.3 SAMPLE SITES

The groundwater wells included in the October monitoring and sampling event were grouped into six (6) main areas of the Mount Nansen Site (**Table 1-1**). The majority groundwater wells were located around existing infrastructure including the tailings facility, the tailings pond and seepage pond/dam (26 wells), the Brown McDade Pit (12 wells) and the Mill Complex (9 wells). Additional wells (primarily drive-point piezometer installations) were sampled in the vicinity of Dome Creek (9) and Pony Creek (9) sample sites. **Table 1-1** provides the location, status, and sample recovery for groundwater wells included in the October sampling program. The well locations are also illustrated in **Figures 1-2** and **1-3**. Photographs of each sample site are included in **Appendix A**.

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Mount Nansen Site
October 2014 Groundwater Monitoring Program

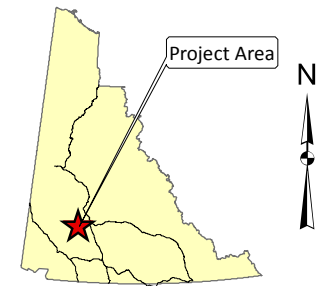


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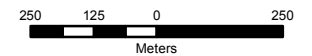
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Legend

— Watercourses



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 ELR Project: 14-175.1

FIGURE 1-1

Site Location - Mount Nansen Site

6882000

6881000

6880000

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

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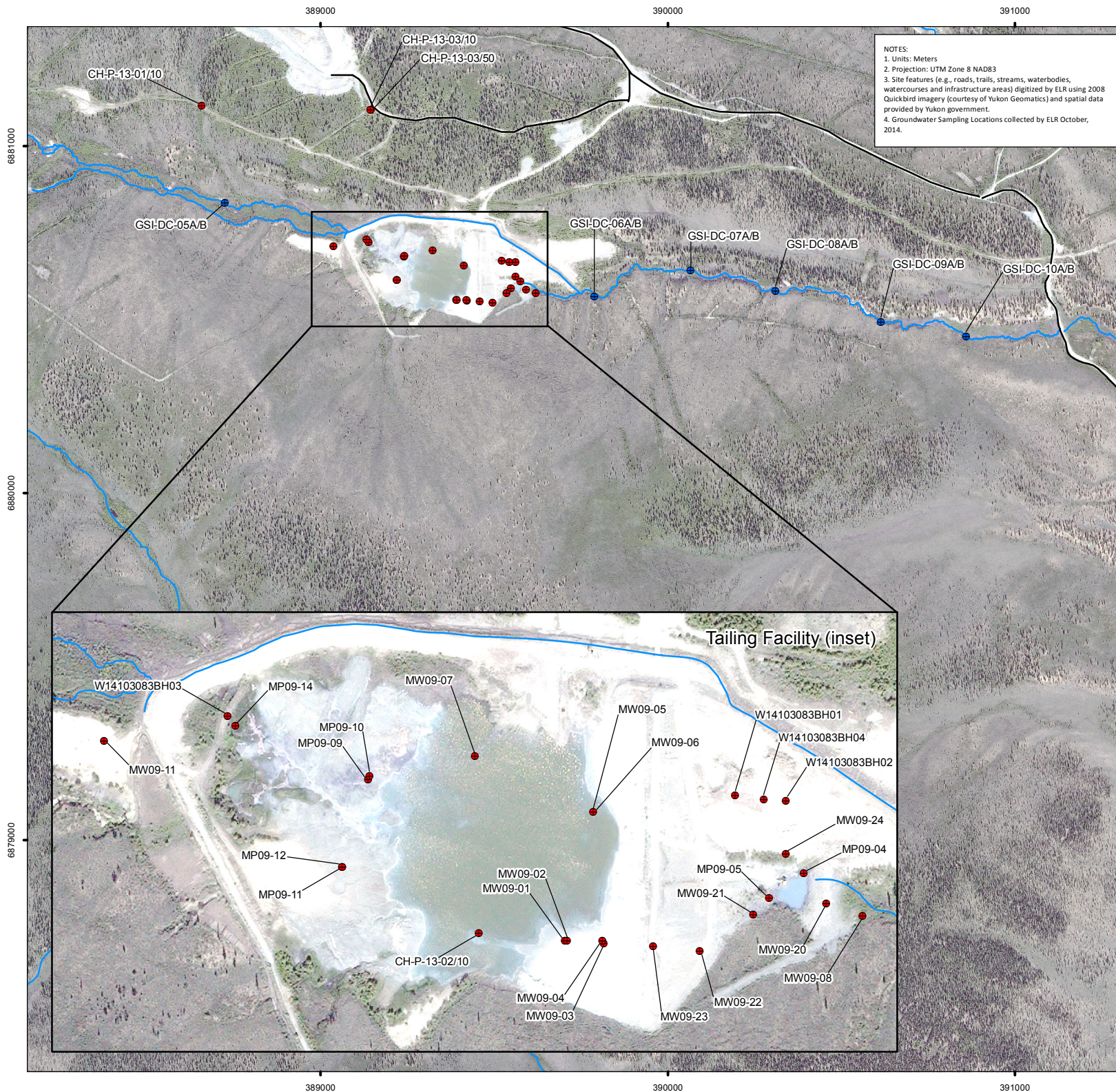
Table 1-1 Summary of Samples Collected at each Well Location

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	✓	-
	GSI-DC-02B	387879	6881129	Direct Sampled	✓	-
	GSI-DC-03B	388107	6881079	Direct Sampled	✓	-
	GSI-DC-05B	388725	6880836	Frozen	-	-
	GSI-DC-06B	389788	6880567	Direct Sampled	✓	-
	GSI-DC-07B	390065	6880641	Good	✓	Duplicate
	GSI-DC-08-B	390311	6880583	Direct Sampled	✓	-
	GSI-DC-09-B	390614	6880494	Good	✓	-
	GSI-DC-10-B	390859	6880447	Good	✓	-
Mill Complex	GSI-HA-01A	387842	6881132	Direct Sampled	✓	-
	GSI-HA-02A	387861	6881135	Direct Sampled	✓	-
	GSI-HA-03A	387878	6881131	Direct Sampled	✓	-
	GSI-HA-04A	387916	65881130	Direct Sampled	✓	-
	GSI-HA-05A	387898	6881125	Direct Sampled	✓	-
	MW09-16	387992	6881094	Good	✓	Field Blank
	MW09-17	388075	6880970	Good	✓	-
	MW09-18	388054	6880986	Good	✓	-
	MW09-19	388051	6881016	Good	✓	Duplicate
Brown McDade Pit	CH-P-13-01/10	388657	6881116	Direct Sampled	✓	-
	CH-P-13-03/10	389145	6881105	Damaged ²	-	-
	CH-P-13-03/50	389143	6881110	Direct Sampled	✓	-
	CH-P-13-04/10	389138	6881472	Good	✓	-
	CH-P-13-04/35	389138	6881472	Blocked ²	-	-
	CH-P-13-05/50	388954	6881466	Good	✓	Duplicate
	GLL07-01	388851	6881783	Frozen	-	-
	GLL07-02	389069	6881703	Direct Sampled	✓	-
	GLL07-03	388959	6881477	Good	✓	-
	MW09-13	389006	6881664	Frozen	-	-
	MW09-14	389008	6881669	Frozen	-	-
	MW09-15	388920	6881727	Frozen	-	-
Pony Creek	GSI-PC-01-B	N/A	N/A	Destroyed	-	-
	GSI-PC-02-B	388907	6881786	Frozen	-	-
	GSI-PC-03-B	389256	6881706	Direct Sampled	✓	-
	GSI-PC-04-B	389586	6881656	Direct Sampled	✓	-
	GSI-PC-05-B	389713	6881661	Direct Sampled	✓	-

Area	Well Name	UTM (Zone 08N)		Status ^{1,2}	Sample Collected	QA/QC Sample Collected
		Easting	Northing			
	MP09-01	N/A	N/A	Destroyed	-	-
	MP09-02	388867	6881816	Good	✓	-
	MP09-03	388956	6881739	Frozen	-	-
	MP09-08	389160	6881718	Frozen	-	-
Seepage Dam	W14103083BH01	389522	6880669	Frozen	-	-
	W14103083BH02	389561	6880665	Direct Sampled	✓	-
	W14103083BH04	389544	6880666	Direct Sampled	✓	-
Tailings Facility	MP09-04	389575	6880609	Good	✓	-
	MP09-05	389548	6880590	Good	✓	Duplicate
	MP09-09	389240	6880681	Good	✓	-
	MP09-10	389241	6880684	Good	✓	-
	MP09-11	389220	6880619	Good	✓	-
	MP09-12	389220	6880619	Good	✓	-
	MP09-14	389138	6880722	Frozen	-	-
	MW09-01	389396	6880563	Damaged ²	-	-
	MW09-02	389393	6880562	Good	✓	-
	MW09-03	389411	6880555	Good	✓	Duplicate/Field Blank
	MW09-04	389420	6880557	Good	✓	-
	MW09-05	389413	6880656	Good	✓	-
	MW09-06	389411	6880653	Good	✓	-
	MW09-07	389322	6880699	Direct Sampled	✓	-
	MW09-08	389620	6880576	Good	✓	-
	MW09-11	389037	6880711	Dry	-	-
	MW09-20	389592	6880586	Dry	-	-
	MW09-21	389536	6880577	Good	✓	-
	MW09-22	389495	6880549	Good	✓	Field Blank
	MW09-23	389459	6880553	Good	✓	-
	MW09-24	389561	6880624	Good	✓	-
	W14103083BH03	389132	6880730	Good	✓	Duplicate
	CH-P-13-02/10	388924	6881014	Dry/Damaged ²	-	-

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

² Further details concerning damaged, degraded, or obstructed wells are provided in Section 3.2.



Mount Nansen Site **October 2014 Groundwater Monitoring Program**



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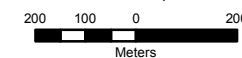
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Groundwater Sample Locations

- Drive Points
- Monitoring Wells
- Watercourses



Scale: 1:15,000



January, 2015

Hemerra Project: 1343-005.05

FIGURE 1-2

Groundwater Sampling Locations
Dome Creek and Tailings Facility

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NOTES:

1. Units: Meters
2. Projection: UTM Zone 8 NAD83
3. Site features (e.g., roads, trails, streams, waterbodies, watercourses and infrastructure areas) digitized by ELR using 2008 Quickbird imagery and spatial data provided (courtesy of Yukon government).
4. Groundwater Sampling Locations collected by Hemmera/ELR October, 2014.

Mount Nansen Site
October 2014 Groundwater Monitoring Program



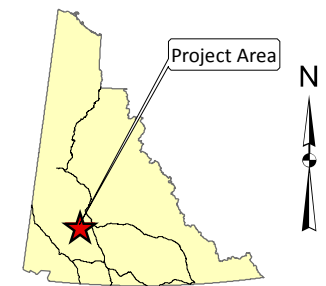
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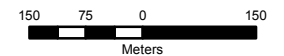
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Groundwater Sampling Locations

- Drive Point
- Monitoring Well
- Watercourses



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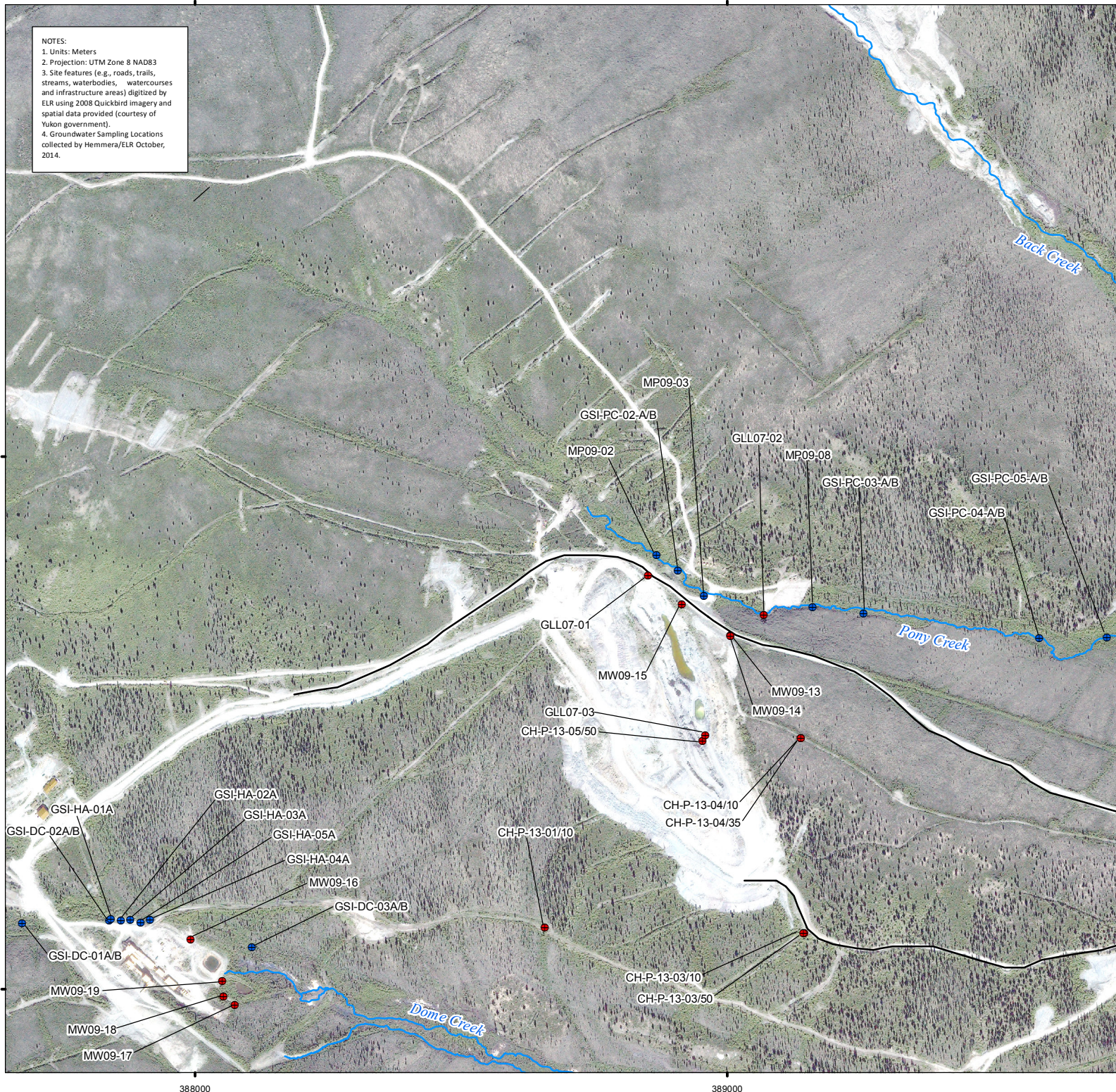


January, 2015

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FIGURE 1-3

Groundwater Sampling Locations
Mill Complex and Brown McDade Pit



2.0 METHODOLOGY

2.1 PROTOCOLS

Groundwater purging, monitoring and sampling conducted by Hemmera/ELR was in accordance with the Groundwater Sampling Standard Operating Procedures included in the document *Scope of Work: Groundwater Sampling Program – Mount Nansen Site 2014*. These procedures were consistent with Environment Yukon's *Protocol for the Contaminated Sites Regulation #7 - Sampling and Decommissioning* (Environment Yukon, March 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 (well), headspace gases were measured prior to any other well measurements. Oxygen (%), carbon dioxide (ppm), and methane (%LEL) were measured using a RAE Systems MultiRAE Four-Gas Monitor with photoionization detector (PID).

The well structure and casing of each well 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 from each well.

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

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

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

Groundwater turbidity measured in Nephelometric Turbidity Units (NTU) was also measured prior to sampling (described below in **Section 2.3**) and was used as an indication of sample quality. Where possible, samples were not collected until turbidity was less than 50 NTU. Purge volumes and purge rates were measured using a graduated container and stop watch. All well measurements, purging details, and additional field notes were recorded on customized field forms in order to minimize the potential for field errors; this information is presented in **Table 3-1**.

Table 2-1 Groundwater Sampling – Field Parameter Purging Criteria

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

2.3 DIRECT SAMPLING

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

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

2.4 FIELD PARAMETERS

Hemmera/ELR measured *in-situ* water quality parameters using YSI Professional Plus field meters, Lamotte 2020e or Hach 2100Q turbidity meters, and Hach DR 850 Portable Colorimeters. Flow-through cells were used with the YSI Professional Plus meters to minimize field parameter variability. The *in-situ* groundwater quality parameters recorded at each sample station included; water temperature (°C), specific conductivity (µS/cm), conductivity (µS/cm), oxidation/reduction potential (ORP; mv), pH (pH units), sulphide (mg/l), dissolved oxygen (mg/l), and turbidity (NTU).

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

2.5 GROUNDWATER SAMPLING

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

In addition to the analytical parameters provided to Hemmera/ELR in the SOW, AAM's consultant requested that filtered and unpreserved dissolved metals samples be collected from six (6) specific stations at the Site. These additional samples were collected to address arsenic quantification questions from previous sampling events. The stations chosen for this additional paired metals analysis are provided in **Table 2-3**.

Table 2-2 Groundwater Sampling – 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
1c ¹	120 ml (plastic)	Dissolved Metals	100 ml	Field Filtered, No Head Space	-
2	1 L (plastic)	General Chemistry	250 ml	-	-
3	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	60 ml	Preserved	NaOH
4	250 ml (glass)	NH ₃	120 ml	Preserved	H ₂ SO ₄
5	120 ml (plastic)	Thiocyanate	100 ml	Preserved	HNO ₃
6	120 ml (plastic)	Sulphide	100 ml	Preserved	Zinc Acetate, capped and mixed, then NaOH
7	250 ml (glass amber)	Total Inorganic Carbon	100 ml	-	-
8 ²	145 ml (plastic)	Cyanide (total, free, weak acid dissociable)	100 ml	Preserved	NaOH

Notes: ¹ Denotes filtered, unpreserved dissolved metals for groundwater locations specified by AAM's consultant (AMEC). Completed for a subset of 6 wells. Sampled with zero headspace.

² Secondary cyanide sample for analysis of free and weak acid dissolved cyanide

Table 2-3 Groundwater Sampling – Sites for Collecting Samples for Paired Metals Analysis

Sample Location	Site Description
MP09-05	tailings dam, downstream toe
MP09-09	tailings facility, interior, west side
MP09-11	tailings facility, interior, west side
MW09-22	tailings dam, downstream toe
GSI-DC-06B	Dome Creek
GSI-DC-10B	Dome Creek

2.6 DATA ANALYSIS

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

2.7 QUALITY ASSURANCE AND QUALITY CONTROL

2.7.1 Field QA/QC

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

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

2.7.2 QA/QC

Analytical QA/QC measures were included in the fall sampling program as outlined in the scope of work and as per standard industry practice. This included the collection field duplicates and field blanks, and the use of travel blanks. Duplicate samples were collected at a ratio of 10% of the regular samples (6 duplicates were collected in relation to 49 samples), and a field blank was collected for each day field sampling was conducted (a total of 4 field blanks were collected). Two travel blanks accompanied the analytical supplies and samples from the lab to the field and back to the lab again (1 for each shipment).

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

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

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

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

3.0 RESULTS

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

3.1 GROUNDWATER SAMPLING SUMMARY

Groundwater sampling was completed between October 7 and 10, 2014. Weather conditions varied throughout the time of sampling with ambient air temperature ranging from -10 to 7°C. Of the 65 wells specified for the October sampling event, 63 were located and assessed during the sampling event and two (2) were found to have been destroyed (MP09-01 / GSI-PC-01-B). 47 wells were sampled; 28 using purging and sample methods as per the program protocols, and 19 sampled directly without purging according to the sample priority ranking. In 13 of the 19 direct sampled wells, volumes were insufficient to collect a full sample set. **Table 3.1** provides a summary of sample success for wells sampled directly without purging.

Of the 16 wells assessed but not sampled during the program, ten (10) wells were frozen, two (2) wells were dry, and four (4) wells were either damaged or had an obstruction in the well. A summary of the condition (status) and sampling result for groundwater wells is provided in **Table 1-1**. A summary of all well measurements, purge details, and *in-situ* parameter results is provided in **Table 3-2**.

Table 3-1 Summary of Samples Collected from Low Producing Wells in October 2014

Well Name	Dissolved Metals	Dissolved Mercury	Dissolved Metals Pair ¹	Physical Parameters	Anions/ Nutrients	Cyanide	Ammonia	Thiocyanate	Sulphide	Total Inorganic Carbon ²	Cyanide
Priority	1a	1b	1c	2	2	3	4	5	6	7	8
GSI-DC-01B	✓	✓	-	✓	-	-	-	-	-	-	-
GSI-DC-02B	✓	✓	-	✓	✓	✓	-	-	-	-	-
GSI-DC-03B	✓	✓	-	✓	✓	✓	✓	✓	✓	✓	✓
GSI-DC-06B	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
GSI-DC-08-B	✓	✓	-	✓	✓	-	-	-	-	-	-
GSI-HA-01A	✓	✓	-	✓	✓	✓	-	-	-	-	-
GSI-HA-02A	✓	✓	-	✓	✓	-	-	-	-	-	-
GSI-HA-03A	✓	✓	-	✓	✓	-	-	-	-	-	-
GSI-HA-04A	✓	✓	-	✓	✓	-	-	-	-	-	-
GSI-HA-05A	✓	✓	-	✓	✓	✓	-	-	-	-	-
CH-P-13-01/10	✓	✓	-	✓	✓	✓	✓	-	-	-	-
CH-P-13-03/50	✓	✓	-	✓	✓	✓	✓	✓	✓	✓	✓
GLL07-02	✓	✓	-	✓	✓	✓	✓	✓	✓	✓	✓
GSI-PC-03-B	✓	✓	-	-	-	-	-	-	-	-	-
GSI-PC-04-B	✓	✓	-	-	-	-	-	-	-	-	-
GSI-PC-05-B	✓	✓	-	-	-	-	-	-	-	-	-
W14103083BH02	✓	✓	-	✓	✓	-	✓	✓	-	-	-
W14103083BH04	✓	✓	-	✓	✓	✓	✓	✓	✓	✓	✓
MW09-07	✓	✓	-	✓	✓	✓	✓	✓	✓	✓	✓

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 Sampling of paired dissolved metals was requested by AAM to assist with arsenic quantification.

Sample locations were chosen by AAM's consultant. Groundwater monitoring wells selected for paired metals analysis are summarized in Table 2-3.

Table 3-2 Groundwater Field Parameters and Well Measurements for 2014 Spring Sampling Program

Area	Location ID	Sample Date	Stick up Height (m)	Depth To Water (m) ¹	Depth to Bottom (m)	Standing Water Volume (L)	Volume Purged (L)	Purge Start Time	Purge End Time	Elapsed Purge Time	Purge Rate (l/min)	Criteria ² (3WV/PS/DS)	Draw Down (m)	pH	Temperature (°C)	Conductivity (µS/cm)	ORP (mV)	Dissolved Oxygen (mg/L)	Dissolved Sulphide (mg/L)	Methane (%LEL)	Oxygen (%)	Carbon Dioxide (ppm)	Field Turbidity (NTU)	Method Used	Well Diameter (inches) ³
Dome Creek	GSI-DC-01A	2014-10-07	0.93	Dry	0.81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	-	-	-	1 DP
	GSI-DC-01B	2014-10-07	0.95	1.42	1.54	-	-	-	-	-	-	DS	-	-	-	-	-	-	-	0	20.9	-	-	Peristaltic	1 DP
	GSI-DC-02A	2014-10-07	0.92	1.65	1.92	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	0	-	-	1 DP
	GSI-DC-02B	2014-10-07	0.88	2.25	4.07	-	-	-	-	-	-	DS	-	-	-	-	-	-	-	0	20.9	-	-	Peristaltic	1 DP
	GSI-DC-03A	2014-10-07	0.91	1.19	1.91	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.2	480	-	-	1 DP
	GSI-DC-03B	2014-10-07	0.91	1.19	3.76	-	-	-	-	-	-	DS	-	-	-	-	-	-	-	0	20.9	700	-	Peristaltic	1 DP
	GSI-DC-05A	2014-10-09	1.04	Frozen	1.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.5	510	-	-	1 DP
	GSI-DC-05B	2014-10-09	0.55	Frozen	2.81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.5	500	-	Peristaltic	1 DP
	GSI-DC-06A	2014-10-10	0.87	0.97	1.91	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	440	-	-	1 DP
	GSI-DC-06B	2014-10-10	0.51	0.63	2.69	-	-	-	-	-	-	DS	-	-	-	-	-	-	-	2	20.9	700	51.40	Peristaltic	1 DP
	GSI-DC-07A	2014-10-10	0.94	1.26	1.91	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	480	-	-	1 DP
	GSI-DC-07B	2014-10-10	0.93	1.27	3.71	1.13	6	11:15	11:45	0:30	0.20	3WV	0.357	6.90	1.07	579	-3.1	1.38	0.04	0	20.9	460	4.48	Peristaltic	1 DP
	GSI-DC-08-A	2014-10-10	0.91	1.20	1.85	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.5	460	-	-	1/2 DP
	GSI-DC-08-B	2014-10-10	0.27	0.66	2.78	0.25	0.35 (used as sample)	10:31	10:40	0:09	-	DS	-	-	-	-	-	-	0.80	0	20.5	480	1078 AU	Peristaltic	1/2 DP
	GSI-DC-09A	2014-10-10	0.91	1.16	2.00	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.5	430	-	-	1/2 DP
	GSI-DC-09-B	2014-10-10	0.93	1.19	3.86	0.3	2.1	11:26	11:41	0:15	0.14	3WV	0.260	6.01	1.9	94	61.4	0.49	0.05	0	20.5	480	2.56	Peristaltic	1/2 DP
	GSI-DC-10A	2014-10-10	1.04	Frozen	1.81	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.5	430	-	-	1/2 DP
	GSI-DC-10-B	2014-10-10	1.03	1.00	3.76	0.1	2	12:30	12:45	0:15	0.13	3WV	- ³	6.15	1.9	234	41.4	0.66	0.06	0	20.5	410	4.76	Peristaltic	1/2 DP
Mill Complex	GSI-HA-01A	2014-10-07	1.22	2.27	3.03	-	-	-	-	-	-	DS	-	-	-	-	-	-	-	0	20.9	0	-	Peristaltic	1 DP
	GSI-HA-02A	2014-10-07	1.49	1.98	3.02	-	-	-	-	-	-	DS	-	-	-	-	-	-	-	0	20.9	0	-	Peristaltic	1 DP
	GSI-HA-03A	2014-10-07	0.93	1.01	2.10	-	-	-	-	-	-	DS	-	-	-	-	-	-	-	0	20.9	0	-		1 DP
	GSI-HA-04A	2014-10-07	0.59	1.12	2.10	-	-	-	-	-	-	DS	-	-	-	-	-	-	-	0	20.6	0	-	Peristaltic	1 DP
	GSI-HA-05A	2014-10-07	0.96	1.17	2.10	-	-	-	-	-	-	DS	-	-	-	-	-	-	-	0	20.9	0	-	Peristaltic	1 DP
	MW09-16	2014-10-07	1.22	1.67	2.61	2	10	11:53	12:26	0:33	0.30	3WV	0.009	6.55	2.51	2154	55.5	5.38	0.01	0	20.6	0	1.22	Peristaltic	2
	MW09-17	2014-10-07	0.97	5.12	5.90	2	8.5	16:28	16:29	0:01	0.27	3WV	0.000	6.70	0.06	2914	98.2	2.14	0.02	0	20.9	0	0.43	Peristaltic	2
	MW09-18 ⁴	2014-10-07	0.9	4.57	7.69	6	14	16:48	17:33	0:45	0.31	PS	-	6.73	-0.21	2847	106.8	1.31	0.02	0	20.9	660	0.33	Peristaltic	2
	MW09-19	2014-10-07	0.99	2.53	5.87	7	18	9:57	10:58	1:00	0.30	PS	1.368	6.44	1.15	2290	-31.2	2.78	0.15	0	20.6	0	1.92	Peristaltic	2
Brown McDade	CH-P-13-01/10 ⁴	2014-10-10	0.5	2.71	6.63	4.88	3	9:08	9:31	0:23	0.13	DS	-	6.82	0.17	856	189.4	11.49	0.04	0	20.6	480	17.40	Peristaltic	1 1/2
	CH-P-13-03/10	2014-10-07	0.68	Blocked	5.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.6	2440	-	-	2

Area	Location ID	Sample Date	Stick up Height (m)	Depth To Water (m) ¹	Depth to Bottom (m)	Standing Water Volume (L)	Volume Purged (L)	Purge Start Time	Purge End Time	Elapsed Purge Time	Purge Rate (l/min)	Criteria ² (3WV/PS/DS)	Draw Down (m)	pH	Temperature (°C)	Conductivity (µS/cm)	ORP (mV)	Dissolved Oxygen (mg/L)	Dissolved Sulphide (mg/L)	Methane (%LEL)	Oxygen (%)	Carbon Dioxide (ppm)	Field Turbidity (NTU)	Method Used	Well Diameter (inches) ⁹
Pit	CH-P-13-03/50	2014-10-09	0.60	48.50	50.76		-	-	-			DS		-	-	-	-	-	-	0	20.9	606	1656 AU	Waterra	1
	CH-P-13-04/10	2014-10-10	0.63	3.05	6.32	6.54	2.05	16:37	16:52	0:15	0.14	PS	2.680	6.82	0.00	80	42.9	3.91	0.09	0	20.9	580	13.80	Peristaltic	1 3/4
	CH-P-13-04/35	2014-10-07	0.60	Blocked	6.51	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	550	-	-	1
	CH-P-13-05/50	2014-10-07	0.78	22.60	50.47	30.5	90	13:46	14:43	0:57	1.58	3WV	1.480	5.82	0.40	356	98.2	1.42	0.05	0	20.9	440	7.37	Hydrolift	1
	GLL07-01	2014-10-07	0.75	Frozen	13.89	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	15.3	█	-	-	2
	GLL07-02	2014-10-08	1.37	8.31	7.20	5	-	-	-	-	-	DS	-	-	-	-	-	-	0.13	0	20.7	460	31.50	Bailer	6
	GLL07-03	2014-10-07	1.15	5.04	11.75	13.5	45	11:28	12:25	0:57	0.79	3WV	4.205	6.01	1.20	159	99.9	2.32	0.19	0	20.9	460	24.00	5/8" Waterra, manual	2
	MW09-13	2014-10-07	0.75	Frozen	9.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	960	-	-	2
	MW09-14	2014-10-07	0.73	Frozen	6.94	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
	MW09-15	2014-10-07	0.85	Frozen	14.04	-	-	-	-			-		-	-	-	-	-	-	0	20.9	560	-	-	2
Pony Creek	GSI-PC-01-A	-	-	Destroyed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	GSI-PC-01-B	-	-	Destroyed	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	GSI-PC-02-A	2014-10-07	0.83	Frozen	0.26	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	430	-	-	1
	GSI-PC-02-B	2014-10-07	0.85	Frozen	0.27	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	20.9	530	-	-	1
	GSI-PC-03-A	2014-10-08	0.88	Frozen	2.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	490	-	-	1/2 DP
	GSI-PC-03-B	2014-10-08	0.90	1.60	2.64	-	-	-	-	-	-	DS	-	-	-	-	-	-	0.37	0	20.9	550	69.50	Micro Waterra	1/2 DP
	GSI-PC-04-A	2014-10-08	0.89	0.39	2.01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	430	-	-	1/2 DP
	GSI-PC-04-B	2014-10-08	0.92	1.28	2.59	-	-	-	-	-	-	DS	-	-	-	-	-	-	0.43	0	20.9	460	53.30	Micro Waterra	1/2 DP
	GSI-PC-05-A	2014-10-08	0.92	1.51	2.10	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.6	440	-	-	1/2 DP
	GSI-PC-05-B	2014-10-08	0.91	1.85	3.75	-	-	-	-	-	-	DS	-	-	-	-	-	-	0.80	0	20.6	630	2084 AU	Micro Waterra	1/2 DP
	MP09-01	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	MP09-02 ⁵	2014-10-08	1.36	1.62	1.97	<0.65	6	9:55	10:01	0:06	1.0	3WV	-	-	-	-	-	-	0.03	0	20.9	490	6.04	Peristaltic	1/2 DP
	MP09-03	2014-10-07	0.82	Frozen	1.62	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	430	-	-	1/2 DP
	MP09-08	2014-10-08	1.50	0.88	1.54	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	440	-	-	1/2 DP
Seepage Dam	W14103083BH01	2014-10-09	0.64	Frozen	6.65	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
	W14103083BH02 ⁵	2014-10-09	0.80	6.17	6.81	1.28	-	-	-	-	-	DS	-	-	-	-	-	-	-	-	-	-	-	Peristaltic	2
	W14103083BH04 ^{5,6}	2014-10-09	0.80	6.23	6.59	0.73	-	-	-	-	-	DS	-	-	-	-	-	-	-	-	-	-	-	Peristaltic	2
Tailings Facility	MP09-04	2014-10-09	1.20	1.96	3.07	2.25	6.5	13:29	13:56	0:17	0.38	PS	0.130	7.15	0.10	159	37.4	3.65	0.04	0	20.9	460	6.41	Peristaltic	1 1/2
	MP09-05	2014-10-09	1.20	1.40	1.82	0.45	3	11:16	11:34	0:18	0.17	3WV	0.070	6.68	1.00	356	-61.5	0.66	0.03	0	20.5	410	3.98	Peristaltic	1 1/2

Area	Location ID	Sample Date	Stick up Height (m)	Depth To Water (m) ¹	Depth to Bottom (m)	Standing Water Volume (L)	Volume Purged (L)	Purge Start Time	Purge End Time	Elapsed Purge Time	Purge Rate (l/min)	Criteria ² (3WV/PS/DS)	Draw Down (m)	pH	Temperature (°C)	Conductivity (µS/cm)	ORP (mV)	Dissolved Oxygen (mg/L)	Dissolved Sulphide (mg/L)	Methane (%LEL)	Oxygen (%)	Carbon Dioxide (ppm)	Field Turbidity (NTU)	Method Used	Well Diameter (inches) ⁹
	MP09-09 ⁶	2014-10-10	2.24	2.68	5.54	2.86	2.5	8:20	8:35	0:15	0.17	PS	2.868	8.90	2.81	546	771.0	4.08	0.53	-	-	-	179.00	Peristaltic	1 1/4
	MP09-10 ⁶	2014-10-10	1.98	2.50	4.27	1.77	1.5	8:40	8:55	0:15	0.10	PS	1.768	8.86	2.97	290	85.6	7.04	0.80	-	-	-	Over range for instrument	Peristaltic	1 1/4
	MP09-11 ⁶	2014-10-09	1.74	1.54	4.86	5.88	6	14:25	15:52	0:27	0.22	PS	3.158	7.17	1.75	9	-20.2	2.69	0.14	-	-	-	54.1	Peristaltic	1 1/4
	MP09-12 ⁶	2014-10-09	1.70	1.68	4.18	4.5	5	13:52	14:09	0:17	0.29	PS	2.282	6.99	2.33	642	27.8	5.30	0.40	-	-	-	141.00	Peristaltic	1 1/4
	MP09-14	2014-10-09	1.07	0.46	1.97	-	-	-	-	-	-	-		-	-	-	-	-	-	-	-	-	-	-	1/2 DP
	MW09-01 ⁷	2014-10-08	0.82	5.01	8.53	-	-	-	-	-	-	-		-	-	-	-	-	-	0	20.9	430	-	Peristaltic	1 1/2
	MW09-02	2014-10-08	0.75	2.40	4.82	5	9.5	9:10	10:14	1:04	0.15	PS	0.921	6.97	2.44	3194	-47.8	1.34	0.02	0	20.9	560	1.97	Peristaltic	2
	MW09-03	2014-10-0	0.37	4.31	9.83	12	25	12:55	13:55	1:00	0.42	PS	0.463	6.99	1.37	2681	20.3	0.92	0.04	0	20.9	430	0.75	Peristaltic	2
	MW09-04	2014-10-08	0.50	2.87	6.36	8	15	11:31	12:37	1:06	0.23	PS	1.734	8.38	2.80	2870	19.2	0.99	0.01	0	20.9	440	1.23	Peristaltic	2
	MW09-05	2014-10-08	0.81	5.95	7.47	3	7.5	16:03	17:00	0:57	0.13	PS	0.646	6.12	3.07	1907	72.2	0.99	0.02	0	20.9	550	7.68	Peristaltic	2
Tailings Facility	MW09-06	2014-10-08	1.65	2.63	5.94	7	15.5	17:18	18:24	1:06	0.23	PS	0.268	7.40	4.96	1819	61.2	0.84	0.02	0	20.9	460	4.05	Peristaltic	2
	MW09-07	2014-10-10	1.35	2.61	3.40	1.6	-	-	-			DS		-	-	-	-	-	0.52	0	20.9	490	35.8	Peristaltic	2
	MW09-08	2014-10-09	1.08	1.12	3.91	5.62	17.5	15:18	15:55	0:37	0.47	3WV	0.160	6.56	3.00	59	-72.3	0.35	0.11	0	20.9	430	6.22	Peristaltic	2
	MW09-11	2014-10-08	0.82	Dry	4.91	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.4	860	-	Bailer	2
	MW09-20	2014-10-09	0.91	Dry	3.71	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	600	-	Unknown	2
	MW09-21	2014-10-09	0.72	1.71	3.25	4	11.5	10:07	10:40	0:33	0.35	PS	0.300	6.61	0.90	349	-64.0	0.90	0.06	0	20.5	550	10.40	Peristaltic	2
	MW09-22	2014-10-08	0.88	3.45	5.16	12	10	14:28	15:21	0:43	0.23	PS	0.573	6.06	2.00	1600	21.7	1.51	0.06	0	20.9	460	8.40	Peristaltic	2
	MW09-23	2014-10-08	0.10	11.09	15.82	11	35	8:09	8:44	0:45	0.78	3WV	0.247	6.54	0.11	2592	13.8	2.37	0.16	0	20.9	480	102.00	Hydrolift	2
	MW09-24	2014-10-09	0.68	9.30	11.17	4	15	8:23	9:07	0:44	0.34	3WV	0.070	7.19	0.40	188	62.8	8.60	0.09	0	20.9	1180	18.20	Purged with 5/8" watterra, sampled with bailer	2
	W14103083BH03	2014-10-08	0.76	1.70	5.38	7.5	24	17:36	18.24	0:48	0.50	3WV	0.070	6.35	1.50	185	-76.2	1.17	3:50	0	20.9	480	13.20	Peristaltic	2
	CH-P-13-02/10 ⁸	2014-10-09	NR	8.11	8.17	0.09	-	-	-	-	-	-	-	-	-	-	-	-	-	0	20.9	1030	-	-	1 1/2

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

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

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

³ Drawdown could not be measured due to well diameter. Water level meter could not be placed in well during purging process.

⁴ Field parameters were not collected at sample site MP09-02. During the purging process freezing was occurring in the tubing causing the well to go dry. Samples were collected following purging of three well volumes.

⁵ DTB of W14103083BH02 and W14103083BH04 were found to be above previous measurements. Variation in DTB measurements is thought to be the result of ice accumulation in the bottom of the well. Samples were therefore collected from above an ice blockage.

⁶ Head space gases were not measured at these sites. Issues with the photoionization detector prevented in-situ data collection.

⁷ Sample location MW09-01 could not be sampled due to an excessive quantity of tailings present in the groundwater. Presence of tailing may indicate the well screen has been damaged or compromised.

⁸ Although sample site CH-P-13-02/10 was recorded as a dry well, ~90ml of standing water was measured. This volume was determined to be insufficient for sampling. Bentonite was also present at the bottom of the well.

⁹ DP refers to Drive Point

3.2 ANALYTICAL RESULTS

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

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

3.2.1 Dome Creek

Groundwater along Dome Creek was sampled between October 7 and October 10, 2014. Samples were obtained from eight (8) of the nine (9) drive-point piezometers located within this area identified for the sampling program. Sample site GSI-DC-05B was frozen during the time of sampling. Sample sites GSI-DC-01B, GSI-DC-02B, GSI-DC-03B, GSI-DC-06B, and GSI-DC-08-B were sampled directly without purging. A summary of the samples collected for direct sampled wells is provided in **Table 3-1**.

Field pH measurements were less than the CCME FAL guideline at two (2) sample locations (GSI-DC-09B and GSI-DC-10B). Field dissolved oxygen concentrations were also less than the CCME FAL guideline at three (3) sample locations (GSI-DC-09B, GSI-DC-10B, and GSI-DC-07B). Concentrations of dissolved aluminum, arsenic, cadmium, chromium, copper, iron, nickel, selenium, and zinc exceeded the CCME FAL guidelines at one or more sample location in the Dome Creek area (**Table A**). Concentrations of fluoride and ammonia also exceeded the CCME FAL guidelines in various sample locations.

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.

Groundwater turbidity in GSI-DC-08-B was extremely high during the time of sample collection (1078 AU) and could have influenced analytical results. Groundwater turbidity in GSI-DC-06B was measured at 51.4 NTU, which is considered slightly greater than optimal. Where measured, the turbidity of all other samples collected within the Dome Creek area was less than 50 NTU (**Table 3-2**).

3.2.2 Mill Complex

Groundwater in the Mill Complex Area was sampled on October 7, 2014. Samples were obtained all nine (9) of the wells identified in this area. Drive-points GSI-HA-01A, GSI-HA-02A, GSI-HA-03A, GSI-HA-04A, and GSI-HA-05A were sampled directly without purging. A summary of the samples collected for direct sampled wells is provided in **Table 3-1**.

Field pH measurements were less than the CCME FAL guideline at sample site MW09-19. Field dissolved oxygen concentrations were also less than the CCME FAL guideline at four (4) sample locations (MW09-16, MW09-17, MW09-18, and MW09-19). Concentrations of dissolved aluminum, arsenic, cadmium, chromium, copper, iron and zinc exceeded the CCME FAL guidelines at one or more sample location in Mill Complex area. Concentrations of fluoride also exceeded the CCME FAL guidelines in various sample locations.

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

Where measured, groundwater turbidity of all samples collected within this area was less than 50 NTU (**Table 3-1**).

3.2.3 Brown McDade Pit

Groundwater wells in the Brown McDade Pit area were sampled between October 7 and October 10, 2014. Samples were obtained from six (6) of the 12 sample sites located within this area. Four (4) wells were frozen during the time of sampling (MW09-13, MW09-14, MW09-15, and GLL07-01), and two (2) wells had an obstruction that prevented sampling (CH-P-13-03/10, and CH-P-13-04/35). Drive-points CH-P-13-01/10, CH-P-13-03/50, and GLL07-02 were sampled directly without purging. A summary of the samples collected for direct sampled wells is provided in **Table 3-1**.

Field pH measurements were less than the CCME FAL guideline at two (2) sample locations (CH-P-13-05/50 and GLL07-03). Field dissolved oxygen concentrations were also less than the CCME FAL guideline at three (3) sample locations (CH-P-13-04/10, CH-P-13-05/50, and GLL07-03). Concentrations of dissolved aluminum, arsenic, cadmium, chromium, copper, iron, selenium, and zinc exceeded the CCME FAL guidelines at one or more sample location in Brown McDade Pit area.

CH-P-13-03/10 was damaged at the top coupler of the PVC pipe, the field crew was able to successfully repair the well. The well casing material (sand) was missing and presumed to have fallen into the well, as indicated by the DTB measurement of 5.2 m which was less than that previously documented DTB (10 m) during the spring sampling event. Re-developing the well and removing the sand was not possible using a hydrolift due to an absence of groundwater, hence this well is still considered to be damaged.

CH-P-13-04/35 was blockage at 6.505 m below the surface. Based on the sound and feel of vibration on the water level meter, it appeared to the crew as though it may have been obstructed by a bailer, but this could not be confirmed. Based on a review of available well logs, Hemmera/ELR also believe that the obstruction could be an existing piezometer installation. There is a partial record of a piezometer having been installed at 35 m, however no cables extend to the well surface. Therefore, it is possible that wires or cables have fallen into the well and have developed the blockage at the current point of refusal for sampling equipment. In order to verify the type of blockage and a potential solution, it may be necessary to employ a well inspection camera during a future monitoring event. During the October 2014 monitoring event, an additional bailer was used to verify no water was present in the well above the blockage.

Sample site GLL07-02 had no markings or identification on the well casing. This sample site consisted of a large (15.5 cm) metal pipe/stick-up protector with no PVC or internal well casing (refer to Photo).

Wells CH-P-13-05/50 and GLL07-03 were not properly sealed (no PVC caps or J-plugs were observed during initial inspection).

Groundwater turbidity in CH-P-13-03/50 was extremely high during the time of sample collection (1656 AU) which could have influenced analytical results. The turbidity of GLL07-03 was within an acceptable range during the start of sample collection but became extremely cloudy during the collection of the general chemistry samples. Where measured, the turbidity of all other samples collected within the Brown McDade Pit area was less than 50 NTU (**Table 3-2**).

Based on observations during the fall sampling event, Hemmera/ELR noted that groundwater well CH-P-13-01/10 may be influenced by discontinuous permafrost (i.e., the well was frozen during the spring event and had very limited recharge during the fall event despite having a moderate standing water volume of 4.88 L). Based on this observation, the groundwater sample collected during the October 2014 sampling event may represent the water quality of the permafrost active layer. These observations are described further in **Appendix D**.

3.2.4 Pony Creek

Groundwater wells along Pony Creek were sampled on October 8, 2014. Samples were obtained from four (4) of the nine (9) sample sites in this area during the sampling event. Three (3) wells were frozen during the time of sampling (GSI-PC-02-B, MP09-03, and MP09-08), and two (2) wells had been destroyed by placer mining operations (MP09-01 and GSI-PC-01-B). Drive-points GSI-PC-03-B, GSI-PC-04-B, and GSI-PC-05-B were sampled directly without purging. A summary of the samples collected for direct sampled wells is provided in **Table 3-1**.

Concentrations of dissolved aluminum, arsenic, chromium, copper, iron, and zinc exceeded the CCME FAL guidelines at one or more sample location in this area.

Field parameters were not collected at sample site MP09-02 due to freezing in the sample tubing. Samples were collected following purging of three well volumes.

Groundwater turbidity in GSI-PC-05-B was extremely high during the time of sample collection (2084 AU) which could have influenced analytical results. The turbidity of GSI-PC-03-B and GSI-PC-04-B was also outside an acceptable range during the sample collection (69.5 NTU and 53.3 NTU). Where measured, the turbidity of all other samples collected within this area was less than 50 NTU (**Table 3-1**).

3.2.5 Seepage Dam

Groundwater wells in the Seepage Dam area were sampled between October 8 and October 9, 2014. Samples were obtained from two (2) of the three (3) sample sites in this area during the sampling event. Well W14103083BH01 was frozen during the time of sampling. Sample sites W14103083BH02 and W14103083BH04 were sampled directly without purging. A summary of the samples collected for direct sampled wells is provided in **Table 3-1**.

Concentrations of dissolved cadmium and selenium exceeded the CCME FAL guidelines at one or more sample location in this area. Concentrations of fluoride also exceeded the CCME FAL guidelines in various sample locations.

Based on observations during the fall sampling event, Hemmera/ELR noted that groundwater wells W14103083BH02 and W14103083BH04 may be influenced by discontinuous permafrost. These wells were frozen during the spring event and had very limited recharge during the fall event despite the presence of standing water. Further, the depth to bottom of these wells was reduced from previous measurements (spring; 7.920 m and 6.730 m respectively, fall; 6.806 m and 6.590 m respectively). This reduction could be the result of ice accumulation in the bottom of the well. Based on these observations, the groundwater samples collected during the October 2014 sampling event may represent the water quality of the permafrost active layer. These observations are described further in **Appendix D**.

Head space gases were not measured from sample site W14103083BH04. Issues with the photoionization detector prevented in-situ data collection at this site.

3.2.6 Tailings Facility

Groundwater wells in the Tailings Facility area were sampled between October 8 and October 10, 2014. Samples were obtained from 18 of the 23 sample sites located in this area.

Two (2) wells were dry during the time of sampling (MW09-11 and MW09-20), one (1) was frozen (MP09-14), and two (2) wells were damaged and could not be sampled (MW09-01 and CHP-13-02/10). Sample site MW09-07 was sampled directly without purging. A summary of the samples collected for direct sampled wells is provided in **Table 3-1**.

Concentrations of dissolved aluminum, arsenic, cadmium, chromium, copper, iron, mercury, selenium, silver and zinc exceeded the CCME FAL guidelines at one or more sample location in this area. Groundwater pH in the tailings facility area was also outside of CCME FAL guidelines at sample sites MW09-05, MW09-22, and W14103083BH03. Field dissolved oxygen concentrations were less than the CCME FAL guideline at all sample sites located within this area. Concentrations of fluoride, ammonia, nitrite, and free cyanide also exceeded the CCME FAL guidelines in at least one sample station.

Wells MP09-09, MP09-10, MP09-12, and MW09-07 had vents installed on the side of the PVC well, which could have influenced in-situ gas measurements. Head space gases were not measured from sample sites MP09-09 and MP09-10. Issues with the field meter prevented in-situ data collection at these sites.

Sample locations MP09-12 and MW09-08 were initially frozen when monitored. Hemmera/ELR used boiled laboratory deionized water to thaw the well before purging.

Sample location MW09-01 could not be sampled due to an excessive quantity of tailings present in the groundwater. There had previously been a blockage at this well (June 2014) which was not encountered during the October sampling event; it is possible that this had been remnant ice. The designation of MW09-01 as a damaged well during the October event was due to the presence of tailings, which may indicate that the well screen has been damaged or compromised.

ELR/Hemmera field staff noted that the well casing of sample site MW09-08 is elevated above the metal stickup protector and therefore is not properly sealed.

Although sample site CH-P-13-02/10 was recorded as a dry well, ~90 ml of standing water was measured. This volume was determined to be insufficient for sampling. This well was considered to be damaged due to the presence of bentonite at the bottom of the well. CH-P-13-02/10 was treated as dry well and therefore not sampled. It may be possible to re-develop this well during a future monitoring event if sufficient water is present.

Groundwater turbidity of samples collected from MP09-09, MP09-11, and MP09-12 were greater than the target limit of 50 NTU for sampling (179, 54.1, and 141 NTU), indicating that suspended solids could potentially affect the sample quality. Field turbidity was also extremely high in MP09-10, measuring 'out of range' on the field turbidity meter (>4000 NTU). Where measured, turbidity of all other samples collected within this area was less than 50 NTU (**Table 3-2**).

3.3 QUALITY ASSURANCE AND QUALITY CONTROL RESULTS

Six (6) duplicate groundwater samples were collected during the fall sampling event. Two (2) travel blanks were provided by the laboratory and accompanied the samples throughout the sampling program.

One (1) field blank was prepared on site for each day of sampling (4 field blanks in total). Detailed results of QA/QC sampling are provided in **Table B**, including RPD values for all duplicate and sample pairs collected.

3.3.1 Field and Travel Blanks

The majority of field blank and travel blank analytical results were reported as less than the MDL, indicating minimal evidence of contamination during the sampling or transportation process. A detectable concentration of dissolved aluminum (0.0015 mg/l) was recorded in Field Blank 1 which was sampled on October 7, 2014. A detectable concentration of dissolved copper (0.00027 mg/l) was recorded in Field Blank 3 which was sampled on October 9, 2014. No detectable concentrations of any parameter were recorded in Field Blanks 2 or 4.

A detectable concentration of ammonia was recorded in Trip Blank 1 (0.0093 mg/L).

3.3.2 Field Duplicates

3.3.2.1 CH-P-13-05/50 and DUP-1

Field blank and travel blank analytical results were reported less than detection limits for all analysed parameters, indicating that there was no evidence of contamination during the sampling, transportation, or laboratory analysis process.

3.3.2.2 MW09-19 and DUP-2

Field blank and travel blank analytical results were reported less than detection limits for all analysed parameters, indicating that there was no evidence of contamination during the sampling, transportation, or laboratory analysis process.

3.3.2.3 W14103083BH03 and DUP-3

Field blank and travel blank analytical results were reported less than detection limits for all analysed parameters, indicating that there was no evidence of contamination during the sampling, transportation, or laboratory analysis process.

3.3.2.4 MW09-03 and DUP-4

Field blank and travel blank analytical results were reported less than detection limits for all analysed parameters, indicating that there was no evidence of contamination during the sampling, transportation, or laboratory analysis process.

3.3.2.5 MP09-05 and DUP-5

The RDP values for sulphate, total cyanide, and total organic carbon between MP09-05 and DUP-5 (25.8%, 22.9%, and 63.3%, respectively) exceeded the desired limit which could suggest a potential error affecting data precision. All other RDP values were within an acceptable range of variability (less than 20%). As the RDP values of sulphate and total cyanide only marginally exceed the recommended 20% threshold, the results are still considered to be satisfactory. As the RDP value for total organic carbon greatly exceeds the acceptable limit, Hemmera/ELR believe that this result may not be representative.

Based on a review of the available data, no definitive reason for these variances is apparent. Only three RDP exceedences were observed amongst all parameters, and from three separate sample bottles in the field. A review of the field data suggests proper purging (stable parameters, over 6 well volumes purged).

3.3.2.6 GS1-DC-07B and DUP-6

Field blank and travel blank analytical results were reported less than detection limits for all analysed parameters, indicating that there was no evidence of contamination during the sampling, transportation, or laboratory analysis process.

3.3.3 Quality Assurance and Quality Control Summary

Results for the QAQC analytical program show minimal evidence of contamination during the sampling, transportation, and laboratory testing process. Overall, across six collected field duplicates, elevated variation between test and duplicate samples was only elevated in one sample, and for only three isolated parameters (sulfate, total organic carbon, and total cyanide). Similarly, among four field blanks collected in the program only two individual parameter detections occurred (aluminum and copper). Finally, one single ammonia detection occurred among two travel blanks. Overall, these results are considered to represent a sound QA/QC program with no indications of contamination during field collection, transportation, or laboratory process.

4.0 RECOMMENDATIONS

Hemmera/ELR has prepared the following recommendations based on the observations and results of the fall 2014 groundwater sampling program.

1. All groundwater wells should be properly sealed with PVC caps or J-plugs. Wells without caps have risk of becoming contaminated which may affect data precision or quality. Wells at risk of contamination include the following; MP09-10, W14103083BH04, GSI-PC-02-A, and GLL07-02.

2. Damaged or degraded wells should be repaired. This includes wells where an obstruction is restricting ability to sample the well and those that need to be re-developed. Damaged or degraded wells include the following; CH-P-13-03/10, CH-P-13-04/35, MW09-01 and CH-P-13-02/10.

The casing of well CH-P-13-03/10 was repaired during the spring sampling event, but missing casing material (sand) has presumably fallen into the well, as indicated by the DTB measurement of 5.2 m which was less than that previously documented DTB (10 m) during the spring sampling event. Re-developing the well and removing the sand was not possible using a hydrolift due to an absence of groundwater. Removal of nearly 5m column of sand/sediment that extends over the water table may be challenging. A potential way to clear out the sand includes filling the well with water and simultaneously air-lifting the water (with an air compressor). Depending on the well's hydraulic conductivity large volumes of water may be required. For example, if the well accepts large volumes of water without significant pooling inside the well, an air-lift redevelopment method may be effective. An alternative approach would include using a hydrovac with skinny tubing (1.5") to vacuum the sand/sediment out of the well.

CH-P-13-04/35 had blockage at 6.505 m below the surface. As mentioned earlier, this blockage could potentially be equipment associated with a previous piezometer installation. A deployable camera would be recommended to be used during future monitoring events to further investigate the blockage.

MW09-01 could not be sampled due to an excessive quantity of tailings present in the groundwater. This presence of tailing may indicate the well screen has been damaged or compromised. If this is the case, not much can be done to repair this well other than having it reinstalled.

CH-P-13-02/10 had only 90 ml of standing water present in the well. This volume was determined to be insufficient for sampling. Bentonite was also present at the bottom of the well. CH-P-13-02/10 was treated as dry well and therefore not sampled. Again, this well should be redeveloped in a future program but requires a larger quantity of standing water to complete the task. A similar redevelopment method as described for CH-P-13-04/35 could be employed.

3. Many of the drive-point piezometers included in the fall sampling event did not produce sufficient volumes necessary for complete sample collection. Issues with ice build-up were also observed at the drive-point sample locations. These sites should be re-developed and potentially re-installed if purge volumes do not improve. Alternatively, drive-point sites could be sampled earlier in the season (potentially late August/early September) in order to ensure drive-points are free of ice.
4. Monitoring wells should be fitted for the measurement of in-situ headspace vapour. This would include installing PVC caps or J-plugs on each well, and addressing vents currently installed on the side of some of the PVC wells.
5. To avoid inclusion of acid or alkaline-generating solids that are not representative of an equilibrium condition with groundwater, it is recommended that samples for analysis of acidity, alkalinity, and hardness be field-filtered.
6. To avoid degassing of carbon dioxide, precipitation of calcium carbonate in sample bottles, and exclusion of the representative precipitate component from analysis, it is recommended that samples for analysis of alkalinity be collected in a separate bottle with zero headspace and that the laboratory be instructed to analyze the contents of the entire bottle.

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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7.0 STATEMENT OF LIMITATIONS

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

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

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

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

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

TABLES

Table A
Groundwater Sampling Analytical Results and CCME Guideline Exceedances for 2014 Spring Sampling Program

		Site Location :	Dome Creek										
		Sample Location:	GSI-DC-01B	GSI-DC-02B	GSI-DC-03B	GSI-DC-05B	GSI-DC-06B		GSI-DC-07B	GSI-DC-08B	GSI-DC-09B	GSI-DC-10B	
		Sample ID:	GSI-DC-01B	GSI-DC-02B	GSI-DC-03B		GSI-DC-06B	GSI-DC-06B METALS TEST	GSI-DC-07B	GSI-DC-08B	GSI-DC-09B	GSI-DC-10B	GSI-DC-10B METALS TEST
		Date Sampled:	07/10/2014	07/10/2014	07/10/2014	09/10/2014	10/10/2014		10/10/2014	10/10/2014	10/10/2014	10/10/2014	
		Job Number	L1531123	L1531123	L1531123		L1531711	L1531711	L1531711	L1531711	L1531711	L1531711	L1531711
		Well Status:	Direct Sampled	Direct Sampled	Direct Sampled	Frozen	Direct Sampled	Direct Sampled	Sampled	Direct Sampled	Sampled	Sampled	Sampled
Parameter	Units	CCME FAL ^{3,4}											
Field Parameters													
Dissolved Oxygen	%	-	20.9	20.9	20.9	-	20.9	-	20.9	20.5	20.5	20.5	-
Dissolved Oxygen	mg/L	9.5 ⁶	-	-	-	-	-	-	1.38	-	0.49	0.66	-
Temperature	°C	-	-	-	-	-	-	-	1.07	-	1.9	1.9	-
pH	pH Units	6.5-9 ⁵	-	-	-	-	-	-	6.9	-	6.01	6.15	-
Specific Conductivity	uS/cm	-	-	-	-	-	-	-	-	-	169.8	420.2	-
Conductivity	uS/cm	-	-	-	-	-	-	-	579	-	94.9	234.7	-
Oxidation-Reduction Potential	mV	-	-	-	-	-	-	-	-3.1	-	61.4	41.4	-
Field Sulfide	mg/L	-	-	-	-	-	-	-	0.00004	0.0008	0.00005	0.00006	-
Field Turbidity	NTU	-	-	-	-	-	51.4	-	4.48	1078 AU	2.56	4.76	-
Physical Tests													
Conductivity	uS/cm	-	-	928	1090	-	1130	-	525	999	411	1050	-
Hardness, Total (CaCO3)	mg/L	-	320	544	685	-	734	749	261	560	194	548	555
pH	pH Units	6.5-9 ⁵	-	7.98	8.08	-	7.9	-	7.75	7.36	7.4	6.83	-
Anions and Nutrients													
Alkalinity, Total (CaCO3)	mg/L	-	-	244	242	-	702	-	149	403	81	138	-
Ammonia	mg/L	Varies ⁷	-	-	0.129	-	2.9*	-	1.39	-	1.74	1.61	-
Chloride	mg/L	-	-	<2.500	<5.000	-	10.3	-	0.56	3.2	<0.500	<5.000	-
Fluoride	mg/L	0.12	-	<0.100	<0.200	-	0.33	-	0.081	0.14	0.054	<0.200	-
Nitrate	mg/L	13	-	0.298	<0.050	-	<0.050	-	<0.005	<0.025	<0.005	<0.050	-
Nitrite	mg/L	0.06	-	0.0104	<0.010	-	<0.010	-	<0.001	0.02	<0.001	<0.010	-
Total Kjeldahl Nitrogen	mg/L	-	-	-	0.377	-	8.39	-	1.87	-	2.61	2.8	-
Sulfate	mg/L	-	-	301	411	-	5	-	135	190	128	496	-
Sulfide	mg/L	-	-	-	<0.020	-	0.02	-	0.024	-	<0.020	0.024	-
Anion Sum	mEq/L	-	-	11.2	13.4	-	14.4	-	5.8	12.1	4.28	13.1	-
Cation Sum	mEq/L	-	-	11.4	14.1	-	17.3	-	6.76	19.4	5.28	16.3	-
Cation - Anion Balance	%	-	-	0.8	2.5	-	9	-	7.7	23.1	10.4	11	-
Organic / Inorganic Carbon													
Total Organic Carbon	mg/L	-	-	-	5.56	-	79.6	-	18.1	-	21.2	35.2	-
Total Inorganic Carbon	mg/L	-	-	-	51.7	-	105	-	30.2	-	16.1	25.4	-

Table A
Groundwater Sampling Analytical Results and CCME Guideline Exceedances for 2014 Spring Sampling Program

		Site Location :	Mill Complex								
		Sample Location:	GSI-HA-01A	GSI-HA-02A	GSI-HA-03A	GSI-HA-04A	GSI-HA-05A	MW09-16	MW09-17	MW09-18	MW09-19
		Sample ID:	GSI-HA-01A	GSI-HA-02A	GCI-HA-03A	GSI-HA-04A	GSI-HA-05A	MW09-16	MW09-17	MW09-18	MW09-19
		Date Sampled:	07/10/2014	07/10/2014	07/10/2014	07/10/2014	07/10/2014	07/10/2014	07/10/2014	07/10/2014	07/10/2014
		Job Number	L1531123	L1531123	L1531123	L1531123	L1531123	L1531123	L1531123	L1531123	L1531123
		Well Status:	Direct Sampled	Direct Sampled	Direct Sampled	Direct Sampled	Direct Sampled	Sampled	Sampled	Sampled	Sampled
Parameter	Units	CCME FAL ^{3,4}									
Field Parameters											
Dissolved Oxygen	%	-	20.9	20.9	20.9	20.6	20.9	20.6	20.9	20.9	20.6
Dissolved Oxygen	mg/L	9.5 ⁶	-	-	-	-	-	5.38	2.14	1.31	2.78
Temperature	°C	-	-	-	-	-	-	2.51	0.06	-0.21	1.15
pH	pH Units	6.5-9 ⁵	-	-	-	-	-	6.55	6.7	6.73	6.44
Specific Conductivity	uS/cm	-	-	-	-	-	-	-	-	-	-
Conductivity	uS/cm	-	-	-	-	-	-	2154	2914	2847	2290
Oxidation-Reduction Potential	mV	-	-	-	-	-	-	55.5	98.2	106.8	-31.2
Field Sulfide	mg/L	-	-	-	-	-	-	0.00001	0.00002	0.00002	0.00015
Field Turbidity	NTU	-	-	-	-	-	-	1.22	0.43	0.33	1.92
Physical Tests											
Conductivity	uS/cm	-	971	695	882	240	897	2010	2710	2650	2130
Hardness, Total (CaCO3)	mg/L	-	566	372	512	104	502	1330	1880	1860	1380
pH	pH Units	6.5-9 ⁵	8.14	7.33	7.57	7.54	7.75	7.56	7.83	7.82	7.36
Anions and Nutrients											
Alkalinity, Total (CaCO3)	mg/L	-	218	121	161	29.6	170	337	638	572	473
Ammonia	mg/L	Varies ⁷	-	-	-	-	-	<0.005	<0.005	0.0244	4.86
Chloride	mg/L	-	<5.000	0.56	<2.500	<0.500	<2.500	<5.000	<10.000	<10.000	<5.000
Fluoride	mg/L	0.12	<0.200	0.142	<0.100	0.029	<0.100	<0.200	<0.400	<0.400	<0.200
Nitrate	mg/L	13	<0.050	0.0126	<0.025	<0.005	0.054	0.14	0.17	<0.100	<0.050
Nitrite	mg/L	0.06	<0.010	0.0027	<0.005	<0.001	<0.005	<0.010	<0.020	<0.020	<0.010
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	-	-	0.092	0.088	0.085	6.19
Sulfate	mg/L	-	351	249	343	80.5	340	1020	1440	1400	968
Sulfide	mg/L	-	-	-	-	-	-	<0.020	<0.020	<0.020	0.242
Anion Sum	mEq/L	-	11.7	7.62	10.3	2.27	10.5	28	42.8	40.5	29.6
Cation Sum	mEq/L	-	11.7	8.92	13.6	2.64	11.2	27.3	38.3	37.9	29.9
Cation - Anion Balance	%	-	0.3	7.8	13.7	7.6	3.3	-1.4	-5.6	-3.3	0.4
Organic / Inorganic Carbon											
Total Organic Carbon	mg/L	-	-	-	-	-	-	3.14	2.71	2.66	24.4
Total Inorganic Carbon	mg/L	-	-	-	-	-	-	66.4	111	107	105

Table A
Groundwater Sampling Analytical Results and CCME Guideline Exceedances for 2014 Spring Sampling Program

		Site Location :	Brown McDade Pit											
		Sample Location:	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
		Sample ID:	CH-P-13-01/10		CH-P-13-03/50	CH-P-13-04/10		CH-P-13-05/50		GLL07-02	GLL07-03			
		Date Sampled:	10/10/2014	07/10/2014	09/10/2014	10/10/2014	07/10/2014	07/10/2014	07/10/2014	07/10/2014	08/10/2014	07/10/2014	07/10/2014	07/10/2014
		Job Number	L1531711		L1531711	L1531711		L1531123		L1531123	L1531123			
		Well Status:	Direct Sampled	Blocked	Direct Sampled	Sampled	Blocked	Sampled	Frozen	Direct Sampled	Sampled	Frozen	Frozen	Frozen
Parameter	Units	CCME FAL ^{3,4}												
Field Parameters														
Dissolved Oxygen	%	-	20.6	-	20.9	20.9	-	20.9	-	20.7	20.9	-	-	-
Dissolved Oxygen	mg/L	9.5 ⁶	11.49	-	-	3.91	-	1.42	-	-	2.32	-	-	-
Temperature	°C	-	0.17	-	-	0	-	0.4	-	-	1.2	-	-	-
pH	pH Units	6.5-9 ⁵	6.82	-	-	6.82	-	5.82	-	-	6.01	-	-	-
Specific Conductivity	uS/cm	-	-	-	-	139.5	-	667.5	-	-	294.3	-	-	-
Conductivity	uS/cm	-	856	-	-	80.5	-	356.3	-	-	159.8	-	-	-
Oxidation-Reduction Potential	mV	-	189.4	-	-	42.9	-	98.2	-	-	99.9	-	-	-
Field Sulfide	mg/L	-	0.00004	-	-	0.00009	-	0.00005	-	0.00013	0.00019	-	-	-
Field Turbidity	NTU	-	17.4	-	1656 AU	13.8	-	7.37	-	31.5	24	-	-	-
Physical Tests														
Conductivity	uS/cm	-	1030	-	2630	912	-	2770	-	322	823	-	-	-
Hardness, Total (CaCO3)	mg/L	-	624	-	1820	541	-	1860	-	164	449	-	-	-
pH	pH Units	6.5-9 ⁵	8.17	-	7.71	8.03	-	6.67	-	7.26	6.96	-	-	-
Anions and Nutrients														
Alkalinity, Total (CaCO3)	mg/L	-	167	-	382	217	-	89.8	-	72.6	45.6	-	-	-
Ammonia	mg/L	Varies ⁷	0.0209	-	0.19*	0.0444	-	0.0342	-	0.0051	0.0617	-	-	-
Chloride	mg/L	-	2.5	-	<10.000	1.8	-	<10.000	-	<0.500	<0.500	-	-	-
Fluoride	mg/L	0.12	<0.100	-	<0.400	0.112	-	<0.400	-	0.048	0.096	-	-	-
Nitrate	mg/L	13	0.259	-	0.27	0.0159	-	<0.100	-	0.655	0.571	-	-	-
Nitrite	mg/L	0.06	<0.005	-	0.072	<0.001	-	<0.020	-	<0.001	0.0218	-	-	-
Total Kjeldahl Nitrogen	mg/L	-	0.472	-	2.52	0.577	-	0.071	-	0.426	0.148	-	-	-
Sulfate	mg/L	-	437	-	1390	306	-	1890	-	88.4	390	-	-	-
Sulfide	mg/L	-	-	-	0.025	<0.020	-	<0.020	-	<0.020	0.164	-	-	-
Anion Sum	mEq/L	-	12.5	-	36.5	10.8	-	41.1	-	3.34	9.07	-	-	-
Cation Sum	mEq/L	-	13	-	39.7	11.4	-	40.6	-	3.46	9.63	-	-	-
Cation - Anion Balance	%	-	1.7	-	4.2	2.7	-	-0.6	-	1.8	3	-	-	-
Organic / Inorganic Carbon														
Total Organic Carbon	mg/L	-	12.4	-	57.8	13.1	-	0.88	-	9.45	1.21	-	-	-
Total Inorganic Carbon	mg/L	-	-	-	87	-	-	12.4	-	14.2	9.7	-	-	-

Table A
Groundwater Sampling Analytical Results and CCME Guideline Exceedances for 2014 Spring Sampling Program

		Site Location :	Pony Creek								
		Sample Location:	GSI-PC-01-B	GSI-PC-02-B	GSI-PC-03-B	GSI-PC-04-B	GSI-PC-05-B	MP09-01	MP09-02	MP09-03	MP09-08
		Sample ID:			GIS-PC-03B	GIS-PC-04B	GIS-PC-05B		MP09-02		
		Date Sampled:	07/10/2014	07/10/2014	08/10/2014	08/10/2014	08/10/2014	07/10/2014	08/10/2014	07/10/2014	08/10/2014
		Job Number			L1531123	L1531123	L1531123		L1531123		
		Well Status:	Destroyed	Frozen	Direct Sampled	Direct Sampled	Direct Sampled	Destroyed	Sampled	Frozen	Frozen
Parameter	Units	CCME FAL ^{3,4}									
Field Parameters											
Dissolved Oxygen	%	-	-	-	20.9	20.9	20.6	-	20.9	-	-
Dissolved Oxygen	mg/L	9.5 ⁶	-	-	-	-	-	-	-	-	-
Temperature	°C	-	-	-	-	-	-	-	-	-	-
pH	pH Units	6.5-9 ⁵	-	-	-	-	-	-	-	-	-
Specific Conductivity	uS/cm	-	-	-	-	-	-	-	-	-	-
Conductivity	uS/cm	-	-	-	-	-	-	-	-	-	-
Oxidation-Reduction Potential	mV	-	-	-	-	-	-	-	-	-	-
Field Sulfide	mg/L	-	-	-	0.00037	0.00043	0.0008	-	0.03	-	-
Field Turbidity	NTU	-	-	-	69.5	53.3	2084 AU	-	6.04	-	-
Physical Tests											
Conductivity	uS/cm	-	-	-	-	-	-	-	315	-	-
Hardness, Total (CaCO3)	mg/L	-	-	-	637	264	182	-	160	-	-
pH	pH Units	6.5-9 ⁵	-	-	-	-	-	-	7.9	-	-
Anions and Nutrients											
Alkalinity, Total (CaCO3)	mg/L	-	-	-	-	-	-	-	53.2	-	-
Ammonia	mg/L	Varies ⁷	-	-	-	-	-	-	0.0091	-	-
Chloride	mg/L	-	-	-	-	-	-	-	<0.500	-	-
Fluoride	mg/L	0.12	-	-	-	-	-	-	0.048	-	-
Nitrate	mg/L	13	-	-	-	-	-	-	0.0636	-	-
Nitrite	mg/L	0.06	-	-	-	-	-	-	<0.001	-	-
Total Kjeldahl Nitrogen	mg/L	-	-	-	-	-	-	-	0.477	-	-
Sulfate	mg/L	-	-	-	-	-	-	-	101	-	-
Sulfide	mg/L	-	-	-	-	-	-	-	<0.020	-	-
Anion Sum	mEq/L	-	-	-	-	-	-	-	3.18	-	-
Cation Sum	mEq/L	-	-	-	-	-	-	-	3.4	-	-
Cation - Anion Balance	%	-	-	-	-	-	-	-	3.3	-	-
Organic / Inorganic Carbon											
Total Organic Carbon	mg/L	-	-	-	-	-	-	-	9.21	-	-
Total Inorganic Carbon	mg/L	-	-	-	-	-	-	-	10.4	-	-

Table A
Groundwater Sampling Analytical Results and CCME Guideline Exceedances for 2014 Spring Sampling Program

		Site Location :	Seepage Dam			Tailings Facility									
		Sample Location:	W14103083BH01	W14103083BH02	W14103083BH04	MP09-04	MP09-05		MP09-09		MP09-10	MP09-11		MP09-12	MW09-02
		Sample ID:		W14103083BH02	W14103083BH04	MP09-04	MP09-05	MP09-05 METALS TEST	MP09-09	MP09-09 METALS TEST	MP09-10	MP09-11 METALS TEST	MP09-11	MP09-12	MW09-02
		Date Sampled:	09/10/2014	09/10/2014	09/10/2014	09/10/2014	09/10/2014	09/10/2014	10/10/2014	10/10/2014	10/10/2014	09/10/2014	09/10/2014	09/10/2014	08/10/2014
		Job Number		L1531123	L1531123	L1531123	L1531123	L1531123	L1531711	L1531711	L1531711	L1531123	L1531123	L1531123	L1531123
		Well Status:	Frozen	Direct Sampled	Direct Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled
Parameter	Units	CCME FAL ^{3,4}													
Field Parameters															
Dissolved Oxygen	%	-	-	-	-	20.9	20.5	-	-	-	-	-	-	-	20.9
Dissolved Oxygen	mg/L	9.5 ⁶	-	-	-	3.65	0.66	-	4.08	-	7.04	-	2.69	5.3	1.34
Temperature	°C	-	-	-	-	0.1	1	-	2.81	-	2.97	-	1.75	2.33	2.44
pH	pH Units	6.5-9 ⁵	-	-	-	7.15	6.68	-	8.9	-	8.86	-	7.17	6.99	6.97
Specific Conductivity	uS/cm	-	-	-	-	303.7	658.5	-	NC	-	NC	-	-	-	-
Conductivity	uS/cm	-	-	-	-	159.3	356.3	-	546	-	290	-	9.43	642	3194
Oxidation-Reduction Potential	mV	-	-	-	-	37.4	-61.5	-	771	-	85.6	-	-20.2	27.8	-47.8
Field Sulfide	mg/L	-	-	-	-	0.00004	0.00003	-	0.00053	-	0.0008	-	0.00014	0.0004	0.00002
Field Turbidity	NTU	-	-	-	-	6.41	3.98	-	179	-	Over range	-	54.1	141	1.97
Physical Tests															
Conductivity	uS/cm	-	-	1060	903	835	2510	-	513	-	629	-	1100	749	2940
Hardness, Total (CaCO3)	mg/L	-	-	643	517	494	1460	1480	216	213	261	656	626	434	1570
pH	pH Units	6.5-9 ⁵	-	8.01	8.29	7.99	7.12	-	8.9	-	8.59	-	8.09	8.21	6.97
Anions and Nutrients															
Alkalinity, Total (CaCO3)	mg/L	-	-	210	218	179	224	-	82.6	-	90.5	-	695	421	44.3
Ammonia	mg/L	Varies ⁷	-	0.0174	-	<0.005	12.1	-	3.71	-	5.21	-	6.49	4.49	13.6
Chloride	mg/L	-	-	<5.000	<2.500	<0.500	<10.000	-	2.47	-	2.63	-	<5.000	<0.500	<10.000
Fluoride	mg/L	0.12	-	<0.200	0.17	0.038	<0.400	-	1.77	-	1.54	-	0.36	0.328	0.49
Nitrate	mg/L	13	-	0.5	3.07	0.17	0.35	-	0.0124	-	0.027	-	<0.050	0.0149	<0.100
Nitrite	mg/L	0.06	-	<0.010	<0.005	<0.001	0.027	-	0.0058	-	0.0841	-	<0.010	0.0207	<0.020
Total Kjeldahl Nitrogen	mg/L	-	-	0.236	-	0.156	14.7	-	5.59	-	12	-	12.3	6.07	17.8
Sulfate	mg/L	-	-	421	291	292	1840	-	148	-	212	-	64.2	27.8	1900
Sulfide	mg/L	-	-	<0.020	-	<0.020	0.021	-	<2.000	-	<0.020	-	0.029	<0.020	<0.020
Anion Sum	mEq/L	-	-	13	10.6	9.67	42.8	-	4.89	-	6.39	-	15.2	9	40.4
Cation Sum	mEq/L	-	-	13.3	10.9	10.2	38.2	-	5.91	-	7.05	-	15.4	9.62	42.2
Cation - Anion Balance	%	-	-	1.3	1.2	2.7	-5.8	-	9.4	-	4.9	-	0.7	3.3	2.1
Organic / Inorganic Carbon															
Total Organic Carbon	mg/L	-	-	5.36	-	10.7	28.9	-	33.3	-	46.6	-	53.9	19.4	6.84
Total Inorganic Carbon	mg/L	-	-	-	-	35.7	43.3	-	8.8	-	28	-	134	89.4	<1.000

Table A
Groundwater Sampling Analytical Results and CCME Guideline Exceedances for 2014 Spring Sampling Program

		Site Location :	Tailings Facility														
		Sample Location:	MW09-03	MW09-04	MW09-05	MW09-06	MW09-07	MW09-08	MW09-21	MW09-22			MW09-23	MW09-24	W14103083BH03	CH-P-13-02/10	
		Sample ID:	MW09-03	MW09-04	MW09-05	MW09-06	MW09-07	MW09-08	MW09-21	MW09-22	MW09-22	MW09-22 METALS TEST	MW09-23	MW09-24	W14103083BH03	CH-P-13-02/10	
		Date Sampled:	08/10/2014	08/10/2014	08/10/2014	08/10/2014	10/10/2014	09/10/2014	09/10/2014	08/10/2014	09/10/2014		08/10/2014	09/10/2014	08/10/2014	09/10/2014	
		Job Number	L1531123	L1531123	L1531123	L1531123	L1531711	L1531123	L1531123	L1531123	L1531123	L1531123	L1531123	L1531123	L1531123	L1531123	-
		Well Status:	Sampled	Sampled	Sampled	Sampled	Direct Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled
Parameter	Units	CCME FAL ^{3,4}															
Field Parameters																	
Dissolved Oxygen	%	-	20.9	20.9	20.9	20.9	20.9	20.9	20.5	20.9	-	-	20.9	20.9	20.9	20.9	
Dissolved Oxygen	mg/L	9.5 ⁶	0.92	0.99	0.99	0.84	-	0.35	0.9	1.51	-	-	2.37	8.6	1.17	-	
Temperature	°C	-	1.37	2.8	3.07	4.96	-	3	0.9	2	-	-	0.11	0.4	1.5	-	
pH	pH Units	6.5-9 ⁵	6.99	8.38	6.12	7.4	-	6.56	6.61	6.06	-	-	6.54	7.19	6.35	-	
Specific Conductivity	uS/cm	-	-	-	-	-	-	102.8	647.9	NC	-	-	NC	356.5	337.7	-	
Conductivity	uS/cm	-	2681	2870	1907	1819	-	59.6	349.6	1600	-	-	2592	188.5	185.8	-	
Oxidation-Reduction Potential	mV	-	20.3	19.2	72.2	61.2	-	-72.3	-64	21.7	-	-	13.8	62.8	-76.2	-	
Field Sulfide	mg/L	-	0.00004	0.00001	0.00002	0.00002	0.00052	0.00011	0.00006	0.00006	-	-	0.00016	0.00009	3.5	-	
Field Turbidity	NTU	-	0.75	1.23	7.68	4.05	35.8	6.22	10.4	8.4	-	-	102	18.2	13.2	-	
Physical Tests																	
Conductivity	uS/cm	-	2450	2690	1600	1760	1780	198	1670	2000	-	-	1440	968	761		
Hardness, Total (CaCO3)	mg/L	-	1580	1670	888	1080	971	101	1010	-	900	915	784	574	390		
pH	pH Units	6.5-9 ⁵	7.82	8.02	7.03	7.98	7.4	7.63	7.29	6.69	-	-	7.51	8	6.8		
Anions and Nutrients																	
Alkalinity, Total (CaCO3)	mg/L	-	178	96.8	88.7	127	212	112	336	148	-	-	268	201	260		
Ammonia	mg/L	Varies ⁷	1.06	7.28	4.77	1.22	2*	2.05	10.7	1.92	-	-	2.71	0.008	6.13		
Chloride	mg/L	-	<10.000	<10.000	<5.000	<5.000	<5.000	<0.500	<5.000	<5.000	-	-	<5.000	<5.000	<2.500		
Fluoride	mg/L	0.12	<0.400	<0.400	<0.200	0.26	<0.200	0.217	<0.200	<0.200	-	-	<0.200	<0.200	<0.100		
Nitrate	mg/L	13	<0.100	<0.100	<0.050	<0.050	<0.050	0.0536	0.498	11	-	-	<0.050	2.94	<0.025		
Nitrite	mg/L	0.06	<0.020	<0.020	0.012	<0.010	<0.010	<0.001	0.019	0.198	-	-	<0.010	0.016	<0.005		
Total Kjeldahl Nitrogen	mg/L	-	1.43	8.77	5.76	1.65	3.65	2.75	16	4.76	-	-	4.14	0.228	7.45		
Sulfate	mg/L	-	1530	1730	876	989	893	234	688	1040	-	-	614	355	160		
Sulfide	mg/L	-	<0.020	<0.020	<0.020	<0.020	0.54	0.065	0.044	0.03	-	-	0.038	<0.020	0.136		
Anion Sum	mEq/L	-	35.5	38	20	23.1	22.8	7.13	21.1	-	-	-	18.1	11.6	8.53		
Cation Sum	mEq/L	-	35.1	37.3	20.8	23.5	22.6	4.22	24.8	-	-	-	18.4	11.9	13.7		
Cation - Anion Balance	%	-	-0.6	-0.8	2	0.7	-0.6	-25.6	8.1	-	-	-	0.8	1.1	23.4		
Organic / Inorganic Carbon																	
Total Organic Carbon	mg/L	-	6.18	6.8	12.2	6.68	29.8	21.9	30	12.8	-	-	17.4	9.02	30.6		
Total Inorganic Carbon	mg/L	-	35.6	14.4	14.7	20.7	42.2	22.7	62.4	22.7	-	-	57.1	42.3	55.5		

Table A
Groundwater Sampling Analytical Results and CCME Guideline Exceedances for 2014 Spring Sampling Program

		Site Location :	Dome Creek										
		Sample Location:	GSI-DC-01B	GSI-DC-02B	GSI-DC-03B	GSI-DC-05B	GSI-DC-06B		GSI-DC-07B	GSI-DC-08B	GSI-DC-09B	GSI-DC-10B	
		Sample ID:	GSI-DC-01B	GSI-DC-02B	GSI-DC-03B		GSI-DC-06B	GSI-DC-06B METALS TEST	GSI-DC-07B	GSI-DC-08B	GSI-DC-09B	GSI-DC-10B	GSI-DC-10B METALS TEST
		Date Sampled:	07/10/2014	07/10/2014	07/10/2014	09/10/2014	10/10/2014		10/10/2014	10/10/2014	10/10/2014	10/10/2014	
		Job Number	L1531123	L1531123	L1531123		L1531711	L1531711	L1531711	L1531711	L1531711	L1531711	L1531711
		Well Status:	Direct Sampled	Direct Sampled	Direct Sampled	Frozen	Direct Sampled	Direct Sampled	Sampled	Direct Sampled	Sampled	Sampled	Sampled
Parameter	Units	CCME FAL ^{3,4}											
Cyanides													
Total Cyanide	mg/L	-	-	<0.005	<0.005	-	<0.005	-	<0.005	-	<0.005	<0.005	-
Cyanide, Free	mg/L	0.005	-	<0.005	<0.005	-	<0.005	-	<0.005	-	<0.005	<0.005	-
Cyanide, WAD	mg/L	-	-	<0.005	<0.005	-	<0.005	-	<0.005	-	<0.005	<0.005	-
Thiocyanate (SCN)	mg/L	-	-	-	-	-	<0.5	-	<0.5	-	<0.5	<0.5	-
Dissolved Metals													
Aluminum	mg/L	Varies ⁸	0.003	0.0026	0.0169	-	0.0012	0.0155**	0.0103	0.394	0.0477	0.142	0.134**
Antimony	mg/L	-	0.00117	0.00032	0.00066	-	0.00029	0.00026	0.00017	0.00185	0.00021	0.00035	0.00033
Arsenic	mg/L	0.005	0.00353	0.00537	0.00235	-	0.326	0.342	0.144	0.0945	0.0453	0.13	0.107
Barium	mg/L	-	0.0246	0.115	0.0243	-	0.24	0.232	0.0715	0.18	0.0341	0.424	0.408
Beryllium	mg/L	-	<0.0001	<0.0001	<0.0001	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0002
Bismuth	mg/L	-	<0.0005	<0.0005	<0.0005	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001
Boron	mg/L	1.5	0.058	<0.01	<0.01	-	<0.01	<0.01	0.011	0.11	0.012	<0.02	<0.02
Cadmium	mg/L	Varies ⁹	0.000067	0.000115	0.000846	-	<0.00001	<0.00001	<0.00001	0.000038	<0.00001	<0.00002	<0.00002
Calcium	mg/L	-	89.5	141	177	-	177	181	73.7	154	49.7	152	154
Chromium	mg/L	0.001 ¹⁰	0.00708	<0.0001	0.00176	-	0.00181	0.00158	0.00045	0.0737	0.00086	0.00231	0.00221
Cobalt	mg/L	-	0.00016	0.00138	0.00115	-	0.0022	0.00219	0.00155	0.019	0.00096	0.0215	0.0218
Copper	mg/L	Varies ¹¹	0.0512	0.0043	0.00227	-	0.00052	0.0002	<0.0002	0.00179	<0.0002	0.00097	<0.0004
Iron	mg/L	0.3	0.026	1.64	0.013	-	23.2	22.4	14.3	125	14.2	68.7	66.7
Lead	mg/L	Varies ¹²	0.00209	0.000223	0.000165	-	0.000059	<0.00005	<0.00005	0.0018	<0.00005	0.00014	0.00014
Lithium	mg/L	-	0.00066	0.00167	0.00684	-	<0.0005	<0.0005	0.0011	0.00129	<0.0005	<0.001	<0.001
Magnesium	mg/L	-	23.4	46.6	59.3	-	71	71.7	18.8	42.6	16.9	40.7	41.1
Manganese	mg/L	-	0.0239	2.89	1.95	-	5.07	5.19	1.06	4.58	0.51	13	13.4
Mercury	mg/L	0.000026	<0.00001	<0.00001	<0.00001	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Molybdenum	mg/L	0.073	0.00818	0.000958	0.00236	-	0.0038	0.00368	0.000378	0.011	0.00021	0.0006	0.00057
Nickel	mg/L	Varies ¹³	0.026	0.0111	0.00892	-	0.00368	0.00362	0.00054	0.19	0.00059	0.0045	0.0046
Phosphorus	mg/L	-	<0.05	<0.05	<0.05	-	0.251	0.244	0.083	0.218	0.164	<0.05	<0.05
Potassium	mg/L	-	4.4	3.09	2.94	-	3.95	3.94	2.37	6.82	2.22	2.22	2.23
Selenium	mg/L	0.001	<0.0001	<0.0001	<0.0001	-	0.00054	0.00057	0.00016	0.00105	0.00013	0.00036	0.00031
Silicon	mg/L	-	3.76	6.97	7.03	-	8	8	7.1	10.6	8.13	7.77	7.81
Silver	mg/L	0.0001	0.000011	<0.00001	<0.00001	-	<0.00001	<0.00001	<0.00001	0.00002	<0.00001	<0.00002	<0.00002
Sodium	mg/L	-	4.16	4.94	5.2	-	20.3	19.4	13.2	25.1	10.2	23.7	23.1
Strontium	mg/L	-	0.24	0.305	0.439	-	0.897	0.869	0.239	0.585	0.159	0.579	0.56
Sulfur	mg/L	-	65.9	103	140	-	3.23	3.16	46.2	73.1	44.7	155	157
Thallium	mg/L	0.0008	0.000019	<0.00001	0.000024	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00002	<0.00002
Tin	mg/L	-	0.00399	0.00025	0.00058	-	<0.0001	<0.0001	<0.0001	0.0005	<0.0001	<0.0002	<0.0002
Titanium	mg/L	-	<0.01	<0.01	<0.01	-	<0.01	<0.01	<0.01	0.028	<0.01	<0.02	<0.02
Uranium	mg/L	0.015	0.000415	0.000397	0.00233	-	0.000155	0.00016	0.000034	0.00205	0.000109	0.0003	0.000306
Vanadium	mg/L	-	<0.001	<0.001	<0.001	-	0.0085	0.0079	0.002	0.0816	0.0046	0.0113	0.0102
Zinc	mg/L	0.03	0.0305	0.0173	0.136	-	0.0018	0.002	0.0017	0.017	0.0015	0.0101	0.0099

Table A
Groundwater Sampling Analytical Results and CCME Guideline Exceedances for 2014 Spring Sampling Program

		Site Location :	Mill Complex								
		Sample Location:	GSI-HA-01A	GSI-HA-02A	GSI-HA-03A	GSI-HA-04A	GSI-HA-05A	MW09-16	MW09-17	MW09-18	MW09-19
		Sample ID:	GSI-HA-01A	GSI-HA-02A	GCI-HA-03A	GSI-HA-04A	GSI-HA-05A	MW09-16	MW09-17	MW09-18	MW09-19
		Date Sampled:	07/10/2014	07/10/2014	07/10/2014	07/10/2014	07/10/2014	07/10/2014	07/10/2014	07/10/2014	07/10/2014
		Job Number	L1531123	L1531123	L1531123	L1531123	L1531123	L1531123	L1531123	L1531123	L1531123
		Well Status:	Direct Sampled	Direct Sampled	Direct Sampled	Direct Sampled	Direct Sampled	Sampled	Sampled	Sampled	Sampled
Parameter	Units	CCME FAL ^{3,4}									
Cyanides											
Total Cyanide	mg/L	-	<0.005	-	-	-	<0.005	<0.005	<0.005	<0.005	<0.005
Cyanide, Free	mg/L	0.005	<0.005	-	-	-	<0.005	<0.005	<0.005	<0.005	<0.005
Cyanide, WAD	mg/L	-	<0.005	-	-	-	<0.005	<0.005	<0.005	<0.005	<0.005
Thiocyanate (SCN)	mg/L	-	-	-	-	-	-	<0.5	<0.5	<0.5	<0.5
Dissolved Metals											
Aluminum	mg/L	Varies ⁸	0.0033	0.0081	0.0234	0.0823	0.01	<0.002	<0.002	<0.002	0.0118
Antimony	mg/L	-	0.00023	0.00067	0.00027	0.00097	0.00014	0.069	0.00036	0.00026	0.0002
Arsenic	mg/L	0.005	0.0112	0.00651	0.042	0.00917	0.0404	0.00808	0.0225	0.0575	0.105
Barium	mg/L	-	0.103	0.101	0.0848	0.042	0.116	0.0155	0.00778	0.00832	0.0529
Beryllium	mg/L	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0002	<0.0002	<0.0002	<0.0002
Bismuth	mg/L	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.001
Boron	mg/L	1.5	<0.01	0.022	<0.01	<0.01	<0.01	0.112	0.079	<0.02	0.223
Cadmium	mg/L	Varies ⁹	0.000023	0.000122	0.000081	0.000026	0.000061	0.0286	<0.00002	0.000064	<0.00002
Calcium	mg/L	-	136	94.6	125	26.4	133	307	346	359	304
Chromium	mg/L	0.001 ¹⁰	0.0001	0.0001	0.00294	0.00066	0.00079	<0.0002	<0.0002	<0.0002	0.00043
Cobalt	mg/L	-	0.00029	0.00085	0.00107	0.00051	0.00044	<0.0002	<0.0002	<0.0002	0.00227
Copper	mg/L	Varies ¹¹	0.00103	0.00704	0.00171	0.00198	0.00157	0.00553	0.00046	<0.0004	<0.0004
Iron	mg/L	0.3	2.43	20.3	55	8.36	14.6	<0.01	<0.01	<0.01	18
Lead	mg/L	Varies ¹²	0.000312	0.000186	0.000479	0.000449	0.000166	0.00451	<0.0001	<0.0001	<0.0001
Lithium	mg/L	-	0.00769	0.00209	0.00063	0.00116	0.00177	0.0115	0.0216	0.0217	0.0098
Magnesium	mg/L	-	55.1	33	48.3	9.12	41.1	137	247	234	150
Manganese	mg/L	-	0.12	4.48	4.71	0.477	3.17	0.0297	<0.0001	0.597	5.9
Mercury	mg/L	0.000026	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Molybdenum	mg/L	0.073	0.00154	0.00235	0.00329	0.00114	0.00029	0.00011	<0.0001	<0.0001	<0.0001
Nickel	mg/L	Varies ¹³	0.00488	0.0142	0.0257	0.00466	0.00846	0.0046	<0.001	<0.001	0.0017
Phosphorus	mg/L	-	<0.05	<0.05	<0.05	<0.05	0.088	<0.05	<0.05	<0.05	0.248
Potassium	mg/L	-	3.69	3.25	2.16	0.24	1.85	5.81	6.96	7.09	8.06
Selenium	mg/L	0.001	<0.0001	<0.0001	<0.0001	0.0001	<0.0001	0.00023	0.00024	0.00042	<0.0002
Silicon	mg/L	-	5.96	4.24	7.31	9.04	6.59	4.77	5.05	5.08	9.41
Silver	mg/L	0.0001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00002	<0.00002	<0.00002	<0.00002
Sodium	mg/L	-	4.85	3.33	5	2.12	5.4	8.59	12.4	12.1	14.5
Strontium	mg/L	-	0.37	0.272	0.407	0.0959	0.307	0.688	1.08	1.07	0.982
Sulfur	mg/L	-	114	88.1	116	23.3	112	334	457	448	312
Thallium	mg/L	0.0008	0.000014	0.000014	<0.00001	<0.00001	0.000011	0.000258	0.000107	0.000293	<0.00002
Tin	mg/L	-	0.00012	0.00017	0.00046	0.00016	0.00025	<0.0002	<0.0002	<0.0002	<0.0002
Titanium	mg/L	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.02
Uranium	mg/L	0.015	0.00135	0.00036	0.000117	0.000043	0.000039	0.00411	0.00833	0.00849	0.000436
Vanadium	mg/L	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.002	<0.002	<0.002	<0.002
Zinc	mg/L	0.03	0.0042	0.0271	0.0282	0.0115	0.0154	4.4	<0.002	0.0029	<0.002

Table A
Groundwater Sampling Analytical Results and CCME Guideline Exceedances for 2014 Spring Sampling Program

		Site Location :	Brown McDade Pit												
		Sample Location:	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	
		Sample ID:	CH-P-13-01/10		CH-P-13-03/50	CH-P-13-04/10		CH-P-13-05/50		GLL07-02	GLL07-03				
		Date Sampled:	10/10/2014	07/10/2014	09/10/2014	10/10/2014	07/10/2014	07/10/2014	07/10/2014	07/10/2014	08/10/2014	07/10/2014	07/10/2014	07/10/2014	07/10/2014
		Job Number	L1531711		L1531711	L1531711		L1531123		L1531123	L1531123				
		Well Status:	Direct Sampled	Blocked	Direct Sampled	Sampled	Blocked	Sampled	Frozen	Direct Sampled	Sampled	Frozen	Frozen	Frozen	Frozen
Parameter	Units	CCME FAL ^{3,4}													
Cyanides															
Total Cyanide	mg/L	-	<0.005	-	<0.005	<0.005	-	<0.005	-	<0.005	<0.005	-	-	-	
Cyanide, Free	mg/L	0.005	<0.005	-	<0.005	<0.005	-	<0.005	-	<0.005	<0.005	-	-	-	
Cyanide, WAD	mg/L	-	<0.005	-	<0.005	<0.005	-	<0.005	-	<0.005	<0.005	-	-	-	
Thiocyanate (SCN)	mg/L	-	-	-	<0.5	<0.5	-	<0.5	-	<0.5	<0.5	-	-	-	
Dissolved Metals															
Aluminum	mg/L	Varies ⁸	0.0087	-	0.0065	0.0033	-	0.0656	-	0.0128	0.0121	-	-	-	
Antimony	mg/L	-	0.0022	-	0.00103	0.00107	-	<0.0005	-	0.00061	<0.0001	-	-	-	
Arsenic	mg/L	0.005	0.00206	-	0.00195	0.00128	-	0.00389	-	0.00135	<0.0001	-	-	-	
Barium	mg/L	-	0.0635	-	0.0623	0.0317	-	0.00674	-	0.0213	0.0108	-	-	-	
Beryllium	mg/L	-	<0.0001	-	<0.0002	<0.0001	-	<0.0005	-	<0.0001	<0.0001	-	-	-	
Bismuth	mg/L	-	<0.0005	-	<0.001	<0.0005	-	<0.0025	-	<0.0005	<0.0005	-	-	-	
Boron	mg/L	1.5	0.017	-	<0.02	0.019	-	<0.05	-	<0.01	<0.01	-	-	-	
Cadmium	mg/L	Varies ⁹	0.000168	-	0.000192	0.000674	-	0.333	-	0.000169	0.276	-	-	-	
Calcium	mg/L	-	150	-	455	107	-	453	-	46.2	138	-	-	-	
Chromium	mg/L	0.001 ¹⁰	0.00018	-	<0.0002	0.00027	-	<0.0005	-	0.00014	<0.0001	-	-	-	
Cobalt	mg/L	-	0.00048	-	0.0213	0.0122	-	0.0382	-	<0.0001	0.00282	-	-	-	
Copper	mg/L	Varies ¹¹	0.0101	-	0.00068	0.0021	-	0.117	-	0.00298	0.0088	-	-	-	
Iron	mg/L	0.3	0.057	-	1.05	0.146	-	12	-	0.031	2.24	-	-	-	
Lead	mg/L	Varies ¹²	0.000217	-	<0.0001	0.000098	-	0.00636	-	0.000339	0.000191	-	-	-	
Lithium	mg/L	-	0.00325	-	0.0037	0.0113	-	0.0409	-	0.0015	0.0111	-	-	-	
Magnesium	mg/L	-	60.9	-	166	66.2	-	177	-	11.9	25.1	-	-	-	
Manganese	mg/L	-	0.401	-	12.5	1.35	-	36.7	-	0.00251	2.26	-	-	-	
Mercury	mg/L	0.000026	<0.00001	-	<0.00001	<0.00001	-	0.000015	-	<0.00001	<0.00001	-	-	-	
Molybdenum	mg/L	0.073	0.00145	-	0.00285	0.00273	-	0.00032	-	0.000085	0.000089	-	-	-	
Nickel	mg/L	Varies ¹³	0.00365	-	0.0392	0.0457	-	0.0141	-	0.00062	0.00831	-	-	-	
Phosphorus	mg/L	-	<0.05	-	<0.05	<0.05	-	<0.05	-	<0.05	<0.05	-	-	-	
Potassium	mg/L	-	2.85	-	9.18	3.86	-	4.86	-	0.6	1.62	-	-	-	
Selenium	mg/L	0.001	0.00016	-	0.00445	0.00012	-	<0.0005	-	<0.0001	<0.0001	-	-	-	
Silicon	mg/L	-	7.37	-	6.69	4.92	-	7.18	-	6.51	2.44	-	-	-	
Silver	mg/L	0.0001	<0.00001	-	<0.00002	<0.00001	-	<0.00005	-	0.000013	<0.00001	-	-	-	
Sodium	mg/L	-	9.3	-	58.6	8.85	-	8.67	-	3.71	5.38	-	-	-	
Strontium	mg/L	-	0.452	-	1.05	0.623	-	0.56	-	0.274	0.161	-	-	-	
Sulfur	mg/L	-	146	-	501	106	-	614	-	30.7	135	-	-	-	
Thallium	mg/L	0.0008	0.000028	-	<0.00002	0.000045	-	0.00053	-	<0.00001	0.000138	-	-	-	
Tin	mg/L	-	0.00328	-	0.00092	0.00143	-	<0.0005	-	<0.0001	<0.0001	-	-	-	
Titanium	mg/L	-	<0.01	-	<0.02	<0.01	-	<0.05	-	<0.01	<0.01	-	-	-	
Uranium	mg/L	0.015	0.00211	-	0.0101	0.00098	-	0.000634	-	0.000222	0.000037	-	-	-	
Vanadium	mg/L	-	<0.001	-	<0.002	<0.001	-	<0.005	-	<0.001	<0.001	-	-	-	
Zinc	mg/L	0.03	0.0203	-	0.0239	0.156	-	32.7	-	0.0174	5.87	-	-	-	

Table A
Groundwater Sampling Analytical Results and CCME Guideline Exceedances for 2014 Spring Sampling Program

		Site Location :	Pony Creek								
		Sample Location:	GSI-PC-01-B	GSI-PC-02-B	GSI-PC-03-B	GSI-PC-04-B	GSI-PC-05-B	MP09-01	MP09-02	MP09-03	MP09-08
		Sample ID:			GIS-PC-03B	GIS-PC-04B	GIS-PC-05B		MP09-02		
		Date Sampled:	07/10/2014	07/10/2014	08/10/2014	08/10/2014	08/10/2014	07/10/2014	08/10/2014	07/10/2014	08/10/2014
		Job Number			L1531123	L1531123	L1531123		L1531123		
		Well Status:	Destroyed	Frozen	Direct Sampled	Direct Sampled	Direct Sampled	Destroyed	Sampled	Frozen	Frozen
Parameter	Units	CCME FAL ^{3,4}									
Cyanides											
Total Cyanide	mg/L	-	-	-	-	-	-	-	<0.005	-	-
Cyanide, Free	mg/L	0.005	-	-	-	-	-	-	<0.005	-	-
Cyanide, WAD	mg/L	-	-	-	-	-	-	-	<0.005	-	-
Thiocyanate (SCN)	mg/L	-	-	-	-	-	-	-	<0.5	-	-
Dissolved Metals											
Aluminum	mg/L	Varies ⁸	-	-	0.0155*	0.0115*	0.0164*	-	0.0132	-	-
Antimony	mg/L	-	-	-	0.00367	0.00084	0.00223	-	0.00051	-	-
Arsenic	mg/L	0.005	-	-	0.019	0.0109	0.00267	-	0.00305	-	-
Barium	mg/L	-	-	-	0.113	0.114	0.036	-	0.0308	-	-
Beryllium	mg/L	-	-	-	<0.0001	<0.0001	<0.0001	-	<0.0001	-	-
Bismuth	mg/L	-	-	-	<0.0005	<0.0005	<0.0005	-	<0.0005	-	-
Boron	mg/L	1.5	-	-	0.049	0.022	<0.01	-	<0.01	-	-
Cadmium	mg/L	Varies ⁹	-	-	0.000051	0.00001	0.000082	-	0.000027	-	-
Calcium	mg/L	-	-	-	94	75.3	50.7	-	47.5	-	-
Chromium	mg/L	0.001 ¹⁰	-	-	0.00648	0.00581	0.0008	-	<0.0001	-	-
Cobalt	mg/L	-	-	-	0.00598	0.00471	<0.0001	-	0.00015	-	-
Copper	mg/L	Varies ¹¹	-	-	0.00491	0.00066	0.00411	-	0.00092	-	-
Iron	mg/L	0.3	-	-	1.11	4.16	0.044	-	0.289	-	-
Lead	mg/L	Varies ¹²	-	-	0.000779	0.000335	0.000302	-	0.000064	-	-
Lithium	mg/L	-	-	-	0.00632	0.00088	<0.0005	-	0.0008	-	-
Magnesium	mg/L	-	-	-	97.7	18.5	13.3	-	10.1	-	-
Manganese	mg/L	-	-	-	2.16	2.85	0.00416	-	0.0195	-	-
Mercury	mg/L	0.000026	-	-	<0.00001	<0.00001	<0.00001	-	<0.00001	-	-
Molybdenum	mg/L	0.073	-	-	0.0251	0.00964	0.000452	-	0.00006	-	-
Nickel	mg/L	Varies ¹³	-	-	0.116	0.0646	0.00161	-	<0.0005	-	-
Phosphorus	mg/L	-	-	-	<0.05	<0.05	<0.05	-	<0.05	-	-
Potassium	mg/L	-	-	-	5.11	2.02	0.7	-	0.5	-	-
Selenium	mg/L	0.001	-	-	0.00011	<0.0001	<0.0001	-	<0.0001	-	-
Silicon	mg/L	-	-	-	8.94	7.48	6.07	-	7.21	-	-
Silver	mg/L	0.0001	-	-	<0.00001	<0.00001	<0.00001	-	<0.00001	-	-
Sodium	mg/L	-	-	-	20.7	5.77	3.91	-	3.76	-	-
Strontium	mg/L	-	-	-	0.794	0.423	0.331	-	0.343	-	-
Sulfur	mg/L	-	-	-	120	30.1	31.8	-	35.3	-	-
Thallium	mg/L	0.0008	-	-	<0.00001	<0.00001	0.00001	-	<0.00001	-	-
Tin	mg/L	-	-	-	0.00011	<0.0001	<0.0001	-	<0.0001	-	-
Titanium	mg/L	-	-	-	<0.01	<0.01	<0.01	-	<0.01	-	-
Uranium	mg/L	0.015	-	-	0.00241	0.000143	0.000157	-	0.00008	-	-
Vanadium	mg/L	-	-	-	<0.001	<0.001	0.0014	-	<0.001	-	-
Zinc	mg/L	0.03	-	-	0.0509	0.0069	0.0068	-	0.0029	-	-

Table A
Groundwater Sampling Analytical Results and CCME Guideline Exceedances for 2014 Spring Sampling Program

		Site Location :	Seepage Dam			Tailings Facility									
		Sample Location:	W14103083BH01	W14103083BH02	W14103083BH04	MP09-04	MP09-05		MP09-09		MP09-10	MP09-11		MP09-12	MW09-02
		Sample ID:		W14103083BH02	W14103083BH04	MP09-04	MP09-05	MP09-05 METALS TEST	MP09-09	MP09-09 METALS TEST	MP09-10	MP09-11 METALS TEST	MP09-11	MP09-12	MW09-02
		Date Sampled:	09/10/2014	09/10/2014	09/10/2014	09/10/2014	09/10/2014	09/10/2014	10/10/2014	10/10/2014	10/10/2014	09/10/2014	09/10/2014	09/10/2014	08/10/2014
		Job Number		L1531123	L1531123	L1531123	L1531123	L1531123	L1531711	L1531711	L1531711	L1531123	L1531123	L1531123	L1531123
		Well Status:	Frozen	Direct Sampled	Direct Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled
Parameter	Units	CCME FAL ^{3,4}													
Cyanides															
Total Cyanide	mg/L	-	-	-	<0.005	<0.005	0.244	-	1.98	-	11.1	-	0.0117	0.0093	0.227
Cyanide, Free	mg/L	0.005	-	-	<0.005	<0.005	<0.010	-	0.356	-	1.04	-	<0.005	<0.005	<0.010
Cyanide, WAD	mg/L	-	-	-	<0.005	<0.005	<0.010	-	0.602	-	1.11	-	<0.005	<0.005	0.018
Thiocyanate (SCN)	mg/L	-	-	<0.5	-	<0.5	2.5	-	<0.5	-	<0.5	-	<0.5	<0.5	1.21
Dissolved Metals															
Aluminum	mg/L	Varies ⁸	-	0.0018	0.0021	0.0017	0.0354	0.0307**	0.0041	0.0051**	0.0037	0.0071**	0.0068	0.0026	<0.005
Antimony	mg/L	-	-	0.00024	0.00024	0.0017	0.00048	0.00045	0.101	0.0987	0.0951	0.0421	0.0434	0.0417	0.00453
Arsenic	mg/L	0.005	-	0.00312	0.00357	0.00105	0.0963	0.0838	20.6	20.7	9.93	19.3	18.8	5.66	22.8
Barium	mg/L	-	-	0.114	0.264	0.0287	0.122	0.121	0.00174	0.00146	0.000633	0.119	0.119	0.0434	0.00785
Beryllium	mg/L	-	-	<0.0001	<0.0001	<0.0001	<0.0002	<0.0002	<0.0002	<0.0005	<0.0001	<0.0005	<0.0005	<0.0001	<0.0005
Bismuth	mg/L	-	-	<0.0005	<0.0005	<0.0005	<0.001	<0.001	<0.001	<0.0025	<0.0005	<0.0025	<0.0025	<0.0005	<0.0025
Boron	mg/L	1.5	-	0.017	0.016	0.012	0.085	0.087	0.306	0.313	0.307	<0.05	<0.05	0.064	0.059
Cadmium	mg/L	Varies ⁹	-	0.000296	0.00424	0.00004	0.000295	0.000265	0.000322	0.000318	0.000287	<0.00005	<0.00005	0.000352	0.000497
Calcium	mg/L	-	-	164	140	119	471	477	85.8	84.7	103	151	145	102	477
Chromium	mg/L	0.001 ¹⁰	-	0.00019	0.00011	0.00032	0.00094	0.00078	<0.0002	<0.0005	<0.0001	0.00127	0.0013	0.00037	<0.0005
Cobalt	mg/L	-	-	<0.0001	<0.0001	0.00015	0.016	0.0156	0.0458	0.0469	0.0447	0.00207	0.0021	0.00165	0.0118
Copper	mg/L	Varies ¹¹	-	0.00272	0.00324	0.00261	0.00115	0.00106	0.714	0.657	0.215	<0.001	<0.001	0.00093	<0.001
Iron	mg/L	0.3	-	<0.01	<0.01	<0.01	69.1	68.2	0.214	0.322	0.279	19.6	18.4	4.19	48.7
Lead	mg/L	Varies ¹²	-	<0.00005	<0.00005	<0.00005	<0.0001	<0.0001	0.00099	0.0008	0.000806	0.00226	0.00322	0.00651	<0.00025
Lithium	mg/L	-	-	0.00123	0.00123	0.00069	<0.001	<0.001	<0.001	<0.0025	<0.0005	0.0034	0.0031	0.00252	0.0294
Magnesium	mg/L	-	-	56.7	40.9	48.1	68.9	70.8	0.41	0.4	0.76	67.5	64.1	43.5	92.2
Manganese	mg/L	-	-	0.0118	0.00274	0.000472	15.3	14.8	0.0409	0.0385	0.03	4.96	4.84	2.66	34.7
Mercury	mg/L	0.000026	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.000021	0.000021	0.000028	<0.00001	<0.00001	<0.00001	<0.00001
Molybdenum	mg/L	0.073	-	0.00128	0.00109	0.000219	0.00055	0.00057	0.0146	0.0146	0.0148	0.00913	0.00864	0.00294	0.0056
Nickel	mg/L	Varies ¹³	-	0.00061	0.00056	<0.0005	0.0052	0.0049	0.0184	0.0197	0.0124	0.0097	0.0096	0.00534	0.0033
Phosphorus	mg/L	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	0.168	0.154	0.22	0.128	0.18	0.127	<0.05
Potassium	mg/L	-	-	3.18	2.63	1.63	8.75	8.94	8.78	8.58	9.44	11.2	10.3	5.34	83.7
Selenium	mg/L	0.001	-	0.0006	0.00293	0.00019	<0.0002	<0.0002	0.00233	0.00238	0.00161	<0.0005	<0.0005	0.00011	<0.0005
Silicon	mg/L	-	-	5.37	4.95	5.38	6.63	6.71	9.6	9.47	6.09	13.5	13.6	10.5	6.87
Silver	mg/L	0.0001	-	<0.00001	<0.00001	<0.00001	<0.00002	<0.00002	0.0299	0.028	0.0533	<0.00005	<0.00005	<0.00001	<0.00005
Sodium	mg/L	-	-	8.79	11.7	6.52	83.8	80.2	24.5	24.6	27.6	25.1	24.1	3.84	86.9
Strontium	mg/L	-	-	0.669	0.612	0.366	1.25	1.25	0.158	0.16	0.162	0.844	0.723	0.591	1.07
Sulfur	mg/L	-	-	144	101	103	474	495	90	66.6	86.2	29.1	24.7	10.1	657
Thallium	mg/L	0.0008	-	<0.00001	<0.00001	<0.00001	0.000021	<0.00002	0.00004	0.000066	0.000051	<0.00005	<0.00005	0.000109	0.000256
Tin	mg/L	-	-	0.00042	0.00062	<0.0001	<0.0002	<0.0002	<0.0002	<0.0005	<0.0001	<0.0005	<0.0005	<0.0001	<0.0005
Titanium	mg/L	-	-	<0.01	<0.01	<0.01	<0.02	<0.02	<0.02	<0.05	<0.01	<0.05	<0.05	<0.01	<0.05
Uranium	mg/L	0.015	-	0.00544	0.00755	0.00192	0.00161	0.00161	0.000514	0.00054	0.00138	0.0011	0.00104	0.000644	0.000528
Vanadium	mg/L	-	-	<0.001	<0.001	<0.001	0.003	0.0025	<0.002	<0.005	<0.001	<0.005	<0.005	<0.001	<0.005
Zinc	mg/L	0.03	-	0.0014	0.0083	0.0018	0.0147	0.0142	0.0045	<0.005	0.0021	0.0347	0.0358	0.0367	0.333

Table A
Groundwater Sampling Analytical Results and CCME Guideline Exceedances for 2014 Spring Sampling Program

		Site Location :	Tailings Facility														
		Sample Location:	MW09-03	MW09-04	MW09-05	MW09-06	MW09-07	MW09-08	MW09-21	MW09-22			MW09-23	MW09-24	W14103083BH03	CH-P-13-02/10	
		Sample ID:	MW09-03	MW09-04	MW09-05	MW09-06	MW09-07	MW09-08	MW09-21	MW09-22	MW09-22	MW09-22 METALS TEST	MW09-23	MW09-24	W14103083BH03	CH-P-13-02/10	
		Date Sampled:	08/10/2014	08/10/2014	08/10/2014	08/10/2014	10/10/2014	09/10/2014	09/10/2014	08/10/2014	09/10/2014		08/10/2014	09/10/2014	08/10/2014	09/10/2014	
		Job Number	L1531123	L1531123	L1531123	L1531123	L1531711	L1531123	L1531123	L1531123	L1531123	L1531123	L1531123	L1531123	L1531123	L1531123	-
		Well Status:	Sampled	Sampled	Sampled	Sampled	Direct Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled
Parameter	Units	CCME FAL ^{3,4}															
Cyanides																	
Total Cyanide	mg/L	-	0.043	<0.005	<0.005	<0.005	<0.005	<0.010	0.014	0.0786	-	-	0.016	0.0235	<0.010		
Cyanide, Free	mg/L	0.005	<0.010	<0.005	<0.005	<0.005	<0.005	<0.010	0.0062	0.033	-	-	<0.010	<0.005	<0.010		
Cyanide, WAD	mg/L	-	<0.010	<0.005	<0.005	<0.005	<0.005	<0.010	0.0058	0.0351	-	-	<0.010	<0.005	<0.010		
Thiocyanate (SCN)	mg/L	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	-	-	<0.5	<0.5	<0.5		
Dissolved Metals																	
Aluminum	mg/L	Varies ⁸	<0.01	0.0038	0.0235	<0.002	0.0491	0.0901	0.0965	-	0.025**	0.0229**	0.009	0.0017	0.0529		
Antimony	mg/L	-	0.547	0.341	0.00237	0.254	0.00568	0.00028	0.00024	-	0.00027	0.00026	<0.0005	0.00021	0.00025		
Arsenic	mg/L	0.005	0.838	3.76	0.695	0.106	0.556	0.136	0.117	-	0.00486	0.00433	0.00194	0.00157	0.0605		
Barium	mg/L	-	0.0474	0.00712	0.0312	0.00685	0.022	0.101	0.0892	-	0.0437	0.0433	0.0408	0.0538	0.354		
Beryllium	mg/L	-	<0.001	<0.0002	<0.0001	<0.0002	<0.0002	<0.0001	<0.0002	-	<0.0001	<0.0001	<0.0005	<0.0001	<0.0001		
Bismuth	mg/L	-	<0.005	<0.001	<0.0005	<0.001	<0.001	<0.0005	<0.001	-	<0.0005	<0.0005	<0.0025	<0.0005	<0.0005		
Boron	mg/L	1.5	0.1	0.297	0.093	0.158	0.058	<0.01	0.037	-	0.074	0.078	0.143	0.013	<0.01		
Cadmium	mg/L	Varies ⁹	0.00123	0.000021	0.0032	0.00621	0.000223	<0.00001	0.000095	-	0.00004	0.000037	<0.00005	0.000055	<0.00001		
Calcium	mg/L	-	509	487	281	342	297	30.5	318	-	294	300	206	152	104		
Chromium	mg/L	0.001 ¹⁰	<0.001	<0.0002	0.00058	<0.0002	0.00096	0.00117	0.00158	-	0.00047	0.00042	<0.0005	0.0003	0.00074		
Cobalt	mg/L	-	0.0064	0.00104	0.0178	0.00123	0.0264	0.0008	0.0128	-	0.0171	0.0168	0.0196	0.00042	0.00062		
Copper	mg/L	Varies ¹¹	<0.002	<0.0004	0.00283	0.00644	0.00606	<0.0002	0.00061	-	0.00115	0.00097	<0.001	0.00852	<0.0002		
Iron	mg/L	0.3	0.254	<0.01	8.64	<0.01	9.16	34.4	50.8	-	28.5	28.2	13.7	<0.01	92.4		
Lead	mg/L	Varies ¹²	<0.0005	0.00028	0.00309	0.00034	<0.0001	0.000144	<0.0001	-	<0.00005	<0.00005	<0.00025	<0.00005	<0.00005		
Lithium	mg/L	-	<0.005	0.0055	0.00269	0.0096	0.0029	<0.0005	<0.001	-	0.00067	0.00062	<0.0025	0.00091	0.00081		
Magnesium	mg/L	-	74.6	110	45.1	55.4	55.7	6.12	52.8	-	40.3	40.6	65.4	47	31.8		
Manganese	mg/L	-	55.2	4.64	6.24	5.64	20.5	2.58	5.21	-	6.55	6.35	21.7	0.000705	2.07		
Mercury	mg/L	0.000026	<0.00001	<0.00001	0.000013	0.000011	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001		
Molybdenum	mg/L	0.073	0.00336	0.00739	0.000646	0.00425	0.00156	<0.00005	0.00039	-	0.000093	0.000098	0.00223	0.000323	0.000095		
Nickel	mg/L	Varies ¹³	<0.005	<0.001	0.0103	0.0016	0.0207	<0.0005	0.0018	-	0.00211	0.00207	<0.0025	<0.0005	<0.0005		
Phosphorus	mg/L	-	0.057	0.081	<0.05	<0.05	<0.05	0.116	<0.05	-	<0.05	<0.05	<0.05	<0.05	0.232		
Potassium	mg/L	-	16.6	40.8	15.5	20.5	12	1.32	11.3	-	4.56	4.59	6.4	1.47	1.58		
Selenium	mg/L	0.001	<0.001	<0.0002	0.00011	<0.0002	0.0002	0.0001	0.0003	-	0.00032	0.00033	<0.0005	0.00038	0.00018		
Silicon	mg/L	-	16	12	7.1	7.46	9.98	10.1	5.53	-	4.49	4.47	6.01	5.24	10.9		
Silver	mg/L	0.0001	<0.0001	<0.00002	0.000045	<0.00002	0.000168	<0.00001	<0.00002	-	0.000021	0.000023	<0.00005	<0.00001	<0.00001		
Sodium	mg/L	-	24.1	52.3	37.2	23.7	33.5	1.3	13.6	-	71.3	70.5	23.7	8.41	9.54		
Strontium	mg/L	-	1.47	1.37	0.592	0.706	0.706	0.131	0.838	-	0.752	0.785	0.519	0.443	0.397		
Sulfur	mg/L	-	520	561	302	342	274	0.68	231	-	284	286	197	118	53		
Thallium	mg/L	0.0008	<0.0001	0.000109	0.000208	0.000358	<0.00002	<0.00001	<0.00002	-	<0.00001	<0.00001	<0.00005	<0.00001	<0.00001		
Tin	mg/L	-	<0.001	0.00064	0.00032	<0.0002	<0.0002	<0.0001	<0.0002	-	0.00016	0.00015	<0.0005	0.00016	<0.0001		
Titanium	mg/L	-	<0.1	<0.02	<0.01	<0.02	<0.02	<0.01	<0.02	-	<0.01	<0.01	<0.05	<0.01	<0.01		
Uranium	mg/L	0.015	0.00285	0.000238	0.000455	0.00128	0.00117	0.000088	0.00067	-	0.000847	0.000848	0.00377	0.00436	0.000124		
Vanadium	mg/L	-	<0.01	<0.002	<0.001	<0.002	0.0026	0.004	0.0061	-	<0.001	<0.001	<0.005	<0.001	0.0021		
Zinc	mg/L	0.03	<0.01	0.132	0.732	0.104	0.36	0.0012	0.0035	-	0.0015	0.0016	0.0182	0.0015	0.0021		

Table B
QA/AC Analytical Data

		Sample Location:	GSI-DC-07B			MW09-19			CH-P-13-05/50			MP09-05						
		Sample ID:	GSI-DC-07B	DUP6	RPD (%) ¹⁴	MW09-19	DUP2	RPD (%) ¹⁴	CH-P-13-05/50	DUP-1	RPD (%) ¹⁴	MP09-05	DUP 5	RPD (%) ¹⁴	MP09-05 METALS TEST	DUP 5 D-METALS TEST	RPD (%) ¹⁴	
			Date Sampled:	10/10/2014		07/10/2014			07/10/2014			09/10/2014			09/10/2014			
			Job Number	L1531711		L1531711	L1531123		L1531123	L1531123		L1531123	L1531123		L1531123	L1531123		
		Well Status:	Sampled	Sampled		Sampled	Sampled		Sampled	Sampled		Sampled	Sampled		Sampled	Sampled		
Parameter	Units	CCME FAL ^{3,4}																
Field Parameters																		
Dissolved Oxygen	%	-	20.9	20.9	-	20.6	20.6	-	20.9	20.9	-	20.5	20.5	-	-	-	-	
Dissolved Oxygen	mg/L	9.5 ⁶	1.38	1.38	-	2.78	2.78	-	1.42	1.42	-	0.66	0.66	-	-	-	-	
Temperature	°C	-	1.07	1.07	-	1.15	1.15	-	0.4	0.4	-	1	1	-	-	-	-	
pH	pH Units	6.5-9 ⁵	6.9	6.9	-	6.44	6.44	-	5.82	5.82	-	6.68	6.68	-	-	-	-	
Specific Conductivity	uS/cm	-	-	-	-	-	-	-	667.5	667.5	-	658.5	658.5	-	-	-	-	
Conductivity	uS/cm	-	579	579	-	2290	2290	-	356.3	356.3	-	356.3	356.3	-	-	-	-	
Oxidation-Reduction Potential	mV	-	-3.1	-3.1	-	-31.2	-31.2	-	98.2	98.2	-	-61.5	-61.5	-	-	-	-	
Field Sulfide	mg/L	-	0.00004	0.00004	-	0.00015	0.00015	-	0.00005	0.00005	-	0.00003	0.00003	-	-	-	-	
Field Turbidity	NTU	-	4.48	4.48	-	1.92	1.92	-	7.37	7.37	-	3.98	3.98	-	-	-	-	
Physical Tests																		
Conductivity	uS/cm	-	525	523	0.4	2130	2130	0.0	2770	2750	0.7	2510	2510	0.0	-	-	-	
Hardness, Total (CaCO3)	mg/L	-	261	260	0.4	1380	1380	0.0	1860	1850	0.5	1460	1480	1.4	1480	1470	0.7	
pH	pH Units	6.5-9 ⁵	7.75	7.32	5.7	7.36	7.29	1.0	6.67	6.6	1.1	7.12	7.04	1.1	-	-	-	
Anions and Nutrients																		
Alkalinity, Total (CaCO3)	mg/L	-	149	148	0.7	473	480	1.5	89.8	87.1	3.1	224	223	0.4	-	-	-	
Ammonia	mg/L	Varies ⁷	1.39	1.39	0.0	4.86	4.93	1.4	0.0342	0.0333	2.7	12.1	11.2	7.7	-	-	-	
Chloride	mg/L	-	0.56	0.58	3.5	<5.000	<5.000	nc	<10.000	<10.000	nc	<10.000	<10.000	nc	-	-	-	
Fluoride	mg/L	0.12	0.081	0.062	nc	<0.200	<0.200	nc	<0.400	<0.400	nc	<0.400	<0.400	nc	-	-	-	
Nitrate	mg/L	13	<0.005	<0.005	nc	<0.050	<0.050	nc	<0.100	<0.100	nc	0.35	0.24	nc	-	-	-	
Nitrite	mg/L	0.06	<0.001	<0.001	nc	<0.010	<0.010	nc	<0.020	<0.020	nc	0.027	0.035	nc	-	-	-	
Total Kjeldahl Nitrogen	mg/L	-	1.87	1.91	2.1	6.19	6.14	0.8	0.071	0.058	nc	14.7	15.3	4.0	-	-	-	
Sulfate (SO4)	mg/L	-	135	135	0.0	968	948	2.1	1890	1900	0.5	1840	1420	25.8	-	-	-	
Sulfide	mg/L	-	0.024	0.024	nc	0.242	0.221	9.1	<0.020	<0.020	nc	0.021	<0.020	nc	-	-	-	
Anion Sum	mEq/L	-	5.8	5.8	-	29.6	29.3	-	41.1	41.3	-	42.8	34	-	-	-	-	
Cation Sum	mEq/L	-	6.76	6.73	-	29.9	29.9	-	40.6	40.4	-	38.2	38.6	-	-	-	-	
Cation - Anion Balance	%	-	7.7	7.4	-	0.4	1	-	-0.6	-1.1	-	-5.8	6.3	-	-	-	-	
Organic / Inorganic Carbon																		
Total Organic Carbon	mg/L	-	18.1	17.9	1.1	24.4	23.2	5.0	0.88	1.23	nc	28.9	15	63.3	-	-	-	
Total Inorganic Carbon	mg/L	-	30.2	36	17.5	105	103	1.9	12.4	13.6	9.2	43.3	45.2	4.3	-	-	-	
Cyanides																		
Total Cyanide	mg/L	-	<0.005	<0.005	nc	<0.005	<0.005	nc	<0.005	<0.005	nc	0.244	0.307	22.9	-	-	-	
Cyanide, Free	mg/L	0.005	<0.005	<0.005	nc	<0.005	<0.005	nc	<0.005	<0.005	nc	<0.010	0.023	nc	-	-	-	
Cyanide, WAD	mg/L	-	<0.005	<0.005	nc	<0.005	<0.005	nc	<0.005	<0.005	nc	<0.010	0.029	nc	-	-	-	
Thiocyanate (SCN)	mg/L	-	<0.5	<0.5	nc	<0.5	<0.5	nc	<0.5	<0.5	nc	2.5	2.44	2.4	-	-	-	

Table B
QA/AC Analytical Data

		Sample Location:	MW09-03			W14103083BH03			MW09-16	MW09-03	MW09-22	GSI-DC-06B	N/A	N/A
		Sample ID:	MW09-03	DUP4	RPD (%) ¹⁴	W14103083BH03	DUP-3	RPD (%) ¹⁴	FB1	FB2	FB3	FB4	TRIP BLANK 1	TRIP BLANK 2
		Date Sampled:	08/10/2014			08/10/2014			07/10/2014	08/10/2014	09/10/2014	10/10/2014	11/10/2014	11/10/2014
		Job Number	L1531123	L1531123		L1531123	L1531123		L1531123	L1531711	L1531711	L1531711		
		Well Status:	Sampled	Sampled		Sampled	Sampled		-	-	-	-	-	-
Parameter	Units	CCME FAL ^{3,4}												
Field Parameters														
Dissolved Oxygen	%	-	20.9	20.9	-	20.9	20.9	-	-	-	-	-	-	-
Dissolved Oxygen	mg/L	9.5 ⁶	0.92	0.92	-	1.17	1.17	-	-	-	-	-	-	-
Temperature	°C	-	1.37	1.37	-	1.5	1.5	-	-	-	-	-	-	-
pH	pH Units	6.5-9 ⁵	6.99	6.99	-	6.35	6.35	-	-	-	-	-	-	-
Specific Conductivity	uS/cm	-	NC	NC	-	337.7	337.7	-	-	-	-	-	-	-
Conductivity	uS/cm	-	2681	2681	-	185.8	185.8	-	-	-	-	-	-	-
Oxidation-Reduction Potential	mV	-	20.3	20.3	-	-76.2	-76.2	-	-	-	-	-	-	-
Field Sulfide	mg/L	-	0.00004	0.00004	-	h:mm	h:mm	-	-	-	-	-	-	-
Field Turbidity	NTU	-	0.75	0.75	-	13.2	13.2	-	-	-	-	-	-	-
Physical Tests														
Conductivity	uS/cm	-	2450	2490	1.6	761	751	1.3	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Hardness, Total (CaCO3)	mg/L	-	1580	1550	1.9	390	386	1.0	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
pH	pH Units	6.5-9 ⁵	7.82	7.63	2.5	6.8	6.9	1.5	5.59	5.68	5.39	5.59	5.55	5.49
Anions and Nutrients														
Alkalinity, Total (CaCO3)	mg/L	-	178	181	1.7	260	262	0.8	<2.000	<2.000	<2.000	<2.000	<2.000	<2.000
Ammonia	mg/L	Varies ⁷	1.06	1.06	0.0	6.13	6.07	1.0	<0.005	<0.005	<0.005	<0.005	0.0093	<0.005
Chloride	mg/L	-	<10.000	<10.000	nc	<2.500	2.9	nc	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
Fluoride	mg/L	0.12	<0.400	<0.400	nc	<0.100	<0.100	nc	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Nitrate	mg/L	13	<0.100	<0.100	nc	<0.025	<0.025	nc	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Nitrite	mg/L	0.06	<0.020	<0.020	nc	<0.005	<0.005	nc	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001
Total Kjeldahl Nitrogen	mg/L	-	1.43	1.5	4.8	7.45	7.41	0.5	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Sulfate (SO4)	mg/L	-	1530	1540	0.7	160	154	3.8	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
Sulfide	mg/L	-	<0.020	<0.020	nc	0.136	0.114	17.6	<0.020	<0.020	<0.020	<0.020	<0.020	<0.020
Anion Sum	mEq/L	-	35.5	35.6	-	8.53	8.54	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Cation Sum	mEq/L	-	35.1	34.5	-	13.7	13.5	-	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Cation - Anion Balance	%	-	-0.6	-1.6	-	23.4	22.6	-	0	0	0	0	0	0
Organic / Inorganic Carbon														
Total Organic Carbon	mg/L	-	6.18	6.19	0.2	30.6	32.4	5.7	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
Total Inorganic Carbon	mg/L	-	35.6	36.9	3.6	55.5	57	2.7	<0.500	<0.500	<0.500	<0.500	<0.500	<0.500
Cyanides														
Total Cyanide	mg/L	-	0.043	0.133	nc	<0.010	<0.010	nc	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cyanide, Free	mg/L	0.005	<0.010	<0.050	nc	<0.010	<0.010	nc	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Cyanide, WAD	mg/L	-	<0.010	<0.050	nc	<0.010	<0.010	nc	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005
Thiocyanate (SCN)	mg/L	-	<0.5	<0.5	nc	<0.5	<0.5	nc	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5

Table B
QA/AC Analytical Data

		Sample Location:	GSI-DC-07B			MW09-19			CH-P-13-05/50			MP09-05					
		Sample ID:	GSI-DC-07B	DUP6	RPD (%) ¹⁴	MW09-19	DUP2	RPD (%) ¹⁴	CH-P-13-05/50	DUP-1	RPD (%) ¹⁴	MP09-05	DUP 5	RPD (%) ¹⁴	MP09-05 METALS TEST	DUP 5 D-METALS TEST	RPD (%) ¹⁴
		Date Sampled:	10/10/2014			07/10/2014			07/10/2014			09/10/2014			09/10/2014		
		Job Number	L1531711	L1531711		L1531123	L1531123		L1531123	L1531123		L1531123	L1531123		L1531123	L1531123	
		Well Status:	Sampled	Sampled		Sampled	Sampled		Sampled	Sampled		Sampled	Sampled		Sampled	Sampled	
Parameter	Units	CCME FAL ^{3,4}															
Dissolved Metals																	
Aluminum	mg/L	Varies ⁸	0.0103	0.0102	1.0	0.0118	0.0117	0.9	0.0656	0.0668	1.8	0.0354	0.0336	5.2	0.0307**	0.0318**	3.5
Antimony	mg/L	-	0.00017	0.00015	nc	0.0002	0.00021	nc	<0.0005	<0.0005	nc	0.00048	0.00042	nc	0.00045	0.00047	nc
Arsenic	mg/L	0.005	0.144	0.15	4.1	0.105	0.107	1.9	0.00389	0.00376	3.4	0.0963	0.0956	0.7	0.0838	0.101	18.6
Barium	mg/L	-	0.0715	0.0698	2.4	0.0529	0.0531	0.4	0.00674	0.00697	3.4	0.122	0.123	0.8	0.121	0.123	1.6
Beryllium	mg/L	-	<0.0001	<0.0001	nc	<0.0002	<0.0002	nc	<0.0005	<0.0005	nc	<0.0002	<0.0002	nc	<0.0002	<0.0002	nc
Bismuth	mg/L	-	<0.0005	<0.0005	nc	<0.001	<0.001	nc	<0.0025	<0.0025	nc	<0.001	<0.001	nc	<0.001	<0.001	nc
Boron	mg/L	1.5	0.011	0.013	nc	0.223	0.239	6.9	<0.05	<0.05	nc	0.085	0.077	9.9	0.087	0.085	2.3
Cadmium	mg/L	Varies ⁹	<0.00001	<0.00001	nc	<0.00002	<0.00002	nc	0.333	0.326	2.1	0.000295	0.000263	11.5	0.000265	0.000254	4.2
Calcium	mg/L	-	73.7	73.5	0.3	304	307	1.0	453	453	0.0	471	477	1.3	477	474	0.6
Chromium	mg/L	0.001 ¹⁰	0.00045	0.00036	nc	0.00043	0.00041	nc	<0.0005	<0.0005	nc	0.00094	0.00084	nc	0.00078	0.00086	nc
Cobalt	mg/L	-	0.00155	0.00153	1.3	0.00227	0.00224	1.3	0.0382	0.0383	0.3	0.016	0.0159	0.6	0.0156	0.0159	1.9
Copper	mg/L	Varies ¹¹	<0.0002	0.0006	nc	<0.0004	<0.0004	nc	0.117	0.109	7.1	0.00115	0.00112	nc	0.00106	0.00111	nc
Iron	mg/L	0.3	14.3	14.1	1.4	18	18.2	1.1	12	11.8	1.7	69.1	71.6	3.6	68.2	69.5	1.9
Lead	mg/L	Varies ¹²	<0.00005	<0.00005	nc	<0.0001	<0.0001	nc	0.00636	0.00623	2.1	<0.0001	<0.0001	nc	<0.0001	<0.0001	nc
Lithium	mg/L	-	0.0011	0.00092	nc	0.0098	0.0103	5.0	0.0409	0.0421	2.9	<0.001	<0.001	nc	<0.001	<0.001	nc
Magnesium	mg/L	-	18.8	18.6	1.1	150	148	1.3	177	175	1.1	68.9	70.8	2.7	70.8	69.3	2.1
Manganese	mg/L	-	1.06	1.05	0.9	5.9	5.76	2.4	36.7	36	1.9	15.3	15.1	1.3	14.8	15	1.3
Mercury	mg/L	0.000026	<0.00001	<0.00001	nc	<0.00001	<0.00001	nc	0.000015	0.000017	nc	<0.00001	<0.00001	nc	<0.00001	<0.00001	nc
Molybdenum	mg/L	0.073	0.000378	0.000379	0.3	<0.0001	<0.0001	nc	0.00032	0.00032	0.0	0.00055	0.00051	7.5	0.00057	0.00061	6.8
Nickel	mg/L	Varies ¹³	0.00054	<0.0005	nc	0.0017	0.0017	nc	0.0141	0.0126	11.2	0.0052	0.005	3.9	0.0049	0.0051	4.0
Phosphorus	mg/L	-	0.083	0.081	nc	0.248	0.249	0.4	<0.05	<0.05	nc	<0.05	<0.05	nc	<0.05	<0.05	nc
Potassium	mg/L	-	2.37	2.36	0.4	8.06	8.14	1.0	4.86	4.85	0.2	8.75	8.89	1.6	8.94	8.85	1.0
Selenium	mg/L	0.001	0.00016	0.00019	nc	<0.0002	<0.0002	nc	<0.0005	<0.0005	nc	<0.0002	0.0002	nc	<0.0002	0.00026	nc
Silicon	mg/L	-	7.1	7.08	0.3	9.41	9.49	0.8	7.18	7.1	1.1	6.63	6.82	2.8	6.71	6.71	0.0
Silver	mg/L	0.0001	<0.00001	<0.00001	nc	<0.00002	<0.00002	nc	<0.00005	<0.00005	nc	<0.00002	<0.00002	nc	<0.00002	<0.00002	nc
Sodium	mg/L	-	13.2	13.1	0.8	14.5	14.6	0.7	8.67	8.2	5.6	83.8	81	3.4	80.2	82.3	2.6
Strontium	mg/L	-	0.239	0.23	3.8	0.982	1.08	9.5	0.56	0.525	6.5	1.25	1.15	8.3	1.25	1.26	0.8
Sulfur	mg/L	-	46.2	46	0.4	312	313	0.3	614	607	1.1	474	488	2.9	495	480	3.1
Thallium	mg/L	0.0008	<0.00001	<0.00001	nc	<0.00002	<0.00002	nc	0.00053	0.000543	2.4	0.000021	<0.00002	nc	<0.00002	0.000024	nc
Tin	mg/L	-	<0.0001	<0.0001	nc	<0.0002	<0.0002	nc	<0.0005	<0.0005	nc	<0.0002	<0.0002	nc	<0.0002	<0.0002	nc
Titanium	mg/L	-	<0.01	<0.01	nc	<0.02	<0.02	nc	<0.05	<0.05	nc	<0.02	<0.02	nc	<0.02	<0.02	nc
Uranium	mg/L	0.015	0.000034	0.000032	nc	0.000436	0.000434	0.5	0.000634	0.000649	2.3	0.00161	0.00142	12.5	0.00161	0.00164	1.8
Vanadium	mg/L	-	0.002	0.0019	nc	<0.002	<0.002	nc	<0.005	<0.005	nc	0.003	0.003	nc	0.0025	0.0031	nc
Zinc	mg/L	0.03	0.0017	<0.001	nc	<0.002	<0.002	nc	32.7	31.4	4.1	0.0147	0.0144	2.1	0.0142	0.0156	9.4

Table B
QA/AC Analytical Data

		Sample Location:	MW09-03			W14103083BH03			MW09-16	MW09-03	MW09-22	GSI-DC-06B	N/A	N/A
		Sample ID:	MW09-03	DUP4	RPD (%) ¹⁴	W14103083BH03	DUP-3	RPD (%) ¹⁴	FB1	FB2	FB3	FB4	TRIP BLANK 1	TRIP BLANK 2
		Date Sampled:	08/10/2014			08/10/2014			07/10/2014	08/10/2014	09/10/2014	10/10/2014	11/10/2014	11/10/2014
		Job Number	L1531123	L1531123		L1531123	L1531123		L1531123	L1531711	L1531711	L1531711		
		Well Status:	Sampled	Sampled		Sampled	Sampled		-	-	-	-	-	-
Parameter	Units	CCME FAL ^{3,4}												
Dissolved Metals														
Aluminum	mg/L	Varies ⁸	<0.01	<0.01	nc	0.0529	0.0502	5.2	0.0015	<0.001	<0.001	<0.001	-	-
Antimony	mg/L	-	0.547	0.527	3.7	0.00025	0.00029	nc	<0.0001	<0.0001	<0.0001	<0.0001	-	-
Arsenic	mg/L	0.005	0.838	0.73	13.8	0.0605	0.0688	12.8	<0.0001	<0.0001	<0.0001	<0.0001	-	-
Barium	mg/L	-	0.0474	0.0423	11.4	0.354	0.348	1.7	<0.00005	<0.00005	<0.00005	<0.00005	-	-
Beryllium	mg/L	-	<0.001	<0.001	nc	<0.0001	<0.0001	nc	<0.0001	<0.0001	<0.0001	<0.0001	-	-
Bismuth	mg/L	-	<0.005	<0.005	nc	<0.0005	<0.0005	nc	<0.0005	<0.0005	<0.0005	<0.0005	-	-
Boron	mg/L	1.5	0.1	<0.1	nc	<0.01	<0.01	nc	<0.01	<0.01	<0.01	<0.01	-	-
Cadmium	mg/L	Varies ⁹	0.00123	0.00114	7.6	<0.00001	<0.00001	nc	<0.00001	<0.00001	<0.00001	<0.00001	-	-
Calcium	mg/L	-	509	504	1.0	104	102	1.9	<0.05	<0.05	<0.05	<0.05	-	-
Chromium	mg/L	0.001 ¹⁰	<0.001	<0.001	nc	0.00074	0.00072	2.7	<0.0001	<0.0001	<0.0001	<0.0001	-	-
Cobalt	mg/L	-	0.0064	0.006	6.5	0.00062	0.00058	6.7	<0.0001	<0.0001	<0.0001	<0.0001	-	-
Copper	mg/L	Varies ¹¹	<0.002	<0.002	nc	<0.0002	<0.0002	nc	<0.0002	<0.0002	0.00027	<0.0002	-	-
Iron	mg/L	0.3	0.254	0.247	2.8	92.4	90.7	1.9	<0.01	<0.01	<0.01	<0.01	-	-
Lead	mg/L	Varies ¹²	<0.0005	<0.0005	nc	<0.00005	<0.00005	nc	<0.00005	<0.00005	<0.00005	<0.00005	-	-
Lithium	mg/L	-	<0.005	<0.005	nc	0.00081	0.00116	nc	<0.0005	<0.0005	<0.0005	<0.0005	-	-
Magnesium	mg/L	-	74.6	71.8	3.8	31.8	31.9	0.3	<0.1	<0.1	<0.1	<0.1	-	-
Manganese	mg/L	-	55.2	53.2	3.7	2.07	2.02	2.4	<0.00005	<0.00005	<0.00005	<0.00005	-	-
Mercury	mg/L	0.000026	<0.00001	<0.00001	nc	<0.00001	<0.00001	nc	<0.00001	<0.00001	<0.00001	<0.00001	-	-
Molybdenum	mg/L	0.073	0.00336	0.00246	nc	0.000095	0.000126	nc	<0.00005	<0.00005	<0.00005	<0.00005	-	-
Nickel	mg/L	Varies ¹³	<0.005	<0.005	nc	<0.0005	<0.0005	nc	<0.0005	<0.0005	<0.0005	<0.0005	-	-
Phosphorus	mg/L	-	0.057	0.07	nc	0.232	0.224	3.5	<0.00005	<0.00005	<0.00005	<0.00005	-	-
Potassium	mg/L	-	16.6	16.3	1.8	1.58	1.46	7.9	<0.1	<0.1	<0.1	<0.1	-	-
Selenium	mg/L	0.001	<0.001	<0.001	nc	0.00018	0.0002	nc	<0.0001	<0.0001	<0.0001	<0.0001	-	-
Silicon	mg/L	-	16	15.8	1.3	10.9	10.6	2.8	<0.05	<0.05	<0.05	<0.05	-	-
Silver	mg/L	0.0001	<0.0001	<0.0001	nc	<0.00001	<0.00001	nc	<0.00001	<0.00001	<0.00001	<0.00001	-	-
Sodium	mg/L	-	24.1	24.4	1.2	9.54	9.11	4.6	<0.05	<0.05	<0.05	<0.05	-	-
Strontium	mg/L	-	1.47	1.52	3.3	0.397	0.377	5.2	<0.0002	<0.0002	<0.0002	<0.0002	-	-
Sulfur	mg/L	-	520	508	2.3	53	53.9	1.7	<0.500	<0.500	<0.500	<0.500	-	-
Thallium	mg/L	0.0008	<0.0001	<0.0001	nc	<0.00001	<0.00001	nc	<0.00001	<0.00001	<0.00001	<0.00001	-	-
Tin	mg/L	-	<0.001	<0.001	nc	<0.0001	<0.0001	nc	<0.0001	<0.0001	<0.0001	<0.0001	-	-
Titanium	mg/L	-	<0.1	<0.1	nc	<0.01	<0.01	nc	<0.01	<0.01	<0.01	<0.01	-	-
Uranium	mg/L	0.015	0.00285	0.00266	6.9	0.000124	0.00013	nc	<0.00001	<0.00001	<0.00001	<0.00001	-	-
Vanadium	mg/L	-	<0.01	<0.01	nc	0.0021	0.002	nc	<0.001	<0.001	<0.001	<0.001	-	-
Zinc	mg/L	0.03	<0.01	<0.01	nc	0.0021	0.0019	nc	<0.001	<0.001	<0.001	<0.001	-	-

Table B
QA/AC Analytical Data

		Sample Location:		GSI-DC-07B			MW09-19			CH-P-13-05/50			MP09-05					
		Sample ID:	GSI-DC-07B	DUP6	RPD (%) ¹⁴	MW09-19	DUP2	RPD (%) ¹⁴	CH-P-13-05/50	DUP-1	RPD (%) ¹⁴	MP09-05	DUP 5	RPD (%) ¹⁴	MP09-05 METALS TEST	DUP 5 D-METALS TEST	RPD (%) ¹⁴	
			Date Sampled:			10/10/2014			07/10/2014			07/10/2014			09/10/2014			09/10/2014
		Job Number	L1531711	L1531711		L1531123	L1531123		L1531123	L1531123		L1531123	L1531123					
		Well Status:	Sampled	Sampled		Sampled	Sampled		Sampled	Sampled		Sampled	Sampled					
Parameter	Units	CCME FAL ^{3,4}																
Total Metals																		
Aluminum	mg/L	0.005-0.1 ⁸	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Antimony	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Arsenic	mg/L	0.005	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Barium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Beryllium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Bismuth	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Boron	mg/L	1.5	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Cadmium	mg/L	Varies ⁹	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Calcium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Chromium	mg/L	0.001 ¹⁰	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Cobalt	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Copper	mg/L	Varies ¹¹	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Iron	mg/L	0.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Lead	mg/L	Varies ¹²	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Lithium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Magnesium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Manganese	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Mercury	mg/L	0.000026	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Molybdenum	mg/L	0.073	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Nickel	mg/L	Varies ¹³	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Phosphorus	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Potassium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Selenium	mg/L	0.001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Silicon	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Silver	mg/L	0.0001	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Sodium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Strontium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Sulfur	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Thallium	mg/L	0.0008	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Tin	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Titanium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Uranium	mg/L	0.015	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Vanadium	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Zinc	mg/L	0.03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	

Table B
QA/AC Analytical Data

		Sample Location:	MW09-03			W14103083BH03			MW09-16	MW09-03	MW09-22	GS1-DC-06B	N/A	N/A
		Sample ID:	MW09-03	DUP4	RPD (%) ¹⁴	W14103083BH03	DUP-3	RPD (%) ¹⁴	FB1	FB2	FB3	FB4	TRIP BLANK 1	TRIP BLANK 2
		Date Sampled:	08/10/2014			08/10/2014			07/10/2014	08/10/2014	09/10/2014	10/10/2014	11/10/2014	11/10/2014
		Job Number	L1531123	L1531123		L1531123	L1531123		L1531123	L1531123	L1531123	L1531711	L1531711	L1531711
		Well Status:	Sampled	Sampled		Sampled	Sampled		-	-	-	-	-	-
Parameter	Units	CCME FAL ^{3,4}												
Total Metals														
Aluminum	mg/L	0.005-0.1 ⁸	-	-	-	-	-	-	-	-	-	-	<0.003	<0.003
Antimony	mg/L	-	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.0001
Arsenic	mg/L	0.005	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.0001
Barium	mg/L	-	-	-	-	-	-	-	-	-	-	-	<0.00005	<0.00005
Beryllium	mg/L	-	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.0001
Bismuth	mg/L	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.0005
Boron	mg/L	1.5	-	-	-	-	-	-	-	-	-	-	<0.01	<0.01
Cadmium	mg/L	Varies ⁹	-	-	-	-	-	-	-	-	-	-	<0.00001	<0.00001
Calcium	mg/L	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.05
Chromium	mg/L	0.001 ¹⁰	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.0001
Cobalt	mg/L	-	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.0001
Copper	mg/L	Varies ¹¹	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.0005
Iron	mg/L	0.3	-	-	-	-	-	-	-	-	-	-	<0.01	<0.01
Lead	mg/L	Varies ¹²	-	-	-	-	-	-	-	-	-	-	<0.00005	<0.00005
Lithium	mg/L	-	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.0005
Magnesium	mg/L	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1
Manganese	mg/L	-	-	-	-	-	-	-	-	-	-	-	<0.00005	<0.00005
Mercury	mg/L	0.000026	-	-	-	-	-	-	-	-	-	-	<0.00001	<0.00001
Molybdenum	mg/L	0.073	-	-	-	-	-	-	-	-	-	-	<0.00005	<0.00005
Nickel	mg/L	Varies ¹³	-	-	-	-	-	-	-	-	-	-	<0.0005	<0.0005
Phosphorus	mg/L	-	-	-	-	-	-	-	-	-	-	-	<0.050	<0.050
Potassium	mg/L	-	-	-	-	-	-	-	-	-	-	-	<0.1	<0.1
Selenium	mg/L	0.001	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.0001
Silicon	mg/L	-	-	-	-	-	-	-	-	-	-	-	<0.05	<0.05
Silver	mg/L	0.0001	-	-	-	-	-	-	-	-	-	-	<0.00001	<0.00001
Sodium	mg/L	-	-	-	-	-	-	-	-	-	-	-	<0.050	<0.050
Strontium	mg/L	-	-	-	-	-	-	-	-	-	-	-	<0.0002	<0.0002
Sulfur	mg/L	-	-	-	-	-	-	-	-	-	-	-	<0.500	<0.500
Thallium	mg/L	0.0008	-	-	-	-	-	-	-	-	-	-	<0.00001	<0.00001
Tin	mg/L	-	-	-	-	-	-	-	-	-	-	-	<0.0001	<0.0001
Titanium	mg/L	-	-	-	-	-	-	-	-	-	-	-	<0.01	<0.01
Uranium	mg/L	0.015	-	-	-	-	-	-	-	-	-	-	<0.00001	<0.00001
Vanadium	mg/L	-	-	-	-	-	-	-	-	-	-	-	<0.001	<0.001
Zinc	mg/L	0.03	-	-	-	-	-	-	-	-	-	-	<0.003	<0.003

Notes

- (1) CCME guideline exceedences shaded with dark grey. Light grey shading denotes reportable detection limit in exceedence of CCME Guideline.
- (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 values are 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 values are 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) = $10\{0.83(\log[\text{hardness}]) - 2.46\}$
 0.00 if H > 280
- (10) Chromium CCME FAL guidelines are expressed in chromium, hexavalent (CrVI). All laboratory data is expressed in total chromium. Total chromium values over 0.001 mg/l are flagged as
- (11) Copper varies with Hardness in mg/L as follows for CCME FAL:
 0.002 if H < 82
 0.002 - 0.004 if H ≥ 82 and H ≤ 180 as follows;
 CWQG (µg/L) = $0.2 * e\{0.8545[\ln(\text{hardness})] - 1.465\}$
 0.004 if H > 180
- (12) Lead varies with Hardness in mg/L as follows for CCME FAL:
 0.001 if H < 60
 .001 - 0.00 if H ≥ 60 and H ≤ 180 as follows;
 CWQG (µg/L) = $e\{1.273[\ln(\text{hardness})] - 4.705\}$
 0.007 if H > 180
- (13) Nickel varies with Hardness in mg/L as follows for CCME FAL:
 0.025 if H < 60
 0.025 - 0.15 if H ≥ 60 and H ≤ 180 as follows;
 CWQG (µg/L) = $e\{0.76[\ln(\text{hardness})] + 1.06\}$
 0.15 if H > 180
- (14) RPD = Relative Percent Difference. RPD is calculated as 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.
- * indicates in the absence of field temperature data, CCME guidelines for ammonia are calculated using the highest recorded value from the fall 2014 sampling event (4.96°C)
- ** indicates in the absence of both field and lab pH data, CCME guidelines are calculated using the most stringent guidelines available.
- Indicates QAQC values exceed expected results (RDP values exceed 20% or QAQC analysis is above reportable detection limits)**

APPENDIX A

Site Photographs



Photo 1: View of drive point wells GSI-DC-01A and GSI-DC-01B. Photo taken on October 7th, 2014.



Photo 2: View of drive point wells GSI-DC-02A and GSI-DC-02B. Photo taken on October 7th, 2014.



Photo 3: View of drive point wells GSI-DC-03A and GSI-DC-03B. Photo taken on October 7th, 2014.



Photo 4: View of drive point wells GSI-DC-05A and GSI-DC-05B. Photo taken on October 9th, 2014.



Photo 5: View of drive point wells GSI-DC-06A and GSI-DC-06B. Photo taken on October 10th, 2014.



Photo 6: View of drive point wells GSI-DC-07A and GSI-DC-07B. Photo taken on October 10th, 2014.



Photo 7: View of drive point wells GSI-DC-08A and GSI-DC-08B. Photo taken on October 10th, 2014.



Photo 8: View of drive point wells GSI-DC-09A and GSI-DC-09B. Photo taken on October 10th, 2014.



Photo 9: View of drive point wells GSI-DC-10A and GSI-DC-10B. Photo taken on October 10th, 2014.



Photo 10: View of drive point well GSI-HA-01A. Photo taken on October 7th, 2014.



Photo 11: View of drive point well GSI-HA-02A. Photo taken on October 7th, 2014.



Photo 12: View of drive point well GSI-HA-03A. Photo taken on October 7th, 2014.



Photo 13: View of drive point well GSI-HA-04A. Photo taken on October 7th, 2014.



Photo 14: View of drive point well GSI-HA-05A. Photo taken on October 7th, 2014.



Photo 15: View of well MW09-15. Photo taken on October 7th, 2014.



Photo 16: View of damaged well MW09-16. Photo taken on October 7th, 2014.



Photo 17: View of well MW09-17. Photo taken on October 7th, 2014.



Photo 18: View of well MW09-18. Photo taken on October 7th, 2014.



Photo 19: View of well MW09-19. Photo taken on October 7th, 2014.



Photo 20: View of well CH-P-13-01/10. Photo taken on October 9th, 2014.



Photo 21: View of well CH-P-13-03/10. Photo taken on October 7th, 2014.



Photo 22: View of well CH-P-13-03/50. Photo taken on October 7th, 2014.



Photo 23: View of well CH-P-13-04/10. Photo taken on October 7th, 2014.



Photo 24: View of well CH-P-13-04/35. Photo taken on October 7th, 2014.



Photo 25: View of well CH-P-13-05/50. Photo taken on October 7th, 2014.



Photo 26: View of well GLL07-01. Photo taken on October 7th, 2014.



Photo 27: View of well GLL07-02. Photo taken on October 8th, 2014.



Photo 28: View of well GLL07-03. Photo taken on October 7th, 2014.



Photo 29: View of well MW09-13. Photo taken on October 7th, 2014.



Photo 30: View of well MW09-14. Photo taken on October 7th, 2014.



Photo 31: View of well GSI-PC-02A and GSI-PC-02B. Photo taken on October 7th, 2014.



Photo 32: View of well GSI-PC-03A and GSI-PC-03B. Photo taken on October 8th, 2014.



Photo 33: View of well GSI-PC-04A and GSI-PC-04B. Photo taken on October 8th, 2014.



Photo 34: View of well GSI-PC-05A and GSI-PC-05B. Photo taken on October 8th, 2014.



Photo 35: View of well MP09-02. Photo taken on October 7th, 2014.



Photo 36: View of well MP09-03. Photo taken on October 7th, 2014.



Photo 37: View of well MP09-08. Photo taken on October 8th, 2014.



Photo 38: View of well W14103083BH01. Photo taken on October 9th, 2014.



Photo 39: View of well W14103083BH02. Photo taken on October 9th, 2014.



Photo 40: View of well W14103083BH04. Photo taken on October 9th, 2014.



Photo 41: View of well MP09-04. Photo taken on October 9th, 2014.



Photo 42: View of well MP09-05. Photo taken on October 9th, 2014.



Photo 43: View of well MP09-09 and MP09-10. Photo taken on October 10th, 2014.



Photo 44: View of well MP09-11 and MP09-12. Photo taken on October 9th, 2014.



Photo 45: View of well MP09-14. Photo taken on October 9th, 2014.



Photo 46: View of well MW09-01. Photo taken on October 8th, 2014.



Photo 47: View of well MW09-02. Photo taken on October 8th, 2014.



Photo 48: View of well MW09-03 and MW09-04. Photo taken on October 8th, 2014.

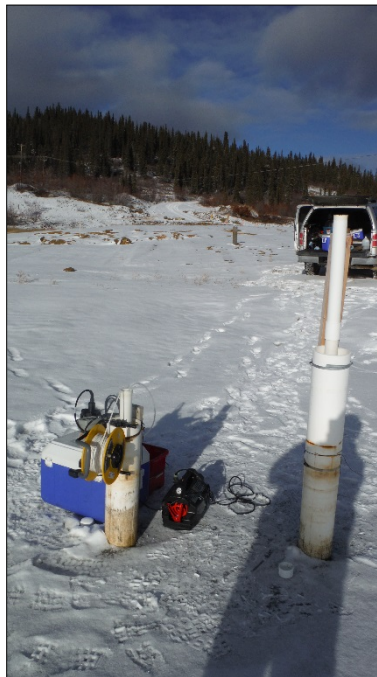


Photo 49: View of well MW09-05 and MW09-06. Photo taken on October 8th, 2014.



Photo 50: View of well MW09-07. Photo taken on October 10th, 2014.



Photo 51: View of well MW09-08. Photo taken on October 9th, 2014.



Photo 52: View of well MW09-11. Photo taken on October 8th, 2014.



Photo 53: View of well MW09-20. Photo taken on October 9th, 2014.



Photo 54: View of well MW09-21. Photo taken on October 9th, 2014.



Photo 55: View of well MW09-22. Photo taken on October 8th, 2014.



Photo 56: View of well MW09-23. Photo taken on October 8th, 2014.



Photo 57: View of well MW09-24. Photo taken on October 9th, 2014.



Photo 58: View of well W14103083BH03. Photo taken on October 8th, 2014.



Photo 59: View of well CH-P-13-02/10. Photo taken on October 9th, 2014.

APPENDIX B

Field Forms



GROUNDWATER SAMPLE COLLECTION SHEET

well sealed
w/ cap;
good

Well Number:	MW09-20	Project Number:	1343-005.03	Date:	9 Oct 2014
Approximate Date Drilled:	unknown in field	Client:	YG-AAM	Sampler:	AB JL
Piezometer Diameter / Screen Length:	2" PVC / unknown in field	Project Name:	October 2014 Mt. Nansen Groundwater	Weather/Temp:	Overcast, light wind, cold ~ -30
CHV (ppm / % LEL):	CO ₂ 600 O ₂ 20.9% CH ₄ 0% LEL	Duplicate Collected:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Recovery:	<input type="checkbox"/> Good <input type="checkbox"/> Bad
Purge Method					
Waterra	Peristaltic	Disp. Bailer	Subm. Pump	Air Lift	Other
Initial Depth to Water (m):	N/A	Calculations:	Purge Start Time:	Purge End Time:	
Depth to Bottom (m):	3.71	dry	Time () min. interval (24h)		
Submerged Tubing Depth (m):			Depth (m)		
Well Stick-up Height (m):	0.90		Temperature (°C)		
Estimated Water Volume (L):			pH		
(DTB - DTW) x 2 (for 2" well diameter) = 1 well volume			Cond. (µs/cm)		
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume			Specific Cond. (µs/cm)		
2" casing has 0.16 USgal/ft or 2.032 l/m			Redox (mV)		
1" casing has 0.04 USgal/ft or 0.508 l/m			DO (mg/L)		
8" sand pack has 0.73 USgal/ft or 9.271 l/m			Appearance & Odour (Clear, Silty, HC odours, etc.)		
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m			Interval Purge Volume (L)		
		Cumulative Purge Volume (L)			
		Total Purge Volume:			
Method:	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Subm. Pump
Analysis					
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)
				<input type="checkbox"/> Yes	
				<input type="checkbox"/> No	
					Comments

Pine MiniRae PID + EER Solinst w/ tape



Sample Site (Con't): MW09-20 *crypt name =*

Field UTM Location: Zn: 08V Easting: 0389590 Northing: 6980587

*Hemera
Whitlock
GPS*

Photo Nos.: 131-135

*Hemera
Van
Camera*

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	
Temperature (°C)	
DO (mg/L)	
Specific Cond. (µs/cm)	
Cond. (µs/cm)	
pH	
Redox (mV)	
Turbidity (NTU)	
DO (mg/L)	

Additional Purge Data - Continued from Front of Page (if required)					
Time () minute interval:					
Depth (m)					
Temperature (°C)					
pH					
Cond. (µs/cm)					
Specific Cond. (µs/cm)					
Redox (mV)					
DO (mg/L)					
Appearance & Odour (Clear, Silty, HC odours, etc.)					
Interval Purge Volume (L)					
Cumulative Purge Volume (L)					
Total Purge Volume:					

General Notes (Condition of well or other features):

2" PVC well inside red stick up protector, all in good condition



GROUNDWATER SAMPLE COLLECTION SHEET

Well Number:	MP09-03		Project Number:	1343-005.03		Date:	7 Oct 2014	
Approximate Date Drilled:	unknown in field		Client:	YG-AAM		Sampler:	AB JL	
Piezometer Diameter / Screen Length:	1/2" PVC inside 1" steel/unknown in field		Project Name:	October 2014 Mt.Nansen Groundwater		Weather/Temp:	overcast, light snow, ~ -5°C	
CHV (ppm / % LEL):	0% CO ₂	20.9% CH ₄	Duplicate Collected:	<input checked="" type="checkbox"/> ID: No		Recovery:	<input type="checkbox"/> Good <input type="checkbox"/> Bad	
Purge Method								
Waterra		Peristaltic		Disp. Bailer		Subm. Pump		Air Lift
								Other
Initial Depth to Water (m):				Calculations:		Purge Start Time:		Purge End Time:
Depth to Bottom (m):				0.73m to ice/obstruction, micro w/L tape won't break through		Time () min. interval (24h)		
Submerged Tubing Depth (m):						Depth (m)		
Well Stick-up Height (m):		0.73				Temperature (°C)		
Estimated Water Volume (L):						pH		
(DTB - DTW) x 2 (for 2" well diameter) = 1 well volume						Cond. (µs/cm)		
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume						Specific Cond. (µs/cm)		
2" casing has 0.16 USgal/ft or 2.032 l/m						Redox (mV)		
1" casing has 0.04 USgal/ft or 0.508 l/m						DO (mg/L)		
8" sand pack has 0.73 USgal/ft or 9.271 l/m						Appearance & Odour (Clear, Silty, HC odours, etc.)		
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m						Interval Purge Volume (L)		
						Cumulative Purge Volume (L)		
						Total Purge Volume:		
Method:	Waterra		Peristaltic		Disp. Bailer		Steel Bailer	
Analysis								
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)		Comments	
				<input type="checkbox"/> Yes				
				<input type="checkbox"/> No				

Pine MiniRae PID, ELR Solinst w/L tape



Sample Site (Con't): M809-03 Wpt #

Field UTM Location: Zn: 08 V Easting: 0388958 Northing: 6881742

} Hemmera
Whitehorse
GPS Photo Nos.: 61-65 } Hemmera
Vine
Camera

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	
Temperature (°C)	
DO (mg/L)	
Specific Cond. (µs/cm)	
Cond. (µs/cm)	
pH	
Redox (mV)	
Turbidity (NTU)	
DO (mg/L)	

Additional Purge Data — Continued from Front of Page (if required)					
Time () minute interval:					
Depth (m)					
Temperature (°C)					
pH					
Cond. (µs/cm)					
Specific Cond. (µs/cm)					
Redox (mV)					
DO (mg/L)					
Appearance & Odour (Clear, Silty, HC odours, etc.)					
Interval Purge Volume (L)					
Cumulative Purge Volume (L)					
Total Purge Volume:					

General Notes (Condition of well or other features):
<p>1/2" PVC casing inside 1" rusty steel protector, along creek bank just before PC crossing below main road</p> <p>Was existing 1/2" tubing + silicon in well at bottom, had to pull and twist to break free from ice at creek surface (tubing was sitting @ bottom of well)</p> <p>→ tried ~ 5 min to get WL tape and/or existing tubing into well below ice (where tubing came up from) w/ no success</p>



GROUNDWATER SAMPLE COLLECTION SHEET

See reverse for details of "A"

Well Number:	GSI-PC-02B		Project Number:	1343-005.03		Date:	7 Oct 2014	
Approximate Date Drilled:	unknown in field		Client:	YG-AAM		Sampler:	AB JC	
Piezometer Diameter / Screen Length:	~3/4" stainless drive point / unknown in field		Project Name:	October 2014 Mt. Nansen Groundwater		Weather/Temp:	overcast, light snow, ~ -5°C	
CHV (ppm / % LEL):	CO ₂ 530	CH ₄ 2%	Duplicate Collected:	<input checked="" type="checkbox"/> ID: NO		Recovery:	<input type="checkbox"/> Good <input type="checkbox"/> Bad	
Purge Method								
Waterra		Peristaltic		Disp. Bailer		Subm. Pump		Air Lift
								Other
Initial Depth to Water (m):		N/A - ice		Calculations:		Purge Start Time:		Purge End Time:
Depth to Bottom (m):		0.89		Water level tape won't pass ice in casing, can hear water running in creek underneath		Time () min. interval (24h)		
Submerged Tubing Depth (m):		N/A				Depth (m)		
Well Stick-up Height (m):		0.85				Temperature (°C)		
Estimated Water Volume (L):		N/A				pH		
(DTB - DTW) x 2 (for 2" well diameter) = 1 well volume (DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume 2" casing has 0.16 USgal/ft or 2.032 l/m 1" casing has 0.04 USgal/ft or 0.508 l/m 8" sand pack has 0.73 USgal/ft or 9.271 l/m 6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		Cond. (µs/cm)						
		Specific Cond. (µs/cm)						
		Redox (mV)						
		DO (mg/L)						
		Appearance & Odour (Clear, Silty, HC odours, etc.)						
		Interval Purge Volume (L)						
		Cumulative Purge Volume (L)						
		Total Purge Volume:						
Method:	Waterra		Peristaltic		Disp. Bailer		Steel Bailer	
Analysis								
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)		Comments	
				<input type="checkbox"/> Yes				
				<input type="checkbox"/> No				

25cm ID Ø

Sealed w/ plastic cap (good seal)

above snow/ice



Sample Site (Con't): GS 1-FC-02 B ^{wpt #} (A is the same)

Field UTM Location: Zn: 08 V Easting: 0388907 Northing: 6881786

Photo Nos.: 56-60 } Hemmera Van Camera

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	
Temperature (°C)	
DO (mg/L)	
Specific Cond. (µs/cm)	
Cond. (µs/cm)	
pH	
Redox (mV)	
Turbidity (NTU)	
DO (mg/L)	

Additional Purge Data - Continued from Front of Page (if required)					
Time () minute interval:					
Depth (m)					
Temperature (°C)					
pH					
Cond. (µs/cm)					
Specific Cond. (µs/cm)					
Redox (mV)					
DO (mg/L)					
Appearance & Odour (Clear, Silty, HC odours, etc.)					
Interval Purge Volume (L)					
Cumulative Purge Volume (L)					
Total Purge Volume:					

General Notes (Condition of well or other features)	
	<p>"A" → same well construction as "B", except no cap, has plastic ziplock bag cover (poor seal)</p> <p>O₂ = 20.9%</p> <p>CO₂ = 430</p> <p>CH₄ = 0% LEL</p> <p>DTW = ice blockage</p> <p>DTB = 0.85m btoe</p> <p>→ no water</p> <p>ice blockage, water level tape won't pass</p> <p>→ Same photos + GPS coordinates</p> <p>Stick up ht ≈ 0.83m above snow/ice</p>

GROUNDWATER SAMPLE COLLECTION SHEET

Well Number:	CH- P-13- 04/35	Project Number:	1343-005.03	Date:	7 Oct 2014		
Approximate Date Drilled:	Unknown in field	Client:	YG-AAM	Sampler:	AB SL		
Piezometer Diameter / Screen Length:	2" PVC / unknown in field	Project Name:	October 2014 Mt.Nansen Groundwater	Weather/Temp:	Overcast, light wind & snow, ~-5°C		
CHV (ppm / % LEL):	CO ₂ 550 CH ₄ 26.9% 0% LEL	Duplicate Collected:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	Recovery:	<input type="checkbox"/> Good <input type="checkbox"/> Bad		
Purge Method							
Waterra	Peristaltic	Disp. Bailer	Subm. Pump	Air Lift	Other		
Initial Depth to Water (m):	N/A - dry	Calculations:	Purge Start Time:	Purge End Time:			
Depth to Bottom (m): (Blockage?)	6.50	No water detected on WL tape. Also existing 1" bailer inside well, dropped bailer down to hollow (plastic?) sounding blockage @ 6.50 m and no water in bailer	Time () min. interval (24h)				
Submerged Tubing Depth (m):	N/A		Depth (m)				
Well Stick-up Height (m):	0.61		Temperature (°C)				
Estimated Water Volume (L):	N/A		pH				
(DTB - DTW) x 2 (for 2" well diameter) = 1 well volume			Cond. (µs/cm)				
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume			Specific Cond. (µs/cm)				
2" casing has 0.16 USgal/ft or 2.032 l/m			Redox (mV)				
1" casing has 0.04 USgal/ft or 0.508 l/m			DO (mg/L)				
8" sand pack has 0.73 USgal/ft or 9.271 l/m			Appearance & Odour (Clear, Silty, HC odours, etc.)				
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m			Interval Purge Volume (L)				
		Cumulative Purge Volume (L)					
		Total Purge Volume:					
Method:	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Subm. Pump	Air Lift	Other
Analysis							
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)	Comments	
				<input type="checkbox"/> Yes			
				<input type="checkbox"/> No			

Pine MiniRac PID, ELR Subst micro WL tape,



Sample Site (Con't): CH-P-13-05/35 Wyp #

Field UTM Location: Zn: 08V

Easting: 0389136

Northing: 6881472

} Hemmera
whitehorse
GPS

Photo Nos.: 46-50

} Hemmera
Van
Camera

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	
Temperature (°C)	
DO (mg/L)	
Specific Cond. (µs/cm)	
Cond. (µs/cm)	
pH	
Redox (mV)	
Turbidity (NTU)	
DO (mg/L)	

Additional Purge Data - Continued from Front of Page (if required)					
Time () minute interval:					
Depth (m)					
Temperature (°C)					
pH					
Cond. (µs/cm)					
Specific Cond. (µs/cm)					
Redox (mV)					
DO (mg/L)					
Appearance & Odour (Clear, Silty, HC odours, etc.)					
Interval Purge Volume (L)					
Cumulative Purge Volume (L)					
Total Purge Volume:					

General Notes (Condition of well or other features):

Metal stick protector w/ 1" PVC well (poor fitting cap) and transducer controller/junction box.
Existing 1" bailer in well. Used bailer to verify no water in well → bailer makes a hollow sound when encountering blockage or bottom @ 6.50m → based on well name, assume DTB should be 35m?



GROUNDWATER SAMPLE COLLECTION SHEET

slits in *
casing,
no seal

Well Number:	MW09-13	Project Number:	1343-005.03	Date:	7 Oct 2044
Approximate Date Drilled:	unknown in field	Client:	YG-AAM	Sampler:	AB / JL
Piezometer Diameter / Screen Length:	2" PVC / unknown in field	Project Name:	October 2014 Mt. Nansen Groundwater	Weather/Temp:	overcast, light wind, light snow ~ -30C
CHV (ppm / % LEL):	CO2 960 LEL 0% O2 20.9 0%	Duplicate Collected:	<input type="checkbox"/> ID:	Recovery:	<input type="checkbox"/> Good <input type="checkbox"/> Bad
Purge Method					
Waterra		Peristaltic		Disp. Bailer	
				Subm. Pump	
				Air Lift	
				Other	
Initial Depth to Water (m):	N/A	Calculations:	Purge Start Time:	Purge End Time:	
Depth to Bottom (m):	blockage 9.02	Suspect DTB = blockage = frozen, see reverse	Time () min. interval (24h)		
Submerged Tubing Depth (m):	N/A		Depth (m)		
Well Stick-up Height (m):	6.75		Temperature (°C)		
Estimated Water Volume (L):	N/A		pH		
$(DTB - DTW) \times 2$ (for 2" well diameter) = 1 well volume $(DTB - DTW) \times 1.1$ (for 1.5" diameter) = 1 well volume 2" casing has 0.16 USgal/ft or 2.032 l/m 1" casing has 0.04 USgal/ft or 0.508 l/m 8" sand pack has 0.73 USgal/ft or 9.271 l/m 6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m			Cond. (µs/cm)		
			Specific Cond. (µs/cm)		
			Redox (mV)		
			DO (mg/L)		
			Appearance & Odour (Clear, Silty, HC odours, etc.)		
			Interval Purge Volume (L)		
		Cumulative Purge Volume (L)			
		Total Purge Volume:			
Method:	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Subm. Pump
Analysis					
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)
				<input type="checkbox"/> Yes	
				<input type="checkbox"/> No	
Comments					

Same equipment as GLL 07-01



Sample Site (Con't): MW09-13 Hemmera Whitehorse GPS

Field UTM Location: Zn: 08 V Easting: 0389006 Northing: 6881664

} wpt
MW09-13 Photo Nos.: 11-15

Hemmera
Van
Camera

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	
Temperature (°C)	
DO (mg/L)	
Specific Cond. (µs/cm)	
Cond. (µs/cm)	
pH	
Redox (mV)	
Turbidity (NTU)	
DO (mg/L)	

Additional Purge Data – Continued from Front of Page (if required)					
Time () minute interval:					
Depth (m)					
Temperature (°C)					
pH					
Cond. (µs/cm)					
Specific Cond. (µs/cm)					
Redox (mV)					
DO (mg/L)					
Appearance & Odour (Clear, Silty, HC odours, etc.)					
Interval Purge Volume (L)					
Cumulative Purge Volume (L)					
Total Purge Volume:					

General Notes (Condition of well or other features)
Red metal stick up protector, on high side of road, beside MW09-14. Protector + well in good condition, well sealed w/ cap (ID on cap) but slits cut into casing below cap, so vapours = ambient. No existing tubing or transducer in well, but no water measured, suspect frozen well as with GLL07-01, MW09-15 + MW09-14



GROUNDWATER SAMPLE COLLECTION SHEET

Well Number:	MW09-14	Project Number:	1343-005.03	Date:	7 Oct 2014
Approximate Date Drilled:	unknown in field	Client:	YG-AAM	Sampler:	AB JL
Piezometer Diameter / Screen Length:	2" PVC / unknown in field	Project Name:	October 2014 Mt. Nansen Groundwater	Weather/Temp:	overcast, light snow, light wind ~ -3°C
CHV (ppm / % LEL):	not recorded,	Duplicate Collected:	<input type="checkbox"/> ID:	Recovery:	<input type="checkbox"/> Good <input type="checkbox"/> Bad
Purge Method	See reverse				
Watera	Peristaltic	Disp. Bailer	Subm. Pump	Air Lift	Other
Initial Depth to Water (m):	N/A	Calculations:	Purge Start Time:	Purge End Time:	
Depth to Bottom (m):	6.94	See reverse, suspect DTB = ice/frozen	Time () min. interval (24h)		
Submerged Tubing Depth (m):	N/A		Depth (m)		
Well Stick-up Height (m):	0.73		Temperature (°C)		
Estimated Water Volume (L):	N/A		pH		
(DTB - DTW) x 2 (for 2" well diameter) = 1 well volume (DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume 2" casing has 0.16 USgal/ft or 2.032 l/m 1" casing has 0.04 USgal/ft or 0.508 l/m 8" sand pack has 0.73 USgal/ft or 9.271 l/m 6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m			Cond. (µs/cm)		
			Specific Cond. (µs/cm)		
			Redox (mV)		
			DO (mg/L)		
			Appearance & Odour (Clear, Silty, HC odours, etc.)		
			Interval Purge Volume (L)		
		Cumulative Purge Volume (L)			
		Total Purge Volume:			
Method:	Watera	Peristaltic	Disp. Bailer	Steel Bailer	Subm. Pump
Analysis					
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)
				<input type="checkbox"/> Yes	
				<input type="checkbox"/> No	
					Comments

Same equipment as GLL07-01 (except too cold for PID)

slits in PVC casing below cap, poor seal



Sample Site (Con't): MW09-14 wpt MW0914

Field UTM Location: Zn: 08 V Easting: 0389008 Northing: 6881664

} Hemmera Whitehorse
GPS

Photo Nos.: 16-20

} Hemmera
Van
Camera

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	
Temperature (°C)	
DO (mg/L)	
Specific Cond. (µs/cm)	
Cond. (µs/cm)	
pH	
Redox (mV)	
Turbidity (NTU)	
DO (mg/L)	

Additional Purge Data - Continued from Front of Page (if required)					
Time () minute interval:					
Depth (m)					
Temperature (°C)					
pH					
Cond. (µs/cm)					
Specific Cond. (µs/cm)					
Redox (mV)					
DO (mg/L)					
Appearance & Odour (Clear, Silty, HC odours, etc.)					
Interval Purge Volume (L)					
Cumulative Purge Volume (L)					
Total Purge Volume:					

General Notes (Condition of well or other features)
Metal stick + 2" PVC w cap → all good condition (right beside MW09-13) PVC cap on well but slits cut below = no seal = ambient air (no CHV recorded because too cold for PID) Existing 5/8" tubing in well which can't be pulled up or moved, therefore suspect frozen just like MW09-13, MW09-15 + GIL07-01



GROUNDWATER SAMPLE COLLECTION SHEET

properly
sealed
well

Well Number:	GLL 07-01	Project Number:	1343-005.03	Date:	7 Oct 2014
Approximate Date Drilled:	unknown in field	Client:	YG-AAM	Sampler:	AB JL
Piezometer Diameter / Screen Length:	2" PVC / unknown in field	Project Name:	October 2014 Mt. Nansen Groundwater	Weather/Temp:	overcast, very light snow, ~ -3°C
CHV (ppm / % LEL):	O ₂ 15.3% CH ₄ 0 CO ₂ 2.00% LEL	Duplicate Collected:	<input type="checkbox"/> ID:	Recovery:	<input type="checkbox"/> Good <input type="checkbox"/> Bad
Purge Method					
Watertra	Peristaltic	Disp. Bailer	Subm. Pump	Air Lift	Other
Initial Depth to Water (m):	N/A	Calculations:	Purge Start Time:	Purge End Time:	
Depth to Bottom (m):	Block 13.890	Depth to blockage / obstruct (likely ice) = 13.890 m (bto c)	Time () min. interval (24h)		
Submerged Tubing Depth (m):	N/A		Depth (m)		
Well Stick-up Height (m):	0.75 m		Temperature (°C)		
Estimated Water Volume (L):	N/A		pH		
(DTB - DTW) x 2 (for 2" well diameter) = 1 well volume			Cond. (µs/cm)		
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume			Specific Cond. (µs/cm)		
2" casing has 0.16 USgal/ft or 2.032 l/m			Redox (mV)		
1" casing has 0.04 USgal/ft or 0.508 l/m			DO (mg/L)		
8" sand pack has 0.73 USgal/ft or 9.271 l/m			Appearance & Odour (Clear, Silty, HC odours, etc.)		
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m			Interval Purge Volume (L)		
		Cumulative Purge Volume (L)			
		Total Purge Volume:			
Method:	Watertra	Peristaltic	Disp. Bailer	Steel Bailer	Subm. Pump
Analysis					
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)
				<input type="checkbox"/> Yes	
				<input type="checkbox"/> No	
					Comments

Equipment = Hemmner Heron H01-L, double checked ✓ ELR shall wL tape

PID Mini Rze Pine 17815



Sample Site (Con't): GLL07-01

Wpt GLL07-01

Field UTM Location: Zn: 08 ✓

Easting: 6388854

Northing: 6881783

} Hemmera with these
GPS

Photo Nos.: 1-5, Hemmera Van
Camera

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	
Temperature (°C)	
DO (mg/L)	
Specific Cond. (µs/cm)	
Cond. (µs/cm)	
pH	
Redox (mV)	
Turbidity (NTU)	
DO (mg/L)	

Additional Purge Data - Continued from Front of Page (if required)					
Time () minute interval:					
Depth (m)					
Temperature (°C)					
pH					
Cond. (µs/cm)					
Specific Cond. (µs/cm)					
Redox (mV)					
DO (mg/L)					
Appearance & Odour (Clear, Silty, HC odours, etc.)					
Interval Purge Volume (L)					
Cumulative Purge Volume (L)					
Total Purge Volume:					

General Notes (Condition of well or other features):

On high side of main road, red metal stick up protector w/ ID on protector. 2" PVC w/ PVC cap, well ID also on cap. Protector + well in good shape.
Existing 5/8" tubing in well, frozen in place, can't be moved/pulled up.
No water encountered in DTW/DTB check (ie no beeps) → presume blockage due to ice/frozen



GROUNDWATER SAMPLE COLLECTION SHEET

no cap on well

Well Number:	MW09-15	Project Number:	1343-005.03	Date:	7 Oct 2014
Approximate Date Drilled:	unknown in field	Client:	YG-AAM	Sampler:	AB JL
Piezometer Diameter / Screen Length:	2" PVC (no cap) / unknown in field	Project Name:	October 2014 Mt.Nansen Groundwater	Weather/Temp:	overcast, light snow, ~-3°C
CHV (ppm / % LEL):	O ₂ 560 CH ₄ 0% LEL O ₂ 20.9	Duplicate Collected:	<input type="checkbox"/> ID:	Recovery:	<input type="checkbox"/> Good <input type="checkbox"/> Bad
Purge Method					
Waterra	Peristaltic	Disp. Bailer	Subm. Pump	Air Lift	Other
Initial Depth to Water (m):	13.97	Calculations:	Purge Start Time:	Purge End Time:	
Depth to Bottom (m):	14.04	Suspected ice / blockage @ 14.04 m block w/ ~7 cm water on top. See reverse →	Time (___) min. interval (24h)		
Submerged Tubing Depth (m):	N/A		Depth (m)		
Well Stick-up Height (m):	0.85		Temperature (°C)		
Estimated Water Volume (L):	N/A		pH		
(DTB - DTW) x 2 (for 2" well diameter) = 1 well volume (DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume 2" casing has 0.16 USgal/ft or 2.032 l/m 1" casing has 0.04 USgal/ft or 0.508 l/m 8" sand pack has 0.73 USgal/ft or 9.271 l/m 6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m			Cond. (µs/cm)		
			Specific Cond. (µs/cm)		
			Redox (mV)		
			DO (mg/L)		
			Appearance & Odour (Clear, Silty, HC odours, etc.)		
			Interval Purge Volume (L)		
		Cumulative Purge Volume (L)			
		Total Purge Volume:			
Method:	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Subm. Pump
Analysis					
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)
				<input type="checkbox"/> Yes <input type="checkbox"/> No	
					Comments

Same equipment as GLL07-01



Sample Site (Con't): MW09-15

Wpt MW09-15

Field UTM Location: Zn: 08 V Easting: 0388920 Northing: 6881727

} Hemmera
whitehorse
GPS

Photo Nos.: 6-10 } Hemmera
Vega
camera

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	
Temperature (°C)	
DO (mg/L)	
Specific Cond. (µs/cm)	
Cond. (µs/cm)	
pH	
Redox (mV)	
Turbidity (NTU)	
DO (mg/L)	

Additional Purge Data – Continued from Front of Page (if required)					
Time () minute interval:					
Depth (m)					
Temperature (°C)					
pH					
Cond. (µs/cm)					
Specific Cond. (µs/cm)					
Redox (mV)					
DO (mg/L)					
Appearance & Odour (Clear, Silty, HC odours, etc.)					
Interval Purge Volume (L)					
Cumulative Purge Volume (L)					
Total Purge Volume:					

General Notes (Condition of well or other features)
Metal stick up protector (red) on high side of main road, well ID marked on protector. 2" PVC well casing w/ <u>no</u> cap, well ID marked on casing. Transducer cable in well, frozen in place, can't be pulled up or moved. no existing tubing installed ↳ assume / suspect ice because cable won't move, similar location/depth as GUL07-01 which also suspect ice because 5/8" tubing won't move



GROUNDWATER SAMPLE COLLECTION SHEET

well properly sealed

Well Number:	CH-P-13-03/10	Project Number:	1343-005.03	Date:	7 Oct 2014		
Approximate Date Drilled:	unknown in field	Client:	YG-AAM	Sampler:	AD JL		
Piezometer Diameter / Screen Length:	2" PVC / unknown in field	Project Name:	October 2014 Mt.Nansen Groundwater	Weather/Temp:	overcast, light wind + snow, ~ -5°C		
CHV (ppm / % LEL):	CO ₂ 2440 % LEL O ₂ 20.6% = 0	Duplicate Collected:	<input type="checkbox"/> ID:	Recovery:	<input type="checkbox"/> Good <input type="checkbox"/> Bad		
Purge Method							
Waterra	Peristaltic	Disp. Bailer	Subm. Pump	Air Lift	Other		
Initial Depth to Water (m):	N/A	Calculations:	Purge Start Time:	Purge End Time:			
Depth to Bottom (m):	5.02m	unknown if actual bottom, or if obstruction. No water detected see reverse	Time () min. interval (24h)				
Submerged Tubing Depth (m):	N/A		Depth (m)				
Well Stick-up Height (m):	0.58		Temperature (°C)				
Estimated Water Volume (L):	N/A		pH				
(DTB - DTW) x 2 (for 2" well diameter) = 1 well volume			Cond. (µs/cm)				
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume			Specific Cond. (µs/cm)				
2" casing has 0.16 USgal/ft or 2.032 l/m			Redox (mV)				
1" casing has 0.04 USgal/ft or 0.508 l/m			DO (mg/L)				
8" sand pack has 0.73 USgal/ft or 9.271 l/m			Appearance & Odour (Clear, Silty, HC odours, etc.)				
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m			Interval Purge Volume (L)				
		Cumulative Purge Volume (L)					
		Total Purge Volume:					
Method:	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Subm. Pump	Air Lift	Other
Analysis							
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)	Comments	
				<input type="checkbox"/> Yes			
				<input type="checkbox"/> No			

Pine PID ~ batteries change

ELR micro hL tape



Sample Site (Con't): CH-P-13-03/10 ^{hpt} CH-P-13-03/10

Field UTM Location: Zn: 08 V Easting: 0389145 Northing: 6881108

Hemmera
with the
GPS

Photo Nos.: 21-25

Hemmera
Vap
Camera

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	
Temperature (°C)	
DO (mg/L)	
Specific Cond. (µs/cm)	
Cond. (µs/cm)	
pH	
Redox (mV)	
Turbidity (NTU)	
DO (mg/L)	

Additional Purge Data - Continued from Front of Page (if required)					
Time () minute interval:					
Depth (m)					
Temperature (°C)					
pH					
Cond. (µs/cm)					
Specific Cond. (µs/cm)					
Redox (mV)					
DO (mg/L)					
Appearance & Odour (Clear, Silty, HC odours, etc.)					
Interval Purge Volume (L)					
Cumulative Purge Volume (L)					
Total Purge Volume:					

General Notes (Condition of well or other features)
Grey metal stick up protector, w/ 2" PVC (w proper sealed cap) inside. All in good condition Protector lid says "CH-P-13" cap says "CH-P-13-" No well repairs needed, cap unscrews w/out pulling casing apart, however as per spring 2004 sampling, sand from protector / stick up was falling down well casing when trying to remove cap. No way to try and develop + remove sand blockage w/ hydrolift because no water



GROUNDWATER SAMPLE COLLECTION SHEET

Well Number:	GSI-DC-03B		Project Number:	1343-005.03		Date:	OCT 7, 2014	
Approximate Date Drilled:			Client:	YG-AAM		Sampler:	GMR + RM	
Piezometer Diameter / Screen Length:	1" METAL DP		Project Name:	October 2014 Mt. Nansen Groundwater		Weather/Temp:	-4°C OVERCAST	
CHV (ppm / % LEL):	—		Duplicate Collected:	<input type="checkbox"/> ID: NONE		Recovery:	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Bad	
Purge Method								
Waterra		Peristaltic		Disp. Bailer		Subm. Pump		Air Lift
		DIRECT SAMPLE PERISTALTIC						Other
Initial Depth to Water (m):	FT	3.89	Calculations:	Purge Start Time:	Purge End Time:			
Depth to Bottom (m):	FT	12.34	/	Time () min. interval (24h)				
Submerged Tubing Depth (m):				Depth (m)				
Well Stick-up Height (m):		0.90		Temperature (°C)				
Estimated Water Volume (L):				pH				
(DTB - DTW) x 2 (for 2" well diameter) = 1 well volume (DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume 2" casing has 0.16 USgal/ft or 2.032 l/m 1" casing has 0.04 USgal/ft or 0.508 l/m 8" sand pack has 0.73 USgal/ft or 9.271 l/m 6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m				Cond. (µs/cm)				
				Specific Cond. (µs/cm)				
				Redox (mV)				
				DO (mg/L)				
				Appearance & Odour (Clear, Silty, HC odours, etc.)				
				Interval Purge Volume (L)				
			Cumulative Purge Volume (L)					
			Total Purge Volume:					
Method:	Waterra		Peristaltic		Disp. Bailer		Steel Bailer	
Analysis			✓ W/BATTERY				Other	
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)		Comments	
GSI-DC-03B	GEN CHEM CYANIDE DISS METALS	18-30	PLASTIC + GLASS	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	TRACE TURBIDITY.			

SCN
 SULPHIDE
 TIC
 NH3.
 ALL MIN.
 VOL%
 03A. GAS.
 MONITORING
 PHD
 O2 CUT
 CH4 CUT
 CO2
 DTW - 3.89 FT
 DTB - 6.27 FT
 SU - 0.90



Sample Site (Con't): G51-DC-03B

Field UTM Location: Zn: 08V Easting: 0388105

Northing: 6881076

LP
085

Photo Nos.: 8463

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	1830
Temperature (°C)	
DO (mg/L)	DIRECT SAMPLE
Specific Cond. (µs/cm)	
Cond. (µs/cm)	
pH	
Redox (mV)	
Turbidity (NTU)	
DO (mg/L)	

Additional Purge Data - Continued from Front of Page (if required)					
Time () minute interval:					
Depth (m)					
Temperature (°C)					
pH					
Cond. (µs/cm)					
Specific Cond. (µs/cm)					
Redox (mV)					
DO (mg/L)					
Appearance & Odour (Clear, Silty, HC odours, etc.)					
Interval Purge Volume (L)					
Cumulative Purge Volume (L)					
Total Purge Volume					

General Notes (Condition of well or other features):

~~3/8~~ 4 in PERISTALTIC
8" SILICON

Gases:
A (plastic bag cap) B
O₂ - 20.2% O₂ - 20.9%
CO₂ - 480 ppm CO₂ - 700 ppm
CH₄ - ~~Ø~~ CH₄ - ~~Ø~~



GROUNDWATER SAMPLE COLLECTION SHEET

Well Number:	MW09-18	Project Number:	1343-005.03	Date:	OCT 7 2014		
Approximate Date Drilled:		Client:	YG-AAM	Sampler:	GARY + RM		
Piezometer Diameter / Screen Length:	2" PVC	Project Name:	October 2014 Mt. Nansen Groundwater	Weather/Temp:	LIGHT SNOW 4°C		
CHV (ppm / % LEL):		Duplicate Collected:	<input type="checkbox"/> ID: NONE	Recovery:	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Bad		
Purge Method							
Waterra	Peristaltic	Disp. Bailer	Subm. Pump	Air Lift	Other		
L Battery							
Initial Depth to Water (m): FT	15.0	Calculations:	Purge Start Time:	1648	Purge End Time: 1735		
Depth to Bottom (m): FT	25.2	10 Ft = 3 m x 2 = 6. x 3 Purge = 18 L	Time () min. interval (24h)	1654	1700		
Submerged Tubing Depth (m):			Depth (m)	15.0	15.0	15.0	
Well Stick-up Height (m):	0.86		Temperature (°C)	-0.21	-0.21	-0.21	
Estimated Water Volume (L):	~6L		pH	6.82	6.75	6.74	
(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)	2865	2857	2851	
			Specific Cond. (µs/cm)				
			Redox (mV)	103.7	104.4	105.7	106.7
			DO (mg/L)	14.2	2.70	1.52	1.30
			Appearance & Odour (Clear, Silty, HC odours, etc.)	CLEAR	CLEAR	CLEAR	CLEAR
			Interval Purge Volume (L)	2	1.5	3	
		Cumulative Purge Volume (L)	2	3.5	6.5		
		Total Purge Volume:		8	10.5		
				14			
Method:	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Subm. Pump		
Analysis		✓					
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)		
MW09-18	FULL SET	17-36	PLASTIC & GLASS	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	0.33		
					Comments		
					NOT ADD SAMPLE/PURGE WHEN WARMER THAN -10°C AIR TEMP		

Sample Site (Con't): MW09-18

Field UTM Location: Zn: 08V Easting: 0388055 Northing: 6880985

Photo Nos.: 8453

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	1736
Temperature (°C)	-0.21
DO (mg/L)	1.31
Specific Cond. (µs/cm)	
Cond. (µs/cm)	2847
pH	6.73
Redox (mV)	106.8
Turbidity (NTU)	0.33
DO (mg/L)	
SULFIDE mg/L	0.02

Additional Purge Data – Continued from Front of Page (if required)					
Time () minute interval:					
Depth (m)					
Temperature (°C)					
pH					
Cond. (µs/cm)					
Specific Cond. (µs/cm)					
Redox (mV)					
DO (mg/L)					
Appearance & Odour (Clear, Silty, HC odours, etc.)					
Interval Purge Volume (L)					
Cumulative Purge Volume (L)					
Total Purge Volume					

General Notes (Condition of well or other features):	
<p>NO HEADSPACE READINGS SLOT IN PIPE.</p> <p>8" SILICON</p> <p>Gases: O₂ - 20.9% CO₂ - 660 ppm CH₄ - 0</p>	



GROUNDWATER SAMPLE COLLECTION SHEET

Well Number:	DC GSI-05-05-A/B	Project Number:	1343-005.03	Date:	20843 OCT 9 2014
Approximate Date Drilled:		Client:	YG-AAM	Sampler:	GMR + RM
Piezometer Diameter / Screen Length:	1" METAL OP	Project Name:	October 2014 Mt. Nansen Groundwater	Weather/Temp:	OVERCAST -7°C
CHV (ppm / % LEL):		Duplicate Collected:	<input type="checkbox"/> ID: NONE	Recovery:	<input type="checkbox"/> Good <input type="checkbox"/> Bad
Purge Method					
Watera	Peristaltic	Disp. Bailer	Subm. Pump	Air Lift	Other
<div> <div> Initial Depth to Water (m): FT Depth to Bottom (m): FT Submerged Tubing Depth (m): Well Stick-up Height (m): Estimated Water Volume (L): </div> <div> Calculations: (Purge Start Time:) (Purge End Time:) Time () min. interval (24h) Depth (m) Temperature (°C) pH Cond. (µs/cm) Specific Cond. (µs/cm) Redox (mV) DO (mg/L) Appearance & Odour (Clear, Silty, HC odours, etc.) Interval Purge Volume (L) Cumulative Purge Volume (L) Total Purge Volume: </div> </div>					
<div> <div> (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 </div> <div> FROZEN 1-89 — 0-58 </div> </div>					
Method:	Watera	Peristaltic	Disp. Bailer	Steel Bailer	Subm. Pump
Analysis					
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)
GSI-DC-05B	NONE	/	/	<input type="checkbox"/> Yes <input type="checkbox"/> No	/
					Comments
					FROZEN INITIALLY. PUSHED THROUGH WITH NEW TUBING BUT ONLY GOT 30ml OF WATER - INSUFFICIENT VOLUME.

A-MONITORING.
OTW - FROZEN AT 3'42 FT
OTB - /
SU - 1.0 m

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

Field UTM Location: Zn: 08V Easting: 0388722 Northing: 6880836

WP91

Photo Nos.: 8476

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	
Temperature (°C)	
DO (mg/L)	
Specific Cond. (µs/cm)	
Cond. (µs/cm)	NO SAMPLE
pH	INSUFFICIENT VOLUME.
Redox (mV)	
Turbidity (NTU)	
DO (mg/L)	

Additional Purge Data - Continued from Front of Page (if required)					
Time () minute interval:					
Depth (m)					
Temperature (°C)					
pH					
Cond. (µs/cm)					
Specific Cond. (µs/cm)					
Redox (mV)					
DO (mg/L)					
Appearance & Odour (Clear, Silty, HC odours, etc.)					
Interval Purge Volume (L)					
Cumulative Purge Volume (L)					
Total Purge Volume:					

General Notes (Condition of well or other features):

0.5 m per tubing.

Gases:

A (plastic bag cap) B

O₂ = 20.5% O₂ = 20.5%

CO₂ = 510 ppm CO₂ = 500 ppm

CH₄ = ~~5~~ CH₄ = ~~5~~



GROUNDWATER SAMPLE COLLECTION SHEET

Well Number:	CH-P-13-02/10	Project Number:	1343-005.03	Date:	OCT 9 2014
Approximate Date Drilled:		Client:	YG-AAM	Sampler:	DR + GR
Piezometer Diameter / Screen Length:	1.5" PVC	Project Name:	October 2014 Mt. Nansen Groundwater	Weather/Temp:	
CHV (ppm / % LEL):		Duplicate Collected:	<input type="checkbox"/> ID: None	Recovery:	<input type="checkbox"/> Good <input type="checkbox"/> Bad
Purge Method					
Waterra	Peristaltic	Disp. Bailer	Subm. Pump	Air Lift	Other
Initial Depth to Water (m):	26.7860	Calculations:	Purge Start Time:	Purge End Time:	
Depth to Bottom (m):	26.802	$= 7.2$ cm of water column. Not enough to fill tubing + bentonite at bottom. Treated as dry well. - 90 ml of water	Time () min. interval (24h)		
Submerged Tubing Depth (m):			Depth (m)		
Well Stick-up Height (m):			Temperature (°C)		
Estimated Water Volume (L):	0.09		pH		
(DTB - DTW) x 2 (for 2" well diameter) = 1 well volume (DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume 2" casing has 0.16 USgal/ft or 2.032 l/m 1" casing has 0.04 USgal/ft or 0.508 l/m 8" sand pack has 0.73 USgal/ft or 9.271 l/m 6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m			Cond. (µs/cm)		
			Specific Cond. (µs/cm)		
			Redox (mV)		
			DO (mg/L)		
			Appearance & Odour (Clear, Silty, HC odours, etc.)		
			Interval Purge Volume (L)		
		Cumulative Purge Volume (L)			
		Total Purge Volume:			
<div>Method:</div> <div> <div>Waterra</div> <div>Peristaltic</div> <div>Disp. Bailer</div> <div>Steel Bailer</div> <div>Subm. Pump</div> <div>Air Lift</div> <div>Other</div> </div>					
Analysis					
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)
				<input type="checkbox"/> Yes <input type="checkbox"/> No	Comments
					BENTONITE AT BOTTOM OF WELL.



Sample Site (Con't): _____

Field UTM Location: Zn: 08V

Easting: 0388924

Northing: 6881014

WP
093

Photo Nos.: 8479 - 8480

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	
Temperature (°C)	
DO (mg/L)	
Specific Cond. (µs/cm)	
Cond. (µs/cm)	
pH	
Redox (mV)	
Turbidity (NTU)	
DO (mg/L)	

Additional Purge Data – Continued from Front of Page (if required)					
Time () minute interval:					
Depth (m)					
Temperature (°C)					
pH					
Cond. (µs/cm)					
Specific Cond. (µs/cm)					
Redox (mV)					
DO (mg/L)					
Appearance & Odour (Clear, Silty, HC odours, etc.)					
Interval Purge Volume (L)					
Cumulative Purge Volume (L)					
Total Purge Volume:					

General Notes (Condition of well or other features):
<p>Gases:</p> <p>O₂ - 20.9%</p> <p>CO₂ - 1030 ppm</p> <p>CH₄ - Ø</p>

FB2
 L Field Blank



GROUNDWATER SAMPLE COLLECTION SHEET

Well Number:	MW09-03	Project Number:	1343-005.03	Date:	OCT 8 2014	
Approximate Date Drilled:		Client:	YG-AAM	Sampler:	GMR + RM	
Piezometer Diameter / Screen Length:	2" PVC	Project Name:	October 2014 Mt. Nansen Groundwater	Weather/Temp:	~6°C PARTLY CLOUDY	
CHV (ppm / % LEL):		Duplicate Collected:	<input checked="" type="checkbox"/> ID: DUP4	Recovery:	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Bad	
Purge Method						
Waterra	Peristaltic	Disp. Bailer	Subm. Pump	Air Lift	Other	
	✓ W/BATTERY					
Initial Depth to Water (m):	14.13	Calculations:	Purge Start Time:	12:55	Purge End Time:	
Depth to Bottom (m):	32.26	~18 FT = 6 m x 2 = 12 L x 3 = 36 L	Time () min. interval (24h)	13:00	13:08	
Submerged Tubing Depth (m):			Depth (m)	13:23	13:34	13:44
Well Stick-up Height (m):	0.37		Temperature (°C)	13:55	13:55	13:55
Estimated Water Volume (L):	12		pH	13:55	13:55	13:55
(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)	13:55	13:55	13:55
			Specific Cond. (µs/cm)	13:55	13:55	13:55
			Redox (mV)	13:55	13:55	13:55
			DO (mg/L)	13:55	13:55	13:55
			Appearance & Odour (Clear, Silty, HC odours, etc.)	13:55	13:55	13:55
			Interval Purge Volume (L)	13:55	13:55	13:55
		Cumulative Purge Volume (L)	13:55	13:55	13:55	
		Total Purge Volume:	13:55	13:55	13:55	
Method	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Subm. Pump	
Analysis						
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)	
MW09-03	COMPLETE SET + FB2 + DUP4	13:54	PLASTIC + GLAS	<input type="checkbox"/> Yes <input type="checkbox"/> No	0.75	
					FB2 + DUP4	



Sample Site (Con't): MW09-03

Field UTM Location: Zn: 08V Easting: 089416

Northing: 5880555

(WP
088)

Photo Nos.: 8470

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	13-54
Temperature (°C)	1.37
DO (mg/L)	0.92
Specific Cond. (µs/cm)	2
Cond. (µs/cm)	2681
pH	6.99
Redox (mV)	20.3
Turbidity (NTU)	0.75
DO (mg/L)	
SULPHIDE mg/L	0.04

Additional Purge Data - Continued from Front of Page (if required)					
Time () minute interval:					
Depth (m)					
Temperature (°C)					
pH					
Cond. (µs/cm)					
Specific Cond. (µs/cm)					
Redox (mV)					
DO (mg/L)					
Appearance & Odour (Clear, Silty, HC odours, etc.)					
Interval Purge Volume (L)					
Cumulative Purge Volume (L)					
Total Purge Volume:					

General Notes (Condition of well or other features)
8" SILICON Gases: O ₂ - 20.9% CO ₂ - 430 ppm CH ₄ - 0 Well cap not tight on due to transducer in the well.



GROUNDWATER SAMPLE COLLECTION SHEET

Well Number:	MW09-04	Project Number:	1343-005.03	Date:	OCT 8 2014
Approximate Date Drilled:		Client:	YG-AAM	Sampler:	Gonz + RM
Piezometer Diameter / Screen Length:	2" PVC	Project Name:	October 2014 Mt. Nansen Groundwater	Weather/Temp:	LIGHT SNOW - 9°C
CHV (ppm / % LEL):		Duplicate Collected:	<input checked="" type="checkbox"/> ID: None	Recovery:	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Bad
Purge Method					
Waterra	Peristaltic	Disp. Bailer	Subm. Pump	Air Lift	Other
	w/ battery				
Initial Depth to Water (m): FT	9.41	Calculations:	Purge Start Time:	11-31	Purge End Time: 12-37
Depth to Bottom (m): FT	20.85	\sim $= 4m$ $\times 2$ $= 8L$ $\times 3$ $= 24L$	Time () min. interval (24h)	11.41	11.56
Submerged Tubing Depth (m):			Depth (m) FT	12.95	14.3
Well Stick-up Height (m):	0.40		Temperature (°C)	3.53	3.15
Estimated Water Volume (L):	~8L		pH	8.22	8.28
(DTB - DTW) x 2 (for 2" well diameter) = 1 well volume			Cond. (µs/cm)	2842	2850
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume			Specific Cond. (µs/cm)		
2" casing has 0.16 USgal/ft or 2.032 l/m			Redox (mV)	25.8	20.0
1" casing has 0.04 USgal/ft or 0.508 l/m			DO (mg/L)	5.6	1.27
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			Interval Purge Volume (L)	2	4
		Cumulative Purge Volume (L)	2	6	
		Total Purge Volume:	15L		
Method:	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Subm. Pump
Analysis		w/ battery			
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)
MW09-04	Full set of samples	12-38	Plastic + Glass	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	1.23
					Comments

Sample Site (Con't): _____

Field UTM Location: Zn: 08V

Easting: 0389416

Northing: 6880555

(WP 088)

Photo Nos.: 8470

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	12-38
Temperature (°C)	28.0
DO (mg/L)	
Specific Cond. (µs/cm)	2870
Cond. (µs/cm)	2870
pH	8.38
Redox (mV)	19.2
Turbidity (NTU)	1.23
DO (mg/L)	0.99
SULPHIDE mg/L	0.01

Additional Purge Data - Continued from Front of Page (if required)					
Time () minute interval:					
Depth (m)					
Temperature (°C)					
pH					
Cond. (µs/cm)					
Specific Cond. (µs/cm)					
Redox (mV)					
DO (mg/L)					
Appearance & Odour (Clear, Silty, HC odours, etc.)					
Interval Purge Volume (L)					
Cumulative Purge Volume (L)					
Total Purge Volume:					

General Notes (Condition of well or other features)	
<p>8" SILICON</p> <p>LONG PURGE TIME</p> <p>Well cap not tight or due to transducer in the well.</p>	
<p>Gases:</p> <p>O₂ - 20.9%</p> <p>CO₂ - 440ppm</p> <p>CH₄ - ∅</p>	



GROUNDWATER SAMPLE COLLECTION SHEET

Well Number:	W14103083 B3404		Project Number:	1343-005.03		Date:	09 OCT 2014	
Approximate Date Drilled:			Client:	YG-AAM		Sampler:	GARE & RM	
Piezometer Diameter / Screen Length:	2"		Project Name:	October 2014 Mt. Nansen Groundwater		Weather/Temp:	CLEAR -8°C	
CHV (ppm / % LEL):			Duplicate Collected:	<input type="checkbox"/> ID: NONE		Recovery:	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Bad	
Purge Method								
Waterra		Peristaltic		Disp. Bailer		Subm. Pump		Air Lift
		6.23 m						
Initial Depth to Water (m):	20.59	Calculations:	Purge Start Time:	Purge End Time:				
Depth to Bottom (m):	21.74	= 6.59 m	Time () min. interval (24h)					
Submerged Tubing Depth (m):		0.36 m column	Depth (m)					
Well Stick-up Height (m):		x 2.032	Temperature (°C)					
Estimated Water Volume (L):	0.73	= 730 ml	pH	DIRECT				
(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)	SAMPLE				
			Specific Cond. (µs/cm)	DUE TO LOW VOLUME AND ICE				
			Redox (mV)	PLUG AT BOTTOM				
			DO (mg/L)					
			Appearance & Odour (Clear, Silty, HC odours, etc.)					
			Interval Purge Volume (L)	OBTAINED ABOUT 500 ml				
			Cumulative Purge Volume (L)					
			Total Purge Volume:					
Method:	Waterra		Peristaltic		Disp. Bailer		Steel Bailer	
Analysis	W/ Baiting							
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)		Comments	
W14103083 B3404	DISSOLVED MERC. DISS. MERC GEN. CHEM	10-56	PLASTIC + GLASS	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	/		SAMPLE WATER IS LIKELY WITHIN THE PERMAFROST ACTIVE ZONE	

CYANIDE

4 BOTTLES. MIN VOLUME

PERMAFROST ACTIVE ZONE

Sample Site (Con't): W14103083 B104

Field UTM Location: Zn:

Easting: 0389541 Northing: 6880668

WP
095

Photo Nos.: 8483

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	
Temperature (°C)	
DO (mg/L)	
Specific Cond. (µs/cm)	
Cond. (µs/cm)	
pH	
Redox (mV)	
Turbidity (NTU)	
DO (mg/L)	

Additional Purge Data - Continued from Front of Page (if required)					
Time () minute interval:					
Depth (m)					
Temperature (°C)					
pH					
Cond. (µs/cm)					
Specific Cond. (µs/cm)					
Redox (mV)					
DO (mg/L)					
Appearance & Odour (Clear, Silty, HC odours, etc.)					
Interval Purge Volume (L)					
Cumulative Purge Volume (L)					
Total Purge Volume:					

General Notes (Condition of well or other features)
<p>Head space gases: METER NOT WORKING. WELL NOT CLOSED. INSTRUMENTS IN THE WAY.</p> <p>No well cap = gases not collected</p>



GROUNDWATER SAMPLE COLLECTION SHEET

GSI

Well Number:	GSI-HA-04A	Project Number:	1343-005.03	Date:	OCT 7 2014
Approximate Date Drilled:		Client:	YG-AAM	Sampler:	GMR + RM
Piezometer Diameter / Screen Length:	1" METAL DP	Project Name:	October 2014 Mt. Nansen Groundwater	Weather/Temp:	LIGHT SNOW ~ -8°C
CHV (ppm / % LEL):		Duplicate Collected:	<input type="checkbox"/> ID: NONE	Recovery:	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Bad
Purge Method					
Watera	Peristaltic	Disp. Bailer	Subm. Pump	Air Lift	Other
DIRECT SAMPLE					
Initial Depth to Water (m):	3-66	Calculations:	Purge Start Time:	Purge End Time:	
Depth to Bottom (m):	6-90	~ 1 m	Time () min. interval (24h)		
Submerged Tubing Depth (m):			Depth (m)		
Well Stick-up Height (m):	0-57		Temperature (°C)		
Estimated Water Volume (L):			pH		
(DTB - DTW) x 2 (for 2" well diameter) = 1 well volume			Cond. (µs/cm)		
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume			Specific Cond. (µs/cm)		
2" casing has 0.16 USgal/ft or 2.032 l/m			Redox (mV)		
1" casing has 0.04 USgal/ft or 0.508 l/m			DO (mg/L)		
8" sand pack has 0.73 USgal/ft or 9.271 l/m			Appearance & Odour (Clear, Silty, HC odours, etc.)		
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m			Interval Purge Volume (L)		
		Cumulative Purge Volume (L)			
		Total Purge Volume:			
Method:	Watera	Peristaltic	Disp. Bailer	Steel Bailer	Subm. Pump
Analysis		✓ w/ BATTERY			
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)
GSI-4A-04A	DISSOLVED METALS GEN CHEM ONLY	1510	PLASTIC	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	TURBID (BLACK)

MIN. VOLUMES.

Sample Site (Con't): ^S~~GAI~~ - HA - 04A

Field UTM Location: Zn: 08V Easting: 0387917 Northing: 6881132

(LP
84)

Photo Nos.: 8462

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	
Temperature (°C)	
DO (mg/L)	
Specific Cond. (µs/cm)	
Cond. (µs/cm)	
pH	
Redox (mV)	
Turbidity (NTU)	
DO (mg/L)	

Additional Purge Data - Continued from Front of Page (if required)					
Time () minute interval:					
Depth (m)					
Temperature (°C)					
pH					
Cond. (µs/cm)					
Specific Cond. (µs/cm)					
Redox (mV)					
DO (mg/L)					
Appearance & Odour (Clear, Silty, HC odours, etc.)					
Interval Purge Volume (L)					
Cumulative Purge Volume (L)					
Total Purge Volume:					

General Notes (Condition of well or other features)	
<p><u>GASES</u></p> <p>O₂ - 20.6 %</p> <p>CH₄ - 0.0 %</p> <p>CO₂ - 0.0 %</p> <p>3.5 m PERISTALTIC</p> <p>8" SILICON</p>	



GROUNDWATER SAMPLE COLLECTION SHEET

Well Number:	GSI-HA-05A	Project Number:	1343-005.03	Date:	OCT 7 2014
Approximate Date Drilled:		Client:	YG-AAM	Sampler:	GMR + RM
Piezometer Diameter / Screen Length:	1" METAL DP	Project Name:	October 2014 Mt. Nansen Groundwater	Weather/Temp:	~ 8 LIGHT SNOW
CHV (ppm / % LEL):		Duplicate Collected:	<input type="checkbox"/> ID: /	Recovery:	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Bad
Purge Method					
Waterra	Peristaltic	Disp. Bailer	Subm. Pump	Air Lift	Other
DIRECT SAMPLE					
Initial Depth to Water (m): FT	3.84	Calculations:	Purge Start Time:	Purge End Time:	
Depth to Bottom (m): FT	6.89	~ 1 m	Time () min. interval (24h)		
Submerged Tubing Depth (m):			Depth (m)		
Well Stick-up Height (m):	0.97		Temperature (°C)		
Estimated Water Volume (L):			pH		
(DTB - DTW) x 2 (for 2" well diameter) = 1 well volume			Cond. (µs/cm)		
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume			Specific Cond. (µs/cm)		
2" casing has 0.16 USgal/ft or 2.032 l/m			Redox (mV)		
1" casing has 0.04 USgal/ft or 0.508 l/m			DO (mg/L)		
8" sand pack has 0.73 USgal/ft or 9.271 l/m			Appearance & Odour (Clear, Silty, HC odours, etc.)		
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m			Interval Purge Volume (L)		
		Cumulative Purge Volume (L)			
		Total Purge Volume:			
Method:	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Subm. Pump
Analysis	✓ w/ BATTERY				
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)
GSI-HA-05A	DISSOLVED METALS GEN CHEM CYANIDE	14:54	PLASTIC	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	SOME TURBIDITY YELLOW TINGE
					DIRECT SAMPLE.

MIN. VOLUMES



Sample Site (Con't): S¹ - HA-05

Field UTM Location: Zn: 08V Easting: 0387896 Northing: 6881127

(WP082) Photo Nos.: 8459

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	
Temperature (°C)	
DO (mg/L)	
Specific Cond. (µs/cm)	
Cond. (µs/cm)	
pH	
Redox (mV)	
Turbidity (NTU)	
DO (mg/L)	

Additional Purge Data - Continued from Front of Page (if required)					
Time () minute interval:					
Depth (m)					
Temperature (°C)					
pH					
Cond. (µs/cm)					
Specific Cond. (µs/cm)					
Redox (mV)					
DO (mg/L)					
Appearance & Odour (Clear, Silty, HC odours, etc.)					
Interval Purge Volume (L)					
Cumulative Purge Volume (L)					
Total Purge Volume:					

General Notes (Condition of well or other features):	
<p>GASES</p> <p>CO₂ - 20.9 0.0 Y</p> <p>O₂ - 20.9 Y</p> <p>CH₄ - 0.0 Y</p> <p>3m PERISTALTIC</p> <p>8" SILICON</p>	



GROUNDWATER SAMPLE COLLECTION SHEET

Well Number:	MV09-01	Project Number:	1343-005.03	Date:	OCT 8 2014
Approximate Date Drilled:		Client:	YG-AAM	Sampler:	GMK + RM
Piezometer Diameter / Screen Length:	1.5" PVC.	Project Name:	October 2014 Mt. Nansen Groundwater	Weather/Temp:	LIGHT SNOW -9°C
CHV (ppm / % LEL):		Duplicate Collected:	<input type="checkbox"/> ID:	Recovery:	<input type="checkbox"/> Good <input type="checkbox"/> Bad
Purge Method					
Waterra	Peristaltic	Disp. Bailer	Subm. Pump	Air Lift	Other
Initial Depth to Water (m): FT		Calculations:	Purge Start Time:	Purge End Time:	
Depth to Bottom (m): FT			Time () min. interval (24h)		
Submerged Tubing Depth (m):			Depth (m)		
Well Stick-up Height (m):			Temperature (°C)		
Estimated Water Volume (L):			pH		
(DTB - DTW) x 2 (for 2" well diameter) = 1 well volume			Cond. (µs/cm)		
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		Specific Cond. (µs/cm)			
2" casing has 0.16 USgal/ft or 2.032 l/m		Redox (mV)			
1" casing has 0.04 USgal/ft or 0.508 l/m		DO (mg/L)			
8" sand pack has 0.73 USgal/ft or 9.271 l/m		Appearance & Odour (Clear, Silty, HC odours, etc.)			
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		Interval Purge Volume (L)			
		Cumulative Purge Volume (L)			
		Total Purge Volume:			
Method:	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Subm. Pump
Analysis					
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)
				<input type="checkbox"/> Yes	INNOE OF CASING HAS TAILINGS
				<input type="checkbox"/> No	

TRICK WITH TAILINGS - PERISTALTIC LIQUID FREEZING IN TUBING + CLOGGING. TRIED 5/8" WATER. EQUIPMENT CLOGGED WITH TAILINGS. COULD NOT SAMPLE.



Sample Site (Con't): MW09-011

Field UTM Location: Zn: 08V Easting: 0389396

Northing: 6880562

(WPT 087)

Photo Nos.:

8471-8472

8466⁺-8469

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	
Temperature (°C)	
DO (mg/L)	
Specific Cond. (µs/cm)	
Cond. (µs/cm)	
pH	
Redox (mV)	
Turbidity (NTU)	
DO (mg/L)	

Additional Purge Data - Continued from Front of Page (if required)					
Time () minute interval:					
Depth (m)					
Temperature (°C)					
pH					
Cond. (µs/cm)					
Specific Cond. (µs/cm)					
Redox (mV)					
DO (mg/L)					
Appearance & Odour (Clear, Silty, HC odours, etc.)					
Interval Purge Volume (L)					
Cumulative Purge Volume (L)					
Total Purge Volume:					

General Notes (Condition of well or other features):

TRIED WITH PERI TUBING - CLOGGED
TRIED WITH 5/8" WATERPA - FOOT VALVE CLOGGED
EXCESSIVE QUANTITY OF TAILINGS IN WATER.
BROKEN SCREEN? BROKEN WELL? HARD TO SAY.

Gases:
O₂ - 20.9%
CO₂ - 430ppm
CH₄ - 0

Big hole in the well casing.



GROUNDWATER SAMPLE COLLECTION SHEET

Well Number:	MW09-02	Project Number:	1343-005.03	Date:	OCT 8 2014		
Approximate Date Drilled:		Client:	YG-AAM	Sampler:	CMR + RM		
Piezometer Diameter / Screen Length:	2" PVC	Project Name:	October 2014 Mt. Nansen Groundwater	Weather/Temp:	-9°C LIGHT SNOW		
CHV (ppm / % LEL):		Duplicate Collected:	<input type="checkbox"/> ID: NONE	Recovery:	<input type="checkbox"/> Good <input type="checkbox"/> Bad		
Purge Method							
Waterra	Peristaltic	Disp. Bailer	Subm. Pump	Air Lift	Other		
	✓ w/ Baiting						
Initial Depth to Water (m):	7.88	Calculations:	Purge Start Time:	0910	Purge End Time:		
Depth to Bottom (m):	15.8	8 ft	Time () min. interval (24h)	0921 0929 9-39 9-50 10-03 10-13			
Submerged Tubing Depth (m):		= 2.5m	Depth (m)	10.8 10.8 10.9 10.9 10.9 10.9			
Well Stick-up Height (m):	0.67	x 2	Temperature (°C)	2.83 3.0 2.48 2.53 2.43 2.44			
Estimated Water Volume (L):	5L	= 5L	pH	6.92 6.92 6.94 6.97 6.98 6.97			
(DTB - DTW) x 2 (for 2" well diameter) = 1 well volume		x 3	Cond. (µs/cm)	2912 2948 3059 3108 3170 3194			
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		= 15 L	Specific Cond. (µs/cm)	✓			
2" casing has 0.16 USgal/ft or 2.032 l/m		PAR	Redox (mV)	21.7 10.0 -6.9 26.4 -37.5 -47.8			
1" casing has 0.04 USgal/ft or 0.508 l/m			DO (mg/L)	8.75 2.23 1.33 3.22 8.68 1.34			
8" sand pack has 0.73 USgal/ft or 9.271 l/m			Appearance & Odour (Clear, Silty, HC odours, etc.)	CLEAR CLEAR CLEAR CLEAR CLEAR CLEAR			
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m			Interval Purge Volume (L)	2.5 1 1.5 1 2 1			
			Cumulative Purge Volume (L)	2.5 3.5 5 6.5 8.5 9.5			
			Total Purge Volume:				
Method:	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Subm. Pump	Air Lift	Other
Analysis		w/ Baiting					
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)	Comments	
MW09-02	FULL SET OF SAMPLES	10.15	PLASTIC + GLASS	<input checked="" type="checkbox"/> Yes	1.97	PARAMETERS STABILIZED VERY SLOW PURGE.	
				<input type="checkbox"/> No			



Sample Site (Con't): MW09-02

Field UTM Location: Zn: 08V. Easting: 0389396

Northing: 6880562

(WP
087)

Photo Nos.: 8465

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	10-15
Temperature (°C)	2.44
DO (mg/L)	/
Specific Cond. (µs/cm)	/
Cond. (µs/cm)	3194
pH	6.97
Redox (mV)	-47.8
Turbidity (NTU)	1.97
DO (mg/L)	1.34
SULPHIDE. mg/L	0.02

Additional Purge Data - Continued from Front of Page (if required)					
Time () minute interval:					
Depth (m)					
Temperature (°C)					
pH					
Cond. (µs/cm)					
Specific Cond. (µs/cm)					
Redox (mV)					
DO (mg/L)					
Appearance & Odour (Clear, Silty, HC odours, etc.)					
Interval Purge Volume (L)					
Cumulative Purge Volume (L)					
Total Purge Volume:					

General Notes (Condition of well or other features)
8" SILICON Gases: O ₂ - 20.9% CO ₂ - 560 ppm CH ₄ - /



GROUNDWATER SAMPLE COLLECTION SHEET

Well Number:	MW09-17	Project Number:	1343-005.03	Date:	OCT 7 2014		
Approximate Date Drilled:		Client:	YG-AAM	Sampler:	GMK + RM		
Piezometer Diameter / Screen Length:	2"	Project Name:	October 2014 Mt. Nansen Groundwater	Weather/Temp:	OVERCAST LIGHT SNOW -10°C		
CHV (ppm / % LEL):		Duplicate Collected:	<input type="checkbox"/> ID: NONE	Recovery:	<input type="checkbox"/> Good <input type="checkbox"/> Bad		
Purge Method							
Watera	Peristaltic	Disp. Bailer	Subm. Pump	Air Lift	Other		
	✓						
Initial Depth to Water (m):	16.80 FT	Calculations:	Purge Start Time:	8:34 1558	Purge End Time: 1629		
Depth to Bottom (m):	19.36 FT	3.16	Time () min. interval (24h)	16-03 1611 1615 1623 1629			
Submerged Tubing Depth (m):		= 1 m	Depth (m) FT	16.80 FT 16.8 16.8	→		
Well Stick-up Height (m):	0.91	= purge	Temperature (°C)	0.13 0.10 0.03 0.02 0.06			
Estimated Water Volume (L):	2		pH	6.77 6.72 6.72 6.71 6.70			
(DTB - DTW) x 2 (for 2" well diameter) = 1 well volume			Cond. (µs/cm)	2908 2910 2915 2913 2914			
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume			Specific Cond. (µs/cm)				
2" casing has 0.16 USgal/ft or 2.032 l/m			Redox (mV)	100 95.8 96.1 97.3 98.2			
1" casing has 0.04 USgal/ft or 0.508 l/m			DO (mg/L)	14.0 3.74 3.01 2.31 2.14			
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			Interval Purge Volume (L)	2 1 2 2 1.5			
			Cumulative Purge Volume (L)	2 3 5 7 8.5			
			Total Purge Volume:				
Method	Watera	Peristaltic	Disp. Bailer	Steel Bailer	Subm. Pump	Air Lift	Other
Analysis							
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)	Comments	
MW09-17	FULL SET	1630		<input type="checkbox"/> Yes <input type="checkbox"/> No	0.43		

NEED TO RTN: RETURNED TO WELL IN PM
WHEN TEMPS HIGHER

Sample Site (Con't): MW09-17

Field UTM Location: Zn: 08V Easting: 0388075

Northing: 6880969

WP73

Photo Nos.: 8451-8452

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	1630
Temperature (°C)	0.06
DO (mg/L)	2.14
Specific Cond. (µs/cm)	2914
Cond. (µs/cm)	2914
pH	6.7
Redox (mV)	98.2
Turbidity (NTU)	0.43
DO (mg/L) ^{mg/L} SULFIDE	0.02 0.00

Additional Purge Data - (Continued from Front of Page (if required))					
Time () minute interval:					
Depth (m)					
Temperature (°C)					
pH					
Cond. (µs/cm)					
Specific Cond. (µs/cm)					
Redox (mV)					
DO (mg/L)					
Appearance & Odour (Clear, Silty, HC odours, etc.)					
Interval Purge Volume (L)					
Cumulative Purge Volume (L)					
Total Purge Volume:					

General Notes (Condition of well or other features)	
Head space gases: CO ₂ 0.0 CH ₄ 0.0 O ₂ 20.9	8" SILICON -8°C + 7m PERISTALTIC Water freezing in peristaltic - Abandoned well - waiting for warmer part of the day. Skinny dipper (water level type) is in decimal feet. conversion done later



GROUNDWATER SAMPLE COLLECTION SHEET

Well Number:	GCI-HA-03A		Project Number:	1343-005.03		Date:	OCT 7 2014	
Approximate Date Drilled:			Client:	YG-AAM		Sampler:	GMR + RM.	
Piezometer Diameter / Screen Length:	1" METAL DP.		Project Name:	October 2014 Mt.Nansen Groundwater		Weather/Temp:	LIGHT SNOW ~ -8°C	
CHV (ppm / % LEL):			Duplicate Collected:	<input type="checkbox"/> ID: NONE		Recovery:	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Bad	
Purge Method								
Waterra		Peristaltic		Disp. Bailer		Subm. Pump		Air Lift
		DIRECT		SAMPLE				
Initial Depth to Water (m):	ET	3-30	Calculations:	Purge Start Time:		Purge End Time:		
Depth to Bottom (m):	FT	6.89.	~ 1 m	Time () min. interval (24h)				
Submerged Tubing Depth (m):				Depth (m)				
Well Stick-up Height (m):		0.90		Temperature (°C)				
Estimated Water Volume (L):				pH				
(DTB - DTW) x 2 (for 2" well diameter) = 1 well volume				Cond. (µs/cm)				
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume				Specific Cond. (µs/cm)				
2" casing has 0.16 USgal/ft or 2.032 l/m				Redox (mV)				
1" casing has 0.04 USgal/ft or 0.508 l/m				DO (mg/L)				
8" sand pack has 0.73 USgal/ft or 9.271 l/m				Appearance & Odour (Clear, Silty, HC odours, etc.)				
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m				Interval Purge Volume (L)				
				Cumulative Purge Volume (L)				
				Total Purge Volume:				
Method:	Waterra		Peristaltic		Disp. Bailer		Steel Bailer	
Analysis			✓ w/ BATTERY					
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)		Comments	
GCI-HA-03A	DISSOLVED METALS GEN CHEM	14-42	PLASTIC	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	SOME TURBIDITY YELLOW TINGE		DIRECT SAMPLE	

MIN. VOLUMES



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

Field UTM Location: Zn: 08V Easting: 0387876 Northing: 6881132

(WP81) Photo Nos.: 8458.

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	
Temperature (°C)	
DO (mg/L)	
Specific Cond. (µs/cm)	
Cond. (µs/cm)	
pH	
Redox (mV)	
Turbidity (NTU)	
DO (mg/L)	

Additional Purge Data - Continued from Front of Page (if required)					
Time () minute interval:					
Depth (m)					
Temperature (°C)					
pH					
Cond. (µs/cm)					
Specific Cond. (µs/cm)					
Redox (mV)					
DO (mg/L)					
Appearance & Odour (Clear, Silty, HC odours, etc.)					
Interval Purge Volume (L)					
Cumulative Purge Volume (L)					
Total Purge Volume:					

General Notes (Condition of well or other features)	
<p>HEAD GASES</p> <p>O₂ 20.9 Y, CH₄ 0.0 Y, CO₂ 0.0 Y.</p> <p>3 M PERISTALTIC 8" OF SILICON</p>	

GROUNDWATER SAMPLE COLLECTION SHEET

Well Number:	CH-P-13-05/50	Project Number:	1343-005.03	Date:	7 Oct 2014
Approximate Date Drilled:	unknown in field	Client:	YG-AAM	Sampler:	AS JL
Piezometer Diameter / Screen Length:	1" PVC / unknown in field	Project Name:	October 2014 Mt. Nansen Groundwater	Weather/Temp:	overcast, light wind + snow, ~ -5°C
CHV (ppm / % LEL):	CO ₂ 440 CH ₄ 20.9% 0% LEL	Duplicate Collected:	<input checked="" type="checkbox"/> ID: DUP-1	Recovery:	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Bad
Purge Method					
Watera	Peristaltic	Disp. Bailer	Subm. Pump	Air Lift	Other
hydro lift					
Initial Depth to Water (m):	22.26	Calculations:	Purge Start Time:	13:46	Purge End Time:
Depth to Bottom (m):	49.99	50-22.25	Time () min. interval (24h)	13:58	14:07
Submerged Tubing Depth (m):	~ 43.5	= 27.75 m	Depth (m)	23.45	24.16
Well Stick-up Height (m):	0.70	= 1.1 L/m	Temperature (°C)	0.4	0.4
Estimated Water Volume (L):	~30.5L	= ~30.5L	pH	5.72	5.70
(DTB - DTW) x 2 (for 2" well diameter) = 1 well volume		@ ambient temp ~ -5°C, water in flow through purge bucket starting to freeze - purging	Cond. (µs/cm)	356.3	356.3
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume			Specific Cond. (µs/cm)	672.7	671.8
2" casing has 0.16 USgal/ft or 2.032 l/m			Redox (mV)	124.8	111.7
1" casing has 0.04 USgal/ft or 0.508 l/m			DO (mg/L)	1.58	1.72
8" sand pack has 0.73 USgal/ft or 9.271 l/m			Appearance & Odour (Clear, Silty, HC odours, etc.)	light brown mostly clear - clear	mostly clear - clear
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m			Interval Purge Volume (L)	15	15
			Cumulative Purge Volume (L)	15	30
			Total Purge Volume:	45	60
				75	90
Method:	Watera	Peristaltic	Disp. Bailer	Steel Bailer	Subm. Pump
Analysis	hydro lift				
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)
CH-P-13-05/50 and DUP-1	parent + DUP, all as per scope of work	14:46 - 15:03	full suite (parent + DUP) as per scope of work inc filter + preserve as appropriate	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	7.37 NTU c time of sample
Comments					

same sample equipment as GLL07-03 except also added Hydro lift

Field sulphides = 0.05 mg/L



Sample Site (Con't): CH-P-13-05/50 ^{Wpt =}

Field UTM Location: Zn: 00 V Easting: 0388956 Northing: 6881467

} Hemmera
whitehouse
GPS

Photo Nos.: 36-40

} Hemmera
seen

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	
Temperature (°C)	
DO (mg/L)	SEE
Specific Cond. (µs/cm)	PREVIOUS
Cond. (µs/cm)	PAGE
pH	
Redox (mV)	
Turbidity (NTU)	
DO (mg/L)	

Additional Purge Data - Continued from Front of Page (if required)					
Time () minute interval:					
Depth (m)					
Temperature (°C)					
pH					
Cond. (µs/cm)					
Specific Cond. (µs/cm)					
Redox (mV)					
DO (mg/L)					
Appearance & Odour (Clear, Silty, HC odours, etc.)					
Interval Purge Volume (L)					
Cumulative Purge Volume (L)					
Total Purge Volume:					

General Notes (Condition of well or other features):

Grey metal stick up protector w/ 1" PVC well (no cap). Existing 5/8" wellscreen already in well
↳ also transducer controller in casing protector
↳ in good shape
Located along pit access road, behind concrete lock block protectors

GROUNDWATER SAMPLE COLLECTION SHEET

Well Number:	GLL 07-03		Project Number:	1343-005.03		Date:	7 Oct 2014	
Approximate Date Drilled:	unknown in field		Client:	YG-AAM		Sampler:	AB JL	
Piezometer Diameter / Screen Length:	2" PVC / unknown in field		Project Name:	October 2014 Mt. Nansen Groundwater		Weather/Temp:	Overcast, light wind snow, ~ -5°C	
CHV (ppm / % LEL):	CO ₂ 460	CH ₄ 0%	Duplicate Collected:	<input checked="" type="checkbox"/> NO		Recovery:	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Bad	
Purge Method: 2 down/up during purge, eventually								
Watera	Peristaltic	Disp. Bailer	Subm. Pump	Air Lift	Other stabilize			
manual 5/8" foot valve								
Initial Depth to Water (m):	5.045	Calculations:	Purge Start Time:	11:28		Purge End Time:	12:25	
Depth to Bottom (m):	11.76	11.75 - 5.05	Time (7.5 min. interval (24h))	11:34	11:43	11:53	12:03	12:14
Submerged Tubing Depth (m):	~ 11 m	~ 6.70 m	Depth (m)	6.820	8.365	8.565	9.125	9.115
Well Stick-up Height (m):	1.09	~ 22/m	Temperature (°C)	1.4	1.5	1.0	1.1	1.1
Estimated Water Volume (L):	~ 13.5	~ 13.4 L	pH	5.52	5.79	5.93	5.98	6.02
(DTB - DTW) x 2 (for 2" well diameter) = 1 well volume			Cond. (µs/cm)	163.3	151.7	153.7	153.3	157.7
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume			Specific Cond. (µs/cm)	297.7	276.1	283.2	282.1	290.8
2" casing has 0.16 USgal/ft or 2.032 l/m			Redox (mV)	247.1	197.8	131.4	108.6	101.7
1" casing has 0.04 USgal/ft or 0.508 l/m			DO (mg/L)	2.59	2.49	2.51	2.37	2.27
8" sand pack has 0.73 USgal/ft or 9.271 l/m			Appearance & Odour (Clear, Silty, HC odours, etc.)	faint light brown mostly clear	same as prev.	"	"	faint light brown
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m			Interval Purge Volume (L)	7.5	7.5	7.5	7.5	7.5
			Cumulative Purge Volume (L)	7.5	15	22.5	30	37.5
			Total Purge Volume:					
Method:	Watera	Peristaltic	Disp. Bailer	Steel Bailer	Subm. Pump	Air Lift	Other	
Analysis	manual 5/8" foot valve							
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)		Comments	
GLL07-03	Full suite as per scope of work	12:13 - 13:00	As per scope of work, inc. filter & preserve	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	24.0 NTU @ time of sample (faint light brown)		Water becoming slightly more turbid while filling last bottle (Gen Chem)	

Equip: Hemmera 451, ELIR small w/L tape, Pine PID,

Hoskin L-motte turbidity. Maxim field sulphide Hach DR 890

Field Sulphides

0.19 mg/L



Sample Site (Con't): ELL07-03 Wpt ELL 07-03

Field UTM Location: Zn: 08 v Easting: 0388956 Northing: 6881474

} Hemmera
Whitkorse
GPS

Photo Nos.: 31-35

} Hemmera
Van
Convey

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	
Temperature (°C)	
DO (mg/L)	SEE
Specific Cond. (µs/cm)	
Cond. (µs/cm)	PREVIOUS
pH	
Redox (mV)	PAGE
Turbidity (NTU)	
DO (mg/L)	

Additional Purge Data - Continued from Front of Page (if required)					
Time () minute interval:					
Depth (m)					
Temperature (°C)					
pH					
Cond. (µs/cm)					
Specific Cond. (µs/cm)					
Redox (mV)					
DO (mg/L)					
Appearance & Odour (Clear, Silty, HC odours, etc.)					
Interval Purge Volume (L)					
Cumulative Purge Volume (L)					
Total Purge Volume:					

General Notes (Condition of well or other features):

Round metal stick up protector (steel) → just beyond/below lock blocks on pit access road
2" PVC well w cap but poor seal because transducer cable inside well (data logger outside)
Existing 5/8" + foot valve in well, used this to sample
→ use caution / have spotter in this area re: possibility for falling rocks from pit walls above



GROUNDWATER SAMPLE COLLECTION SHEET

Well Number:	MW09-06	Project Number:	1343-005.03	Date:	OCT 8 2014				
Approximate Date Drilled:		Client:	YG-AAM	Sampler:	Gunn & RM				
Piezometer Diameter / Screen Length:	2" PVC	Project Name:	October 2014 Mt. Nansen Groundwater	Weather/Temp:	MOSTLY CLOUDY ~ -8°C				
CHV (ppm / % LEL):		Duplicate Collected:	<input type="checkbox"/> ID: NONE	Recovery:	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Bad BUT SLOW				
Purge Method									
Waterra	Peristaltic	Disp. Bailer	Subm. Pump	Air Lift	Other				
	✓ w/ battery								
Initial Depth to Water (m):	8.620	Calculations:	Purge Start Time:	1718	Purge End Time:				
Depth to Bottom (m):	19.50	11 ft = 3.5 m x 2 = ~7 L x 3 = 21 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	Time () min. interval (24h)	1724	1736	1747	1758	1809	1823
Submerged Tubing Depth (m):			Depth (m) FT	9.2	9.5	→	→	→	→
Well Stick-up Height (m):	1.65		Temperature (°C)	4.15	4.90	4.96	4.97	5.00	4.96
Estimated Water Volume (L):	~7		pH	7.06	7.29	7.35	7.38	7.40	7.40
			Cond. (µs/cm)	1783	1770	1797	1813	1827	1819
			Specific Cond. (µs/cm)						
			Redox (mV)	65	58.8	59.0	59.2	60.5	61.2
			DO (mg/L)	7.50	1.17	0.92	1.40	0.83	0.84
			Appearance & Odour (Clear, Silty, HC odours, etc.)	CLEAR	→	→	→	→	→
			Interval Purge Volume (L)	2	2.5	2	2.5	3	3.5
		Cumulative Purge Volume (L)	2	4.5	6.5	9	12	15.5	
		Total Purge Volume:							
Method:	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Subm. Pump	Air Lift	Other		
Analysis		✓ w/ BATTERY							
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)	Comments			
MW09-06	FULL SET	18-24	PLASTIC GLASS	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	4-05				

TALL
STICK UP

a = 4.51 turned off + on again



Sample Site (Con't): MW09-06

Field UTM Location: Zn: 08V Easting: 0389411 Northing: 6880653

LPT
096

Photo Nos.: 8474-8475

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	1824
Temperature (°C)	4.96
DO (mg/L)	0.84
Specific Cond. (µs/cm)	
Cond. (µs/cm)	1819
pH	7.40
Redox (mV)	61.2
Turbidity (NTU)	4.05
DO (mg/L)	—
SULPHIDE mg/L	0.02

Additional Purge Data - Continued from Front of Page (if required)					
Time () minute interval:					
Depth (m)					
Temperature (°C)					
pH					
Cond. (µs/cm)					
Specific Cond. (µs/cm)					
Redox (mV)					
DO (mg/L)					
Appearance & Odour (Clear, Silty, HC odours, etc.)					
Interval Purge Volume (L)					
Cumulative Purge Volume (L)					
Total Purge Volume:					

General Notes (Condition of well or other features)
8" SILICON O ₂ - 20.9 % CO ₂ - 460 ppm CH ₄ - ϕ



GROUNDWATER SAMPLE COLLECTION SHEET

Well Number:	MW09-05	Project Number:	1343-005.03	Date:	OCT 8 2014
Approximate Date Drilled:		Client:	YG-AAM	Sampler:	GMK + RM
Piezometer Diameter / Screen Length:	2" PVC	Project Name:	October 2014 Mt. Nansen Groundwater	Weather/Temp:	PART CLOUDY ~ -6°C
CHV (ppm / % LEL):		Duplicate Collected:	<input type="checkbox"/> ID: NONE	Recovery:	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Bad
Purge Method					
Watera	Peristaltic	Disp. Bailer	Subm. Pump	Air Lift	Other
	✓ L/BATTERY				
Initial Depth to Water (m): FT	19.53	Calculations:	Purge Start Time:	1603	Purge End Time:
Depth to Bottom (m): FT	24.5	$= 5 \text{ ft}$ $= 1.5$ $\times 2$ $3L$ $\times 3$ $\times 9L$	Time () min. interval (24h)	1611	1620
Submerged Tubing Depth (m):			Depth (m) ft.	21.0	21.55
Well Stick-up Height (m):	0.81		Temperature (°C)	3.49	2.92
Estimated Water Volume (L):	~3L		pH	6.33	24.2
(DTB - DTW) x 2 (for 2" well diameter) = 1 well volume			Cond. (µs/cm)	2265	2412
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume			Specific Cond. (µs/cm)		
2" casing has 0.16 USgal/ft or 2.032 l/m			Redox (mV)	81.1	84.5
1" casing has 0.04 USgal/ft or 0.508 l/m			DO (mg/L)	4.16	2.86
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			Interval Purge Volume (L)	1	2
		Cumulative Purge Volume (L)	1	3	
		Total Purge Volume:	7.5L		
Method	Watera	Peristaltic	Disp. Bailer	Steel Bailer	Subm. Pump
Analysis					
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)
MW09-05	FULL SET	1702	PLASTIC + GLASS	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	7.68
					ORIGINAL STAFF GAUGE DEEP



Sample Site (Con't): MW09-05

Field UTM Location: Zn: 08V Easting: 038941

Northing: 6880653

WPT
090

Photo Nos.: 8474 + 8475

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	17-02
Temperature (°C)	3-07
DO (mg/L)	0.99
Specific Cond. (µs/cm)	
Cond. (µs/cm)	1907
pH	6.12
Redox (mV)	72.2
Turbidity (NTU)	7.68
DO (mg/L)	TP
SULPHIDE mg/L	0.02

Additional Purge Data - Continued from Front of Page (if required)					
Time () minute interval:					
Depth (m)					
Temperature (°C)					
pH					
Cond. (µs/cm)					
Specific Cond. (µs/cm)					
Redox (mV)					
DO (mg/L)					
Appearance & Odour (Clear, Silty, HC odours, etc.)					
Interval Purge Volume (L)					
Cumulative Purge Volume (L)					
Total Purge Volume:					

General Notes (Condition of well or other features):

8" SILICON
NEW PERI TUBING NEXT TRIP.
O₂ - 20.7%
CO₂ - 550 ppm
CH₄ - 0



GROUNDWATER SAMPLE COLLECTION SHEET

Well Number:	MW09-23	Project Number:	1343-005.03	Date:	OCT 8 2014	
Approximate Date Drilled:	HAS LEVEL LOGGER	Client:	YG-AAM	Sampler:	GMR + RM	
Piezometer Diameter / Screen Length:	1" IT - REMOVED 2" PVC FOR SAMPLING	Project Name:	October 2014 Mt. Nansen Groundwater	Weather/Temp:	LIGHT SNOW -9°C	
CHV (ppm / % LEL):		Duplicate Collected:	<input type="checkbox"/> ID: NONE	Recovery:	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Bad	
Purge Method						
Waterra	Peristaltic	Disp. Bailer	Subm. Pump	Air Lift	Other	
W/ HYDROLIFT						
Initial Depth to Water (m): FT	36.39	Calculations:	Purge Start Time:	8:09	Purge End Time:	
Depth to Bottom (m): FT	51.9	~16 ft = ~5.5 m X 2 = 11 L X 3 = 33 L	Time (min. interval (24h))	8:12	8:18	
Submerged Tubing Depth (m):			Depth (m)	37.2	37.2	→ 37.2
Well Stick-up Height (m):	0.10		Temperature (°C)	0.37	-0.12	0.15
Estimated Water Volume (L):	~11		pH	5.88	6.37	6.49
(DTB - DTW) x 2 (for 2" well diameter) = 1 well volume			Cond. (µs/cm)	2428	2547	2547
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume			Specific Cond. (µs/cm)			
2" casing has 0.16 USgal/ft or 2.032 l/m			Redox (mV)	137.2	52.1	37.2
1" casing has 0.04 USgal/ft or 0.508 l/m			DO (mg/L)	10.5		4.12
8" sand pack has 0.73 USgal/ft or 9.271 l/m			Appearance & Odour (Clear, Silty, HC odours, etc.)	CLAR	TURBID	→
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m			Interval Purge Volume (L)	3	6	5
		Cumulative Purge Volume (L)	3	9	14	
		Total Purge Volume:				
Method:	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Subm. Pump	
Analysis			✓			
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)	
MW09-23	Full set	18:35	Plastic + Glass	<input type="checkbox"/> Yes <input type="checkbox"/> No	102	
					Comments	
					PURGED AND RETURNED TO SAMPLE	

BAILER

SAMPLE - RED IN COLOUR (RUSTY RED)

WITH BAILER (1")

Sample Site (Con't): MW09-23

Field UTM Location: Zn:

Easting: 6389457

Northing: 6880554

WPT
86

Photo Nos.: 8464

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	<u>1835</u>
Temperature (°C)	<u>6.11</u>
DO (mg/L)	<u>2.37</u>
Specific Cond. (µs/cm)	
Cond. (µs/cm)	<u>2592</u>
pH	<u>6.54</u>
Redox (mV)	<u>13.8</u>
Turbidity (NTU)	<u>102</u>
DO (mg/L)	
<u>SULPHIDE mg/L</u>	<u>0.16</u>

Additional Purge Data - Continued from Front of Page (if required)					
Time () minute interval:					
Depth (m)					
Temperature (°C)					
pH					
Cond. (µs/cm)					
Specific Cond. (µs/cm)					
Redox (mV)					
DO (mg/L)					
Appearance & Odour (Clear, Silty, HC odours, etc.)					
Interval Purge Volume (L)					
Cumulative Purge Volume (L)					
Total Purge Volume:					

General Notes (Condition of well or other features)
<p><u>17m Waterline 5/8" + Foot Valve (O25)</u></p> <p><u>1" BAILER</u></p> <p><u>O₂ - 20.9%</u></p> <p><u>CO₂ - 480 ppm</u></p> <p><u>CH₄ - 8</u></p>



GROUNDWATER SAMPLE COLLECTION SHEET

This is not an environmental sampling monitoring well, rusty steel casing in gravel w/ no PVC well

Well Number:	GLL07-02	Project Number:	1343-005.03	Date:	6 Oct 2014		
Approximate Date Drilled:	unknown in field	Client:	YG-AAM	Sampler:	AB JL		
Piezometer Diameter / Screen Length:	15.5 cm ID Ø / unknown in field	Project Name:	October 2014 Mt. Nansen Groundwater	Weather/Temp:	overcast, light snow, cold ~ -8°C		
CHV (ppm / % LEL):	CO2 460 CH4 20.7% 0% LEL	Duplicate Collected:	<input checked="" type="checkbox"/> ID: NO	Recovery:	<input type="checkbox"/> Good <input type="checkbox"/> Bad		
Purge Method							
Waterra	Peristaltic	Disp. Bailer	Subm. Pump	Air Lift	Other		
N/A → direct sample							
Initial Depth to Water (m):	6.355	Calculations:	Purge Start Time:	N/A	Purge End Time:	N/A	
Depth to Bottom (m):	7.20	15.5 cm	Time () min. interval (24h)				
Submerged Tubing Depth (m):	~ 7.0	~ 65 1/4"	Depth (m)				
Well Stick-up Height (m):	1.33	7.2 - 6.35	Temperature (°C)				
Estimated Water Volume (L):	~ 5 L	= 0.85 m	pH				
(DTB - DTW) x 2 (for 2" well diameter) = 1 well volume		> 6.35 L/m	Cond. (µs/cm)				
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		~ 5 L	Specific Cond. (µs/cm)				
2" casing has 0.16 USgal/ft or 2.032 l/m			Redox (mV)				
1" casing has 0.04 USgal/ft or 0.508 l/m			DO (mg/L)				
8" sand pack has 0.73 USgal/ft or 9.271 l/m			Appearance & Odour (Clear, Silty, HC odours, etc.)				
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m			Interval Purge Volume (L)				
			Cumulative Purge Volume (L)				
			Total Purge Volume:				
Method:	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Subm. Pump	Air Lift	Other
Analysis			1 L plastic (existing)				
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)	Comments	
GLL07-02	Full suite + full bottles as per SOW	11:05	As per SOW, inc field filter + preserve as appropriate	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	31.5 NTU post sample	DTW post sample 6.55 m	

Field sulphides = 0.13 mg/L

direct sample ✓ existing 1 L plastic bailer in well - unsure if there is even a screen, or how much water will yield

Discuss w/ PM before submitting for analysis?

Sample Site (Con't): ELL07-02

Wyp+H

Field UTM Location: Zn: 68 V Easting: 0389071

Northing: 6881705

Hemmera
whitehorse
GPS

Photo Nos.: 66-70

Hemmera
Van
Canada

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	/
Temperature (°C)	/
DO (mg/L)	N/A
Specific Cond. (µs/cm)	/
Cond. (µs/cm)	SEE
pH	/
Redox (mV)	PREVIOUS
Turbidity (NTU)	/
DO (mg/L)	PAGE
	/
	/
	/

Additional Purge Data - Continued from Front of Page (if required)					
Time () minute interval:	/	/	/	/	/
Depth (m)	/	/	/	/	/
Temperature (°C)	/	/	/	/	/
pH	/	/	/	/	/
Cond. (µs/cm)	/	/	N/A	/	/
Specific Cond. (µs/cm)	/	/	/	/	/
Redox (mV)	/	/	/	/	/
DO (mg/L)	/	/	/	/	/
Appearance & Odour (Clear, Silty, HC odours, etc.)	/	/	/	/	/
Interval Purge Volume (L)	/	/	/	/	/
Cumulative Purge Volume (L)	/	/	/	/	/
Total Purge Volume:					

General Notes (Condition of well or other features):

Large rusty metal casing (~15.5 cm ID Ø) located below main road, near barricaded entrance to tunnel
 - No PVC casing inside, large hole into ground w/ water present and existing 1L bailer + twine
 ↳ Unsure whether this is supposed to be a PVC casing MW or not? There are no markings anywhere on metal casing indicating this is ELL07-02? Check w/ PM before submitting sample
 Decide to collect direct sample w/ existing bailer. Unsure if twine penetrates (if there is a screen?), and have no ability to use per pump as tubing coils up inside casing + doesn't reach bottom

Equipment MiniPac PID (Piro), Salinst w/L tube (twice) ECR, 1L plastic disposable bailer (already in place)
 Hoskin LaMotte, Maxim HACH

GROUNDWATER SAMPLE COLLECTION SHEET

no cap
on PVC well

Well Number:	W14103083BH03		Project Number:	1343-005.03		Date:	8 Oct 2014		
Approximate Date Drilled:	unknown in field		Client:	YG-AAM		Sampler:	AB JL		
Piezometer Diameter / Screen Length:	2" PVC / unknown in field		Project Name:	October 2014 Mt. Nansen Groundwater		Weather/Temp:	Overcast, light wind, cold ~ -8°C		
CHV (ppm / % LEL):	CO ₂ 480 CH ₄ 20.9% 0% LEL		Duplicate Collected:	<input checked="" type="checkbox"/> ID: DUP-3		Recovery:	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Bad		
Purge Method									
Waterra		Peristaltic		Disp. Bailer		Subm. Pump		Air Lift	
		peri pump							
Initial Depth to Water (m):	1.70	Calculations:	Purge Start Time:	17:36		Purge End Time:	18:24		
Depth to Bottom (m):	5.38	5.38 - 1.70 = 3.68 m x 2 L/m = 7.36 L	Time (5) min. interval (24h)	17:39	17:44	17:49	17:54	17:59	
Submerged Tubing Depth (m):	~ 5.0		Depth (m)	1.74	1.75	1.75	1.77	1.79	1.77
Well Stick-up Height (m):	0.71		Temperature (°C)	4.5		1.3	1.4	1.4	1.5
Estimated Water Volume (L):	~ 7.5		pH			6.21	6.21	6.26	6.28
(DTB - DTW) x 2 (for 2" well diameter) = 1 well volume			Cond. (µs/cm)	Frozen		183.0	183.4	183.3	183.9
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume			Specific Cond. (µs/cm)			334.0	334.0	333.6	334.2
2" casing has 0.16 USgal/ft or 2.032 l/m			Redox (mV)			-45.9	-53.1	-60.9	-65.7
1" casing has 0.04 USgal/ft or 0.508 l/m			DO (mg/L)			0.99	0.76	0.74	0.82
8" sand pack has 0.73 USgal/ft or 9.271 l/m			Appearance & Odour (Clear, Silty, HC odours, etc.)	mostly clear, faint light brown	mostly clear, light grey / brown, trace silt				
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m			Interval Purge Volume (L)	0.75	1.5	1.5	2.5	2.75	3.0
			Cumulative Purge Volume (L)	0.75	2.25	3.75	6.25	9.0	
			Total Purge Volume:	24 L					
Method:	Waterra		Peristaltic		Disp. Bailer		Steel Bailer		
Analysis	@ low flow								
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)		Comments		
W14103083BH03 + DUP-3	Full suite, full bottles as per SOW (DUP-3 as well)	18:26 - 18:37	As per SOW	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	13.2 NTU @ time of sample		Field sulphide = 0.16 mg/L		

OVER →

MiniRae PID (Pine) Solinst Wb Tape (ELR), Hemmen VST, ELR peri pump, Haskin LaMotte, Maxam HACH



Sample Site (Con't): W14.... BH03 *W14 Name*

Field UTM Location: Zn: 08 ✓ Easting: 0389134 Northing: 6880732

*Hemmer
Whitehorse
GPS*

Photo Nos.: 106-110

*Hemmer
Van
Compton*

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	
Temperature (°C)	
DO (mg/L)	
Specific Cond. (µs/cm)	<i>SEE</i>
Cond. (µs/cm)	<i>OVER</i> →
pH	
Redox (mV)	
Turbidity (NTU)	
DO (mg/L)	

Additional Purge Data - Continued from Front of Page (if required)					
Time () minute interval:	<i>18:09</i>	<i>18:14</i>	<i>18:19</i>	<i>18:24</i>	
Depth (m)	<i>1.77</i>	<i>1.78</i>	<i>—</i>		
Temperature (°C)	<i>1.4°C</i>	<i>1.5</i>	<i>1.5</i>	<i>1.5</i>	
pH	<i>6.31</i>	<i>6.32</i>	<i>6.34</i>	<i>6.35</i>	
Cond. (µs/cm)	<i>184.3</i>	<i>185.5</i>	<i>186.4</i>	<i>185.8</i>	
Specific Cond. (µs/cm)	<i>335.0</i>	<i>337.2</i>	<i>337.9</i>	<i>337.7</i>	
Redox (mV)	<i>-69.2</i>	<i>-72.3</i>	<i>-74.6</i>	<i>-76.2</i>	
DO (mg/L)	<i>0.91</i>	<i>1.03</i>	<i>1.12</i>	<i>1.17</i>	
Appearance & Odour (Clear, Silty, HC odours, etc.)	<i>mostly clear</i>	<i>" "</i>	<i>" "</i>		
Interval Purge Volume (L)	<i>3.0</i>	<i>3.0</i>	<i>3.0</i>	<i>3.0</i>	
Cumulative Purge Volume (L)	<i>15</i>	<i>18</i>	<i>21</i>	<i>24</i>	
Total Purge Volume:					

General Notes (Condition of well or other features)
<p><i>Red metal stick up w/ lid, w/ 2" PVC well (no cap) inside</i></p> <p><i>Existing 2L plastic bailer in well dark red/brown stained bottom of bailer</i></p> <p><i>Installed 6m of 1/2" tubing + 6" silicon for low flow sampling</i></p>

GROUNDWATER SAMPLE COLLECTION SHEET

Well Number: MW 09-11		Project Number: 1343-005.03		Date: 8 Oct 2014	
Approximate Date Drilled: unknown in field		Client: YG-AAM		Sampler: AB JC	
Piezometer Diameter / Screen Length: 2" PVC - emp / unknown in field		Project Name: October 2014 Mt. Nansen Groundwater		Weather/Temp: overcast, light wind, cold ~ -2°C	
CHV (ppm / % LEL): E02 860 CH4 20.4% 0% LEL		Duplicate Collected: <input checked="" type="checkbox"/> NO		Recovery: <input type="checkbox"/> Good <input type="checkbox"/> Bad	
Purge Method					
Waterra		Peristaltic		Air Lift	
		Disp. Bailer		Other	
		Subm. Pump			
Initial Depth to Water (m): N/A Dry		Calculations:		Purge Start Time:	
Depth to Bottom (m): 4.91				Purge End Time:	
Submerged Tubing Depth (m): N/A				Time () min. interval (24h)	
Well Stick-up Height (m): 0.80				Depth (m)	
Estimated Water Volume (L): N/A				Temperature (°C)	
(DTB - DTW) x 2 (for 2" well diameter) = 1 well volume				pH	
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume				Cond. (µs/cm)	
2" casing has 0.16 USgal/ft or 2.032 l/m				Specific Cond. (µs/cm)	
1" casing has 0.04 USgal/ft or 0.508 l/m				Redox (mV)	
8" sand pack has 0.73 USgal/ft or 9.271 l/m				DO (mg/L)	
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m				Appearance & Odour (Clear, Silty, HC odours, etc.)	
				Interval Purge Volume (L)	
				Cumulative Purge Volume (L)	
				Total Purge Volume:	
Method:		Waterra		Peristaltic	
Analysis		Disp. Bailer		Steel Bailer	
		Subm. Pump		Air Lift	
		Other			
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)
				<input type="checkbox"/> Yes	
				<input type="checkbox"/> No	
					Comments

good sentry cap on well (slits above only)

Dry



Sample Site (Con't): MW09-11 *hpt name =*

Field UTM Location: Zn: 08 V Easting: 0389039 Northing: 6880712

*Hemmera
Whitchersee
EPS*

Photo Nos.: 100-105

*Hemmera
Van
Convera*

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	
Temperature (°C)	
DO (mg/L)	
Specific Cond. (µs/cm)	
Cond. (µs/cm)	
pH	
Redox (mV)	
Turbidity (NTU)	
DO (mg/L)	

Additional Purge Data - Continued from Front of Page (if required)					
Time () minute interval:					
Depth (m)					
Temperature (°C)					
pH					
Cond. (µs/cm)					
Specific Cond. (µs/cm)					
Redox (mV)					
DO (mg/L)					
Appearance & Odour (Clear, Silty, HC odours, etc.)					
Interval Purge Volume (L)					
Cumulative Purge Volume (L)					
Total Purge Volume					

General Notes (Condition of well or other features):

Red metal stick up + 2" PVC well w/cap all in good condition. located in sand area above tailing's road
↳ Existing 16 plastic bailer in well w no water in it

MiniRaz PID (Pine) Solinst WL type (E-LR)

GROUNDWATER SAMPLE COLLECTION SHEET

see reverse for "A"

Well Number:	GSI-PC - 03 A/B	Project Number:	1343-005.03	Date:	8 Oct 2014		
Approximate Date Drilled:	unknown in field	Client:	YG-AAM	Sampler:	AB JL		
Piezometer Diameter / Screen Length:	0.25 cm stainless steel / unknown in field	Project Name:	October 2014 Mt. Nansen Groundwater	Weather/Temp:	Overcast, light snow, cold ~ -8°C		
CHV (ppm / % LEL):	CO ₂ 550 CH ₄ 26.9% 0% LEL	Duplicate Collected:	NO NO	Recovery:	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Bad		
Purge Method							
Water	Peristaltic	Disp. Bailer	Subm. Pump	Air Lift	Other		
N/A → no purge, direct sample only							
Initial Depth to Water (m):	1.60	Calculations:	Purge Start Time:	N/A	Purge End Time:		
Depth to Bottom (m):	2.64	$(DTB - DTW) \times 2$ (for 2" well diameter) = 1 well volume $(DTB - DTW) \times 1.1$ (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	Time () min. interval (24h)				
Submerged Tubing Depth (m):	~ 2.5		Depth (m)				
Well Stick-up Height (m):	0.92		Temperature (°C)				
Estimated Water Volume (L):			pH				
			Cond. (µs/cm)				
			Specific Cond. (µs/cm)				
			Redox (mV)				
			DO (mg/L)				
			Appearance & Odour (Clear, Silty, HC odours, etc.)				
			Interval Purge Volume (L)				
		Cumulative Purge Volume (L)					
		Total Purge Volume:					
Method:	Water	Peristaltic	Disp. Bailer	Steel Bailer	Subm. Pump	Air Lift	Other
Analysis	manual ~ foot valve micro						
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)	Comments	
GSI-PC-03B	Dis Metals (both full)	15:00-15:07	1x 120 ml plastic 1x 40 ml vial	<input checked="" type="checkbox"/> Yes + filler <input type="checkbox"/> No	69.5 NTU prior to metals filtering	Field sulphides = 0.37 mg/L	

cap in place
w/ good seal

⊗ Limited
parameters
sampled

→ 15:00 - start direct sample w/ macro water + foot valve manual, yield ~ 200 ml brown, silty turbid water before going dry, will return after finishing MPO9-08 sampling to check recharge
 15:45 - returned to well, yield ≤ 10 ml water, very slow recharge - finished w/ limited volume / priority sampling along Pony Creek



Sample Site (Con't): GSI-PC-03 A/B ^{Wpt #}

Field UTM Location: Zn: 08 V

Easting:

Northing:

→ both A/B

} Hemmera
Whitchease
EPS

Photo Nos.: 71-75

→ both A/B

} Hemmera
Van
Cormier

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	
Temperature (°C)	
DO (mg/L)	
Specific Cond. (µs/cm)	
Cond. (µs/cm)	
pH	
Redox (mV)	
Turbidity (NTU)	
DO (mg/L)	

Additional Purge Data – Continued from Front of Page (if required)					
Time () minute interval:					
Depth (m)					
Temperature (°C)					
pH					
Cond. (µs/cm)					
Specific Cond. (µs/cm)					
Redox (mV)					
DO (mg/L)					
Appearance & Odour (Clear, Silty, HC odours, etc.)					
Interval Purge Volume (L)					
Cumulative Purge Volume (L)					
Total Purge Volume:					

General Notes (Condition of well or other features)	
Existing micro waterera 1/4" tubing in well, frozen in place, had to be twisted & pulled hard to break free from ice/frozen → Existing tubing was kinked at top of casing, had to replace ✓ 3m of new micro waterera plus micro foot valve	"A" Details → same construction as "B" except no cap, Ziploc bag cover only → not great seal CO ₂ 490 OZ 20.9% CH ₄ 0% LEL DTW DTB = N/A → frozen @ 0.94m and no existing tubing in well. Attempt to use "B" tubing to break ice, but won't penetrate

Stick up = 0.88cm

GROUNDWATER SAMPLE COLLECTION SHEET

> for "A" details, see reverse

Well Number:	GSI-PC-04 A/B	Project Number:	1343-005.03	Date:	8 Oct 2014		
Approximate Date Drilled:	Unknown in field	Client:	YG-AAM	Sampler:	AB JL		
Piezometer Diameter / Screen Length:	25cm ID / unknown in field	Project Name:	October 2014 Mt.Nansen Groundwater	Weather/Temp:	overcast, light snow, ~ -5°C		
CHV (ppm / % LEL):	CO ₂ 460 (H ₂) O ₂ 20.9% 0% LEL	Duplicate Collected:	<input checked="" type="checkbox"/> ID: NO	Recovery:	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Bad		
Purge Method							
Waterra	Peristaltic	Disp. Bailor	Subm. Pump	Air Lift	Other		
N/A - direct sample w/ no purge (limited volumes)							
Initial Depth to Water (m):	1.28	Calculations:	Purge Start Time:	Purge End Time:			
Depth to Bottom (m):	2.59	$(DTB - DTW) \times 2$ (for 2" well diameter) = 1 well volume $(DTB - DTW) \times 1.1$ (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	Time () min. interval (24h)				
Submerged Tubing Depth (m):	~ 2.30		Depth (m)				
Well Stick-up Height (m):	0.92		Temperature (°C)				
Estimated Water Volume (L):			pH				
			Cond. (µs/cm)	N/A			
			Specific Cond. (µs/cm)				
			Redox (mV)				
			DO (mg/L)	DIRECT			
			Appearance & Odour (Clear, Silty, HC odours, etc.)	SAMPLE			
			Interval Purge Volume (L)				
		Cumulative Purge Volume (L)					
		Total Purge Volume:					
Method:	Waterra	Peristaltic	Disp. Bailor	Steel Bailor	Subm. Pump	Air Lift	Other
Analysis	micro ineffective manual						
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)	Comments	
GSI-PC-04B	Diss Metals } Full volume Diss Hg	13:30 - 13:40	1 x 120ml plastic 1 x 40ml vial	<input checked="" type="checkbox"/> Yes + filler <input type="checkbox"/> No	53.3 NTU from bottle before filling/filtration metals + Hg	2 bottles only, both full, remaining sample for turbidity + sulphides (field)	

Good seal
w/ plastic
cap

= 0.43
mg/L

⊗
limited
parameters
sampled

Pine MiniRae, ELR Solinst w/L type, manual micro meter, Hoshin Lamotte, Maxam HACH

Yield ~ 250ml slightly turbid water when sampling ~ micro meter before well goes dry. (13:30 - 13:40) → wait 5 mins and no retrievable recharge. Will attempt again to get whatever we can after checking GSI-PC-05 A/B
14:30 - return to well, yield < 40ml to surface after 50 min recharge - will be limited sample, enough for Diss Metals + Hg only

Sample Site (Con't):

G51-PE-01 A/B ← wpt name =

↗ both wells

Field UTM Location: Zn: 00 V Easting: 0389586 Northing: 6881656

} Hemmera
whitehorse
GPS

↗ both wells
Photo Nos.: 81-85

} Hemmera
Van
Emura

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	
Temperature (°C)	
DO (mg/L)	N/A
Specific Cond. (µs/cm)	
Cond. (µs/cm)	DIRECT
pH	SAMPLE
Redox (mV)	
Turbidity (NTU)	SEE PREVIOUS
DO (mg/L)	PAGE

Additional Purge Data - Continued from Front of Page (if required)					
Time () minute interval:					
Depth (m)					
Temperature (°C)					
pH					
Cond. (µs/cm)			N/A		
Specific Cond. (µs/cm)					
Redox (mV)					
DO (mg/L)					
Appearance & Odour (Clear, Silty, HC odours, etc.)					
Interval Purge Volume (L)					
Cumulative Purge Volume (L)					
Total Purge Volume:					

General Notes (Condition of well or other features)	
<p>25cm diam stainless steel drive point well (w/ cap)</p> <p>Existing micro watera tubing inside well, slightly frozen in place, but pulled out relatively easily</p> <p>existing tubing was kinked @ top casing, had to be replaced w/ 3m of new micro watera + micro foot valve</p>	<p>"A" details - same construction as "B" except has no cap, ziplock bag poor seal</p> <p>CO₂ 430 O₂ 20.9% CH₄ 0% LEL</p> <p>DTW 0.93m DTB 2.01m</p> <p>Stick up = 0.91</p>

GROUNDWATER SAMPLE COLLECTION SHEET

see details for "A" on next page

Well Number:	GSI-PC-05A/B		Project Number:	1343-005.03		Date:	8 Oct 2014	
Approximate Date Drilled:	unknown in field		Client:	YG-AAM		Sampler:	AB JC	
Piezometer Diameter / Screen Length:	25cm ID / unknown in field		Project Name:	October 2014 Mt. Nansen Groundwater		Weather/Temp:	Overcast, light snow, cold, ~ -8°C	
CHV (ppm / % LEL):	CO ₂ 630 CH ₄ 20.6% 0% LEL		Duplicate Collected:	<input checked="" type="checkbox"/> No		Recovery:	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Bad	
Purge Method								
Waterra		Peristaltic		Disp. Bailer		Subm. Pump		Air Lift
N/A - proceed w/ direct sample								Other
Initial Depth to Water (m):	1.85		Calculations:	Purge Start Time:	N/A		Purge End Time:	N/A
Depth to Bottom (m):	3.70		<p>(DTB - DTW) x 2 (for 2" well diameter) = 1 well volume</p> <p>(DTB - DTW) x 1.1 (for 1.5" diameter) = 1 well volume</p> <p>2" casing has 0.16 USgal/ft or 2.032 l/m</p> <p>1" casing has 0.04 USgal/ft or 0.508 l/m</p> <p>8" sand pack has 0.73 USgal/ft or 9.271 l/m</p> <p>6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m</p>	Time () min. interval (24h)				
Submerged Tubing Depth (m):	~ 3.5			Depth (m)	↓			
Well Stick-up Height (m):	0.89			Temperature (°C)	Water very brown, silty, turbid w/ trace			
Estimated Water Volume (L):				pH	bits of floating organics			
				Cond. (µs/cm)				
				Specific Cond. (µs/cm)				
				Redox (mV)				
				DO (mg/L)				
				Appearance & Odour (Clear, Silty, HC odours, etc.)				
				Interval Purge Volume (L)				
			Cumulative Purge Volume (L)					
			Total Purge Volume:					
Method	Waterra		Peristaltic	Disp. Bailer	Steel Bailer	Subm. Pump	Air Lift	Other
Analysis	micro (festive manual)							
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)		Comments	
GSI-PC-05/B	Diss Metals + Diss Hg	14:00 - 14:07	1x120ml plastic, 1x40ml glass	<input checked="" type="checkbox"/> Yes - w/ filter <input type="checkbox"/> No	2084 AU prior to metals filtering		Did not measure field sulphides w/ very turbid water =	

well sealed w/ plastic cap

⊗ Limited parameters ⊗

14:00 - start direct sample w/ manual micro waterra, yield ~ 300 ml very silty + turbid water before going dry @ 14:07, wait 0.80 5 mins, no significant recharge, nothing to surface

→ Able to direct sample Diss Metals (full) + Diss Hg (full)

→ Not enough water remaining for other parameters/jars, and also very turbid → OK to measure field sulphides w/ such high turbidity?

mg/L w/ "LIMIT" flashing



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

Wpt Name

both wells

Field UTM Location: Zn: 08 V Easting: 0389710

Northing: 6061663

Hemmera
whitehorse
EPS

Photo Nos.: 76-80

Hemmera
Van
Cane/4

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	
Temperature (°C)	
DO (mg/L)	N/A
Specific Cond. (µs/cm)	
Cond. (µs/cm)	No PURGE,
pH	
Redox (mV)	DIRECT SAMPLE
Turbidity (NTU)	
DO (mg/L)	

Additional Purge Data - Continued from Front of Page (if required)					
Time () minute interval:					
Depth (m)					
Temperature (°C)					
pH					
Cond. (µs/cm)					
Specific Cond. (µs/cm)					
Redox (mV)					
DO (mg/L)					
Appearance & Odour (Clear, Silty, HC odours, etc.)					
Interval Purge Volume (L)					
Cumulative Purge Volume (L)					
Total Purge Volume:					

General Notes (Condition of well or other features):	
25cm ID stainless steel drive point well. Existing micro watermeter tubing + footvalve in well, not frozen in place, able to pull out easily (not frozen) Used existing tubing for direct sample	"A" well details → same construction as "B" except has no cap, poor seal w/ zip lock bag CO ₂ 440 O ₂ 20.6% CH ₄ 6% LEL DTW = 1.51 DTB = 2.10 ↳ could be bottom, could be ice Stick up height = 0.81m (hollow sand w/ probe)

Equipment: Pine Mini-Rae PBD, ELR Salinst w/L tape, manual micro watermeter, Ramoth (Hoskin) + MACH (maxim)



GROUNDWATER SAMPLE COLLECTION SHEET

Well Number:	GSI-HA-01A	Project Number:	1343-005.03	Date:	OCT 7 2014		
Approximate Date Drilled:		Client:	YG-AAM	Sampler:	GMR + RM		
Piezometer Diameter / Screen Length:	1" METAL OP.	Project Name:	October 2014 Mt. Nansen Groundwater	Weather/Temp:	LIGHT SNOW ~ -8°C		
CHV (ppm / % LEL):		Duplicate Collected:	<input type="checkbox"/> ID: NONE	Recovery:	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Bad		
Purge Method							
Watera	Peristaltic	Disp. Bailer	Subm. Pump	Air Lift	Other		
Initial Depth to Water (m): FT		7.46	Calculations:		Purge Start Time:		
Depth to Bottom (m): FT		9.93	DIRECT SAMPLE.		Purge End Time:		
Submerged Tubing Depth (m):		2			Time () min. interval (24h)		
Well Stick-up Height (m):		1.15			Depth (m)		
Estimated Water Volume (L):					Temperature (°C)		
(DTB - DTW) x 2 (for 2" well diameter) = 1 well volume					pH		
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume					Cond. (µs/cm)		
2" casing has 0.16 USgal/ft or 2.032 l/m					Specific Cond. (µs/cm)		
1" casing has 0.04 USgal/ft or 0.508 l/m					Redox (mV)		
8" sand pack has 0.73 USgal/ft or 9.271 l/m					DO (mg/L)		
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m					Appearance & Odour (Clear, Silty, HC odours, etc.)		
			Interval Purge Volume (L)				
			Cumulative Purge Volume (L)				
			Total Purge Volume:				
Method:	Watera	Peristaltic	Disp. Bailer	Steel Bailer	Subm. Pump	Air Lift	Other
Analysis							
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)	Comments	
GSI-HA-01A	DISS METALS 80mL GEN CHEM 800mL	1420	PLASTIC	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	SOME TURBIDITY YELLOW TINGE	DIRECT SAMPLE	

CYANIDE 60m
* MIN VOLUMES *



Sample Site (Con't): G51-HA-01A

Field UTM Location: Zn: 08V Easting: 038784

Northing: 6881135

WP79.

Photo Nos.: 8461

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	
Temperature (°C)	
DO (mg/L)	
Specific Cond. (µs/cm)	
Cond. (µs/cm)	NONE
pH	
Redox (mV)	TAKEN
Turbidity (NTU)	
DO (mg/L)	DIRECT
	SAMPLE

Additional Purge Data - Continued from Front of Page (if required)					
Time () minute interval:					
Depth (m)					
Temperature (°C)					
pH					
Cond. (µs/cm)					
Specific Cond. (µs/cm)					
Redox (mV)					
DO (mg/L)					
Appearance & Odour (Clear, Silty, HC odours, etc.)					
Interval Purge Volume (L)					
Cumulative Purge Volume (L)					
Total Purge Volume					

General Notes (Condition of well or other features):

Head Space gases
O₂ 20.9%.
CH₄ 0.0%.
CO₂ 0.0%.

2 m OF PERI TUBING
8" SILICON



GROUNDWATER SAMPLE COLLECTION SHEET

Well Number:	GSI-HA-02A		Project Number:	1343-005.03		Date:	OCT 7 2014		
Approximate Date Drilled:			Client:	YG-AAM		Sampler:	GMR + RM		
Piezometer Diameter / Screen Length:	1" METAL DP		Project Name:	October 2014 Mt. Nansen Groundwater		Weather/Temp:	LIGHT SNOW OVERCAST ~ -8°C		
CHV (ppm / % LEL):			Duplicate Collected:	<input type="checkbox"/> ID: NONE		Recovery:	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Bad		
Purge Method									
Waterra		Peristaltic		Disp. Bailer		Subm. Pump		Air Lift	
		DIRECT SAMPLE							
Initial Depth to Water (m):	FT	6.50	Calculations: ~ 1 m OF WATER.	Purge Start Time:	Purge End Time:				
Depth to Bottom (m):	FT	9.92		Time () min. interval (24h)					
Submerged Tubing Depth (m):				Depth (m)					
Well Stick-up Height (m):		1.45		Temperature (°C)					
Estimated Water Volume (L):				pH					
(DTB - DTW) x 2 (for 2" well diameter) = 1 well volume			DIRECT SAMPLE NO PURGE	Cond. (µs/cm)					
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume				Specific Cond. (µs/cm)					
2" casing has 0.16 USgal/ft or 2.032 l/m				Redox (mV)					
1" casing has 0.04 USgal/ft or 0.508 l/m				DO (mg/L)					
8" sand pack has 0.73 USgal/ft or 9.271 l/m				Appearance & Odour (Clear, Silty, HC odours, etc.)					
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m				Interval Purge Volume (L)					
				Cumulative Purge Volume (L)					
				Total Purge Volume:					
Method:									
Waterra		Peristaltic		Disp. Bailer		Steel Bailer		Subm. Pump	
		✓							
Analysis									
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)		Comments		
GSI-HA-02A	DISSOLVED METALS GEN CHEM	14-33	PLASTIC	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	SOME TURBIDITY YELLOW TINGE				

MIN VOLUMES.

Sample Site (Con't): _____

Field UTM Location: Zn: 08V Easting: 0387861 Northing: 6881135

WP80 Photo Nos.: 8457

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	
Temperature (°C)	
DO (mg/L)	
Specific Cond. (µs/cm)	
Cond. (µs/cm)	
pH	
Redox (mV)	
Turbidity (NTU)	DIRECT
DO (mg/L)	SAMPLE.

Additional Purge Data - Continued from Front of Page (if required)					
Time () minute interval:					
Depth (m)					
Temperature (°C)					
pH					
Cond. (µs/cm)					
Specific Cond. (µs/cm)					
Redox (mV)					
DO (mg/L)					
Appearance & Odour (Clear, Silty, HC odours, etc.)					
Interval Purge Volume (L)					
Cumulative Purge Volume (L)					
Total Purge Volume:					

General Notes (Condition of well or other features)	
<p>HEAD SP GAS</p> <p>CO₂ 0.0 %</p> <p>CH₄ 0.0</p> <p>O₂ 20.9</p> <p>↓</p> <p>4m PERISTALTIC TUBING</p> <p>8" SILICON</p>	



GROUNDWATER SAMPLE COLLECTION SHEET

Well Number:	G01-DC-02B	Project Number:	1343-005.03	Date:	OCT 7 2014
Approximate Date Drilled:		Client:	YG-AAM	Sampler:	Gmk + RM
Piezometer Diameter / Screen Length:	1" METAL DP	Project Name:	October 2014 Mt. Nansen Groundwater	Weather/Temp:	LIGHT SNOW ~ -8°C
CHV (ppm / % LEL):		Duplicate Collected:	<input checked="" type="checkbox"/> ID: NONE	Recovery:	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Bad
Purge Method					
Waterra	Peristaltic	Disp. Bailer	Subm. Pump	Air Lift	Other
	<input checked="" type="checkbox"/>				
Initial Depth to Water (m): FT	7.39	Calculations:	Purge Start Time:	Purge End Time:	
Depth to Bottom (m): FT	12.36	DIRECT SAMPLE	Time () min. interval (24h)		
Submerged Tubing Depth (m):			Depth (m)		
Well Stick-up Height (m): M	0.88		Temperature (°C)		
Estimated Water Volume (L):			pH		
(DTB - DTW) x 2 (for 2" well diameter) = 1 well volume			Cond. (µs/cm)		
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume			Specific Cond. (µs/cm)		
2" casing has 0.16 USgal/ft or 2.032 l/m			Redox (mV)		
1" casing has 0.04 USgal/ft or 0.508 l/m			DO (mg/L)		
8" sand pack has 0.73 USgal/ft or 9.271 l/m			Appearance & Odour (Clear, Silty, HC odours, etc.)		
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m			Interval Purge Volume (L)		
		Cumulative Purge Volume (L)			
		Total Purge Volume:			
Method:	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Subm. Pump
Analysis		<input checked="" type="checkbox"/> L/BATTERY			
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)
G01-DC-02B	DISSOLVED METALS GEN CHEM CYANIDE	14-08.	PLASTIC ONLY.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	—
					DP.

3 BOTTLES
 CH4 0.0 %
 CO2 0.0 %
 O2 20.9 %

A GASES.
 DTW 5.41 FT
 DTB 6.30 FT
 SU 0.88 M



Sample Site (Con't): _____

Field UTM Location: Zn: 08V Easting: 0387879 Northing: 6881128 (WPC83) Photo Nos.: 8460

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	
Temperature (°C)	
DO (mg/L)	
Specific Cond. (µs/cm)	
Cond. (µs/cm)	
pH	
Redox (mV)	
Turbidity (NTU)	
DO (mg/L)	

Additional Purge Data - Continued from Front of Page (if required)					
Time () minute interval:					
Depth (m)					
Temperature (°C)					
pH					
Cond. (µs/cm)					
Specific Cond. (µs/cm)					
Redox (mV)					
DO (mg/L)					
Appearance & Odour (Clear, Silty, HC odours, etc.)					
Interval Purge Volume (L)					
Cumulative Purge Volume (L)					
Total Purge Volume:					

General Notes (Condition of well or other features)

Head space gases

O₂ 20-9%

CO₂ 0-78%

CH₄ 0.0%

B is DOWNSTREAM OF A BY 0.4m.



GROUNDWATER SAMPLE COLLECTION SHEET

FB1

Well Number:	MW09-16	Project Number:	1343-005.03	Date:	OCT 7 2014				
Approximate Date Drilled:		Client:	YG-AAM	Sampler:	GMR + RM				
Piezometer Diameter / Screen Length:	2"	Project Name:	October 2014 Mt. Nansen Groundwater	Weather/Temp:	PARTLY SUNNY LIGHT SNOW -10°C				
CHV (ppm / % LEL):		Duplicate Collected:	<input type="checkbox"/> ID: NONE	Recovery:	<input type="checkbox"/> Good <input type="checkbox"/> Bad				
Purge Method									
Waterra	Peristaltic	Disp. Bailer	Subm. Pump	Air Lift	Other				
	✓								
Initial Depth to Water (m):	5.47	Calculations:	Purge Start Time:	11-53	Purge End Time: 12-26				
Depth to Bottom (m):	8.56	3 ft. = 1 m X 2 = 2 L X 3 = 6 L SKINNY DIPPER 15 FT!	Time () min. interval (24h)	11:59	12:11	12:19	12:24		
Submerged Tubing Depth (m):			Depth (m)	5.5	5.5	5.5	5.5		
Well Stick-up Height (m):	1.21		Temperature (°C)	2.29	2.39	2.36	2.51		
Estimated Water Volume (L):	2 L		pH	6.57	6.55	6.55	6.55		
(DTB - DTW) x 2 (for 2" well diameter) = 1 well volume			Cond. (µs/cm)	2154	2155	2157	2154		
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume			Specific Cond. (µs/cm)						
2" casing has 0.16 USgal/ft or 2.032 l/m			Redox (mV)	35.4	47.5	52.7	55.5		
1" casing has 0.04 USgal/ft or 0.508 l/m			DO (mg/L)	8.96	5.84	5.56	5.38		
8" sand pack has 0.73 USgal/ft or 9.271 l/m			Appearance & Odour (Clear, Silty, HC odours, etc.)	CLEAR	CLEAR	CLEAR	CLEAR		
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m			Interval Purge Volume (L)	0.5	4.5	3	2		
		Cumulative Purge Volume (L)	0.5	5	8	10			
		Total Purge Volume:							
Method:	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Subm. Pump	Air Lift	Other		
Analysis		✓							
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)		Comments		
MW09-16	FULL SET. + FB1	12-27	PLASTIC + GLASS	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	1.22				

~~FB1~~

Sample Site (Con't): MW09-16

Field UTM Location: Zn: 08V Easting: 0387990 Northing: 6881097

WPT
(76)

Photo Nos.: 8455

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	<u>12-24</u>
Temperature (°C)	<u>2.51</u>
DO (mg/L)	<u>5.38</u>
Specific Cond. (µs/cm)	
Cond. (µs/cm)	<u>2154</u>
pH	<u>6.55</u>
Redox (mV)	<u>55.5</u>
Turbidity (NTU)	<u>1.22</u>
DO (mg/L)	
<u>SULFIDE mg/l</u>	<u>0.01</u>

Additional Purge Data - Continued from Front of Page (if required)					
Time () minute interval:					
Depth (m)					
Temperature (°C)					
pH					
Cond. (µs/cm)					
Specific Cond. (µs/cm)					
Redox (mV)					
DO (mg/L)					
Appearance & Odour (Clear, Silty, HC odours, etc.)					
Interval Purge Volume (L)					
Cumulative Purge Volume (L)					
Total Purge Volume					

General Notes (Condition of well or other features):

Head space gases
 $O_2 = 20.6\%$
 $CH_4 = 0.0\%$
 $CO_2 = 0.0\%$
 SUT IN CASING.

SULPHIDE = 0.01 mg/l
BLANK = 0.00 mg/l
8" SILICON

FB1



GROUNDWATER SAMPLE COLLECTION SHEET

Well Number:	MW09-19	Project Number:	1343-005.03	Date:	OCT 7 2014	
Approximate Date Drilled:		Client:	YG-AAM	Sampler:	GMR + RM	
Piezometer Diameter / Screen Length:	2"	Project Name:	October 2014 Mt. Nansen Groundwater	Weather/Temp:	-10°C SNOW OVERCAST	
CHV (ppm / % LEL):		Duplicate Collected:	<input checked="" type="checkbox"/> ID: DUP 2	Recovery:	<input type="checkbox"/> Good <input type="checkbox"/> Bad	
Purge Method						
Waterra	Peristaltic	Disp. Bailer	Subm. Pump	Air Lift	Other	
Initial Depth to Water (m):	2.532	Calculations:	Purge Start Time:	9-57	Purge End Time:	
Depth to Bottom (m):	5.895	$3.4 \times 2 = 6.8$ $\sim 7L$ $\times 3 = 21L$	Time () min. interval (24h)	10-02	10-13	
Submerged Tubing Depth (m):			10-24	10-34	10-43	10-50
Well Stick-up Height (m):	0.95		10-56			
Estimated Water Volume (L):	$\sim 7L$		11-05			
(DTB - DTW) x 2 (for 2" well diameter) = 1 well volume			11-15			
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume			11-44			
2" casing has 0.16 USgal/ft or 2.032 l/m			11-55			
1" casing has 0.04 USgal/ft or 0.508 l/m			12-00			
8" sand pack has 0.73 USgal/ft or 9.271 l/m			12-05			
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m			12-10			
			Temperature (°C)	1.47	1.46	
			pH	6.31	6.45	
			Cond. (µs/cm)	2268	2249	
			Specific Cond. (µs/cm)			
			Redox (mV)	83.1	12.8	
			DO (mg/L)	14.5	4.75	
			Appearance & Odour (Clear, Silty, HC odours, etc.)	CLEAR	FULL PURGE - LIKE ODOUR CLEAR	
			Interval Purge Volume (L)	1	2	
			Cumulative Purge Volume (L)	1	3	
			Total Purge Volume:			
Method:	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Subm. Pump	
Analysis						
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)	
MW09-19	FULL SET OF SAMPLES AND DUPLICATES	11-00		<input type="checkbox"/> Yes <input type="checkbox"/> No	1.92	
Comments						



Sample Site (Con't): MW09-19

Field UTM Location: Zn: 08V Easting: 0388054 Northing: 6881018

(LP)
(075)

Photo Nos.: 8454

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	11:00
Temperature (°C)	1.15
DO (mg/L)	2.78 78
Specific Cond. (µs/cm)	
Cond. (µs/cm)	2290
pH	6.44
Redox (mV)	-31.2
Turbidity (NTU)	1.92
DO (mg/L)	
SULPHIDE mg/L	0.15

Additional Purge Data - Continued from Front of Page (if required)					
Time () minute interval:					
Depth (m)					
Temperature (°C)					
pH					
Cond. (µs/cm)					
Specific Cond. (µs/cm)					
Redox (mV)					
DO (mg/L)					
Appearance & Odour (Clear, Silty, HC odours, etc.)					
Interval Purge Volume (L)					
Cumulative Purge Volume (L)					
Total Purge Volume:					

General Notes (Condition of well or other features):

Head Space gases: 8" OF SILICON
O₂ = 20.6
CH₄ = 0.0
CO₂ = 0.0
BLANK = 0.0 mg/l
SULFIDE = 0.15 mg/l



GROUNDWATER SAMPLE COLLECTION SHEET

Well Number:	5 GSI-DC-01B		Project Number:	1343-005.03		Date:	OCT 7 2014	
Approximate Date Drilled:			Client:	YG-AAM		Sampler:	GMR FRM	
Piezometer Diameter / Screen Length:	METAL 1" DP.		Project Name:	October 2014 Mt.Nansen Groundwater		Weather/Temp:	EIGHT SNOW -8°C	
CHV (ppm / % LEL):			Duplicate Collected:	<input type="checkbox"/> ID: NONE		Recovery:	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Bad	
Purge Method								
Waterra		Peristaltic		Disp. Bailer		Subm. Pump		Air Lift
		✓						
Initial Depth to Water (m):	4.67		Calculations:	Purge Start Time:		Purge End Time:		
Depth to Bottom (m):	5.05		<p>(DTB - DTW) x 2 (for 2" well diameter) = 1 well volume</p> <p>(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume</p> <p>2" casing has 0.16 USgal/ft or 2.032 l/m</p> <p>1" casing has 0.04 USgal/ft or 0.508 l/m</p> <p>8" sand pack has 0.73 USgal/ft or 9.271 l/m</p> <p>6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m</p>	Time () min. interval (24h)				
Submerged Tubing Depth (m):				Depth (m)				
Well Stick-up Height (m):	0.9			Temperature (°C)		NO PURGE.		
Estimated Water Volume (L):				pH		DIRECT SAMPLE		
				Cond. (µs/cm)		ONLY.		
				Specific Cond. (µs/cm)				
				Redox (mV)				
				DO (mg/L)				
				Appearance & Odour (Clear, Silty, HC odours, etc.)		50 ml DISSOLVED METALS.		
				Interval Purge Volume (L)		ONLY		
			Cumulative Purge Volume (L)					
			Total Purge Volume:					
Method:	Waterra		Peristaltic		Disp. Bailer		Steel Bailer	
Analysis	✓							
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)		Comments	
GSI-DC-01B	DISSOLVED METALS ONLY 50ml w/ 0.5 PRESERVATIVE	13-10	PLASTIC 120.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	NONE COLLECTED			

1B (O&P) O2 20.9%
CH4 0.0%
CO2 3.13%

GSI-DC-01A READINGS
* O2 20.9% DEPTH TO W = DRY
CH4 0.0% DTB = 2.66 FT
CO2 3.17% SU = 0.87

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

Field UTM Location: Zn: 08V Easting: 0387672 Northing: 6881123

WP
78

Photo Nos.: 8456

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	1310.
Temperature (°C)	
DO (mg/L)	
Specific Cond. (µs/cm)	
Cond. (µs/cm)	
pH	
Redox (mV)	
Turbidity (NTU)	
DO (mg/L)	

Additional Purge Data - Continued from Front of Page (if required)					
Time () minute interval:					
Depth (m)					
Temperature (°C)					
pH					
Cond. (µs/cm)					
Specific Cond. (µs/cm)					
Redox (mV)					
DO (mg/L)					
Appearance & Odour (Clear, Silty, HC odours, etc.)					
Interval Purge Volume (L)					
Cumulative Purge Volume (L)					
Total Purge Volume:					

General Notes (Condition of well or other features):	
<p>Head Space Gases</p> <p>O₂ = 20.97.</p> <p>CH₄ = 0.07.</p> <p>CO₂ = 3.137.</p> <p>PERI TUBING = 2.5 m</p> <p>SILICON = 8"</p> <p>ONLY COLLECTED 50ml DISSOLVED METALS</p> <p>DIRECT SAMPLE, NO PURGE.</p> <p>B is 0.5m UPSTREAM OF A.</p>	



GROUNDWATER SAMPLE COLLECTION SHEET

Well Number:	GSI-DC-07 AB B.		Project Number:	1343-005.03		Date:	OCT 10 2014			
Approximate Date Drilled:			Client:	YG-AAM		Sampler:	RM + GR			
Piezometer Diameter / Screen Length:	1" METAL DP.		Project Name:	October 2014 Mt. Nansen Groundwater		Weather/Temp:	Sunny 5°C			
CHV (ppm / % LEL):			Duplicate Collected:	<input checked="" type="checkbox"/> ID: Dup6		Recovery:	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Bad			
Purge Method										
Waterra		Peristaltic		Disp. Bailer		Subm. Pump		Air Lift		
		W / battery								
Initial Depth to Water (m):	FT	4.18	Calculations: = 8 FT = 2.5 m = 0.000144 0.000452 ≠ 0.0012	Purge Start Time:	11:15		11:20			
Depth to Bottom (m):	FT	12.17		Time () min. interval (24h)	11:20		11:25			
Submerged Tubing Depth (m):				Depth (m) FT	5.3		5.35			
Well Stick-up Height (m):	FT	29 3.08		Temperature (°C)	1.17		1.06			
Estimated Water Volume (L):		1.13		pH	6.92		6.90			
(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)	576		575			
				Specific Cond. (µs/cm)						
				Redox (mV)	70.4		39.84		21.5	
				DO (mg/L)	6.85		3.53		2.6	
				Appearance & Odour (Clear, Silty, HC odours, etc.)	Clear					
			Interval Purge Volume (L)	1		1		1		
			Cumulative Purge Volume (L)	1		2				
			Total Purge Volume:	1		2				
Method:	Waterra		Peristaltic		Disp. Bailer		Steel Bailer			
		W / battery								
Analysis										
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)		Comments			
GSI-DC-07B	Full set 9 BOTTLES	11-50	Plastic + glass	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	4.48.					

Dup6 - 9 BOTTLES.

GSI-DC-07

A = DTW = 4.12 FT
 OTB = 6.27 FT
 SU = 3.13 FT

HEADSPACE GASES:
 NOT OBTAINED. METER NOT WORKING.
 SEE OVER



Sample Site (Con't): _____

Field UTM Location: Zn: 08V Easting: 0390064 Northing: 6880641

WP
102

Photo Nos.: 8504

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	11-50
Temperature (°C)	1-07
DO (mg/L)	1.38
Specific Cond. (µs/cm)	
Cond. (µs/cm)	579
pH	6.9
Redox (mV)	-3.1
Turbidity (NTU)	4.48
DO (mg/L)	
SULPHIDE mg/L	0.04

Additional Purge Data - Continued from Front of Page (if required)					
Time () minute interval:					
Depth (m)					
Temperature (°C)					
pH					
Cond. (µs/cm)					
Specific Cond. (µs/cm)					
Redox (mV)					
DO (mg/L)					
Appearance & Odour (Clear, Silty, HC odours, etc.)					
Interval Purge Volume (L)					
Cumulative Purge Volume (L)					
Total Purge Volume:					

General Notes (Condition of well or other features):

Gases:
A (plastic bag cap) B
O₂ - 20.9% O₂ - 20.9%
CO₂ - 460 ppm CO₂ - 480 ppm
CH₄ - 0 CH₄ - 0%

GROUNDWATER SAMPLE COLLECTION SHEET

Well Number:	MW09-07	Project Number:	1343-005.03	Date:	10 Oct 2014		
Approximate Date Drilled:	unknown in field	Client:	YG-AAM	Sampler:	AB JL		
Piezometer Diameter / Screen Length:	2" PVC / unknown in field	Project Name:	October 2014 Mt. Nansen Groundwater	Weather/Temp:	overcast, light wind, ~0°C		
CHV (ppm / % LEL):	CO ₂ 490 CH ₄ 20.9 0% LEL	Duplicate Collected:	<input checked="" type="checkbox"/> ID: NO	Recovery:	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Bad		
Purge Method							
Waterra	Peristaltic	Disp. Bailor	Subm. Pump	Air Lift	Other		
N/A → based on spring 2014 sample sheet, this is slow recharge → do direct sample - / limited volume							
Initial Depth to Water (m):	2.61	Calculations:	Purge Start Time:	Purge End Time:			
Depth to Bottom (m):	3.42	3.42 - 2.61	Time () min. interval (24h)				
Submerged Tubing Depth (m):	~3.25	= 0.81 m	Depth (m)				
Well Stick-up Height (m):	1.35	> 2 L/m	Temperature (°C)				
Estimated Water Volume (L):	~1.6 L	= 1.6 L	pH				
(DTB - DTW) x 2 (for 2" well diameter) = 1 well volume			Cond. (µs/cm)	N/A			
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume			Specific Cond. (µs/cm)	DIRECT			
2" casing has 0.16 USgal/ft or 2.032 l/m			Redox (mV)	SAMPLE			
1" casing has 0.04 USgal/ft or 0.508 l/m			DO (mg/L)	(LOW VOLUME, SLOW RECHARGE)			
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			Interval Purge Volume (L)				
			Cumulative Purge Volume (L)				
			Total Purge Volume:				
Method:	Waterra	Peristaltic	Disp. Bailor	Steel Bailor	Subm. Pump	Air Lift	Other
Analysis	A very low flow - see reverse for pump rate + recharge info						
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)	Comments	
MW09-07	Full suite + full bottles as per SAW	8:17-8:23 8:53-9:02	As per SAW, inc field filter + preserved	<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No	35.9 NTU from Gen chem bottle sample	Field Sulphides 0.52 mg/L from Gen chem bottle sample	

as appropriate

(direct sample a lowest flow possible)

chem bottle sample

well sealed w/ cap but
slits cut below cap



Sample Site (Con't): MW09-07

Wright name =

Field UTM Location: Zn: 03 V Easting: 0389322

Northing: 6880701

Hemmera
Whitehorse
GPS

Photo Nos.: 141-145

Hemmera
Van
Camera

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	
Temperature (°C)	
DO (mg/L)	
Specific Cond. (µs/cm)	N/A
Cond. (µs/cm)	
pH	DIRECT
Redox (mV)	
Turbidity (NTU)	SAMPLE
DO (mg/L)	
LOW VOLUME, SLOW RECHARGE	

Additional Purge Data - Continued from Front of Page (if required)					
Time () minute interval:					
Depth (m)					
Temperature (°C)					
pH					
Cond. (µs/cm)					
Specific Cond. (µs/cm)		N/A			
Redox (mV)					
DO (mg/L)					
Appearance & Odour (Clear, Silty, HC odours, etc.)					
Interval Purge Volume (L)					
Cumulative Purge Volume (L)					
Total Purge Volume:					

General Notes (Condition of well or other features):

2" PVC well inside 6" PVC casing/protect. well is higher than protector. Both in good shape
Used existing 1/4" tubing in well for low flow direct sample

8:17-8:23 - direct sampled 2L, DTW dropped to 3.07m

Wait 15 mins, recharge to 2.99m (8:33) → Wait another 15 mins, DTW = 2.88m (8:53)
→ resume sample collect at 8:57-9:02, yield ~ 850mL, → DTW dropped to 3.27m

Pine MiniPac PID, ECR Solinst WL tape, Hemmera per pump, L. Motte (Huskin), HACH (Maxim)

GROUNDWATER SAMPLE COLLECTION SHEET

see details for "A" on next page

Well Number:	GSI-DC-09A/B		Project Number:	1343-005.03		Date:	10 Oct 2014	
Approximate Date Drilled:	unknown in field		Client:	YG-AAM		Sampler:	AB JL	
Piezometer Diameter / Screen Length:	2.5cm ID stainless / unknown in field		Project Name:	October 2014 Mt. Nansen Groundwater		Weather/Temp:	mild sun + cloud, light wind ~ +3°C	
CHV (ppm / % LEL):	CO ₂ 480 CH ₄ 20.5% 0% LEL		Duplicate Collected:	<input checked="" type="checkbox"/> AD: NO		Recovery:	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Bad	
Purge Method								
Waterra		Peristaltic		Disp. Bailer		Subm. Pump		Air Lift
		e low flow						
Initial Depth to Water (m):	1.19		Calculations:	Purge Start Time:		1126		Purge End Time:
Depth to Bottom (m):	3.85		3.85 - 1.20 = 2.65 m ~ 0.125 L/m ~ 0.35 L ~ 0.3 L	Time (3) min. interval (24h)		1129		1132
Submerged Tubing Depth (m):	~ 3.6			Depth (m)		1.37		1.39
Well Stick-up Height (m):	0.93			Temperature (°C)		1.9		1.9
Estimated Water Volume (L):	~ 0.3 L			pH		5.54		5.82
(DTB - DTW) x 2 (for 2" well diameter) = 1 well volume				Cond. (µs/cm)		110.9		101.1
(DTB - DTW) x 1.1 (for 1.5" diameter) = 1 well volume			Specific Cond. (µs/cm)		197.9		180.9	
2" casing has 0.16 USgal/ft or 2.032 l/m			Redox (mV)		99.5		80.7	
1" casing has 0.04 USgal/ft or 0.508 l/m			DO (mg/L)		0.99		0.64	
8" sand pack has 0.73 USgal/ft or 9.271 l/m			Appearance & Odour (Clear, Silty, HC odours, etc.)		light brown, mostly clear, no particles visible		mostly clear, faint light brown	
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m			Interval Purge Volume (L)		.45		.45	
			Cumulative Purge Volume (L)		.45		.9	
			Total Purge Volume:		1.30		1.7	
					2.1			
Method:	Waterra		Peristaltic		Disp. Bailer		Steel Bailer	
Analysis	e low flow							
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)		Comments	
GSI-DC-09B	Full suite w/ full bottles as per SWH	11:42 - 11:59	As per SWH inc. appropriate field filter + acid	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	256 NTU from gen den bottle		Field sulphides ~ 0.05 mg/L from gen den bottle	

proper seal w/ plastic cap

at very low flow

Same sample equipment as DC-09B, except able to do complete purge w/ YSI, yield all bottles full for sample



Sample Site (Con't): GSI-DC-09 A/B

crypt name =

coords
for both
wells

Field UTM Location: Zn: 08 V Easting: 0390613

Northing: 6880498

Hemmera
whitehorse
GPS

Photo Nos.:

both wells
151-155

Hemmera
Van
Camera

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	
Temperature (°C)	
DO (mg/L)	
Specific Cond. (µs/cm)	
Cond. (µs/cm)	
pH	
Redox (mV)	
Turbidity (NTU)	
DO (mg/L)	

Additional Purge Data - Continued from Front of Page (if required)					
Time () minute interval:					
Depth (m)					
Temperature (°C)					
pH					
Cond. (µs/cm)					
Specific Cond. (µs/cm)					
Redox (mV)					
DO (mg/L)					
Appearance & Odour (Clear, Silty, HC odours, etc.)					
Interval Purge Volume (L)					
Cumulative Purge Volume (L)					
Total Purge Volume:					

General Notes (Condition of well or other features)	
25cm ID of stainless steel drive points, in good condition Existing 1/2" tubing + silicon in well for low flow sampling	"A" well details - same construction as "B" well, except has cap, just ziplock bag for seal Co ₂ 430 O ₂ 20.5% CH ₄ 0% LEL DTW = 1.16 DTB = 2.00 Stick up = 0.93 m

Pine MiniRae PID, ECR Solinst WL tape (mini)

GROUNDWATER SAMPLE COLLECTION SHEET

see details for "A" on next page

good seal w/ plastic cap

Well Number:	GS1-DC-10A/B	Project Number:	1343-005.03	Date:	16 Oct 2014
Approximate Date Drilled:	unknown in field	Client:	YG-AAM	Sampler:	AD SL
Piezometer Diameter / Screen Length:	2.5 cm Ø 10 stainless / unknown in field	Project Name:	October 2014 Mt. Nansen Groundwater	Weather/Temp:	mix sun + cloud, light wind ~ +4°C
CHV (ppm / % LEL):	CH ₄ 410 20.5% 0% LEL	Duplicate Collected:	<input checked="" type="checkbox"/> ID: NO	Recovery:	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Bad
Purge Method					
Waterra	Peristaltic	Disp. Bailer	Subm. Pump	Air Lift	Other
	low flow				
Initial Depth to Water (m):	1.00	Calculations:	Purge Start Time:	1230	Purge End Time:
Depth to Bottom (m):	1.86	ice at ground surface had to break through by pulling/twisting existing tubing in well 0.86m x 1.25 l/m ~ 1.1 L	Time (3) min. interval (24h)	1233	1236
Submerged Tubing Depth (m):	~ 1.75		Depth (m)	N/A - unable to measure down, large hole + pass ice C	1m
Well Stick-up Height (m):	1.02		Temperature (°C)	1.8	1.8
Estimated Water Volume (L):	~ 1.1 L		pH	6.02	6.04
(DTB - DTW) x 2 (for 2" well diameter) = 1 well volume			Cond. (µs/cm)	224.0	231.9
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume			Specific Cond. (µs/cm)	402.0	416.6
2" casing has 0.16 USgal/ft or 2.032 l/m			Redox (mV)	61.0	54.7
1" casing has 0.04 USgal/ft or 0.508 l/m			DO (mg/L)	1.24	0.77
8" sand pack has 0.73 USgal/ft or 9.271 l/m			Appearance & Odour (Clear, Silty, HC odours, etc.)	mostly clear, faint light brown	same as previous
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m			Interval Purge Volume (L)	0.4	0.4
		Cumulative Purge Volume (L)	0.4	0.8	
		Total Purge Volume:	2.0	1.2	1.6
				2.0	
Method:	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Subm. Pump
Analysis		low flow			
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)
GS1-DC-10B	Full suite (w/ full bottles) and	1246-12:59	As per spec and paired metals emb. filter + preserve as appropriate	<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No	4.76 NTU from Gen dem bottle
paired metals		SOW = scope of work		Comments	
		appropriate		Field sulphides = 0.06 mg/L from gen dem bottle	

Full suite AND paired metals

Same sample equipment as GS1-DC-09B



Sample Site (Con't): GSI-DC-16A/B

crypt name =

both wells

both wells

Field UTM Location: Zn: 09V Easting: 0390861 Northing: 6880447

Hemmer
Whitaker
GPS

Photo Nos.: 156-166

Hemmer
Van
Caret

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	
Temperature (°C)	
DO (mg/L)	
Specific Cond. (µs/cm)	
Cond. (µs/cm)	SEE
pH	
Redox (mV)	PREVIOUS
Turbidity (NTU)	
DO (mg/L)	PAGE

Additional Purge Data - Continued from Front of Page (if required)						
Time () minute interval:						
Depth (m)						
Temperature (°C)						
pH						
Cond. (µs/cm)						
Specific Cond. (µs/cm)						
Redox (mV)						
DO (mg/L)						
Appearance & Odour (Clear, Silty, HC odours, etc.)						
Interval Purge Volume (L)						
Cumulative Purge Volume (L)						
Total Purge Volume:						

General Notes (Condition of well or other features)	
Stan less steel drive point 25cm, in good condition existing 1/2" tubing in well was frozen in place, hard to twist & pull to get loose → used existing tubing to sample	"A" well details → same as "B" except no cap, poor seal w/ ziplock bag O ₂ 430 O ₂ 20.5% CH ₄ 0% LEL DTV = N/A DTB = 1.02m = depth Frozen to ice/blockage Stick up height = 0.95m



GROUNDWATER SAMPLE COLLECTION SHEET

9 Oct 2014 SAMPLE

166601

Well Number:	CH-P-13-03/50	Project Number:	1343-005.03	Date:	7 Oct 2014 → monitor		
Approximate Date Drilled:	unknown in field	Client:	YG-AAM	Sampler:	AR JL		
Piezometer Diameter / Screen Length:	1" PVC / unknown in field	Project Name:	October 2014 Mt. Nansen Groundwater	Weather/Temp:	overcast, high wind and snow, ~ -5°C		
CHV (ppm / % LEL):	CO ₂ 606 0% LEL O ₂ 20.9% = 0	Duplicate Collected:	<input checked="" type="checkbox"/> NO: NO	Recovery:	<input type="checkbox"/> Good <input type="checkbox"/> Bad		
Purge Method							
Waterra	Peristaltic	Disp. Bailor	Subm. Pump	Air Lift	Other		
N/A → direct sample via manual 5/8" tubing + small foot valve							
Initial Depth to Water (m):	N/A	Calculations:	Purge Start Time:	Purge End Time:			
Depth to Bottom (m):	50.64	No water detected at low sensitivity, faint sound & high sensitivity ~ 48.5 m ~ 50m, attempt bailer sample to verify if water present and direct sample if so (8 Oct 2014)	Time () min. interval (24h)				
Submerged Tubing Depth (m):	N/A		Depth (m)				
Well Stick-up Height (m):	0.54		Temperature (°C)				
Estimated Water Volume (L):	N/A		pH				
(DTB - DTW) x 2 (for 2" well diameter) = 1 well volume			Cond. (µs/cm)	N/A			
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume			Specific Cond. (µs/cm)				
2" casing has 0.16 USgal/ft or 2.032 l/m			Redox (mV)	DIRECT			
1" casing has 0.04 USgal/ft or 0.508 l/m			DO (mg/L)	SAMPLE			
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			Interval Purge Volume (L)	→ SOL REVERSE			
		Cumulative Purge Volume (L)					
		Total Purge Volume:					
Method:	Waterra	Peristaltic	Disp. Bailor	Steel Bailor	Subm. Pump	Air Lift	Other
Analysis	5/8" manual						
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)	Comments	
CH-P-13-03/50	Full sample set w/ full bottles, very turbid → Full suite saw	17:30 - 17:45 9 Oct 2014	As per SOP: inc. Field filled and preserved	<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No	1656 AU from gen clean bottle (much clearer for disinfecting after filter)	Not recorded field sulphides, too turbid + limited sample	

well properly sealed

Sample attempt

very turbid sample, limited purge sample volume

Same equipment as CH-P-13-03/10 (PID, w/ type) plus used 1 1" bailer + 50m turbine

8 Oct 2014, 0800 → found water in well w/ 1" bailer near bottom (suspect 49m?) → proceed w/

direct sample (possible limited volume/priority filling) → no success getting water to surface → SEE REVERSE →



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

Field UTM Location: Zn: 08 V Easting: 0389144 Northing: 6881110

Hemmera
whitehorse
GPS

Photo Nos.: 26-30

Hemmera
Vista
Camera

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	
Temperature (°C)	
DO (mg/L)	
Specific Cond. (µs/cm)	
Cond. (µs/cm)	N/A
pH	
Redox (mV)	see reverse
Turbidity (NTU)	
DO (mg/L)	

Additional Purge Data - Continued from Front of Page (if required)					
Time () minute interval:					
Depth (m)					
Temperature (°C)					
pH					
Cond. (µs/cm)					
Specific Cond. (µs/cm)					
Redox (mV)					
DO (mg/L)					
Appearance & Odour (Clear, Silty, HC odours, etc.)					
Interval Purge Volume (L)					
Cumulative Purge Volume (L)					
Total Purge Volume					

General Notes (Condition of well or other features)

- Gray metal stick up protector w 1" PVC cell + cap inside, as well as electronic controller for transducer
- All in good shape. No tubing or transducer
- Metal protector lid says "CH-P-13-03" "49.58 mbs" "VWP+ well"
- despite ID says CH-P-13-03, suspect/assume this is CH-P-13-03/50
- g Oct → feel weight of water in bailer but doesn't yield any water to top (leaks past bail?)
 - tried 2 x 3" bailers, tried water tape as weight to push down, won't yield water to surface (need weighted bailer?)
- Also found bailer sometimes hangs up in casing (bend?) at 18m (approx) and doesn't reach bottom
- g Oct - attempt to sample again w bailers, no success → purge ~3 L into 5/8" tubing and collect from tubing (well goes dry, water intaking doesn't reach surface)
 - see AB field notes



GROUNDWATER SAMPLE COLLECTION SHEET

@ well not quite 2" (2" bailer doesn't fit inside) ~ 1 3/4"?

16 Oct 2014 sample
8 Oct 2014

Well Number:	CH-P-13-04/10	Project Number:	1343-005.03	Date:	7 Oct 2014
Approximate Date Drilled:	unknown in field	Client:	YG-AAM	Sampler:	AB JL
Piezometer Diameter / Screen Length:	2" PVC w cap / unknown in field	Project Name:	October 2014 Mt. Nansen Groundwater	Weather/Temp:	overcast, light wind, snow, ~ -5°C
CHV (ppm / % LEL):	10% 580 CH ₄ 0% 20.9 0% LEL	Duplicate Collected:	<input checked="" type="checkbox"/> ID No	Recovery:	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Bad
Purge Method					
Waterra	Peristaltic	Disp. Bailer	Subm. Pump	Air Lift	Other drawdown
@ lowest possible speed w/out water freezing in tubing					
Initial Depth to Water (m):	3.05	Calculations:	Purge Start Time:	16:37	Purge End Time:
Depth to Bottom (m): or blockage?	6.32	6.32 - 3.05 = 3.27 m	Time (3) min. interval (24h)	16:40	16:43
Submerged Tubing Depth (m):	~ 6m	= 3.27 m	Depth (m)	4.30	4.75
Well Stick-up Height (m):	0.53	> 2 L/m	Temperature (°C)	0.1	0.0
Estimated Water Volume (L):	6.54 L	= 6.54 L	pH	6.55	6.65
(DTB - DTW) x 2 (for 2" well diameter) = 1 well volume		↳ water freezing in tubing during purge, drawdown exceeds purge rate, suggest return tomorrow w/ bailer for direct sample	Cond. (µs/cm)	160.4	109.5
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume			Specific Cond. (µs/cm)	304.6	207.5
2" casing has 0.16 USgal/ft or 2.032 l/m			Redox (mV)	58.5	43.5
1" casing has 0.04 USgal/ft or 0.508 l/m			DO (mg/L)	3.06	3.82
8" sand pack has 0.73 USgal/ft or 9.271 l/m			Appearance & Odour (Clear, Silty, HC odours, etc.)	clear no odors	" "
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m			Interval Purge Volume (L)	0.75	0.4
			Cumulative Purge Volume (L)	0.75	1.15
			Total Purge Volume:	1.6	2.05
Method:	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Subm. Pump
Analysis	a low flow				
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)
CH-P-13-04/10	SEE REVERSE FOR DETAILS	14:24 - 14:30	SEE REVERSE FOR DETAILS	<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No	13.8 NTU
					Yield 1L in 6 mins then dry, water clear when

good sealed cap, but slit in PVC below cap

can't purge slow enough to match because of cold

+ slow recharge

@ limited parameters, limited volumes

Pine MiniRae PID, ELR micro w/ tape
ELR per pump, Hemmera YSI, Hoskin LaMotte, Maxim HACH

Field sulphides = 0.09 mg/L

Sampling on 16 Oct 2014
from Gen Chem bottle

8 Oct 2014 09:20 DTW = 5.455 m, not fully recharged since yesterday, wait for full recharge before direct sample
10 Oct 2014 17:10 DTW = 5.415 m, either very slow recharge, or static water may be @ 5.415 m → proceed w/ direct limited sample

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

Wpt #

Field UTM Location: Zn: 08 V

Easting: 0389137

Northing: 6881472

Hemmera
Whitehorse
GPS

Photo Nos.: 41-45

Hemmera
Van
Camera

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	
Temperature (°C)	
DO (mg/L)	
Specific Cond. (µs/cm)	SEE
Cond. (µs/cm)	
pH	PREVIOUS
Redox (mV)	
Turbidity (NTU)	PAGE
DO (mg/L)	

Additional Purge Data - Continued from Front of Page (if required)					
Time () minute interval:					
Depth (m)					
Temperature (°C)					
pH					
Cond. (µs/cm)					
Specific Cond. (µs/cm)					
Redox (mV)					
DO (mg/L)					
Appearance & Odour (Clear, Silty, HC odours, etc.)					
Interval Purge Volume (L)					
Cumulative Purge Volume (L)					
Total Purge Volume					

General Notes (Condition of well or other features)	
<p>Metal Stick up protector w/ 2" PVC well inside w/ cap - all in good shape</p> <p>Add 7m of 1/4" tubing + 6" silicon for low flow sampling</p> <p>Based on well note, assume DTB should be 10m?, we encounter blockage/bottom @ 6.32 m</p> <p>10 Oct 2014 Limited Sample (Parameters + Volumes) Details</p> <p>(collected)</p> <ol style="list-style-type: none"> 1) Dis Metals (full, filter + preserve) 2) Dis Hg (full, filter + preserve) 3) Gen Chem (1/4 full, ~250 mL) 4) Cyanide (1/2 full, preserved) 5) NH3 (1/2 full, preserved) 6) SCN (3/4 full, preserved) 7) Sulphide (3/4 full, preserved) <p>NOT COLLECTED (any volume)</p> <p>= TIC/TOC</p> <p>= Cyanate</p>	

GROUNDWATER SAMPLE COLLECTION SHEET

see reverse for details of "A"

Well Number:	GSI-DC-08 A/B	Project Number:	1343-005.03	Date:	10 Oct 2014		
Approximate Date Drilled:	unknown in field	Client:	YG-AAM	Sampler:	AB JL		
Piezometer Diameter / Screen Length:	2.5 cm ID stainless / unknown in field	Project Name:	October 2014 Mt. Nansen Groundwater	Weather/Temp:	mix sun + cloud, very light wind ~ +2°C		
CHV (ppm / % LEL):	480 CHV 0.5% 0% LEL	Duplicate Collected:	<input checked="" type="checkbox"/> AD: NO	Recovery:	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Bad		
Purge Method							
Watera	Peristaltic	Disp. Bailor	Subm. Pump	Air Lift	Other		
a low flow @ → no full purge							
Initial Depth to Water (m):	0.66	Calculations:	Purge Start Time:	1031	Purge End Time:		
Depth to Bottom (m):	2.78	2.78 - 0.66 = 2.12 m	Time (3) min. interval (24h)	1034 1037 1040			
Submerged Tubing Depth (m):	~ 2.8		Depth (m)	2.28 @	→ stopped purge and proceed		
Well Stick-up Height (m):	0.33		Temperature (°C)	1.3	✓ direct sample only		
Estimated Water Volume (L):	~ 0.25 L	~ 0.125 L ~ 0.25	pH	5.68	(instead of sampling through flow through)		
(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)	226.8	fill filter water collected		
			Specific Cond. (µs/cm)	404.0	from flow through into		
			Redox (mV)	117.1	gen chem for metals		
			DO (mg/L)	2.23	then proceed (continue) ✓		
			Appearance & Odour (Clear, Silty, HC odours, etc.)	light brown, no silt/sand visible			
			Interval Purge Volume (L)	0.35	direct sampling		
			Cumulative Purge Volume (L)	0.35			
			Total Purge Volume:	0.35	→ not wasted, collected for dis metals		
Method:	Watera	Peristaltic	Disp. Bailor	Steel Bailor	Subm. Pump	Air Lift	Other
Analysis	a very low flow → purge direct into 1 L general chem						
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)	Comments	
GSI-DC-08 B	Disg Metals (full) Dis Hg (full) Gen Chem (250ml)	10:34 - 11:10 (intermittent)	1 x 120ml plastic 1 x 40ml plastic 1 x 1L plastic (4 full)	<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No	1078 AU from gen chem bottle	Field sulphides = 0.80 mg/L from gen chem bottle	

Pine MiniRae PID, ECR Solinst HL tape (mini), Hemmera YSI, ECR per. pump

⊗ Purged direct into sample bottle in case low recharge/low volume. Stopped purge @ 10:34 to monitor recharge
 10:50 DTW = 1.86 → appears to be enough water to slowly fill all bottles (stopped trying to purge)
 → resumed sampling and yield ~ 100ml before DTW below 2.60 m

⊗ pre-filtered water is light brown to brown colour, but with no particles visible, filtered metals also light brown

"LIMIT" reached on HACH meter

good seal w/ plastic cap

⊗ limited parameters + limited volume in gen chem bottle



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

Wpt Name =

Co-ords for both wells

Field UTM Location: Zn: 08V Easting: 0390311

Northing: 6880584

Hemmer
Whitehorse
GPS

Photo Nos.: 146-150

Hemmer
Winn
Consulting

both wells

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	
Temperature (°C)	
DO (mg/L)	SEE
Specific Cond. (µs/cm)	PREVIOUS
Cond. (µs/cm)	PAGE,
pH	
Redox (mV)	LIMITED
Turbidity (NTU)	PURGE TIME/
DO (mg/L)	VOLUME/
	READINGS

Additional Purge Data - Continued from Front of Page (if required)					
Time () minute interval:					
Depth (m)					
Temperature (°C)					
pH					
Cond. (µs/cm)					
Specific Cond. (µs/cm)					
Redox (mV)					
DO (mg/L)					
Appearance & Odour (Clear, Silty, HC odours, etc.)					
Interval Purge Volume (L)					
Cumulative Purge Volume (L)					
Total Purge Volume:					

General Notes (Condition of well or other features):	
25cm ID Ø stainless steel well w plastic cap in good condition Found existing Micro waterm tubing + foot valve on ground Added 3m of 1/4" tubing + 6" silicon for low flow	"A" well details - same construction as "B" well except no cap, just ziplock bag for poor seal O ₂ 460 O ₂ 20.5% CH ₄ 0% LEL DTW = 1.20 DTB 1.85 Stick up height = 0.92



GROUNDWATER SAMPLE COLLECTION SHEET

Well Number:	GSI-DC-06B	Project Number:	1343-005.03	Date:	OCT 10 2014
Approximate Date Drilled:		Client:	YG-AAM	Sampler:	GMA + RM
Piezometer Diameter / Screen Length:	1 1/4" METAL OP.	Project Name:	October 2014 Mt. Nansen Groundwater	Weather/Temp:	PM 11:14 CLOUDY +2°C
CHV (ppm / % LEL):		Duplicate Collected:	<input type="checkbox"/> ID: NONE	Recovery:	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Bad
Purge Method					
Waterra	Peristaltic	Disp. Bailer	Subm. Pump	Air Lift	Other
	W/ BATTERY				
Initial Depth to Water (m):	2.06	Calculations:	Purge Start Time:	Purge End Time:	
Depth to Bottom (m):	8.82	<p>(DTB - DTW) x 2 (for 2" well diameter) = 1 well volume</p> <p>(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume</p> <p>2" casing has 0.16 USgal/ft or 2.032 l/m</p> <p>1" casing has 0.04 USgal/ft or 0.508 l/m</p> <p>8" sand pack has 0.73 USgal/ft or 9.271 l/m</p> <p>6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m</p>	Time () min. interval (24h)		
Submerged Tubing Depth (m):			Depth (m)		
Well Stick-up Height (m):	0.53		Temperature (°C)		
Estimated Water Volume (L):			pH		
			Cond. (µs/cm)		
			Specific Cond. (µs/cm)		
			Redox (mV)		
			DO (mg/L)		
			Appearance & Odour (Clear, Silty, HC odours, etc.)		
			Interval Purge Volume (L)		
		Cumulative Purge Volume (L)			
		Total Purge Volume:			
Method:	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Subm. Pump
Analysis		W/ BATTERY			
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)
GSI-DC-06B	DISS METALS DISS MERC GEN CHEM	10-20	PLASTIC + GLASS	<input type="checkbox"/> Yes <input type="checkbox"/> No	51.4
					+ F134

CYANIDE
NH3
SCN
SULPHIDE
TIC
CYANATE

10
BOTTLES
FULL SET.
MIN VOLUMES

INCLUDING
DISSOLVED
METALS (F)
NO PRESERVATIVE
NO HEADSPACE

A=
DTBW = 3.19 ft
DTB = 6.26 ft
SU = 0.88 m

Sample Site (Con't): _____

Field UTM Location: Zn: 08V

Easting: 0389787

Northing: 6880565

WP104

Photo Nos.: 8503

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	10-20
Temperature (°C)	
DO (mg/L)	
Specific Cond. (µs/cm)	
Cond. (µs/cm)	
pH	
Redox (mV)	
Turbidity (NTU)	51.4
DO (mg/L)	
SULPHIDE mg/L	0.15

Additional Purge Data - Continued from Front of Page (if required)					
Time () minute interval:					
Depth (m)					
Temperature (°C)					
pH					
Cond. (µs/cm)					
Specific Cond. (µs/cm)					
Redox (mV)					
DO (mg/L)					
Appearance & Odour (Clear, Silty, HC odours, etc.)					
Interval Purge Volume (L)					
Cumulative Purge Volume (L)					
Total Purge Volume					

General Notes (Condition of well or other features)	
<p>4 m Perforating 8" SILICON</p>	<p>Gases: A (plastic bag cap) B O₂ - 20.9% O₂ - 20.9% CO₂ - 4400ppm CO₂ - 700ppm CH₄ - 0 CH₄ - 2ppm</p>



GROUNDWATER SAMPLE COLLECTION SHEET

Well Number:	MP09-10		Project Number:	1343-005.03		Date:	Oct 10, 2014	
Approximate Date Drilled:			Client:	YG-AAM		Sampler:	GMM & RM	
Piezometer Diameter / Screen Length:	1.25" PVC		Project Name:	October 2014 Mt. Nansen Groundwater		Weather/Temp:	CLDY. +1°C	
CHV (ppm / % LEL):			Duplicate Collected:	<input type="checkbox"/> ID: NONE		Recovery:	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Bad	
Purge Method								
Watterra		Peristaltic		Disp. Bailer		Subm. Pump		Air Lift
								Other
Initial Depth to Water (m):	8.20	Calculations: 5.8 ft	Purge Start Time:	8:40		Purge End Time:		
Depth to Bottom (m):	14.00		Time () min. interval (24h)	8:46	8:50	8:55		
Submerged Tubing Depth (m):			Depth (m) FT	11.8	29.8	DRY		
Well Stick-up Height (m):	1.95		Temperature (°C)	3.16	2.97		RETURNED	
Estimated Water Volume (L):			pH	8.47	8.86		LATER	
(DTB - DTW) x 2 (for 2" well diameter) = 1 well volume			Cond. (µs/cm)	720	290		TO SAMPLE	
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume			Specific Cond. (µs/cm)					
2" casing has 0.16 USgal/ft or 2.032 l/m			Redox (mV)	85.5	85.6			
1" casing has 0.04 USgal/ft or 0.508 l/m			DO (mg/L)	12.6	7.04			
8" sand pack has 0.73 USgal/ft or 9.271 l/m			Appearance & Odour (Clear, Silty, HC odours, etc.)	VERY TURBID				
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		Interval Purge Volume (L)	1	40.5				
		Cumulative Purge Volume (L)	1	11.5				
		Total Purge Volume:						
Method:	Watterra	Peristaltic	Disp. Bailer	Steel Bailer	Subm. Pump	Air Lift	Other	
Analysis								
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)		Comments	
MP09-10	FULL SET 9 BOTTLES	1400	PLASTIC & GLASS	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	OVER RANGE FOR INSTRUMENT		VERY TURBID WITH TAILINGS.	

Sample Site (Con't): _____

Field UTM Location: Zn: 08^v Easting: 0389239 Northing: 6880680

Photo Nos.: 8499

8508
TURBID WATER

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	1400
Temperature (°C)	2.97
DO (mg/L)	7.04
Specific Cond. (µs/cm)	
Cond. (µs/cm)	290
pH	8.86
Redox (mV)	85.6
Turbidity (NTU)	OVER RANGE FOR INST.
DO (mg/L)	
SULPHIDE mg/l	0.80 "LIMIT"

Additional Purge Data - Continued from Front of Page (if required)					
Time () minute interval:					
Depth (m)					
Temperature (°C)					
pH					
Cond. (µs/cm)					
Specific Cond. (µs/cm)					
Redox (mV)					
DO (mg/L)					
Appearance & Odour (Clear, Silty, HC odours, etc.)					
Interval Purge Volume (L)					
Cumulative Purge Volume (L)					
Total Purge Volume					

General Notes (Condition of well or other features):

Head space gases; METER NOT WORKING AND HOLES (SLITS) IN PVC. PHOTO 8505
 Cut in the PVC casing = gases not collected

09-10 8.20 WL
14.00 DTB



GROUNDWATER SAMPLE COLLECTION SHEET

Well Number:	MP09-09		Project Number:	1343-005.03		Date:	10 Oct 2014	
Approximate Date Drilled:			Client:	YG-AAM		Sampler:	Gunn + RM	
Piezometer Diameter / Screen Length:	1.25" PVC		Project Name:	October 2014 Mt. Nansen Groundwater		Weather/Temp:	cloudy 22	
CHV (ppm / % LEL):			Duplicate Collected:	<input checked="" type="checkbox"/> ID: None		Recovery:	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Bad	
Purge Method								
Waterra		Peristaltic		Disp. Bailer		Subm. Pump		Air Lift
		✓ w/ Battery						
Initial Depth to Water (m):	8.78	Calculations: = 3M = 1.25" = (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	Purge Start Time:	0820		Purge End Time:		
Depth to Bottom (m):	18.19		Time () min. interval (24h)	8:27	8:30	8:33	8:35	13-03
Submerged Tubing Depth (m):			Depth (m) FL	13.1	14.7	16.2	18.0	dry 9.0
Well Stick-up Height (m):	2.20		Temperature (°C)	2.55	2.73	2.77	2.81	
Estimated Water Volume (L):			pH	8.77	8.88	8.90	8.90	
			Cond. (µs/cm)	555	550	520	546	
			Specific Cond. (µs/cm)					
			Redox (mV)	81.5	78.8	77.4	77.1	
			DO (mg/L)	6.94	5.05	4.12	4.08	
			Appearance & Odour (Clear, Silty, HC odours, etc.)	very TURBID	→	→	→	
		Interval Purge Volume (L)	1	0.5	0.5	0.5		
		Cumulative Purge Volume (L)	1	1.5	2	2.5		
		Total Purge Volume:						
Method:	Waterra		Peristaltic		Disp. Bailer		Steel Bailer	
Analysis								
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)		Comments	
MP09-09	Full set, plus extra Metal (not preserved).	1315	PLASTIC + GLASS	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	179.		V. TURBID	



Sample Site (Con't): _____

Field UTM Location: Zn: 08V Easting: 0389239 Northing: 6880680

(099)

09 is taller than 10
Photo Nos.: 8499 ~~8500~~

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	
Temperature (°C)	
DO (mg/L)	
Specific Cond. (µs/cm)	
Cond. (µs/cm)	
pH	
Redox (mV)	
Turbidity (NTU)	
DO (mg/L)	
SULPHIDE mg/l	0.53 0.53

Additional Purge Data - Continued from Front of Page (if required)					
Time () minute interval:					
Depth (m)					
Temperature (°C)					
pH					
Cond. (µs/cm)					
Specific Cond. (µs/cm)					
Redox (mV)					
DO (mg/L)					
Appearance & Odour (Clear, Silty, HC odours, etc.)					
Interval Purge Volume (L)					
Cumulative Purge Volume (L)					
Total Purge Volume:					

General Notes (Condition of well or other features):

Cut PVC casing - gases not collected



GROUNDWATER SAMPLE COLLECTION SHEET

sampled Oct 10, 2014

Well Number:	CH-P-13-01/10	Project Number:	1343-005.03	Date:	OCT 9 2010		
Approximate Date Drilled:		Client:	YG-AAM	Sampler:	GMR + RM		
Piezometer Diameter / Screen Length:	1.5" PVC	Project Name:	October 2014 Mt. Nansen Groundwater	Weather/Temp:	OVERCAST ~ 7°C		
CHV (ppm / % LEL):		Duplicate Collected:	<input type="checkbox"/> ID: NONE	Recovery:	<input type="checkbox"/> Good <input checked="" type="checkbox"/> Bad		
Purge Method							
Waterra	Peristaltic	Disp. Bailer	Subm. Pump	Air Lift	Other		
	✓ ~ / Battery						
Initial Depth to Water (m):	8.89	Calculations:	Purge Start Time:	0908	Purge End Time:		
Depth to Bottom (m):	21.75	4cm ID, 13 ft 12.86 ft = 3.89 m water column	Time () min. interval (24h)	0913 9-31	1611 1510 1515		
Submerged Tubing Depth (m):			Depth (m)	12.7 20.00	19.8 19.8		
Well Stick-up Height (m):			Temperature (°C)	0.07 0.17			
Estimated Water Volume (L):	4.88	4.88 L of water purge 15 L approx.	pH	6.21 6.82			
(DTB - DTW) x 2 (for 2" well diameter) = 1 well volume			Cond. (µs/cm)	963 856			
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume			Specific Cond. (µs/cm)				
2" casing has 0.16 USgal/ft or 2.032 l/m			Redox (mV)	192.3 189.4			
1" casing has 0.04 USgal/ft or 0.508 l/m			DO (mg/L)	13.02 11.49			
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			Interval Purge Volume (L)	1.5 1.5			
			Cumulative Purge Volume (L)	1.5 3			
			Total Purge Volume:				
Method:	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Subm. Pump	Air Lift	Other
Analysis							
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)	Comments	
CH-P-13-01/10	DISS METALS DISS MERCURY CYANIDE	15:15 OCT 10 2014	PLASTIC + GLASS	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	17.4		

NH3 GEN CHEM. 5 Bottles - minimum volumes

NO RECHARGE SINCE YESTERDAY. LIKELY COLLECTED GW FROM THE ACTIVE LAYER OF THE PERMAFROST.



Sample Site (Con't): C4-P-13-01/10

Field UTM Location: Zn: 08V Easting: 0388654 Northing: 6881119

WP
092

Photo Nos.: 8477-8478.

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	1515 04/10/2014
Temperature (°C)	
DO (mg/L)	
Specific Cond. (µs/cm)	
Cond. (µs/cm)	
pH	
Redox (mV)	
Turbidity (NTU)	17.4
DO (mg/L)	
SULPHIDE mg/L	0.04

Additional Purge Data - Continued from Front of Page (if required)					
Time () minute interval:					
Depth (m)					
Temperature (°C)					
pH					
Cond. (µs/cm)					
Specific Cond. (µs/cm)					
Redox (mV)					
DO (mg/L)					
Appearance & Odour (Clear, Silty, HC odours, etc.)					
Interval Purge Volume (L)					
Cumulative Purge Volume (L)					
Total Purge Volume:					

General Notes (Condition of well or other features):

8.5m Peritubing
Gases 20.0%
or 4800ppm
cor - 9

GROUNDWATER SAMPLE COLLECTION SHEET

Well Number:	MP09-08		Project Number:	1343-005.03		Date:	8 Oct 2014		
Approximate Date Drilled:	unknown in field		Client:	YG-AAM		Sampler:	AB JL		
Piezometer Diameter / Screen Length:	1/2" PVC inside 1" metal / unknown in field		Project Name:	October 2014 Mt. Nansen Groundwater		Weather/Temp:	Overcast, light snow ~-7°C		
CHV (ppm / % LEL):	CO2 440 O2 20.9%	CH4 0% LEL	Duplicate Collected:	<input checked="" type="checkbox"/> ID: NO		Recovery:	<input type="checkbox"/> Good <input type="checkbox"/> Bad		
Purge Method									
Waterra		Peristaltic		Disp. Bailer		Subm. Pump		Air Lift	
								Other	
Initial Depth to Water (m):		0.38 m		Calculations:		Purge Start Time:		Purge End Time:	
Depth to Bottom (m):		1.54 m		W/L tape encrusted ice @ 0.00m, no detect water, can't measure bottom. Used micro waterra + foot valve to break apart ice and get DTW/DTB measurements.		Time () min. interval (24h)			
Submerged Tubing Depth (m):		~1.45				Depth (m)			
Well Stick-up Height (m):		0.73				Temperature (°C)			
Estimated Water Volume (L):						pH			
(DTB - DTW) x 2 (for 2" well diameter) = 1 well volume						Cond. (µs/cm)			
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume						Specific Cond. (µs/cm)			
2" casing has 0.16 USgal/ft or 2.032 l/m						Redox (mV)			
1" casing has 0.04 USgal/ft or 0.508 l/m						DO (mg/L)			
8" sand pack has 0.73 USgal/ft or 9.271 l/m						Appearance & Odour (Clear, Silty, HC odours, etc.)			
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m						Interval Purge Volume (L)			
				Cumulative Purge Volume (L)					
				Total Purge Volume:					
Method:	Waterra		Peristaltic		Disp. Bailer		Steel Bailer		
Analysis									
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)		Comments		
				<input type="checkbox"/> Yes					
				<input type="checkbox"/> No					

no well cap or seal

☒ unknown frozen

Returned to well @ 15:33 Oct 8, after snipping GSI-PC-03 to -05, existing tubing was again frozen in place in well, had to pull and twist to get out, ice blockage formed @ 0.65 cm preventing tubing or water level tape passing, ruined (bent/kinked) the existing 1/2" waterra + micro waterra in place & well trying to break past ice, all tubing removed from well.
FROZEN, unable to sample



Sample Site (Con't): M009-08

Wpt name

Field UTM Location: Zn: 08 V Easting: 0389159 Northing: 6881720

*Hemmera
Whitchorse
GPS*

Photo Nos.: 86-90

*Hemmera
Van
Cassini*

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	
Temperature (°C)	
DO (mg/L)	
Specific Cond. (µs/cm)	
Cond. (µs/cm)	
pH	
Redox (mV)	
Turbidity (NTU)	
DO (mg/L)	

Additional Purge Data - Continued from Front of Page (if required)					
Time () minute interval:					
Depth (m)					
Temperature (°C)					
pH					
Cond. (µs/cm)					
Specific Cond. (µs/cm)					
Redox (mV)					
DO (mg/L)					
Appearance & Odour (Clear, Silty, HC odours, etc.)					
Interval Purge Volume (L)					
Cumulative Purge Volume (L)					
Total Purge Volume					

General Notes (Condition of well or other features):

Drive point well in creek 1/2" PVC inside 2" steel
→ has existing 1/4" + silicon for low flow and 1/4" + micro-foot valve for manual; pulled 1/2" tubing out of frozen well and used micro-welder + foot valve to break apart ice and give access to well tape in early afternoon; retrieved in late afternoon but well frozen, unable to advance well tape or tubing → see reverse



GROUNDWATER SAMPLE COLLECTION SHEET

→ SAMPLE 8 Oct 2014

Well Number:	MP09-02	Project Number:	1343-005.03	Date:	7 Oct 2014	
Approximate Date Drilled:	unknown in field	Client:	YG-AAM	Sampler:	AS JL	
Piezometer Diameter / Screen Length:	1/2" PVC inside 3" metal / unknown in field	Project Name:	October 2014 Mt. Nansen Groundwater	Weather/Temp:	overcast, clearing, light snow, ~ -5°	
CHV (ppm / % LEL):	CO ₂ 490 CH ₄ 20.9% 0% LEL	Duplicate Collected:	<input checked="" type="checkbox"/> ID: No	Recovery:	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Bad	
Purge Method						
Waterra	Peristaltic	Disp. Bailer	Subm. Pump	Air Lift	Other	
e low flow						
Initial Depth to Water (m):	1.62	Calculations:	Purge Start Time:	09:55	Purge End Time:	
Depth to Bottom (m):	1.98	DTW = depth to surface ice that probe broke through 1.98 - 1.62 = 0.36 m = 0.125 L/m = miniscule	Time (3) min. interval (24h)	09:58	10:01	
Submerged Tubing Depth (m):	~ 1.8		Depth (m)	N/A - can't measure drawdown, w/ probe went for		
Well Stick-up Height (m):	1.0 m		Temperature (°C)	dark brown, water		
Estimated Water Volume (L):	< 0.65 L		pH	silty, clear, start		
(DTB - DTW) x 2 (for 2" well 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)	didn't freeze	sample	
(DTB - DTW) x 1.1 (for 1.5" diameter) = 1 well volume			Specific Cond. (µs/cm)	measure in tubing		
			Redox (mV)	w/ flow	can't	
			DO (mg/L)	through	slow pump	
			Appearance & Odour (Clear, Silty, HC odours, etc.)			
			Interval Purge Volume (L)	0.3	0.2	
			Cumulative Purge Volume (L)	0.3	0.5	
			Total Purge Volume:	0.5		
Method:	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Subm. Pump	
Analysis	e low flow					
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)	
MP09-02	Full suite w/ full bottles as per saw	10:02 - 10:18	As per saw inc. field filter	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	6.04 NTU @ time of sample	
					Field Sulphides - 0.03 mg/L	

Pine PID, ELR Solinst microVLE type

preserve as appropriate

No field parameters, water freezing in tubing during purge, > 3 UV purged, water clear during sample

→ Lamotte Hoskin, HACH maxam

no cap, well not sealed

above current ice

08 Oct 14



Sample Site (Con't): MPO9 - 02 ← *Wpt name =*

Field UTM Location: Zn: 08 ✓ Easting: 088866 Northing: 10881816

*Hemmera
Whitehorse
GPS*

Photo Nos.: 51-55 *Hemmera
Van
Emerson*

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	
Temperature (°C)	
DO (mg/L)	<i>SEE</i>
Specific Cond. (µs/cm)	<i>PREVIOUS</i>
Cond. (µs/cm)	<i>PAGE</i>
pH	
Redox (mV)	
Turbidity (NTU)	
DO (mg/L)	

Additional Purge Data – Continued from Front of Page (if required)					
Time () minute interval:					
Depth (m)					
Temperature (°C)					
pH					
Cond. (µs/cm)					
Specific Cond. (µs/cm)					
Redox (mV)					
DO (mg/L)					
Appearance & Odour (Clear, Silty, HC odours, etc.)					
Interval Purge Volume (L)					
Cumulative Purge Volume (L)					
Total Purge Volume:					

General Notes (Condition of well or other features):

1" rusty metal casing protecting 1/2" PVC tubing, located in middle of (now frozen) creek channel
 ↳ existing 1/4" tubing (w/silicon) already in well, difficulty getting tubing past ice @ 1.68m, but eventually got to bottom

⊗ Sampled 6 Oct 2014; 10:02 - 10:18 → see details on previous page. Able to collect full suite w/ full bottles, just didn't get field parameters (but did get > 3 wv) for fear water freezing in tubing and/or well going dry



GROUNDWATER SAMPLE COLLECTION SHEET

Well Number:	MW09-22	Project Number:	1343-005.03	Date:	OCT 8 2014					
Approximate Date Drilled:		Client:	YG-AAM	Sampler:	RM + GMR					
Piezometer Diameter / Screen Length:	2" PVC	Project Name:	October 2014 Mt. Nansen Groundwater	Weather/Temp:	PARTLY CLOUDY -8°C					
CHV (ppm / % LEL):		Duplicate Collected:	<input type="checkbox"/> ID: <u>NONE</u>	Recovery:	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Bad					
Purge Method										
Waterra	Peristaltic	Disp. Bailer	Subm. Pump	Air Lift	Other					
	✓ w/ BATTERY									
Initial Depth to Water (m):	11.32	Calculations:	Purge Start Time:	14-28	Purge End Time: 15-21					
Depth to Bottom (m):	16.94	= 6 ft = 2 m x 2 = 4 L x 3 = 12 L	Time () min. interval (24h)	1433	1440	1447	1455	1501	1508	1520
Submerged Tubing Depth (m):			Depth (m) ft.	12.65	13.0	13.2	13.2	13.2	13.2	13.2
Well Stick-up Height (m):	0.78		Temperature (°C)	1.95	1.94	1.81	2.0	1.91	1.91	2.00
Estimated Water Volume (L):	4 L		pH	6.19	6.14	6.12	6.07	6.07	6.06	6.06
(DTB - DTW) x 2 (for 2" well diameter) = 1 well volume			Cond. (µs/cm)	12.7	12.2	13.03	14.14	15.75	17.30	16.60
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume			Specific Cond. (µs/cm)							
2" casing has 0.16 USgal/ft or 2.032 l/m			Redox (mV)	15.9	11.2	12.1		19.3	23.9	21.7
1" casing has 0.04 USgal/ft or 0.508 l/m			DO (mg/L)	3.57	2.01	1.44	1.30	2.14	1.48	1.51
8" sand pack has 0.73 USgal/ft or 9.271 l/m			Appearance & Odour (Clear, Silty, HC odours, etc.)	CLEAR w/ odour	CLEAR	→	→	→	→	→
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m			Interval Purge Volume (L)	1	2.5	0.5	1	1.5	1.5	2
		Cumulative Purge Volume (L)	1	3.5	4	5	6.5	8	10	
		Total Purge Volume:	10L							
Method:	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Subm. Pump	Air Lift	Other			
Analysis	w/ battery									
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)		Comments			
MW09-22	Full set + EXTRA METALS	15-22	Plastic + Glass	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	8.40		SULPHUR-LIKE ODOUR			

ON OCT 9, 2014

FORGOT DUP METALS.

RETURNED ON OCT 9 2014 TO RECOLLECT PRESERVED METALS PLUS UNPRESERVED METALS

Purged 10L, then collected samples.



Sample Site (Con't): MW09-22

Field UTM Location: Zn: 08V

Easting: 0389494

Northing: 6880551

(WP
089)

Photo Nos.: 8473

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	15-22
Temperature (°C)	2.0
DO (mg/L)	1.51
Specific Cond. (µs/cm)	
Cond. (µs/cm)	1600
pH	6.06
Redox (mV)	21.7
Turbidity (NTU)	8.40
DO (mg/L)	
SULPHIDE mg/L	0.06

Additional Purge Data - Continued from Front of Page (if required)					
Time () minute interval:					
Depth (m)					
Temperature (°C)					
pH					
Cond. (µs/cm)					
Specific Cond. (µs/cm)					
Redox (mV)					
DO (mg/L)					
Appearance & Odour (Clear, Silty, HC odours, etc.)					
Interval Purge Volume (L)					
Cumulative Purge Volume (L)					
Total Purge Volume					

General Notes (Condition of well or other features)
8" SILICON NO GAS READINGS - METER NOT WORKING O ₂ - 20.9 % CO ₂ - 460 ppm CH ₄ - ✓



GROUNDWATER SAMPLE COLLECTION SHEET

Well Number:	FB3	Project Number:	1343-005.03	Date:	Oct 9 2014
Approximate Date Drilled:		Client:	YG-AAM	Sampler:	RMT + GMR
Piezometer Diameter / Screen Length:	PREPARED	Project Name:	October 2014 Mt. Nansen Groundwater	Weather/Temp:	
CHV (ppm / % LEL):	AT MW09-22	Duplicate Collected:	<input type="checkbox"/> ID:	Recovery:	<input type="checkbox"/> Good <input type="checkbox"/> Bad
Purge Method					
Waterra	Peristaltic	Disp. Bailer	Subm. Pump	Air Lift	Other
Initial Depth to Water (m):		Calculations:	Purge Start Time:	Purge End Time:	
Depth to Bottom (m):		<p>(DTB - DTW) x 2 (for 2" well diameter) = 1 well volume</p> <p>(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume</p> <p>2" casing has 0.16 USgal/ft or 2.032 l/m</p> <p>1" casing has 0.04 USgal/ft or 0.508 l/m</p> <p>8" sand pack has 0.73 USgal/ft or 9.271 l/m</p> <p>6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m</p>	Time () min. interval (24h)		
Submerged Tubing Depth (m):			Depth (m)		
Well Stick-up Height (m):			Temperature (°C)		
Estimated Water Volume (L):			pH		
			Cond. (µs/cm)		
			Specific Cond. (µs/cm)		
			Redox (mV)		
			DO (mg/L)		
			Appearance & Odour (Clear, Silty, HC odours, etc.)		
			Interval Purge Volume (L)		
		Cumulative Purge Volume (L)			
		Total Purge Volume:			
Method:	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Subm. Pump
Analysis					
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)
FB3	FULL SET. 9 BOTTLES.	12:00		<input type="checkbox"/> Yes <input type="checkbox"/> No	
					Comments



Sample Site (Con't): _____

Field UTM Location: Zn:

Easting:

Northing:

Photo Nos.:

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	
Temperature (°C)	
DO (mg/L)	
Specific Cond. (µs/cm)	
Cond. (µs/cm)	
pH	
Redox (mV)	
Turbidity (NTU)	
DO (mg/L)	

Additional Purge Data – Continued from Front of Page (If required)					
Time (____) minute interval:					
Depth (m)					
Temperature (°C)					
pH					
Cond. (µs/cm)					
Specific Cond. (µs/cm)					
Redox (mV)					
DO (mg/L)					
Appearance & Odour (Clear, Silty, HC odours, etc.)					
Interval Purge Volume (L)					
Cumulative Purge Volume (L)					
Total Purge Volume					

General Notes (Condition of well or other features)	



GROUNDWATER SAMPLE COLLECTION SHEET

Well Number:	W141030838H02		Project Number:	1343-005.03		Date:	OCT 9 2014	
Approximate Date Drilled:			Client:	YG-AAM		Sampler:	BMR + RM	
Piezometer Diameter / Screen Length:	2" PVC		Project Name:	October 2014 Mt. Nansen Groundwater		Weather/Temp:	cloudy - 7°C	
CHV (ppm / % LEL):			Duplicate Collected:	<input type="checkbox"/> ID: NONE		Recovery:	<input type="checkbox"/> Good <input type="checkbox"/> Bad	
Purge Method								
Waterra		Peristaltic		Disp. Bailer		Subm. Pump		Air Lift
		6.13 m						
Initial Depth to Water (m):	20.24	Calculations:	Purge Start Time:	Purge End Time:				
Depth to Bottom (m):	22.33	$= 2.09 \text{ ft}$ $= 0.63 \text{ m}$ column $= 1.28 \text{ L}$	Time () min. interval (24h)					
Submerged Tubing Depth (m):	6.76 m		Depth (m)					
Well Stick-up Height (m):			Temperature (°C)					
Estimated Water Volume (L):			pH	NO PURGE				
(DTB - DTW) x 2 (for 2" well diameter) = 1 well volume			Cond. (µs/cm)	DIRECT SAMPLE				
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		Specific Cond. (µs/cm)						
2" casing has 0.16 USgal/ft or 2.032 l/m		Redox (mV)						
1" casing has 0.04 USgal/ft or 0.508 l/m		DO (mg/L)						
8" sand pack has 0.73 USgal/ft or 9.271 l/m		Appearance & Odour (Clear, Silty, HC odours, etc.)	ABOUT 850V					
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		Interval Purge Volume (L)	ICE PLUG AT BOTTOM OF WELL					
		Cumulative Purge Volume (L)						
		Total Purge Volume:						
Method:	Waterra		Peristaltic		Disp. Bailer		Steel Bailer	
Analysis	W / BATTERY							
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)		Comments	
	DISSOLVED METALS DISSOLVED MERC GEN. CHEM.	1045.	PLASTIC + GLASS	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			INSUFFICIENT VOLUME IN SPRING SO DIRECT SAMPLE THIS TIME.	

CYANIDE
NH3
SCN
SULPHIDE } ALL MIN VOLUME
7 BOTTLES USED

DEPTHS INDICATE ICE PLUG AT THE BOTTOM. SAMPLE WATER IS LIKELY WITHIN THE PERMAFROST ACTIVE ZONE



Sample Site (Con't): L14103083 BH012

Field UTM Location: Zn: 08V Easting: 0389562 Northing: 6880666

LP.

094

Photo Nos.: 8481-8482

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	
Temperature (°C)	
DO (mg/L)	
Specific Cond. (µs/cm)	
Cond. (µs/cm)	
pH	
Redox (mV)	
Turbidity (NTU)	
DO (mg/L)	

Additional Purge Data - Continued from Front of Page (if required)					
Time () minute interval:					
Depth (m)					
Temperature (°C)					
pH					
Cond. (µs/cm)					
Specific Cond. (µs/cm)					
Redox (mV)					
DO (mg/L)					
Appearance & Odour (Clear, Silty, HC odours, etc.)					
Interval Purge Volume (L)					
Cumulative Purge Volume (L)					
Total Purge Volume					

General Notes (Condition of well or other features)
<p>Head space gases:</p> <p>No well cap = gases not collected</p>

GROUNDWATER SAMPLE COLLECTION SHEET

Well Number:	MW09-21	Project Number:	1343-005.03	Date:	9 Oct 2014
Approximate Date Drilled:	unknown in field	Client:	YG-AAM	Sampler:	AB JL
Piezometer Diameter / Screen Length:	2" PVC / unknown in field	Project Name:	October 2014 Mt. Nansen Groundwater	Weather/Temp:	Overcast, cold ~ -6°C
CHV (ppm / % LEL):	CO2 550 CF4 20.5% O2 LEL	Duplicate Collected:	N/A	Recovery:	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Bad
Purge Method					
Waterra	Peristaltic	Disp. Bailer	Subm. Pump	Air Lift	Other
	c low flow				
Initial Depth to Water (m):	1.71	Calculations:	Purge Start Time:	10:08	Purge End Time:
Depth to Bottom (m):	3.62	$3.62 - 1.71 = 1.91 \text{ m}$ $\times 2 \text{ L/m} = \sim 4 \text{ L}$	Time (4) min. interval (24h)	10:12	10:16
Submerged Tubing Depth (m):	~ 3.25		Depth (m)	1.96	1.96
Well Stick-up Height (m):	0.79		Temperature (°C)	1.0	1.0
Estimated Water Volume (L):	~ 4		pH	6.60	6.56
(DTB - DTW) x 2 (for 2" well diameter) = 1 well volume			Cond. (µs/cm)	342.2	347.9
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume			Specific Cond. (µs/cm)	634.8	642.7
2" casing has 0.16 USgal/ft or 2.032 l/m			Redox (mV)	-45.2	-50.4
1" casing has 0.04 USgal/ft or 0.508 l/m			DO (mg/L)	1.19	0.96
8" sand pack has 0.73 USgal/ft or 9.271 l/m			Appearance & Odour (Clear, Silty, HC odours, etc.)	light red, brown fine sand still	"
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m			Interval Purge Volume (L)	1	1.5
		Cumulative Purge Volume (L)	1.0	2.5	
		Total Purge Volume:	11.5		
Method:	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Subm. Pump
Analysis	c lowest flow possible to minimize sediments, but not have water freeze in tubing				
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)
MW09-21	Full suite w/ full bottles as per SOP	10:42-10:55	As per SOP, inc? field filter + preserve as needed	<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No	10.40 NTU c time of sample
					Field sulphides = 0.06 mg/L

Mini Rate PID (Pine) Solinst WL & ga (mini) (ELR), Hemmera YSF, ECT per pump

well has cap w/ slits cut, no proper air seal

OVER →



Sample Site (Con't): MW09-21

h₂O₂ name =

Field UTM Location: Zn: 68 V Easting: 6389536 Northing: 6880578

Hemmera
whitehorse
GPS

Photo Nos.: 121-125

Hemmera
Main Camera

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	
Temperature (°C)	
DO (mg/L)	
Specific Cond. (µs/cm)	
Cond. (µs/cm)	SEE →
pH	OVER →
Redox (mV)	
Turbidity (NTU)	
DO (mg/L)	

Additional Purge Data - Continued from Front of Page (if required)					
Time (4) minute interval:	1036	1040			
Depth (m)	2.01	2.01			
Temperature (°C)	0.8	0.9			
pH	6.60	6.61			
Cond. (µs/cm)	351.1	349.6			
Specific Cond. (µs/cm)	656.7	642.9			
Redox (mV)	-63.1	-64.0			
DO (mg/L)	0.92	0.90			
Appearance & Odour (Clear, Silty, HC odours, etc.)	faint light red / brown, trace silt & fine sand				
Interval Purge Volume (L)	1.5	1.5			
Cumulative Purge Volume (L)	10	11.5			
Total Purge Volume:					

General Notes (Condition of well or other features):

2" PVC well inside red metal stick up protector. Well ID marked on well cap. Good condition
Existing tubing in well removed, very dark + oxidized, also old bailer on ground removed, added new 1/4" 16" silicon

Transducer/data logger in well pulled up + re-inserted @ 9:55, 9 Oct 2014



GROUNDWATER SAMPLE COLLECTION SHEET

Well Number:	MP09-05	Project Number:	1343-005.03	Date:	9 Oct 2014
Approximate Date Drilled:	unknown in field	Client:	YG-AAM	Sampler:	AB JL
Piezometer Diameter / Screen Length:	1.5" PVC / unknown in field	Project Name:	October 2014 Mt. Nansen Groundwater	Weather/Temp:	Overcast, cold, light wind ~ -8°C
CHV (ppm / % LEL):	CO ₂ 410 O ₂ 20.5% CH ₄ 0% LEL	Duplicate Collected:	<input checked="" type="checkbox"/> ID: DUP-5	Recovery:	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Bad
Purge Method					
Waterra	Peristaltic	Disp. Bailer	Subm. Pump	Air Lift	Other
low flow					
Initial Depth to Water (m):	1.40	Calculations:	Purge Start Time:	1116	Purge End Time:
Depth to Bottom (m):	1.82	1.82 - 1.40 = 0.42 m	Time (3) min. interval (24h)	1119	1122
Submerged Tubing Depth (m):	~ 1.70	= 2 L/m	Depth (m)	1.49	1.48
Well Stick-up Height (m):		= ~ 0.85	Temperature (°C)	0.9	0.9
Estimated Water Volume (L):	~ 0.45	* well actually 1.5" Ø, 0.42 x ~ 1.1 = ~ 0.45 L	pH	6.67	6.64
(DTB - DTW) x 2 (for 2" well diameter) = 1 well volume			Cond. (µs/cm)	356.3	356.3
(DTB - DTW) x 1.1 (for 1.5" diameter) = 1 well volume			Specific Cond. (µs/cm)	659.6	659.7
2" casing has 0.16 USgal/ft or 2.032 l/m			Redox (mV)	-41.7	-55.7
1" casing has 0.04 USgal/ft or 0.508 l/m			DO (mg/L)	1.77	0.71
8" sand pack has 0.73 USgal/ft or 9.271 l/m			Appearance & Odour (Clear, light red/brown, Silty, HC odours, etc.)	trace fine sand, light	mostly clear, very faint light brown/ren
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m			Interval Purge Volume (L)	0.6	0.6
			Cumulative Purge Volume (L)	0.6	1.2
			Total Purge Volume:	3.0	
Method:	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Subm. Pump
Analysis	low flow				
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)
MP09-05 + DUP-5	Parent + DUP, full suite (full bottles) as per saw	1133 - 1208	As per saw and paired metals	<input checked="" type="checkbox"/> Yes as applicable	3.98 NTU @ time of sample
					Field sulphides = 0.03 mg/L

poor fitting well cap = no seal

* both samples also paired metals
2 dir metals filter, preserve
2 dir metals filter, unpreserved, no hemisphere

PKUS
paired metal extra bottle

SOW = Scope of Work

Sample Site (Con't): MPO9-05

Field UTM Location: Zn: 08V Easting: 0389548 Northing: 6880592

} Hemmer
Whitthorse
GPS

Photo Nos.: 116-120

} Hemmer
Van
Candey

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	
Temperature (°C)	
DO (mg/L)	
Specific Cond. (µs/cm)	SEE
Cond. (µs/cm)	
pH	PREVIOUS
Redox (mV)	
Turbidity (NTU)	PAEE
DO (mg/L)	

Additional Purge Data - Continued from Front of Page (if required)					
Time () minute interval:					
Depth (m)					
Temperature (°C)					
pH					
Cond. (µs/cm)					
Specific Cond. (µs/cm)					
Redox (mV)					
DO (mg/L)					
Appearance & Odour (Clear, Silty, HC odours, etc.)					
Interval Purge Volume (L)					
Cumulative Purge Volume (L)					
Total Purge Volume:					

General Notes (Condition of well or other features):
<p>1.5" PVC stick up (no protector) beside pond shore. Well cap but poor seal.</p> <p>Existing 1/4" tubing in well but red oxidized, water slightly frozen, replaced w/ new tubing + 6" silicon for low flow</p>

Same equipment as MWO9-21

GROUNDWATER SAMPLE COLLECTION SHEET

Well Number:	MP09-04		Project Number:	1343-005.03		Date:	9 Oct 2014			
Approximate Date Drilled:	unknown in field		Client:	YG-AAM		Sampler:	AB JL			
Piezometer Diameter / Screen Length:	1 1/2" PVC / unknown in field		Project Name:	October 2014 Mt. Nansen Groundwater		Weather/Temp:	overcast, light wind, cold, - - 8°C			
CHV (ppm / % LEL):	CO2 460 O2 20.9%	CH4 0% LEL	Duplicate Collected:	<input checked="" type="checkbox"/> ID: NO		Recovery:	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Bad			
Purge Method										
Waterra	Peristaltic	Disp. Bailer	Subm. Pump	Air Lift	Other	L → a low flow				
Initial Depth to Water (m):		1.96	Calculations:	Purge Start Time:	13 29	Purge End Time:	13 56			
Depth to Bottom (m):		3.09	3.09 - 1.96 = 2.13 m > 1.01 l/m = 2.25 m x 3 = 6.75 L for 3 Well Volumes	Time (3) min. interval (24h)	13 32	13 35	13 38	13 41		
Submerged Tubing Depth (m):		~ 2.75		Depth (m)	2.06	2.06	2.07	2.09	2.09	
Well Stick-up Height (m):		1.21		Temperature (°C)	0.1	0.0	-0.1	0.2	0.0	
Estimated Water Volume (L):		~ 2.25 L		pH	7.32	7.27	7.24	7.21	7.20	
(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)	164.8	160.7	159.5	160.2	159.6	
				Specific Cond. (µs/cm)	313.5	301.3	306.2	305.1	305.1	304.5
				Redox (mV)	34.2	36.1	37.1	37.3	37.2	37.5
				DO (mg/L)	4.23	4.01	3.87	3.81	3.77	3.71
				Appearance & Odour (Clear, Silty, HC odours, etc.)	mostly clear	"	clear	"	"	"
				Interval Purge Volume (L)	0.65	0.65	0.65	0.8	0.75	0.75
			Cumulative Purge Volume (L)	6.65	1.3	1.95	2.75	3.5		
			Total Purge Volume:	6.5						
Method	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Subm. Pump	Air Lift	Other			
Analysis	a low flow									
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)	Comments				
MP09-04	Full suite of full bottles as per	13 58 - 14:07	As per SOW, inc. field filter & preserve	<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No	6.41 NTU at time of sample	Field sulphides = 0.04 mg/L				

good seal well cap

SOW

ins appropriate

OVER →

→ All same equipment as MW09-21



Sample Site (Con't): MP09-04

Field UTM Location: Zn: 08 ✓ Easting: 0389574 Northing: 6880611

} Hemmera
Whitchase
GPS
Photo Nos.: 136-140 } Hemmera
Van
Camera

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	
Temperature (°C)	
DO (mg/L)	
Specific Cond. (µs/cm)	SEE OVER
Cond. (µs/cm)	
pH	
Redox (mV)	
Turbidity (NTU)	
DO (mg/L)	

Additional Purge Data - Continued from Front of Page (if required)					
Time (<u>3</u>) minute interval:	1350	1353	1356		
Depth (m)	2.69	2.69	-		
Temperature (°C)	0.2	0.2	0.1		
pH	7.16	7.15	7.15		
Cond. (µs/cm)	159.5	159.3	159.3		
Specific Cond. (µs/cm)	303.4	302.8	303.7		
Redox (mV)	37.4	37.4	37.4		
DO (mg/L)	3.69	3.63	3.65		
Appearance & Odour (Clear, Silty, HC odours, etc.)	clear	"	"		
Interval Purge Volume (L)	0.75	0.75	0.75		
Cumulative Purge Volume (L)	5	5.75	6.5		
Total Purge Volume					

General Notes (Condition of well or other features)
1.5" PVC well w/ no stick up protector, just above "shore" of tailings pond Replaced cracked (no suction) 1/2" tubing w/ new 1/2" and 1/2" 6" silicon

GROUNDWATER SAMPLE COLLECTION SHEET

Well Number:	MW09-09	Project Number:	1343-005.03	Date:	9 Oct 2014
Approximate Date Drilled:	unknown in field	Client:	YG-AAM	Sampler:	AB JL
Piezometer Diameter / Screen Length:	2" PVC w cap / unknown in field	Project Name:	October 2014 Mt. Nansen Groundwater	Weather/Temp:	overcast, light wind, cold ~ -8°C
CHV (ppm / % LEL):	CO ₂ 430 CH ₄ 20.9% 0% LEL	Duplicate Collected:	<input checked="" type="checkbox"/> ID: No	Recovery:	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Bad
Purge Method					
Waterra	Peristaltic	Disp. Bailer	Subm. Pump	Air Lift	Other
	@ low flow				
Initial Depth to Water (m):	N/A	Calculations:	Purge Start Time:	15:18	Purge End Time:
Depth to Bottom (m):	N/A	Frozen obstruction	Time (3) min. interval (24h)	15:21 15:24 15:27 15:30 15:35 15:40	
Submerged Tubing Depth (m):	~ 3.60	@ 1.14 m,	Depth (m)	1.22 1.25 1.26 1.27 1.27 1.28	
Well Stick-up Height (m):	1.07	9 Oct 2014,	Temperature (°C)	4.2 3.8 3.4 3.5 3.3 3.2	
Estimated Water Volume (L):	~ 5.62	See reverse,	pH	6.67 6.55 6.51 6.53 6.53 6.54	
(DTB - DTW) x 2 (for 2" well diameter) = 1 well volume		@ 750 ml boiling	Cond. (µs/cm)	63.1 61.1 60.2 60.1 59.9 60.3	
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume		DI water cleared	Specific Cond. (µs/cm)	104.6 102.5 102.3 102.2 102.8 103.3	
2" casing has 0.16 USgal/ft or 2.032 l/m		ice,	Redox (mV)	-52.1 -54.0 -59.3 -60.4 -64.0 -66.9	
1" casing has 0.04 USgal/ft or 0.508 l/m		DTW = 1.12 m	DO (mg/L)	0.88 0.52 0.43 0.44 0.47 0.42	
8" sand pack has 0.73 USgal/ft or 9.271 l/m		DTB = 3.93 m	Appearance & Odour (Clear, mostly clear, faint light brown/grey, brown/gold)		
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m		3.93 - 1.12 = 2.81 m x 2 l/m	Interval Purge Volume (L)	1 1.25 1.25 1.5 2.5 2.5	
			Cumulative Purge Volume (L)	1 2.25 3.5 5 7.5 10	OVER
			Total Purge Volume:	17.5	
Method:	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Subm. Pump
Analysis		@ low flow			
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)
MW09-09	Full suite as per saw (inc. full bottles)	15:50 - 16:07	As per SAW inc. field filter + preserve	<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No	6.22 NTU @ time of sample
					Field sulphides = 0.11 mg/L

Pine MiniPac PID → all same equipment as MP09-05 / MW09-21 once thawed
ELR Solinst w/ tape

not well sealed,
cap in place
but slit extends
beyond cap

Sample Site (Con't): MW09-08

Wypit name =

Field UTM Location: Zn: 08V

Easting: 0389617 Northing: 6880579

Hemmer
Whitaker
GPS

Photo Nos.: 126-130

Hemmer
Vern
Cameron

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	
Temperature (°C)	
DO (mg/L)	
Specific Cond. (µs/cm)	
Cond. (µs/cm)	SEE
pH	OVER
Redox (mV)	
Turbidity (NTU)	
DO (mg/L)	

Additional Purge Data - Continued from Front of Page (if required)					
Time (3 th minute interval):	15:45	15:50	15:55		
Depth (m)	1.27	1.28	1.28		
Temperature (°C)	3.0	3.1	3.0		
pH	6.55	6.56	6.56		
Cond. (µs/cm)	59.4	59.8	59.6		
Specific Cond. (µs/cm)	102.7	102.9	102.8		
Redox (mV)	-69.5	-71.7	-72.3		
DO (mg/L)	0.37	0.36	0.35		
Appearance & Odour (Clear, Silty, HC odours, etc.)	mostly clear very faint light brown	"	"		
Interval Purge Volume (L)	2.5	2.5	2.5		
Cumulative Purge Volume (L)	12.5	15	17.5		
Total Purge Volume:					

General Notes (Condition of well or other features):

- 2" PVC well w/ red stick up probe beside creek bank, below lowest toolings down.
- in good condition, but well casing higher than stick up
- Existing 1/2" tubing in well, frozen in place, had to twist + pull repeatedly to free from ice, once free blockage remains and can't advance w/ probe or tubing below 1.14m (ice blockage)
- Tried 5/8" tubing + foot valve to break through ice, unsuccessful (tubing kinked while bashing) → probably good throw-out option well
- Returned later in day, boiled ~ 750 ml of lab supplied DI water and poured down well, loosening + clearing ice

GROUNDWATER SAMPLE COLLECTION SHEET

Well Number:	MW09-24	Project Number:	1343-005.03	Date:	9 Oct 2014		
Approximate Date Drilled:	unknown in field	Client:	YG-AAM	Sampler:	AB JL		
Piezometer Diameter / Screen Length:	2" PVC / unknown in field	Project Name:	October 2014 Mt. Nansen Groundwater	Weather/Temp:	overcast, cold ~ -8°C		
CHV (ppm / % LEL):	CO2 1480 CH4 20.9% 0% LEL	Duplicate Collected:	<input checked="" type="checkbox"/> Yes: No	Recovery:	<input checked="" type="checkbox"/> Good <input type="checkbox"/> Bad		
Purge Method							
Watertra	Peristaltic	Disp. Bailer	Subm. Pump	Air Lift	Other		
manual 5/8" footvalve							
Initial Depth to Water (m):	9.30	Calculations:	Purge Start Time:	0823	Purge End Time:	0907	
Depth to Bottom (m):	11.24	11.24 - 9.30 = 1.94m	Time (2.5 min. interval (24h))	8:28 8:35	08:47 08:54	9:00 09:07	
Submerged Tubing Depth (m):	~10.27	= 1.94m	Depth (m)	9.35	9.32 9.39	9.35 9.37	
Well Stick-up Height (m):	0.64	+ 2L/m	Temperature (°C)	0.0 0.4	0.5 0.3	0.3 0.4	
Estimated Water Volume (L):	~4L	~ 3.88	pH	6.83 6.91	7.09 7.12	7.20 7.19	
(DTB - DTW) x 2 (for 2" well diameter) = 1 well volume			Cond. (µs/cm)	184.7 192.6	188.8 196.4	193.5 188.5	
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume			Specific Cond. (µs/cm)	354.4 362.9	355.2 373.0	346.9 356.5	
2" casing has 0.16 USgal/ft or 2.032 l/m			Redox (mV)	77.6 69.4	62.6 62.5	62.0 62.8	
1" casing has 0.04 USgal/ft or 0.508 l/m			DO (mg/L)	11.01 10.39	9.23 10.33	8.50 8.60	
8" sand pack has 0.73 USgal/ft or 9.271 l/m			Appearance & Odour (Clear, Silty, HC odours, etc.)	mostly clear (100%)	" "	" "	
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m			Interval Purge Volume (L)	2.5 2.5	2.5 2.5	2.5 2.5	
			Cumulative Purge Volume (L)	2.5 5	7.5 10	12.5 15	
			Total Purge Volume:				
Method:	Watertra	Peristaltic	Disp. Bailer	Steel Bailer	Subm. Pump	Air Lift	Other
Analysis			2 L plastic	sampled w/ bailer to avoid any fine sand from watertra			
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)	Comments	
MW09-24	Full suite as per SOW (bottles full)	09:15 - 09:30	As per SOW inc. preserve + field filter as applicable	<input checked="" type="checkbox"/> Yes <input checked="" type="checkbox"/> No	18.2 NTU @ time of sample w/ bailer.	field sulphides: 0.09 mg/L	

Pne MiniPac PID, ELR Solinst small WL type, added 12m 5/8" footvalve, Hemmera YST, Huskin La Motte, Maxim HACH

Sample Site (Con't): MW09-24 ^{hypt #}

Field UTM Location: Zn: 08 V

Easting: 0389559

Northing: 6880625

} Hemmera
Whitehorse
EPS

Photo Nos.: 111-115

} Hemmera
Van
Cinema

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	
Temperature (°C)	
DO (mg/L)	
Specific Cond. (µs/cm)	SEE
Cond. (µs/cm)	PREVIOUS
pH	PAGE
Redox (mV)	
Turbidity (NTU)	
DO (mg/L)	

Additional Purge Data - Continued from Front of Page (if required)					
Time () minute interval:					
Depth (m)					
Temperature (°C)					
pH					
Cond. (µs/cm)					
Specific Cond. (µs/cm)					
Redox (mV)					
DO (mg/L)					
Appearance & Odour (Clear, Silty, HC odours, etc.)					
Interval Purge Volume (L)					
Cumulative Purge Volume (L)					
Total Purge Volume:					

General Notes (Condition of well or other features)
<p>2" PVC well w/ cap inside red metal stick up w/ lid → ID marked on both → all in good condition</p> <p>Existing 2 L plastic boiler in well, looks new clean</p>



GROUNDWATER SAMPLE COLLECTION SHEET

Well Number:	MP09-12		Project Number:	1343-005.03		Date:	09 OCT 2014	
Approximate Date Drilled:			Client:	YG-AAM		Sampler:	GMR + RM	
Piezometer Diameter / Screen Length:	1.25" PVC		Project Name:	October 2014 Mt. Nansen Groundwater		Weather/Temp:	CLOUDY. -9°C	
CHV (ppm / % LEL):			Duplicate Collected:	<input type="checkbox"/> ID: NONE		Recovery:	<input type="checkbox"/> Good <input type="checkbox"/> Bad	
Purge Method								
Waterra		Peristaltic		Disp. Bailer		Subm. Pump		Air Lift
Initial Depth to Water (m):	5.54	Calculations:	Purge Start Time:	1352		Purge End Time:		
Depth to Bottom (m):	4.175	2.5 m water column. R of casing = $0.024 \times 0.024 \times 3.142 \times 1000 = 4.5 \text{ L}$	Time () min. interval (24h)	1400 1409				
Submerged Tubing Depth (m):			Depth (m)	11.3 13				
Well Stick-up Height (m):	1.70		Temperature (°C)	1.98 1.83				
Estimated Water Volume (L):	4.5		pH	6.64 6.99				
(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)	761 642				
			Specific Cond. (µs/cm)					
			Redox (mV)	66.26 27.8				
			DO (mg/L)	6.39 5.3				
			Appearance & Odour (Clear, Silty, HC odours, etc.)	STARTED TURBID. CLEARING 1				
			Interval Purge Volume (L)	3 2				
		Cumulative Purge Volume (L)	3 5					
		Total Purge Volume:	THEN DRY. WILL RETURN TO SAMPLE.					
Method:	Waterra		Peristaltic		Disp. Bailer		Steel Bailer	
Analysis								
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)		Comments	
MP09-12	FULL SET MINIMUM VOLS	15-10	PLASTIC + GLASS	<input type="checkbox"/> Yes <input type="checkbox"/> No	141		SLITS IN WELL CASING - NO GASES RECORDED.	

USED BOILED DI WATER TO BREAK THROUGH ICE PLUG. THEN PURGED. USED ~ 600 ml OF DI WATER.



Sample Site (Con't): _____

Field UTM Location: Zn: 08V Easting: 0389218 Northing: 6880619

(WP
098)

8494-8495. PURGE WATER CHOCOLATE MILK
Photo Nos.: 8491-8493

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	1510
Temperature (°C)	23.3
DO (mg/L)	5.3
Specific Cond. (µs/cm)	
Cond. (µs/cm)	642
pH	6.99
Redox (mV)	27.8
Turbidity (NTU)	141
DO (mg/L)	
SULPHIDE mg/l	0.40

Additional Purge Data - Continued from Front of Page (if required)					
Time () minute interval:					
Depth (m)					
Temperature (°C)					
pH					
Cond. (µs/cm)					
Specific Cond. (µs/cm)					
Redox (mV)					
DO (mg/L)					
Appearance & Odour (Clear, Silty, HC odours, etc.)					
Interval Purge Volume (L)					
Cumulative Purge Volume (L)					
Total Purge Volume:					

General Notes (Condition of well or other features)
5.5 m peristaltic tubing Cuts in the PVC casing = gases not collected



GROUNDWATER SAMPLE COLLECTION SHEET

Well Number:	MP09-11		Project Number:	1343-005.03		Date:	OCT 9 2014		
Approximate Date Drilled:			Client:	YG-AAM		Sampler:	GMR + RM		
Piezometer Diameter / Screen Length:	1.25" PVC		Project Name:	October 2014 Mt.Nansen Groundwater		Weather/Temp:	CLOUDY. -9°C		
CHV (ppm / % LEL):			Duplicate Collected:	<input type="checkbox"/> ID: NONE		Recovery:	<input type="checkbox"/> Good <input type="checkbox"/> Bad		
Purge Method									
Waterra		Peristaltic		Disp. Bailer		Subm. Pump		Air Lift	
								Other	
Initial Depth to Water (m):	FT	5.84	Calculations: = 1.7m = 3.25m column = 5.88 L	Purge Start Time:	1425		Purge End Time:	1452	
Depth to Bottom (m):	FT	15.95		Time () min. interval (24h)	1431	1436	1439	1444	1450
Submerged Tubing Depth (m):				Depth () FT	8.6	9.9	11.8	13.3	15.4
Well Stick-up Height (m):		1.74		Temperature (°C)	2.0	1.32	1.9	2.24	1.75
Estimated Water Volume (L):		5.88 L		pH	6.82	7.00	7.08	7.15	7.17
(DTB - DTW) x 2 (for 2" well diameter) = 1 well volume				Cond. (µs/cm)	1019	1026	1014	966	943
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume				Specific Cond. (µs/cm)					
2" casing has 0.16 USgal/ft or 2.032 l/m				Redox (mV)	66.6 ↓	33.3 ↓	10.3 ↓	-6.9 ↓	-20.2
1" casing has 0.04 USgal/ft or 0.508 l/m				DO (mg/L)	9.55 ↓	6.20 ↓	3.92 ↓	3.14	2.69
8" sand pack has 0.73 USgal/ft or 9.271 l/m				Appearance & Odour (Clear, Silty, HC odours, etc.)	TURBID →				
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m			Interval Purge Volume (L)	1.5	1	1	1.5	1	
			Cumulative Purge Volume (L)	1.5	2.5	3.5	5	6	
			Total Purge Volume:	THEN DRY					
Method:	Waterra		Peristaltic	Disp. Bailer	Steel Bailer	Subm. Pump	Air Lift	Other	
Analysis									
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)		Comments		
MP09-11	FULL SET MIN. VOLUME.	1550	PLASTIC AND GUBBS	<input type="checkbox"/> Yes <input type="checkbox"/> No	0.43 54.1		PURGED DRY. LEFT IT FOR 45 MINS THEN SAMPLED.		

DTB 4.95

Sample Site (Con't): _____

Field UTM Location: Zn: 08V Easting: 0389218 Northing: 6880619

Photo Nos.: 8491 - 8493

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	1550
Temperature (°C)	17.5
DO (mg/L)	2.69
Specific Cond. (µs/cm)	
Cond. (µs/cm)	943
pH	7.17
Redox (mV)	-20.2
Turbidity (NTU)	54.1
DO (mg/L)	
SULPHIDE mg/L	0.14

Additional Purge Data - Continued from Front of Page (if required)					
Time () minute interval:					
Depth (m)					
Temperature (°C)					
pH					
Cond. (µs/cm)					
Specific Cond. (µs/cm)					
Redox (mV)					
DO (mg/L)					
Appearance & Odour (Clear, Silty, HC odours, etc.)					
Interval Purge Volume (L)					
Cumulative Purge Volume (L)					
Total Purge Volume					

General Notes (Condition of well or other features)
<p>4.5 m peristaltic tubing</p> <p>Cuts in the PVC casing - gases not collected</p>



GROUNDWATER SAMPLE COLLECTION SHEET

Well Number:	MP09-14		Project Number:	1343-005.03		Date:	OCT 9 2010	
Approximate Date Drilled:			Client:	YG-AAM		Sampler:	GARY + RM	
Piezometer Diameter / Screen Length:	DP		Project Name:	October 2014 Mt. Nansen Groundwater		Weather/Temp:	CLOUDY -9°C	
CHV (ppm / % LEL):			Duplicate Collected:	<input type="checkbox"/> ID:		Recovery:	<input type="checkbox"/> Good <input type="checkbox"/> Bad	
Purge Method								
Waterra		Peristaltic		Disp. Bailer		Subm. Pump		Air Lift
								Other
Initial Depth to Water (m):		1.50		Calculations:		Purge Start Time:		Purge End Time:
Depth to Bottom (m):						Time () min. interval (24h)		
Submerged Tubing Depth (m):						Depth (m)		
Well Stick-up Height (m):						Temperature (°C)		
Estimated Water Volume (L):						pH		
(DTB - DTW) x 2 (for 2" well diameter) = 1 well volume						Cond. (µs/cm)		
(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume						Specific Cond. (µs/cm)		
2" casing has 0.16 USgal/ft or 2.032 l/m						Redox (mV)		
1" casing has 0.04 USgal/ft or 0.508 l/m						DO (mg/L)		
8" sand pack has 0.73 USgal/ft or 9.271 l/m						Appearance & Odour (Clear, Silty, HC odours, etc.)		
6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m						Interval Purge Volume (L)		
						Cumulative Purge Volume (L)		
						Total Purge Volume:		
Method:	Waterra		Peristaltic		Disp. Bailer		Steel Bailer	
Analysis								
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)		Comments	
				<input type="checkbox"/> Yes				
				<input type="checkbox"/> No				



Sample Site (Con't): _____

Field UTM Location: Zn: 08V

Easting: 0389140

Northing: 6880721

(WP
097)

Photo Nos.: 8489 - 8490
~~0489~~ -

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	
Temperature (°C)	
DO (mg/L)	
Specific Cond. (µs/cm)	
Cond. (µs/cm)	
pH	
Redox (mV)	
Turbidity (NTU)	
DO (mg/L)	

Additional Purge Data - Continued from Front of Page (if required)					
Time () minute interval:					
Depth (m)					
Temperature (°C)					
pH					
Cond. (µs/cm)					
Specific Cond. (µs/cm)					
Redox (mV)					
DO (mg/L)					
Appearance & Odour (Clear, Silty, HC odours, etc.)					
Interval Purge Volume (L)					
Cumulative Purge Volume (L)					
Total Purge Volume					

General Notes (Condition of well or other features)

INSUFFICIENT VOLUME ~ 600ml
FROZEN SURFACE WATER ALL AROUND DP.
No well cap = gases not collected



GROUNDWATER SAMPLE COLLECTION SHEET

Well Number:	W14103083 B401		Project Number:	1343-005.03		Date:	OCT 9 2014	
Approximate Date Drilled:			Client:	YG-AAM		Sampler:	GMR + RM	
Piezometer Diameter / Screen Length:	2" PVC		Project Name:	October 2014 Mt.Nansen Groundwater		Weather/Temp:	CLOUDY -8°C	
CHV (ppm / % LEL):			Duplicate Collected:	<input type="checkbox"/> ID: NONE.		Recovery:	<input type="checkbox"/> Good <input type="checkbox"/> Bad	
Purge Method								
Waterra		Peristaltic		Disp. Bailer		Subm. Pump		Air Lift
		646m						
Initial Depth to Water (m):	21.32	Frozen	Calculations:	Purge Start Time:	Purge End Time:			
Depth to Bottom (m):	FT		<p>(DTB - DTW) x 2 (for 2" well diameter) = 1 well volume</p> <p>(DTB-DTW) x 1.1 (for 1.5" diameter) = 1 well volume</p> <p>2" casing has 0.16 USgal/ft or 2.032 l/m</p> <p>1" casing has 0.04 USgal/ft or 0.508 l/m</p> <p>8" sand pack has 0.73 USgal/ft or 9.271 l/m</p> <p>6 5/8" sand pack has 0.50 USgal/ft or 6.35 l/m</p>	Time () min. interval (24h)				
Submerged Tubing Depth (m):				Depth (m)				
Well Stick-up Height (m):				Temperature (°C)				
Estimated Water Volume (L):				pH				
				Cond. (µs/cm)				
				Specific Cond. (µs/cm)				
				Redox (mV)				
				DO (mg/L)				
				Appearance & Odour (Clear, Silty, HC odours, etc.)				
				Interval Purge Volume (L)				
			Cumulative Purge Volume (L)					
			Total Purge Volume:					
Method:	Waterra	Peristaltic	Disp. Bailer	Steel Bailer	Subm. Pump	Air Lift	Other	
Analysis								
Sample ID	Parameters Analyzed	Sample Time	Container Types	Preservative	Turbidity (NTU)		Comments	
NOT SAMPLED.		NOT SAMPLED	—	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	—		—	



Sample Site (Con't): W14103083B401

Field UTM Location: Zn: 08V Easting: 0389522 Northing: 6880667

WP.
096.

Photo Nos.: 8484 + 8485

Final Groundwater Field Parameters (Following Purge)	
Time (hh:mm; 24h)	
Temperature (°C)	
DO (mg/L)	
Specific Cond. (µs/cm)	
Cond. (µs/cm)	
pH	
Redox (mV)	
Turbidity (NTU)	
DO (mg/L)	

Additional Purge Data – Continued from Front of Page (if required)					
Time () minute interval:					
Depth (m)					
Temperature (°C)					
pH					
Cond. (µs/cm)					
Specific Cond. (µs/cm)					
Redox (mV)					
DO (mg/L)					
Appearance & Odour (Clear, Silty, HC odours, etc.)					
Interval Purge Volume (L)					
Cumulative Purge Volume (L)					
Total Purge Volume					

General Notes (Condition of well or other features)
No well cap = gases not collected

APPENDIX C

Laboratory Reports



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

Date Received: 10-OCT-14
Report Date: 24-OCT-14 15:30 (MT)
Version: FINAL REV. 2

Client Phone: 867-456-4865

Certificate of Analysis

Lab Work Order #: L1531123
Project P.O. #: NOT SUBMITTED
Job Reference: 1343-005.05
C of C Numbers: 1, 2, 3, 4
Legal Site Desc:

Comments:

24-OCT-2014 This report replaces the previous version and contains a correction to a Sample Date for one sample.

Brent Mack, B.Sc.
Account Manager

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

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1531123-1 Water 07-OCT-14 15:03 CH-P-13-05/50	L1531123-2 Water 07-OCT-14 13:00 GLL07-03	L1531123-3 Water 07-OCT-14 14:42 GCI-HA-03A	L1531123-4 Water 07-OCT-14 18:30 GSI-DC-03B	L1531123-5 Water 07-OCT-14 17:36 MW09-18
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (uS/cm)	2770	823	882	1090	2650
	Hardness (as CaCO3) (mg/L)	1860	449	512	685	1860
	pH (pH)	6.67	6.96	7.57	8.08	7.82
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	89.8	45.6	161	242	572
	Ammonia, Total (as N) (mg/L)	0.0342	0.0617		0.129	0.0244
	Chloride (Cl) (mg/L)	<10 ^{DLA}	<0.50	<2.5 ^{DLA}	<5.0 ^{DLA}	<10 ^{DLA}
	Fluoride (F) (mg/L)	<0.40 ^{DLA}	0.096	<0.10 ^{DLA}	<0.20 ^{DLA}	<0.40 ^{DLA}
	Nitrate (as N) (mg/L)	<0.10 ^{DLA}	0.571	<0.025 ^{DLA}	<0.050 ^{DLA}	<0.10 ^{DLA}
	Nitrite (as N) (mg/L)	<0.020 ^{DLA}	0.0218	<0.0050 ^{DLA}	<0.010 ^{DLA}	<0.020 ^{DLA}
	Total Kjeldahl Nitrogen (mg/L)	0.071	0.148		0.377	0.085
	Sulfate (SO4) (mg/L)	1890	390	343	411	1400
	Sulphide as S (mg/L)	<0.020	0.164		<0.020	<0.020
	Anion Sum (meq/L)	41.1	9.07	10.3	13.4	40.5
	Cation Sum (meq/L)	40.6	9.63	13.6	14.1	37.9
	Cation - Anion Balance (%)	-0.6	3.0	13.7	2.5	-3.3
	Cyanide, Weak Acid Diss (mg/L)	<0.0050 ^{CNP}	<0.0050		<0.0050	<0.0050
	Cyanide, Total (mg/L)	<0.0050 ^{CNP}	<0.0050		<0.0050	<0.0050
	Thiocyanate (SCN) (mg/L)	<0.50	<0.50			<0.50
	Cyanide, Free (mg/L)	<0.0050 ^{CNP}	<0.0050		<0.0050	<0.0050
Organic / Inorganic Carbon	Total Inorganic Carbon (mg/L)	12.4	9.7		51.7	107
	Total Organic Carbon (mg/L)	0.88	1.21		5.56	2.66
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)	0.0656	0.0121	0.0234	0.0012	<0.0020 ^{DLA}
	Antimony (Sb)-Dissolved (mg/L)	<0.00050 ^{DLA}	<0.00010	0.00027	0.00066	0.00026
	Arsenic (As)-Dissolved (mg/L)	0.00389	<0.00010	0.0420	0.00235	0.0575
	Barium (Ba)-Dissolved (mg/L)	0.00674	0.0108	0.0848	0.0243	0.00832
	Beryllium (Be)-Dissolved (mg/L)	<0.00050 ^{DLA}	<0.00010	<0.00010	<0.00010	<0.00020 ^{DLA}
	Bismuth (Bi)-Dissolved (mg/L)	<0.0025 ^{DLA}	<0.00050	<0.00050	<0.00050	<0.0010 ^{DLA}
	Boron (B)-Dissolved (mg/L)	<0.050 ^{DLA}	<0.010	<0.010	<0.010	<0.020 ^{DLA}
	Cadmium (Cd)-Dissolved (mg/L)	0.333	0.276	0.000081	0.000846	0.000064
	Calcium (Ca)-Dissolved (mg/L)	453	138	125	177	359
	Chromium (Cr)-Dissolved (mg/L)	<0.00050 ^{DLA}	<0.00010	0.00294	0.00176	<0.00020 ^{DLA}
	Cobalt (Co)-Dissolved (mg/L)	0.0382	0.00282	0.00107	0.00115	<0.00020 ^{DLA}
	Copper (Cu)-Dissolved (mg/L)	0.117	0.00880	0.00171	0.00227	<0.00040 ^{DLA}
	Iron (Fe)-Dissolved (mg/L)	12.0	2.24	55.0	0.013	<0.010

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1531123-6 Water 07-OCT-14 16:30 MW09-17	L1531123-7 Water 07-OCT-14 15:10 GSI-HA-04A	L1531123-8 Water 07-OCT-14 14:54 GSI-HA-05A	L1531123-9 Water 07-OCT-14 14:20 GSI-HA-01A	L1531123-10 Water 07-OCT-14 14:33 GSI-HA-02A
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (uS/cm)	2710	240	897	971	695
	Hardness (as CaCO3) (mg/L)	1880	104	502	566	372
	pH (pH)	7.83	7.54	7.75	8.14	7.33
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	638	29.6	170	218	121
	Ammonia, Total (as N) (mg/L)	<0.0050				
	Chloride (Cl) (mg/L)	<10 ^{DLA}	<0.50	<2.5 ^{DLA}	<5.0 ^{DLA}	0.56
	Fluoride (F) (mg/L)	<0.40 ^{DLA}	0.029	<0.10 ^{DLA}	<0.20 ^{DLA}	0.142
	Nitrate (as N) (mg/L)	0.17	<0.0050	0.054	<0.050 ^{DLA}	0.0126 ^{HTD}
	Nitrite (as N) (mg/L)	<0.020 ^{DLA}	<0.0010	<0.0050 ^{DLA}	<0.010 ^{DLA}	0.0027 ^{HTD}
	Total Kjeldahl Nitrogen (mg/L)	0.088				
	Sulfate (SO4) (mg/L)	1440	80.5	340	351	249
	Sulphide as S (mg/L)	<0.020				
	Anion Sum (meq/L)	42.8	2.27	10.5	11.7	7.62
	Cation Sum (meq/L)	38.3	2.64	11.2	11.7	8.92
	Cation - Anion Balance (%)	-5.6	7.6	3.3	0.3	7.8
Cyanides	Cyanide, Weak Acid Diss (mg/L)	<0.0050		<0.0050	<0.0050	
	Cyanide, Total (mg/L)	<0.0050		<0.0050	<0.0050	
	Thiocyanate (SCN) (mg/L)	<0.50				
	Cyanide, Free (mg/L)	<0.0050		<0.0050	<0.0050	
Organic / Inorganic Carbon	Total Inorganic Carbon (mg/L)	111				
	Total Organic Carbon (mg/L)	2.71				
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	<0.0020 ^{DLA}	0.0823	0.0100	0.0033	0.0081
	Antimony (Sb)-Dissolved (mg/L)	0.00036	0.00097	0.00014	0.00023	0.00067
	Arsenic (As)-Dissolved (mg/L)	0.0225	0.00917	0.0404	0.0112	0.00651
	Barium (Ba)-Dissolved (mg/L)	0.00778	0.0420	0.116	0.103	0.101
	Beryllium (Be)-Dissolved (mg/L)	<0.00020 ^{DLA}	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Dissolved (mg/L)	<0.0010 ^{DLA}	<0.00050	<0.00050	<0.00050	<0.00050
	Boron (B)-Dissolved (mg/L)	0.079	<0.010	<0.010	<0.010	0.022
	Cadmium (Cd)-Dissolved (mg/L)	<0.000020 ^{DLA}	0.000026	0.000061	0.000023	0.000122
	Calcium (Ca)-Dissolved (mg/L)	346	26.4	133	136	94.6
	Chromium (Cr)-Dissolved (mg/L)	<0.00020 ^{DLA}	0.00066	0.00079	0.00010	0.00010
	Cobalt (Co)-Dissolved (mg/L)	<0.00020 ^{DLA}	0.00051	0.00044	0.00029	0.00085
	Copper (Cu)-Dissolved (mg/L)	0.00046	0.00198	0.00157	0.00103	0.00704
	Iron (Fe)-Dissolved (mg/L)	<0.010	8.36	14.6	2.43	20.3

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1531123-11 Water 07-OCT-14 14:08 GSI-DC-02B	L1531123-12 Water 07-OCT-14 12:27 MW09-16	L1531123-13 Water 07-OCT-14 11:00 MW09-19	L1531123-14 Water 07-OCT-14 11:00 DUP2	L1531123-15 Water 07-OCT-14 15:03 DUP-1
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (uS/cm)	928	2010	2130	2130	2750
	Hardness (as CaCO3) (mg/L)	544	1330	1380	1380	1850
	pH (pH)	7.98	7.56	7.36	7.29	6.60
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	244	337	473	480	87.1
	Ammonia, Total (as N) (mg/L)		<0.0050	4.86	4.93	0.0333
	Chloride (Cl) (mg/L)	<2.5 ^{DLA}	<5.0 ^{DLA}	<5.0 ^{DLA}	<5.0 ^{DLA}	<10 ^{DLA}
	Fluoride (F) (mg/L)	<0.10 ^{DLA}	<0.20 ^{DLA}	<0.20 ^{DLA}	<0.20 ^{DLA}	<0.40 ^{DLA}
	Nitrate (as N) (mg/L)	0.298	0.140	<0.050 ^{DLA}	<0.050 ^{DLA}	<0.10 ^{DLA}
	Nitrite (as N) (mg/L)	0.0104	<0.010 ^{DLA}	<0.010 ^{DLA}	<0.010 ^{DLA}	<0.020 ^{DLA}
	Total Kjeldahl Nitrogen (mg/L)		0.092	6.19	6.14	0.058
	Sulfate (SO4) (mg/L)	301	1020	968	948	1900
	Sulphide as S (mg/L)		<0.020	0.242	0.221	<0.020
	Anion Sum (meq/L)	11.2	28.0	29.6	29.3	41.3
	Cation Sum (meq/L)	11.4	27.3	29.9	29.9	40.4
	Cation - Anion Balance (%)	0.8	-1.4	0.4	1.0	-1.1
	Cyanide, Weak Acid Diss (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050 ^{CNP}
	Cyanide, Total (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050 ^{CNP}
	Thiocyanate (SCN) (mg/L)		<0.50	<0.50	<0.50	<0.50 ^{CNP}
	Cyanide, Free (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050 ^{CNP}
Organic / Inorganic Carbon	Total Inorganic Carbon (mg/L)		66.4	105	103	13.6
	Total Organic Carbon (mg/L)		3.14	24.4	23.2	1.23
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)	0.0026	<0.0020 ^{DLA}	0.0118	0.0117	0.0668 ^{DLA}
	Antimony (Sb)-Dissolved (mg/L)	0.00032	0.0690	0.00020	0.00021	<0.00050 ^{DLA}
	Arsenic (As)-Dissolved (mg/L)	0.00537	0.00808	0.105	0.107	0.00376
	Barium (Ba)-Dissolved (mg/L)	0.115	0.0155	0.0529	0.0531	0.00697
	Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00020 ^{DLA}	<0.00020 ^{DLA}	<0.00020 ^{DLA}	<0.00050 ^{DLA}
	Bismuth (Bi)-Dissolved (mg/L)	<0.00050	<0.0010 ^{DLA}	<0.0010 ^{DLA}	<0.0010 ^{DLA}	<0.0025 ^{DLA}
	Boron (B)-Dissolved (mg/L)	<0.010	0.112	0.223	0.239	<0.050 ^{DLA}
	Cadmium (Cd)-Dissolved (mg/L)	0.000115	0.0286	<0.000020 ^{DLA}	<0.000020 ^{DLA}	0.326
	Calcium (Ca)-Dissolved (mg/L)	141	307	304	307	453
	Chromium (Cr)-Dissolved (mg/L)	<0.00010	<0.00020 ^{DLA}	0.00043	0.00041	<0.00050 ^{DLA}
	Cobalt (Co)-Dissolved (mg/L)	0.00138	<0.00020 ^{DLA}	0.00227	0.00224	0.0383
	Copper (Cu)-Dissolved (mg/L)	0.00430	0.00553	<0.00040 ^{DLA}	<0.00040 ^{DLA}	0.109
	Iron (Fe)-Dissolved (mg/L)	1.64	<0.010	18.0	18.2	11.8

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1531123-16 Water 07-OCT-14 12:27 FB1	L1531123-17 Water 07-OCT-14 13:10 GSI-DC-01B	L1531123-18 Water 08-OCT-14 18:37 W14103083BH03	L1531123-19 Water 08-OCT-14 15:07 GIS-PC-03B	L1531123-20 Water 08-OCT-14 13:40 GIS-PC-04B
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (uS/cm)	<2.0		761		
	Hardness (as CaCO3) (mg/L)	<0.50	320	390	637	264
	pH (pH)	5.59		6.80		
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	<2.0		260		
	Ammonia, Total (as N) (mg/L)	<0.0050		6.13 ^{DLA}		
	Chloride (Cl) (mg/L)	<0.50		<2.5 ^{DLA}		
	Fluoride (F) (mg/L)	<0.020		<0.10 ^{DLA}		
	Nitrate (as N) (mg/L)	<0.0050		<0.025 ^{DLA}		
	Nitrite (as N) (mg/L)	<0.0010		<0.0050 ^{DLA}		
	Total Kjeldahl Nitrogen (mg/L)	<0.050		7.45		
	Sulfate (SO4) (mg/L)	<0.50		160		
	Sulphide as S (mg/L)	<0.020		0.136		
	Anion Sum (meq/L)	<0.10		8.53		
	Cation Sum (meq/L)	<0.10		13.7		
	Cation - Anion Balance (%)	0.0		23.4		
	Cyanide, Weak Acid Diss (mg/L)	<0.0050		<0.010 ^{DLM}		
	Cyanide, Total (mg/L)	<0.0050		<0.010 ^{DLM}		
Cyanides	Thiocyanate (SCN) (mg/L)	<0.50		<0.50 ^{DLM}		
	Cyanide, Free (mg/L)	<0.0050		<0.010 ^{DLM}		
Organic / Inorganic Carbon	Total Inorganic Carbon (mg/L)	<0.50		55.5		
	Total Organic Carbon (mg/L)	<0.50		30.6		
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)	0.0015 ^{RRV}	0.0030	0.0529	0.0155	0.0115
	Antimony (Sb)-Dissolved (mg/L)	<0.00010	0.00117	0.00025	0.00367	0.00084
	Arsenic (As)-Dissolved (mg/L)	<0.00010	0.00353	0.0605	0.0190	0.0109
	Barium (Ba)-Dissolved (mg/L)	<0.000050	0.0246	0.354	0.113	0.114
	Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
	Boron (B)-Dissolved (mg/L)	<0.010	0.058	<0.010	0.049	0.022
	Cadmium (Cd)-Dissolved (mg/L)	<0.000010	0.000067	<0.000010	0.000051	0.000010
	Calcium (Ca)-Dissolved (mg/L)	<0.050	89.5	104	94.0	75.3
	Chromium (Cr)-Dissolved (mg/L)	<0.00010	0.00708	0.00074	0.00648	0.00581
	Cobalt (Co)-Dissolved (mg/L)	<0.00010	0.00016	0.00062	0.00598	0.00471
	Copper (Cu)-Dissolved (mg/L)	<0.00020	0.0512	<0.00020	0.00491	0.00066
	Iron (Fe)-Dissolved (mg/L)	<0.010	0.026	92.4	1.11	4.16

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1531123-21 Water 08-OCT-14 14:07 GIS-PC-O5B	L1531123-22 Water 08-OCT-14 11:05 GLL07-02	L1531123-23 Water 08-OCT-14 17:02 MW09-05	L1531123-24 Water 08-OCT-14 15:22 MW09-22	L1531123-25 Water 08-OCT-14 18:35 MW09-23
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (uS/cm)		322	1600	2000	1440
	Hardness (as CaCO3) (mg/L)	182	164	888		784
	pH (pH)		7.26	7.03	6.69	7.51
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)		72.6	88.7	148	268
	Ammonia, Total (as N) (mg/L)		0.0051	4.77	1.92	2.71 ^{RRV}
	Chloride (Cl) (mg/L)		<0.50	<5.0 ^{DLA}	<5.0 ^{DLA}	<5.0 ^{DLA}
	Fluoride (F) (mg/L)		0.048	<0.20 ^{DLA}	<0.20 ^{DLA}	<0.20 ^{DLA}
	Nitrate (as N) (mg/L)		0.655	<0.050 ^{DLA}	11.0	<0.050 ^{DLA}
	Nitrite (as N) (mg/L)		<0.0010	0.012	0.198	<0.010 ^{DLA}
	Total Kjeldahl Nitrogen (mg/L)		0.426	5.76	4.76	4.14
	Sulfate (SO4) (mg/L)		88.4	876	1040	614
	Sulphide as S (mg/L)		<0.020	<0.020	0.030	0.038
	Anion Sum (meq/L)		3.34	20.0		18.1
	Cation Sum (meq/L)		3.46	20.8		18.4
	Cation - Anion Balance (%)		1.8	2.0		0.8
Cyanides	Cyanide, Weak Acid Diss (mg/L)		<0.0050	<0.0050	0.0351	<0.010 ^{DLM}
	Cyanide, Total (mg/L)		<0.0050	<0.0050	0.0786	0.016 ^{DLM}
	Thiocyanate (SCN) (mg/L)		<0.50	<0.50	<0.50	<0.50 ^{DLM}
	Cyanide, Free (mg/L)		<0.0050	<0.0050	0.0330	<0.010 ^{DLM}
Organic / Inorganic Carbon	Total Inorganic Carbon (mg/L)		14.2	14.7	22.7	57.1
	Total Organic Carbon (mg/L)		9.45	12.2	12.8	17.4
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD		FIELD
	Aluminum (Al)-Dissolved (mg/L)	0.0164	0.0128	0.0235		0.0090 ^{DLA}
	Antimony (Sb)-Dissolved (mg/L)	0.00223	0.00061	0.00237		<0.00050
	Arsenic (As)-Dissolved (mg/L)	0.00267	0.00135	0.695		0.00194
	Barium (Ba)-Dissolved (mg/L)	0.0360	0.0213	0.0312		0.0408 ^{DLA}
	Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010		<0.00050 ^{DLA}
	Bismuth (Bi)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050		<0.0025 ^{DLA}
	Boron (B)-Dissolved (mg/L)	<0.010	<0.010	0.093		0.143 ^{DLA}
	Cadmium (Cd)-Dissolved (mg/L)	0.000082	0.000169	0.00320		<0.000050
	Calcium (Ca)-Dissolved (mg/L)	50.7	46.2	281		206 ^{DLA}
	Chromium (Cr)-Dissolved (mg/L)	0.00080	0.00014	0.00058		<0.00050 ^{DLA}
	Cobalt (Co)-Dissolved (mg/L)	<0.00010	<0.00010	0.0178		0.0196 ^{DLA}
	Copper (Cu)-Dissolved (mg/L)	0.00411	0.00298	0.00283		<0.0010 ^{DLA}
	Iron (Fe)-Dissolved (mg/L)	0.044	0.031	8.64		13.7

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1531123-26 Water 08-OCT-14 12:38 MW09-04	L1531123-27 Water 08-OCT-14 13:54 MW09-03	L1531123-28 Water 08-OCT-14 10:15 MW09-02	L1531123-29 Water 08-OCT-14 13:54 FB2	L1531123-30 Water 08-OCT-14 18:37 DUP-3
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (uS/cm)	2690	2450	2940	<2.0	751
	Hardness (as CaCO3) (mg/L)	1670	1580	1570	<0.50	386
	pH (pH)	8.02	7.82	6.97	5.68	6.90
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	96.8	178	44.3	<2.0	262
	Ammonia, Total (as N) (mg/L)	7.28	1.06	13.6	<0.0050	6.07 ^{RRV}
	Chloride (Cl) (mg/L)	<10 ^{DLA}	<10 ^{DLA}	<10 ^{DLA}	<0.50	2.9 ^{DLA}
	Fluoride (F) (mg/L)	<0.40 ^{DLA}	<0.40 ^{DLA}	0.49 ^{DLA}	<0.020	<0.10 ^{DLA}
	Nitrate (as N) (mg/L)	<0.10 ^{DLA}	<0.10 ^{DLA}	<0.10 ^{DLA}	<0.0050	<0.025 ^{DLA}
	Nitrite (as N) (mg/L)	<0.020 ^{DLA}	<0.020 ^{DLA}	<0.020 ^{DLA}	<0.0010	<0.0050 ^{DLA}
	Total Kjeldahl Nitrogen (mg/L)	8.77	1.43	17.8	<0.050	7.41
	Sulfate (SO4) (mg/L)	1730	1530	1900	<0.50	154
	Sulphide as S (mg/L)	<0.020	<0.020	<0.020	<0.020	0.114
	Anion Sum (meq/L)	38.0	35.5	40.4	<0.10	8.54
	Cation Sum (meq/L)	37.3	35.1	42.2	<0.10	13.5
	Cation - Anion Balance (%)	-0.8	-0.6	2.1	0.0	22.6
	Cyanide, Weak Acid Diss (mg/L)	<0.0050	<0.010 ^{DLM}	0.018 ^{DLM}	<0.0050	<0.010 ^{DLM}
	Cyanide, Total (mg/L)	<0.0050	0.043 ^{DLM}	0.227 ^{DLM}	<0.0050	<0.010 ^{DLM}
	Thiocyanate (SCN) (mg/L)	<0.50	<0.50	1.21	<0.50	<0.50 ^{DLM}
	Cyanide, Free (mg/L)	<0.0050	<0.010 ^{DLM}	<0.010 ^{DLM}	<0.0050	<0.010 ^{DLM}
Organic / Inorganic Carbon	Total Inorganic Carbon (mg/L)	14.4	35.6	<1.0	<0.50	57.0
	Total Organic Carbon (mg/L)	6.80	6.18	6.84	<0.50	32.4
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	NA	FIELD	FIELD	FIELD
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	0.0038	<0.010 ^{DLA}	<0.0050 ^{DLA}	<0.0010	0.0502
	Antimony (Sb)-Dissolved (mg/L)	0.341	0.547	0.00453	<0.00010	0.00029
	Arsenic (As)-Dissolved (mg/L)	3.76	0.838	22.8	<0.00010	0.0688
	Barium (Ba)-Dissolved (mg/L)	0.00712	0.0474	0.00785	<0.000050	0.348
	Beryllium (Be)-Dissolved (mg/L)	<0.00020 ^{DLA}	<0.0010 ^{DLA}	<0.00050 ^{DLA}	<0.00010	<0.00010
	Bismuth (Bi)-Dissolved (mg/L)	<0.0010 ^{DLA}	<0.0050 ^{DLA}	<0.0025 ^{DLA}	<0.00050	<0.00050
	Boron (B)-Dissolved (mg/L)	0.297	0.10	0.059	<0.010	<0.010
	Cadmium (Cd)-Dissolved (mg/L)	0.000021	0.00123	0.000497	<0.000010	<0.000010
	Calcium (Ca)-Dissolved (mg/L)	487	509	477	<0.050	102
	Chromium (Cr)-Dissolved (mg/L)	<0.00020 ^{DLA}	<0.0010 ^{DLA}	<0.00050 ^{DLA}	<0.00010	0.00072
	Cobalt (Co)-Dissolved (mg/L)	0.00104	0.0064	0.0118	<0.00010	0.00058
	Copper (Cu)-Dissolved (mg/L)	<0.00040 ^{DLA}	<0.0020 ^{DLA}	<0.0010 ^{DLA}	<0.00020	<0.00020
	Iron (Fe)-Dissolved (mg/L)	<0.010	0.254	48.7	<0.010	90.7

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1531123-31 Water 08-OCT-14 13:54 DUP4	L1531123-32 Water 09-OCT-14 12:00 MW09-22	L1531123-33 Water 09-OCT-14 12:00 FB3	L1531123-34 Water 09-OCT-14 10:45 W14103083BH02	L1531123-35 Water 09-OCT-14 10:56 W14103083BH04
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (uS/cm)	2490		<2.0	1060	903
	Hardness (as CaCO3) (mg/L)	1550	900	<0.50	643	517
	pH (pH)	7.63		5.39	8.01	8.29
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	181		<2.0	210	218
	Ammonia, Total (as N) (mg/L)	1.06		<0.0050	0.0174	
	Chloride (Cl) (mg/L)	<10 ^{DLA}		<0.50	<5.0 ^{DLA}	<2.5 ^{DLA}
	Fluoride (F) (mg/L)	<0.40 ^{DLA}		<0.020	<0.20 ^{DLA}	0.17
	Nitrate (as N) (mg/L)	<0.10 ^{DLA}		<0.0050	0.500 ^{DLA}	3.07 ^{DLA}
	Nitrite (as N) (mg/L)	<0.020 ^{DLA}		<0.0010	<0.010 ^{DLA}	<0.0050 ^{DLA}
	Total Kjeldahl Nitrogen (mg/L)	1.50		<0.050	0.236	
	Sulfate (SO4) (mg/L)	1540		<0.50	421	291
	Sulphide as S (mg/L)	<0.020		<0.020	<0.020	
	Anion Sum (meq/L)	35.6		<0.10	13.0	10.6
	Cation Sum (meq/L)	34.5		<0.10	13.3	10.9
	Cation - Anion Balance (%)	-1.6		0.0	1.3	1.2
	Cyanides					
	Cyanide, Weak Acid Diss (mg/L)	<0.050 ^{DLA}		<0.0050		<0.0050
	Cyanide, Total (mg/L)	0.133 ^{DLA}		<0.0050		<0.0050
	Thiocyanate (SCN) (mg/L)	<0.50 ^{DLA}		<0.50	<0.50	
	Cyanide, Free (mg/L)	<0.050 ^{DLA}		<0.0050		<0.0050
Organic / Inorganic Carbon	Total Inorganic Carbon (mg/L)	36.9		<0.50		
	Total Organic Carbon (mg/L)	6.19		<0.50	5.36	
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)	<0.010 ^{DLA}	0.0250	<0.0010	0.0018	0.0021
	Antimony (Sb)-Dissolved (mg/L)	0.527	0.00027	<0.00010	0.00024	0.00024
	Arsenic (As)-Dissolved (mg/L)	0.730	0.00486	<0.00010	0.00312	0.00357
	Barium (Ba)-Dissolved (mg/L)	0.0423	0.0437	<0.000050	0.114	0.264
	Beryllium (Be)-Dissolved (mg/L)	<0.0010 ^{DLA}	<0.00010	<0.00010	<0.00010	<0.00010
	Bismuth (Bi)-Dissolved (mg/L)	<0.0050 ^{DLA}	<0.00050	<0.00050	<0.00050	<0.00050
	Boron (B)-Dissolved (mg/L)	<0.10 ^{DLA}	0.074	<0.010	0.017	0.016
	Cadmium (Cd)-Dissolved (mg/L)	0.00114	0.000040	<0.000010	0.000296	0.00424
	Calcium (Ca)-Dissolved (mg/L)	504	294	<0.050	164	140
	Chromium (Cr)-Dissolved (mg/L)	<0.0010 ^{DLA}	0.00047	<0.00010	0.00019	0.00011
	Cobalt (Co)-Dissolved (mg/L)	0.0060	0.0171	<0.00010	<0.00010	<0.00010
	Copper (Cu)-Dissolved (mg/L)	<0.0020 ^{DLA}	0.00115	0.00027 ^{RRV}	0.00272	0.00324
	Iron (Fe)-Dissolved (mg/L)	0.247	28.5	<0.010	<0.010	<0.010

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1531123-36 Water 09-OCT-14 15:56 MW09-08	L1531123-37 Water 09-OCT-14 13:58 MP09-04	L1531123-38 Water 09-OCT-14 11:33 MP09-05	L1531123-39 Water 09-OCT-14 12:00 DUP 5	L1531123-40 Water 09-OCT-14 10:42 MW09-21
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (uS/cm)	198	835	2510	2510	1670
	Hardness (as CaCO3) (mg/L)	101	494	1460	1480	1010
	pH (pH)	7.63	7.99	7.12	7.04	7.29
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	112	179	224	223	336
	Ammonia, Total (as N) (mg/L)	2.05	<0.0050	12.1	11.2	10.7
	Chloride (Cl) (mg/L)	<0.50	<0.50	<10 ^{DLA}	<10 ^{DLA}	<5.0 ^{DLA}
	Fluoride (F) (mg/L)	0.217 ^{HTD}	0.038	<0.40 ^{DLA}	<0.40 ^{DLA}	<0.20 ^{DLA}
	Nitrate (as N) (mg/L)	0.0536 ^{HTD}	0.170	0.35	0.24	0.498
	Nitrite (as N) (mg/L)	<0.0010	<0.0010	0.027	0.035	0.019
	Total Kjeldahl Nitrogen (mg/L)	2.75	0.156	14.7	15.3	16.0
	Sulfate (SO4) (mg/L)	234	292	1840	1420	688
	Sulphide as S (mg/L)	0.065	<0.020	0.021	<0.020	0.044
	Anion Sum (meq/L)	7.13	9.67	42.8	34.0	21.1
	Cation Sum (meq/L)	4.22	10.2	38.2	38.6	24.8
	Cation - Anion Balance (%)	-25.6	2.7	-5.8	6.3	8.1
	Cyanide, Weak Acid Diss (mg/L)	<0.010 ^{DLM}	<0.0050	<0.010 ^{DLM}	0.029 ^{DLM}	0.0058
	Cyanide, Total (mg/L)	<0.010 ^{DLM}	<0.0050	0.244 ^{DLM}	0.307 ^{DLM}	0.0140
Cyanides	Thiocyanate (SCN) (mg/L)	<0.50	<0.50	2.50	2.44	<0.50
	Cyanide, Free (mg/L)	<0.010 ^{DLM}	<0.0050	<0.010 ^{DLM}	0.023	0.0062
Organic / Inorganic Carbon	Total Inorganic Carbon (mg/L)	22.7	35.7	43.3	45.2	62.4
	Total Organic Carbon (mg/L)	21.9	10.7	28.9	15.0	30.0
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)	0.0901	0.0017	0.0354	0.0336	0.0965
	Antimony (Sb)-Dissolved (mg/L)	0.00028	0.00170	0.00048	0.00042	0.00024
	Arsenic (As)-Dissolved (mg/L)	0.136	0.00105	0.0963	0.0956	0.117
	Barium (Ba)-Dissolved (mg/L)	0.101	0.0287	0.122	0.123	0.0892
	Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00020 ^{DLA}	<0.00020 ^{DLA}	<0.00020 ^{DLA}
	Bismuth (Bi)-Dissolved (mg/L)	<0.00050	<0.00050	<0.0010 ^{DLA}	<0.0010 ^{DLA}	<0.0010 ^{DLA}
	Boron (B)-Dissolved (mg/L)	<0.010	0.012	0.085	0.077	0.037
	Cadmium (Cd)-Dissolved (mg/L)	<0.000010	0.000040	0.000295	0.000263	0.000095
	Calcium (Ca)-Dissolved (mg/L)	30.5	119	471	477	318
	Chromium (Cr)-Dissolved (mg/L)	0.00117	0.00032	0.00094	0.00084	0.00158
	Cobalt (Co)-Dissolved (mg/L)	0.00080	0.00015	0.0160	0.0159	0.0128
	Copper (Cu)-Dissolved (mg/L)	<0.00020	0.00261	0.00115	0.00112	0.00061
	Iron (Fe)-Dissolved (mg/L)	34.4	<0.010	69.1	71.6	50.8

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1531123-41 Water 09-OCT-14 09:15 MW09-24	L1531123-42 Water 09-OCT-14 15:10 MP09-12	L1531123-43 Water 09-OCT-14 15:50 MP09-11	L1531123-44 Water 08-OCT-14 10:02 MP09-02	L1531123-45 Water 08-OCT-14 MW09-06
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (uS/cm)	968	749	1100	315	1760
	Hardness (as CaCO3) (mg/L)	574	434	626	160	1080
	pH (pH)	8.00	8.21	8.09	7.90	7.98
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	201	421	695	53.2	127
	Ammonia, Total (as N) (mg/L)	0.0080	4.49	6.49	0.0091	1.22
	Chloride (Cl) (mg/L)	<5.0 ^{DLA}	<0.50	<5.0 ^{DLA}	<0.50	<5.0 ^{DLA}
	Fluoride (F) (mg/L)	<0.20 ^{DLA}	0.328	0.36 ^{DLA}	0.048	0.26 ^{DLA}
	Nitrate (as N) (mg/L)	2.94	0.0149	<0.050 ^{DLA}	0.0636	<0.050 ^{DLA}
	Nitrite (as N) (mg/L)	0.016	0.0207	<0.010 ^{DLA}	<0.0010	<0.010 ^{DLA}
	Total Kjeldahl Nitrogen (mg/L)	0.228 ^{TKNI}	6.07	12.3	0.477	1.65
	Sulfate (SO4) (mg/L)	355	27.8	64.2	101	989
	Sulphide as S (mg/L)	<0.020	<0.020	0.029	<0.020	<0.020
	Anion Sum (meq/L)	11.6	9.00	15.2	3.18	23.1
	Cation Sum (meq/L)	11.9	9.62	15.4	3.40	23.5
	Cation - Anion Balance (%)	1.1	3.3	0.7	3.3	0.7
Cyanides	Cyanide, Weak Acid Diss (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
	Cyanide, Total (mg/L)	0.0235	0.0093	0.0117	<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)	42.3	89.4	134	10.4	20.7
	Total Organic Carbon (mg/L)	9.02	19.4	53.9	9.21	6.68
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)	0.0017	0.0026	0.0068	0.0132	<0.0020 ^{DLA}
	Antimony (Sb)-Dissolved (mg/L)	0.00021	0.0417	0.0434	0.00051	0.254
	Arsenic (As)-Dissolved (mg/L)	0.00157	5.66	18.8	0.00305	0.106
	Barium (Ba)-Dissolved (mg/L)	0.0538	0.0434	0.119	0.0308	0.00685
	Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00050 ^{DLA}	<0.00010	<0.00020 ^{DLA}
	Bismuth (Bi)-Dissolved (mg/L)	<0.00050	<0.00050	<0.0025 ^{DLA}	<0.00050	<0.0010 ^{DLA}
	Boron (B)-Dissolved (mg/L)	0.013	0.064	<0.050 ^{DLA}	<0.010	0.158
	Cadmium (Cd)-Dissolved (mg/L)	0.000055	0.000352	<0.000050 ^{DLA}	0.000027	0.00621
	Calcium (Ca)-Dissolved (mg/L)	152	102	145	47.5	342
	Chromium (Cr)-Dissolved (mg/L)	0.00030	0.00037	0.00130	<0.00010	<0.00020 ^{DLA}
	Cobalt (Co)-Dissolved (mg/L)	0.00042	0.00165	0.00210	0.00015	0.00123
	Copper (Cu)-Dissolved (mg/L)	0.00852	0.00093	<0.0010 ^{DLA}	0.00092	0.00644
	Iron (Fe)-Dissolved (mg/L)	<0.010	4.19	18.4	0.289	<0.010

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1531123-46 Water 09-OCT-14 12:00 MW09-22 D-METALS TEST	L1531123-47 Water 09-OCT-14 12:00 DUP 5 D-METALS TEST	L1531123-48 Water 09-OCT-14 11:33 MP09-05 D-METALS TEST	L1531123-49 Water 09-OCT-14 15:50 MP09-11 D-METALS TEST	
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (uS/cm)					
	Hardness (as CaCO3) (mg/L)	915	1470	1480	656	
	pH (pH)					
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)					
	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)					
Dissolved Metals	Dissolved Mercury Filtration Location	FIELD	FIELD	FIELD	FIELD	
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	
	Aluminum (Al)-Dissolved (mg/L)	0.0229	0.0318	0.0307	0.0071	
	Antimony (Sb)-Dissolved (mg/L)	0.00026	0.00047	0.00045	0.0421	
	Arsenic (As)-Dissolved (mg/L)	0.00433	0.101	0.0838	19.3	
	Barium (Ba)-Dissolved (mg/L)	0.0433	0.123	0.121	0.119	
	Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00020 ^{DLA}	<0.00020 ^{DLA}	<0.00050 ^{DLA}	
	Bismuth (Bi)-Dissolved (mg/L)	<0.00050	<0.0010 ^{DLA}	<0.0010 ^{DLA}	<0.0025 ^{DLA}	
	Boron (B)-Dissolved (mg/L)	0.078	0.085	0.087	<0.050 ^{DLA}	
	Cadmium (Cd)-Dissolved (mg/L)	0.000037	0.000254	0.000265	<0.000050 ^{DLA}	
	Calcium (Ca)-Dissolved (mg/L)	300	474	477	151	
	Chromium (Cr)-Dissolved (mg/L)	0.00042	0.00086	0.00078	0.00127	
	Cobalt (Co)-Dissolved (mg/L)	0.0168	0.0159	0.0156	0.00207	
	Copper (Cu)-Dissolved (mg/L)	0.00097	0.00111	0.00106	<0.0010 ^{DLA}	
	Iron (Fe)-Dissolved (mg/L)	28.2	69.5	68.2	19.6	

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1531123-1 Water 07-OCT-14 15:03 CH-P-13-05/50	L1531123-2 Water 07-OCT-14 13:00 GLL07-03	L1531123-3 Water 07-OCT-14 14:42 GCI-HA-03A	L1531123-4 Water 07-OCT-14 18:30 GSI-DC-03B	L1531123-5 Water 07-OCT-14 17:36 MW09-18
Grouping	Analyte					
WATER						
Dissolved Metals	Lead (Pb)-Dissolved (mg/L)	0.00636	0.000191	0.000479	0.000165	<0.00010 ^{DLA}
	Lithium (Li)-Dissolved (mg/L)	0.0409	0.0111	0.00063	0.00684	0.0217
	Magnesium (Mg)-Dissolved (mg/L)	177	25.1	48.3	59.3	234
	Manganese (Mn)-Dissolved (mg/L)	36.7	2.26	4.71	1.95	0.597
	Mercury (Hg)-Dissolved (mg/L)	0.000015	<0.000010	<0.000010	<0.000010	<0.000010 ^{DLA}
	Molybdenum (Mo)-Dissolved (mg/L)	0.00032	0.000089	0.00329	0.00236	<0.00010 ^{DLA}
	Nickel (Ni)-Dissolved (mg/L)	0.0141	0.00831	0.0257	0.00892	<0.0010 ^{DLA}
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Dissolved (mg/L)	4.86	1.62	2.16	2.94	7.09
	Selenium (Se)-Dissolved (mg/L)	<0.00050 ^{DLA}	<0.00010	<0.00010	<0.00010	0.00042
	Silicon (Si)-Dissolved (mg/L)	7.18	2.44	7.31	7.03	5.08
	Silver (Ag)-Dissolved (mg/L)	<0.000050 ^{DLA}	<0.000010	<0.000010	<0.000010	<0.000020 ^{DLA}
	Sodium (Na)-Dissolved (mg/L)	8.67	5.38	5.00	5.20	12.1
	Strontium (Sr)-Dissolved (mg/L)	0.560	0.161	0.407	0.439	1.07
	Sulfur (S)-Dissolved (mg/L)	614	135	116	140	448
	Thallium (Tl)-Dissolved (mg/L)	0.000530	0.000138	<0.000010	0.000024	0.000293 ^{DLA}
	Tin (Sn)-Dissolved (mg/L)	<0.00050 ^{DLA}	<0.00010	0.00046	0.00058	<0.00020 ^{DLA}
	Titanium (Ti)-Dissolved (mg/L)	<0.050 ^{DLA}	<0.010	<0.010	<0.010	<0.020 ^{DLA}
	Uranium (U)-Dissolved (mg/L)	0.000634	0.000037	0.000117	0.00233	0.00849 ^{DLA}
	Vanadium (V)-Dissolved (mg/L)	<0.0050 ^{DLA}	<0.0010	<0.0010	<0.0010	<0.0020 ^{DLA}
	Zinc (Zn)-Dissolved (mg/L)	32.7	5.87	0.0282	0.136	0.0029

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1531123-6 Water 07-OCT-14 16:30 MW09-17	L1531123-7 Water 07-OCT-14 15:10 GSI-HA-04A	L1531123-8 Water 07-OCT-14 14:54 GSI-HA-05A	L1531123-9 Water 07-OCT-14 14:20 GSI-HA-01A	L1531123-10 Water 07-OCT-14 14:33 GSI-HA-02A
Grouping	Analyte					
WATER						
Dissolved Metals	Lead (Pb)-Dissolved (mg/L)	<0.00010 ^{DLA}	0.000449	0.000166	0.000312	0.000186
	Lithium (Li)-Dissolved (mg/L)	0.0216	0.00116	0.00177	0.00769	0.00209
	Magnesium (Mg)-Dissolved (mg/L)	247	9.12	41.1	55.1	33.0
	Manganese (Mn)-Dissolved (mg/L)	<0.00010 ^{DLA}	0.477	3.17	0.120	4.48
	Mercury (Hg)-Dissolved (mg/L)	<0.000010 ^{DLA}	<0.000010	<0.000010	<0.000010	<0.000010
	Molybdenum (Mo)-Dissolved (mg/L)	<0.00010 ^{DLA}	0.00114	0.000290	0.00154	0.00235
	Nickel (Ni)-Dissolved (mg/L)	<0.0010 ^{DLA}	0.00466	0.00846	0.00488	0.0142
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	0.088	<0.050	<0.050
	Potassium (K)-Dissolved (mg/L)	6.96	0.24	1.85	3.69	3.25
	Selenium (Se)-Dissolved (mg/L)	0.00024	0.00010	<0.00010	<0.00010	<0.00010
	Silicon (Si)-Dissolved (mg/L)	5.05	9.04	6.59	5.96	4.24
	Silver (Ag)-Dissolved (mg/L)	<0.000020 ^{DLA}	<0.000010	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	12.4	2.12	5.40	4.85	3.33
	Strontium (Sr)-Dissolved (mg/L)	1.08	0.0959	0.307	0.370	0.272
	Sulfur (S)-Dissolved (mg/L)	457	23.3	112	114	88.1
	Thallium (Tl)-Dissolved (mg/L)	0.000107 ^{DLA}	<0.000010	0.000011	0.000014	0.000014
	Tin (Sn)-Dissolved (mg/L)	<0.00020 ^{DLA}	0.00016	0.00025	0.00012	0.00017
	Titanium (Ti)-Dissolved (mg/L)	<0.020 ^{DLA}	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Dissolved (mg/L)	0.00833	0.000043	0.000039	0.00135	0.000360
	Vanadium (V)-Dissolved (mg/L)	<0.0020 ^{DLA}	<0.0010	<0.0010	<0.0010	<0.0010
	Zinc (Zn)-Dissolved (mg/L)	<0.0020 ^{DLA}	0.0115	0.0154	0.0042	0.0271

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1531123-11 Water 07-OCT-14 14:08 GSI-DC-02B	L1531123-12 Water 07-OCT-14 12:27 MW09-16	L1531123-13 Water 07-OCT-14 11:00 MW09-19	L1531123-14 Water 07-OCT-14 11:00 DUP2	L1531123-15 Water 07-OCT-14 15:03 DUP-1
Grouping	Analyte					
WATER						
Dissolved Metals	Lead (Pb)-Dissolved (mg/L)	0.000223	0.00451	<0.00010 ^{DLA}	<0.00010 ^{DLA}	0.00623
	Lithium (Li)-Dissolved (mg/L)	0.00167	0.0115	0.0098	0.0103	0.0421
	Magnesium (Mg)-Dissolved (mg/L)	46.6	137	150	148	175
	Manganese (Mn)-Dissolved (mg/L)	2.89	0.0297	5.90	5.76	36.0
	Mercury (Hg)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010 ^{DLA}	0.000017
	Molybdenum (Mo)-Dissolved (mg/L)	0.000958	0.00011	<0.00010 ^{DLA}	<0.00010 ^{DLA}	0.00032
	Nickel (Ni)-Dissolved (mg/L)	0.0111	0.0046	0.0017	0.0017	0.0126
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	0.248	0.249	<0.050
	Potassium (K)-Dissolved (mg/L)	3.09	5.81	8.06	8.14	4.85
	Selenium (Se)-Dissolved (mg/L)	<0.00010	0.00023	<0.00020 ^{DLA}	<0.00020 ^{DLA}	<0.00050 ^{DLA}
	Silicon (Si)-Dissolved (mg/L)	6.97	4.77	9.41	9.49	7.10
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000020 ^{DLA}	<0.000020 ^{DLA}	<0.000020 ^{DLA}	<0.000050 ^{DLA}
	Sodium (Na)-Dissolved (mg/L)	4.94	8.59	14.5	14.6	8.20
	Strontium (Sr)-Dissolved (mg/L)	0.305	0.688	0.982	1.08	0.525
	Sulfur (S)-Dissolved (mg/L)	103	334	312	313	607
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	0.000258 ^{DLA}	<0.000020 ^{DLA}	<0.000020 ^{DLA}	0.000543 ^{DLA}
	Tin (Sn)-Dissolved (mg/L)	0.00025	<0.00020 ^{DLA}	<0.00020 ^{DLA}	<0.00020 ^{DLA}	<0.00050 ^{DLA}
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.020 ^{DLA}	<0.020 ^{DLA}	<0.020 ^{DLA}	<0.050 ^{DLA}
	Uranium (U)-Dissolved (mg/L)	0.000397	0.00411 ^{DLA}	0.000436 ^{DLA}	0.000434 ^{DLA}	0.000649 ^{DLA}
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0020 ^{DLA}	<0.0020 ^{DLA}	<0.0020 ^{DLA}	<0.0050 ^{DLA}
	Zinc (Zn)-Dissolved (mg/L)	0.0173	4.40	<0.0020 ^{DLA}	<0.0020 ^{DLA}	31.4

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1531123-16 Water 07-OCT-14 12:27 FB1	L1531123-17 Water 07-OCT-14 13:10 GSI-DC-01B	L1531123-18 Water 08-OCT-14 18:37 W14103083BH03	L1531123-19 Water 08-OCT-14 15:07 GIS-PC-03B	L1531123-20 Water 08-OCT-14 13:40 GIS-PC-04B
Grouping	Analyte					
WATER						
Dissolved Metals	Lead (Pb)-Dissolved (mg/L)	<0.000050	0.00209	<0.000050	0.000779	0.000335
	Lithium (Li)-Dissolved (mg/L)	<0.00050	0.00066	0.00081	0.00632	0.00088
	Magnesium (Mg)-Dissolved (mg/L)	<0.10	23.4	31.8	97.7	18.5
	Manganese (Mn)-Dissolved (mg/L)	<0.000050	0.0239	2.07	2.16	2.85
	Mercury (Hg)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Molybdenum (Mo)-Dissolved (mg/L)	<0.000050	0.00818	0.000095	0.0251	0.00964
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	0.0260	<0.00050	0.116	0.0646
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	0.232	<0.050	<0.050
	Potassium (K)-Dissolved (mg/L)	<0.10	4.40	1.58	5.11	2.02
	Selenium (Se)-Dissolved (mg/L)	<0.00010	<0.00010	0.00018	0.00011	<0.00010
	Silicon (Si)-Dissolved (mg/L)	<0.050	3.76	10.9	8.94	7.48
	Silver (Ag)-Dissolved (mg/L)	<0.000010	0.000011	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	<0.050	4.16	9.54	20.7	5.77
	Strontium (Sr)-Dissolved (mg/L)	<0.00020	0.240	0.397	0.794	0.423
	Sulfur (S)-Dissolved (mg/L)	<0.50	65.9	53.0	120	30.1
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	0.000019	<0.000010	<0.000010	<0.000010
	Tin (Sn)-Dissolved (mg/L)	<0.00010	0.00399	<0.00010	0.00011	<0.00010
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Dissolved (mg/L)	<0.000010	0.000415	0.000124	0.00241	0.000143
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0010	0.0021	<0.0010	<0.0010
	Zinc (Zn)-Dissolved (mg/L)	<0.0010	0.0305	0.0021	0.0509	0.0069

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1531123-21 Water 08-OCT-14 14:07 GIS-PC-O5B	L1531123-22 Water 08-OCT-14 11:05 GLL07-02	L1531123-23 Water 08-OCT-14 17:02 MW09-05	L1531123-24 Water 08-OCT-14 15:22 MW09-22	L1531123-25 Water 08-OCT-14 18:35 MW09-23
Grouping	Analyte					
WATER						
Dissolved Metals	Lead (Pb)-Dissolved (mg/L)	0.000302	0.000339	0.00309		DLA <0.00025
	Lithium (Li)-Dissolved (mg/L)	<0.00050	0.00150	0.00269		DLA <0.0025
	Magnesium (Mg)-Dissolved (mg/L)	13.3	11.9	45.1		65.4
	Manganese (Mn)-Dissolved (mg/L)	0.00416	0.00251	6.24		21.7
	Mercury (Hg)-Dissolved (mg/L)	<0.000010	<0.000010	0.000013	<0.000010	<0.000010
	Molybdenum (Mo)-Dissolved (mg/L)	0.000452	0.000085	0.000646		0.00223
	Nickel (Ni)-Dissolved (mg/L)	0.00161	0.00062	0.0103		DLA <0.0025
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050		<0.050
	Potassium (K)-Dissolved (mg/L)	0.70	0.60	15.5		6.40
	Selenium (Se)-Dissolved (mg/L)	<0.00010	<0.00010	0.00011		DLA <0.00050
	Silicon (Si)-Dissolved (mg/L)	6.07	6.51	7.10		6.01
	Silver (Ag)-Dissolved (mg/L)	<0.000010	0.000013	0.000045		DLA <0.000050
	Sodium (Na)-Dissolved (mg/L)	3.91	3.71	37.2		23.7
	Strontium (Sr)-Dissolved (mg/L)	0.331	0.274	0.592		0.519
	Sulfur (S)-Dissolved (mg/L)	31.8	30.7	302		197
	Thallium (Tl)-Dissolved (mg/L)	0.000010	<0.000010	0.000208		DLA <0.000050
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	0.00032		DLA <0.00050
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.010		DLA <0.050
	Uranium (U)-Dissolved (mg/L)	0.000157	0.000222	0.000455		0.00377
	Vanadium (V)-Dissolved (mg/L)	0.0014	<0.0010	<0.0010		DLA <0.0050
	Zinc (Zn)-Dissolved (mg/L)	0.0068	0.0174	0.732		0.0182

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1531123-26 Water 08-OCT-14 12:38 MW09-04	L1531123-27 Water 08-OCT-14 13:54 MW09-03	L1531123-28 Water 08-OCT-14 10:15 MW09-02	L1531123-29 Water 08-OCT-14 13:54 FB2	L1531123-30 Water 08-OCT-14 18:37 DUP-3
Grouping	Analyte					
WATER						
Dissolved Metals	Lead (Pb)-Dissolved (mg/L)	0.00028	<0.00050 ^{DLA}	<0.00025 ^{DLA}	<0.000050	<0.000050
	Lithium (Li)-Dissolved (mg/L)	0.0055	<0.0050 ^{DLA}	0.0294	<0.00050	0.00116
	Magnesium (Mg)-Dissolved (mg/L)	110	74.6	92.2	<0.10	31.9
	Manganese (Mn)-Dissolved (mg/L)	4.64	55.2	34.7	<0.000050	2.02
	Mercury (Hg)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Molybdenum (Mo)-Dissolved (mg/L)	0.00739	0.00336	0.00560	<0.000050	0.000126
	Nickel (Ni)-Dissolved (mg/L)	<0.0010 ^{DLA}	<0.0050 ^{DLA}	0.0033	<0.00050	<0.00050
	Phosphorus (P)-Dissolved (mg/L)	0.081	0.057	<0.050	<0.050	0.224
	Potassium (K)-Dissolved (mg/L)	40.8	16.6	83.7	<0.10	1.46
	Selenium (Se)-Dissolved (mg/L)	<0.00020 ^{DLA}	<0.0010 ^{DLA}	<0.00050 ^{DLA}	<0.00010	0.00020
	Silicon (Si)-Dissolved (mg/L)	12.0	16.0	6.87	<0.050	10.6
	Silver (Ag)-Dissolved (mg/L)	<0.000020 ^{DLA}	<0.00010 ^{DLA}	<0.000050 ^{DLA}	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	52.3	24.1	86.9	<0.050	9.11
	Strontium (Sr)-Dissolved (mg/L)	1.37	1.47	1.07	<0.00020	0.377
	Sulfur (S)-Dissolved (mg/L)	561	520	657	<0.50	53.9
	Thallium (Tl)-Dissolved (mg/L)	0.000109	<0.00010 ^{DLA}	0.000256 ^{DLA}	<0.000010	<0.000010
	Tin (Sn)-Dissolved (mg/L)	0.00064	<0.0010 ^{DLA}	<0.00050 ^{DLA}	<0.00010	<0.00010
	Titanium (Ti)-Dissolved (mg/L)	<0.020 ^{DLA}	<0.10 ^{DLA}	<0.050 ^{DLA}	<0.010	<0.010
	Uranium (U)-Dissolved (mg/L)	0.000238	0.00285 ^{DLA}	0.000528 ^{DLA}	<0.000010	0.000130
	Vanadium (V)-Dissolved (mg/L)	<0.0020 ^{DLA}	<0.010 ^{DLA}	<0.0050 ^{DLA}	<0.0010	0.0020
	Zinc (Zn)-Dissolved (mg/L)	0.132	<0.010 ^{DLA}	0.333	<0.0010	0.0019

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1531123-31 Water 08-OCT-14 13:54 DUP4	L1531123-32 Water 09-OCT-14 12:00 MW09-22	L1531123-33 Water 09-OCT-14 12:00 FB3	L1531123-34 Water 09-OCT-14 10:45 W14103083BH02	L1531123-35 Water 09-OCT-14 10:56 W14103083BH04
Grouping	Analyte					
WATER						
Dissolved Metals	Lead (Pb)-Dissolved (mg/L)	<0.00050 ^{DLA}	<0.000050	<0.000050	<0.000050	<0.000050
	Lithium (Li)-Dissolved (mg/L)	<0.0050 ^{DLA}	0.00067	<0.00050	0.00123	0.00123
	Magnesium (Mg)-Dissolved (mg/L)	71.8	40.3	<0.10	56.7	40.9
	Manganese (Mn)-Dissolved (mg/L)	53.2	6.55	<0.000050	0.0118	0.00274
	Mercury (Hg)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Molybdenum (Mo)-Dissolved (mg/L)	0.00246	0.000093	<0.000050	0.00128	0.00109
	Nickel (Ni)-Dissolved (mg/L)	<0.0050 ^{DLA}	0.00211	<0.00050	0.00061	0.00056
	Phosphorus (P)-Dissolved (mg/L)	0.070	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Dissolved (mg/L)	16.3	4.56	<0.10	3.18	2.63
	Selenium (Se)-Dissolved (mg/L)	<0.0010 ^{DLA}	0.00032	<0.00010	0.00060	0.00293
	Silicon (Si)-Dissolved (mg/L)	15.8	4.49	<0.050	5.37	4.95
	Silver (Ag)-Dissolved (mg/L)	<0.00010 ^{DLA}	0.000021	<0.000010	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	24.4	71.3	<0.050	8.79	11.7
	Strontium (Sr)-Dissolved (mg/L)	1.52	0.752	<0.00020	0.669	0.612
	Sulfur (S)-Dissolved (mg/L)	508	284	<0.50	144	101
	Thallium (Tl)-Dissolved (mg/L)	<0.00010 ^{DLA}	<0.000010	<0.000010	<0.000010	<0.000010
	Tin (Sn)-Dissolved (mg/L)	<0.0010 ^{DLA}	0.00016	<0.00010	0.00042	0.00062
	Titanium (Ti)-Dissolved (mg/L)	<0.10 ^{DLA}	<0.010	<0.010	<0.010	<0.010
	Uranium (U)-Dissolved (mg/L)	0.00266	0.000847	<0.000010	0.00544	0.00755
	Vanadium (V)-Dissolved (mg/L)	<0.010 ^{DLA}	<0.0010	<0.0010	<0.0010	<0.0010
	Zinc (Zn)-Dissolved (mg/L)	<0.010 ^{DLA}	0.0015	<0.0010	0.0014	0.0083

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1531123-36 Water 09-OCT-14 15:56 MW09-08	L1531123-37 Water 09-OCT-14 13:58 MP09-04	L1531123-38 Water 09-OCT-14 11:33 MP09-05	L1531123-39 Water 09-OCT-14 12:00 DUP 5	L1531123-40 Water 09-OCT-14 10:42 MW09-21
Grouping	Analyte					
WATER						
Dissolved Metals	Lead (Pb)-Dissolved (mg/L)	0.000144	<0.000050	<0.00010 ^{DLA}	<0.00010 ^{DLA}	<0.00010 ^{DLA}
	Lithium (Li)-Dissolved (mg/L)	<0.00050	0.00069	<0.0010 ^{DLA}	<0.0010 ^{DLA}	<0.0010 ^{DLA}
	Magnesium (Mg)-Dissolved (mg/L)	6.12	48.1	68.9	70.8	52.8
	Manganese (Mn)-Dissolved (mg/L)	2.58	0.000472	15.3	15.1	5.21
	Mercury (Hg)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Molybdenum (Mo)-Dissolved (mg/L)	<0.000050	0.000219	0.00055	0.00051	0.00039
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	<0.00050	0.0052	0.0050	0.0018
	Phosphorus (P)-Dissolved (mg/L)	0.116	<0.050	<0.050	<0.050	<0.050
	Potassium (K)-Dissolved (mg/L)	1.32	1.63	8.75	8.89	11.3
	Selenium (Se)-Dissolved (mg/L)	0.00010	0.00019	<0.00020 ^{DLA}	0.00020	0.00030
	Silicon (Si)-Dissolved (mg/L)	10.1	5.38	6.63	6.82	5.53
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000020 ^{DLA}	<0.000020 ^{DLA}	<0.000020 ^{DLA}
	Sodium (Na)-Dissolved (mg/L)	1.30	6.52	83.8	81.0	13.6
	Strontium (Sr)-Dissolved (mg/L)	0.131	0.366	1.25	1.15	0.838
	Sulfur (S)-Dissolved (mg/L)	0.68	103	474	488	231
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	0.000021 ^{DLA}	<0.000020 ^{DLA}	<0.000020 ^{DLA}
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00020 ^{DLA}	<0.00020 ^{DLA}	<0.00020 ^{DLA}
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.020 ^{DLA}	<0.020 ^{DLA}	<0.020 ^{DLA}
	Uranium (U)-Dissolved (mg/L)	0.000088	0.00192	0.00161	0.00142	0.000670
	Vanadium (V)-Dissolved (mg/L)	0.0040	<0.0010	0.0030	0.0030	0.0061
	Zinc (Zn)-Dissolved (mg/L)	0.0012	0.0018	0.0147	0.0144	0.0035

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1531123-41 Water 09-OCT-14 09:15 MW09-24	L1531123-42 Water 09-OCT-14 15:10 MP09-12	L1531123-43 Water 09-OCT-14 15:50 MP09-11	L1531123-44 Water 08-OCT-14 10:02 MP09-02	L1531123-45 Water 08-OCT-14 MW09-06
Grouping	Analyte					
WATER						
Dissolved Metals	Lead (Pb)-Dissolved (mg/L)	<0.000050	0.00651	0.00322	0.000064	0.00034
	Lithium (Li)-Dissolved (mg/L)	0.00091	0.00252	0.0031	0.00080	0.0096
	Magnesium (Mg)-Dissolved (mg/L)	47.0	43.5	64.1	10.1	55.4
	Manganese (Mn)-Dissolved (mg/L)	0.000705	2.66	4.84	0.0195	5.64
	Mercury (Hg)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	0.000011
	Molybdenum (Mo)-Dissolved (mg/L)	0.000323	0.00294	0.00864	0.000060	0.00425
	Nickel (Ni)-Dissolved (mg/L)	<0.00050	0.00534	0.0096	<0.00050	0.0016
	Phosphorus (P)-Dissolved (mg/L)	<0.050	0.127	0.180	<0.050	<0.050
	Potassium (K)-Dissolved (mg/L)	1.47	5.34	10.3	0.50	20.5
	Selenium (Se)-Dissolved (mg/L)	0.00038	0.00011	<0.00050 ^{DLA}	<0.00010	<0.00020 ^{DLA}
	Silicon (Si)-Dissolved (mg/L)	5.24	10.5	13.6 ^{DLA}	7.21	7.46 ^{DLA}
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000050 ^{DLA}	<0.000010	<0.000020 ^{DLA}
	Sodium (Na)-Dissolved (mg/L)	8.41	3.84	24.1	3.76	23.7
	Strontium (Sr)-Dissolved (mg/L)	0.443	0.591	0.723	0.343	0.706
	Sulfur (S)-Dissolved (mg/L)	118	10.1	24.7 ^{DLA}	35.3	342
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	0.000109	<0.000050 ^{DLA}	<0.000010	0.000358 ^{DLA}
	Tin (Sn)-Dissolved (mg/L)	0.00016	<0.00010	<0.00050 ^{DLA}	<0.00010	<0.00020 ^{DLA}
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	<0.050 ^{DLA}	<0.010	<0.020 ^{DLA}
	Uranium (U)-Dissolved (mg/L)	0.00436	0.000644	0.00104 ^{DLA}	0.000080	0.00128 ^{DLA}
	Vanadium (V)-Dissolved (mg/L)	<0.0010	<0.0010	<0.0050 ^{DLA}	<0.0010	<0.0020 ^{DLA}
	Zinc (Zn)-Dissolved (mg/L)	0.0015	0.0367	0.0358	0.0029	0.104

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1531123-46 Water 09-OCT-14 12:00 MW09-22 D-METALS TEST	L1531123-47 Water 09-OCT-14 12:00 DUP 5 D-METALS TEST	L1531123-48 Water 09-OCT-14 11:33 MP09-05 D-METALS TEST	L1531123-49 Water 09-OCT-14 15:50 MP09-11 D-METALS TEST	
Grouping	Analyte					
WATER						
Dissolved Metals	Lead (Pb)-Dissolved (mg/L)	<0.000050	<0.00010 ^{DLA}	<0.00010 ^{DLA}	0.00226	
	Lithium (Li)-Dissolved (mg/L)	0.00062	<0.0010 ^{DLA}	<0.0010 ^{DLA}	0.0034	
	Magnesium (Mg)-Dissolved (mg/L)	40.6	69.3	70.8	67.5	
	Manganese (Mn)-Dissolved (mg/L)	6.35	15.0	14.8	4.96	
	Mercury (Hg)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	
	Molybdenum (Mo)-Dissolved (mg/L)	0.000098	0.00061	0.00057	0.00913	
	Nickel (Ni)-Dissolved (mg/L)	0.00207	0.0051	0.0049	0.0097	
	Phosphorus (P)-Dissolved (mg/L)	<0.050	<0.050	<0.050	0.128	
	Potassium (K)-Dissolved (mg/L)	4.59	8.85	8.94	11.2	
	Selenium (Se)-Dissolved (mg/L)	0.00033	0.00026	<0.00020 ^{DLA}	<0.00050 ^{DLA}	
	Silicon (Si)-Dissolved (mg/L)	4.47	6.71	6.71	13.5	
	Silver (Ag)-Dissolved (mg/L)	0.000023	<0.000020 ^{DLA}	<0.000020 ^{DLA}	<0.000050 ^{DLA}	
	Sodium (Na)-Dissolved (mg/L)	70.5	82.3	80.2	25.1	
	Strontium (Sr)-Dissolved (mg/L)	0.785	1.26	1.25	0.844	
	Sulfur (S)-Dissolved (mg/L)	286	480	495	29.1	
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	0.000024 ^{DLA}	<0.000020 ^{DLA}	<0.000050 ^{DLA}	
	Tin (Sn)-Dissolved (mg/L)	0.00015	<0.00020 ^{DLA}	<0.00020 ^{DLA}	<0.00050 ^{DLA}	
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.020 ^{DLA}	<0.020 ^{DLA}	<0.050 ^{DLA}	
	Uranium (U)-Dissolved (mg/L)	0.000848	0.00164	0.00161	0.00110	
	Vanadium (V)-Dissolved (mg/L)	<0.0010	0.0031	0.0025	<0.0050 ^{DLA}	
	Zinc (Zn)-Dissolved (mg/L)	0.0016	0.0156	0.0142	0.0347	

* 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
L1531123-10	GSI-HA-02A	WSMD	Water sample(s) for dissolved mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.
L1531123-11	GSI-DC-02B	WSMD	Water sample(s) for dissolved mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.
L1531123-17	GSI-DC-01B	WSMD	Water sample(s) for dissolved mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.
L1531123-19	GIS-PC-03B	WSMD	Water sample(s) for dissolved mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.
L1531123-20	GIS-PC-04B	WSMD	Water sample(s) for dissolved mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.
L1531123-21	GIS-PC-05B	WSMD	Water sample(s) for dissolved mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.
L1531123-3	GCI-HA-03A	WSMD	Water sample(s) for dissolved mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.
L1531123-31	DUP4	WSMD	Water sample(s) for dissolved mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.
L1531123-32	MW09-22	WSMD	Water sample(s) for dissolved mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.
L1531123-35	W14103083BH04	WSMD	Water sample(s) for dissolved mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.
L1531123-4	GSI-DC-03B	WSMD	Water sample(s) for dissolved mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.
L1531123-46	MW09-22 D-METALS TEST	WSMD	Water sample(s) for dissolved mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.
L1531123-47	DUP 5 D-METALS TEST	WSMD	Water sample(s) for dissolved mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.
L1531123-48	MP09-05 D-METALS TEST	WSMD	Water sample(s) for dissolved mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.
L1531123-49	MP09-11 D-METALS TEST	WSMD	Water sample(s) for dissolved mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.
L1531123-7	GSI-HA-04A	WSMD	Water sample(s) for dissolved mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.
L1531123-8	GSI-HA-05A	WSMD	Water sample(s) for dissolved mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.
L1531123-9	GSI-HA-01A	WSMD	Water sample(s) for dissolved 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)
Duplicate	Aluminum (Al)-Dissolved	DLA	L1531123-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -25, -26, -27, -28, -29, -3, -30, -31, -32, -33, -34, -35, -36, -37, -38, -39, -4, -40, -41, -42, -43, -44, -45, -46, -47, -48, -49, -5, -6, -7, -8, -9
Duplicate	Antimony (Sb)-Dissolved	DLA	L1531123-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -25, -26, -27, -28, -29, -3, -30, -31, -32, -33, -34, -35, -36, -37, -38, -39, -4, -40, -41, -42, -43, -44, -45, -46, -47, -48, -49, -5, -6, -7, -8, -9
Duplicate	Arsenic (As)-Dissolved	DLA	L1531123-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -25, -26, -27, -28, -29, -3, -30, -31, -32, -33, -34, -35, -36, -37, -38, -39, -4, -40, -41, -42, -43, -44, -45, -46, -47, -48, -49, -5, -6, -7, -8, -9
Duplicate	Beryllium (Be)-Dissolved	DLA	L1531123-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -25, -26, -27, -28, -29, -3, -30, -31, -32, -33, -34, -35, -36, -37, -38, -39, -4, -40, -41, -42, -43, -44, -45, -46, -47, -48, -49, -5, -6, -7, -8, -9
Duplicate	Bismuth (Bi)-Dissolved	DLA	L1531123-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -25, -26, -27, -28, -29, -3, -30, -31, -32, -33, -34, -35, -36, -37, -38, -39, -4, -40, -41, -42, -43, -44, -45, -46, -47, -48, -49, -5, -6, -7, -8, -9
Duplicate	Boron (B)-Dissolved	DLA	L1531123-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -25, -26, -27, -28, -29, -3, -30, -31, -32, -33, -34, -35, -36, -37, -38, -39, -4, -40, -41, -42, -43, -44, -45, -46, -47, -48, -49, -5, -6, -7, -8, -9
Duplicate	Chromium (Cr)-Dissolved	DLA	L1531123-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -25, -26, -27, -28, -29, -3, -30, -31, -32, -33, -34, -35, -36, -37, -38, -39, -4, -40, -41, -42, -43, -44, -45, -46, -47, -48, -49, -5, -6, -7, -8, -9
Duplicate	Lead (Pb)-Dissolved	DLA	L1531123-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19,

Reference Information

	Parameter	Qualifier	Applies to Sample Number(s)
Duplicate	Nickel (Ni)-Dissolved	DLA	-2, -20, -21, -22, -23, -25, -26, -27, -28, -29, -3, -30, -31, -32, -33, -34, -35, -36, -37, -38, -39, -4, -40, -41, -42, -43, -44, -45, -46, -47, -48, -49, -5, -6, -7, -8, -9 L1531123-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -25, -26, -27, -28, -29, -3, -30, -31, -32, -33, -34, -35, -36, -37, -38, -39, -4, -40, -41, -42, -43, -44, -45, -46, -47, -48, -49, -5, -6, -7, -8, -9
Duplicate	Selenium (Se)-Dissolved	DLA	L1531123-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -25, -26, -27, -28, -29, -3, -30, -31, -32, -33, -34, -35, -36, -37, -38, -39, -4, -40, -41, -42, -43, -44, -45, -46, -47, -48, -49, -5, -6, -7, -8, -9
Duplicate	Silver (Ag)-Dissolved	DLA	L1531123-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -25, -26, -27, -28, -29, -3, -30, -31, -32, -33, -34, -35, -36, -37, -38, -39, -4, -40, -41, -42, -43, -44, -45, -46, -47, -48, -49, -5, -6, -7, -8, -9
Duplicate	Thallium (Tl)-Dissolved	DLA	L1531123-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -25, -26, -27, -28, -29, -3, -30, -31, -32, -33, -34, -35, -36, -37, -38, -39, -4, -40, -41, -42, -43, -44, -45, -46, -47, -48, -49, -5, -6, -7, -8, -9
Duplicate	Tin (Sn)-Dissolved	DLA	L1531123-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -25, -26, -27, -28, -29, -3, -30, -31, -32, -33, -34, -35, -36, -37, -38, -39, -4, -40, -41, -42, -43, -44, -45, -46, -47, -48, -49, -5, -6, -7, -8, -9
Duplicate	Titanium (Ti)-Dissolved	DLA	L1531123-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -25, -26, -27, -28, -29, -3, -30, -31, -32, -33, -34, -35, -36, -37, -38, -39, -4, -40, -41, -42, -43, -44, -45, -46, -47, -48, -49, -5, -6, -7, -8, -9
Duplicate	Vanadium (V)-Dissolved	DLA	L1531123-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -25, -26, -27, -28, -29, -3, -30, -31, -32, -33, -34, -35, -36, -37, -38, -39, -4, -40, -41, -42, -43, -44, -45, -46, -47, -48, -49, -5, -6, -7, -8, -9
Duplicate	Zinc (Zn)-Dissolved	DLA	L1531123-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -25, -26, -27, -28, -29, -3, -30, -31, -32, -33, -34, -35, -36, -37, -38, -39, -4, -40, -41, -42, -43, -44, -45, -46, -47, -48, -49, -5, -6, -7, -8, -9
Duplicate	Cadmium (Cd)-Dissolved	DLM	L1531123-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -25, -26, -27, -28, -29, -3, -30, -31, -32, -33, -34, -35, -36, -37, -38, -39, -4, -40, -41, -42, -43, -44, -45, -46, -47, -48, -49, -5, -6, -7, -8, -9
Matrix Spike	Sulfate (SO4)	MS-B	L1531123-1, -11, -12, -13, -14, -15, -16, -18, -2, -22, -23, -24, -25, -26, -27, -28, -29, -3, -30, -31, -33, -34, -35, -37, -38, -39, -4, -40, -41, -42, -43, -44, -45, -5, -6, -7, -8, -9
Matrix Spike	Sulfate (SO4)	MS-B	L1531123-1, -11, -12, -13, -14, -15, -16, -18, -2, -22, -23, -24, -25, -26, -27, -28, -29, -3, -30, -31, -33, -34, -35, -37, -38, -39, -4, -40, -41, -42, -43, -44, -45, -5, -6, -7, -8, -9
Matrix Spike	Sulfate (SO4)	MS-B	L1531123-1, -11, -12, -13, -14, -15, -16, -18, -2, -22, -23, -24, -25, -26, -27, -28, -29, -3, -30, -31, -33, -34, -35, -37, -38, -39, -4, -40, -41, -42, -43, -44, -45, -5, -6, -7, -8, -9
Matrix Spike	Sulfate (SO4)	MS-B	L1531123-10
Matrix Spike	Total Organic Carbon	MS-B	L1531123-1, -12, -13, -14, -15, -16, -18, -2, -22, -24, -26, -27, -28, -29, -30, -31, -33, -34, -36, -37, -38, -39, -4, -40, -41, -42, -43, -44, -45, -5, -6
Matrix Spike	Total Organic Carbon	MS-B	L1531123-1, -12, -13, -14, -15, -16, -18, -2, -22, -24, -26, -27, -28, -29, -30, -31, -33, -34, -36, -37, -38, -39, -4, -40, -41, -42, -43, -44, -45, -5, -6
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1531123-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -25, -26, -27, -28, -29, -3, -30, -31, -32, -33, -34, -35, -36, -37, -38, -39, -4, -40, -41, -42, -43, -44, -45, -46, -47, -48, -49, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1531123-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -25, -26, -27, -28, -29, -3, -30, -31, -32, -33, -34, -35, -36, -37, -38, -39, -4, -40, -41, -42, -43, -44, -45, -46, -47, -48, -49, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1531123-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -25, -26, -27, -28, -29, -3, -30, -31, -32, -33, -34, -35, -36, -37, -38, -39, -4, -40, -41, -42, -43, -44, -45, -46, -47, -48, -49, -5, -6, -7, -8, -9

Reference Information

	Parameter	Qualifier	Applies to Sample Number(s)
Matrix Spike	Silicon (Si)-Dissolved	MS-B	L1531123-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -25, -26, -27, -28, -29, -3, -30, -31, -32, -33, -34, -35, -36, -37, -38, -39, -4, -40, -41, -42, -43, -44, -45, -46, -47, -48, -49, -5, -6, -7, -8, -9
Matrix Spike	Sulfur (S)-Dissolved	MS-B	L1531123-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -25, -26, -27, -28, -29, -3, -30, -31, -32, -33, -34, -35, -36, -37, -38, -39, -4, -40, -41, -42, -43, -44, -45, -46, -47, -48, -49, -5, -6, -7, -8, -9
Matrix Spike	Total Organic Carbon	MS-B	L1531123-23, -25
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1531123-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -25, -26, -27, -28, -29, -3, -30, -31, -32, -33, -34, -35, -36, -37, -38, -39, -4, -40, -41, -42, -43, -44, -45, -46, -47, -48, -49, -5, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1531123-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -25, -26, -27, -28, -29, -3, -30, -31, -32, -33, -34, -35, -36, -37, -38, -39, -4, -40, -41, -42, -43, -44, -45, -46, -47, -48, -49, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1531123-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -25, -26, -27, -28, -29, -3, -30, -31, -32, -33, -34, -35, -36, -37, -38, -39, -4, -40, -41, -42, -43, -44, -45, -46, -47, -48, -49, -5, -6, -7, -8, -9
Matrix Spike	Uranium (U)-Dissolved	MS-B	L1531123-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -25, -26, -27, -28, -29, -3, -30, -31, -32, -33, -34, -35, -36, -37, -38, -39, -4, -40, -41, -42, -43, -44, -45, -46, -47, -48, -49, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1531123-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -25, -26, -27, -28, -29, -3, -30, -31, -32, -33, -34, -35, -36, -37, -38, -39, -4, -40, -41, -42, -43, -44, -45, -46, -47, -48, -49, -5, -6, -7, -8, -9
Matrix Spike	Silicon (Si)-Dissolved	MS-B	L1531123-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -25, -26, -27, -28, -29, -3, -30, -31, -32, -33, -34, -35, -36, -37, -38, -39, -4, -40, -41, -42, -43, -44, -45, -46, -47, -48, -49, -5, -6, -7, -8, -9
Matrix Spike	Sulfur (S)-Dissolved	MS-B	L1531123-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -25, -26, -27, -28, -29, -3, -30, -31, -32, -33, -34, -35, -36, -37, -38, -39, -4, -40, -41, -42, -43, -44, -45, -46, -47, -48, -49, -5, -6, -7, -8, -9
Matrix Spike	Total Inorganic Carbon	MS-B	L1531123-28
Matrix Spike	Total Kjeldahl Nitrogen	MS-B	L1531123-24, -26, -27, -28, -29, -31, -33, -34, -36, -37, -38, -39, -40, -41, -42, -43, -44, -45
Matrix Spike	Total Kjeldahl Nitrogen	MS-B	L1531123-24, -26, -27, -28, -29, -31, -33, -34, -36, -37, -38, -39, -40, -41, -42, -43, -44, -45
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1531123-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -25, -26, -27, -28, -29, -3, -30, -31, -32, -33, -34, -35, -36, -37, -38, -39, -4, -40, -41, -42, -43, -44, -45, -46, -47, -48, -49, -5, -6, -7, -8, -9
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L1531123-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -25, -26, -27, -28, -29, -3, -30, -31, -32, -33, -34, -35, -36, -37, -38, -39, -4, -40, -41, -42, -43, -44, -45, -46, -47, -48, -49, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1531123-1, -10, -11, -12, -13, -14, -15, -16, -17, -18, -19, -2, -20, -21, -22, -23, -25, -26, -27, -28, -29, -3, -30, -31, -32, -33, -34, -35, -36, -37, -38, -39, -4, -40, -41, -42, -43, -44, -45, -46, -47, -48, -49, -5, -6, -7, -8, -9

Qualifiers for Individual Parameters Listed:

Qualifier	Description
CNP	Cyanide test sample appears to have been preserved, but pH was <10 at time of testing. Results may be biased low, particularly for Free CN species.
DLA	Detection Limit adjusted for required dilution
DLM	Detection Limit Adjusted due to sample matrix effects.
HTD	Hold time exceeded for re-analysis or dilution, but initial testing was conducted within hold time.
MS-B	Matrix Spike recovery could not be accurately calculated due to high analyte background in sample.
RRV	Reported Result Verified By Repeat Analysis

Reference Information

TKNI TKN result is likely biased low due to Nitrate interference. Nitrate-N is > 10x TKN.

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-COL-VA	Water	Alkalinity by Colourimetric (Automated)	EPA 310.2
This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.			
ANIONS-CL-IC-WR	Water	Chloride by Ion Chromatography	EPA 300.1
This analysis is carried out using procedures adapted from EPA Method 300.1, "Determination of Inorganic Anions by Ion Chromatography", Revision 1.0, April 1999 and from "Determination of Inorganic Anions in Environmental Waters Using a Hydroxide-Selective Column", Application Note 154 v.19, Dionex 2003.			
ANIONS-F-IC-WR	Water	Fluoride by Ion Chromatography	EPA 300.1
This analysis is carried out using procedures adapted from EPA Method 300.1, "Determination of Inorganic Anions by Ion Chromatography", Revision 1.0, April 1999 and from "Determination of Inorganic Anions in Environmental Waters Using a Hydroxide-Selective Column", Application Note 154 v.19, Dionex 2003.			
ANIONS-NO2-IC-WR	Water	Nitrite Nitrogen by Ion Chromatography	EPA 300.1
This analysis is carried out using procedures adapted from EPA Method 300.1, "Determination of Inorganic Anions by Ion Chromatography", Revision 1.0, April 1999 and from "Determination of Inorganic Anions in Environmental Waters Using a Hydroxide-Selective Column", Application Note 154 v.19, Dionex 2003. Nitrate is detected by UV absorbance.			
ANIONS-NO3-IC-WR	Water	Nitrate Nitrogen by Ion Chromatography	EPA 300.1
This analysis is carried out using procedures adapted from EPA Method 300.1, "Determination of Inorganic Anions by Ion Chromatography", Revision 1.0, April 1999 and from "Determination of Inorganic Anions in Environmental Waters Using a Hydroxide-Selective Column", Application Note 154 v.19, Dionex 2003. Nitrate is detected by UV absorbance.			
ANIONS-SO4-IC-WR	Water	Sulphate by Ion Chromatography	EPA 300.1
This analysis is carried out using procedures adapted from EPA Method 300.1, "Determination of Inorganic Anions by Ion Chromatography", Revision 1.0, April 1999 and from "Determination of Inorganic Anions in Environmental Waters Using a Hydroxide-Selective Column", Application Note 154 v.19, Dionex 2003.			
CARBONS-TIC-VA	Water	Total inorganic carbon by CO2 purge	APHA 5310 TOTAL ORGANIC CARBON (TOC)
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".			
CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310 TOTAL ORGANIC CARBON (TOC)
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".			
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.			
HARDNESS-CALC-VA	Water	Hardness	APHA 2340B
Hardness (also known as Total Hardness) is calculated from the sum of Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. Dissolved Calcium and Magnesium concentrations are preferentially used for the hardness calculation.			
HG-DIS-LOW-CVAFS-VA	Water	Dissolved Mercury in Water by CVAFS(Low)	EPA SW-846 3005A & EPA 245.7
This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by filtration (EPA Method 3005A) and involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental			

Reference Information

analysis is by cold vapour atomic fluorescence spectrophotometry or atomic absorption spectrophotometry (EPA Method 245.7).

IONBALANCE-VA Water Ion Balance Calculation APHA 1030E

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

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

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

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030 B&E / EPA SW-846 6020A

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using hotblock, or filtration (APHA 3030B&E). Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modified from EPA Method 6020A).

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

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves filtration (EPA Method 3005A) and analysis by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

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.

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.

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 methylene blue colourimetric method.

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

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

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code Laboratory Location

WR ALS ENVIRONMENTAL - WHITEHORSE, YUKON, CANADA

VA ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

Reference Information

1 2 3 4

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 ww - 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.



Report To				Report Format / Distribution				Analysis Request																																																																																												
Company: Hemmera Environchem Inc.				Select Report Format: <input checked="" type="checkbox"/> PDF <input checked="" type="checkbox"/> EXCEL <input checked="" type="checkbox"/> EDD (DIGITAL)				R <input checked="" type="checkbox"/> Regular (Standard TAT if received by 3 pm - business days)																																																																																												
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Phone: 867-456-4865				Select Distribution: <input checked="" type="checkbox"/> EMAIL <input type="checkbox"/> MAIL <input type="checkbox"/> FAX				E2 <input type="checkbox"/> Same day or weekend emergency - contact ALS to confirm TAT and surcharge																																																																																												
				Email 1 or Fax nsandys@hemmera.com, rmartinka@hemmera.com				Specify Date Required for E2, E or P:																																																																																												
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Contact: Natasha Sandys				Email 2 chris@elr.ca																																																																																																
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	GLL07-03			07-Oct-14	13:00	Water	R	R	R	R	R	R	R	R	R		9																																																																																			
	GCI-HA-03A			07-Oct-14	14:42	Water	R	R									2																																																																																			
	GSI-DC-03B			07-Oct-14	18:30	Water	R	R	R								3																																																																																			
	MW09-18			07-Oct-14	17:36	Water	R	R	R	R	R	R	R	R	R		9																																																																																			
	MW09-17			07-Oct-14	16:30	Water	R	R	R	R	R	R	R	R	R		9																																																																																			
	GSI-HA-04A			07-Oct-14	15:10	Water	R	R									2																																																																																			
	GSI-HA-05A			07-Oct-14	14:54	Water	R	R	R								3																																																																																			
	GSI-HA-01A			07-Oct-14	14:20	Water	R	R									2																																																																																			
	GSI-HA-02A			07-Oct-14	14:33	Water	R	R									2																																																																																			
	GSI-DC-02B			07-Oct-14	14:08	Water	R	R	R								3																																																																																			
	MW09-16			07-Oct-14	12:27	Water	R	R	R	R	R	R	R	R	R		9																																																																																			
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Canada Toll Free: 1 800 668 9878

Page 2 of 4

L1531123-COFC

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

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.

NA-EM-036a v09 Emc/EM January 2011



L1531123-COFC

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REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY

YELLOW - CLIENT COPY

NA-FM-0326e v06 Front04 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.



HEMMERA ENVIROCHEM INC.

ATTN: Natasha Sandys

230 - 2237 2nd Avenue

Whitehorse YK Y1A 0K7

Date Received: 11-OCT-14

Report Date: 24-OCT-14 10:41 (MT)

Version: FINAL

Client Phone: 867-456-4865

Certificate of Analysis

Lab Work Order #: L1531711

Project P.O. #: NOT SUBMITTED

Job Reference: 1343-005.05

C of C Numbers: 1, 2

Legal Site Desc:

Brent Mack, B.Sc.
Account Manager

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

ADDRESS: 8081 Lougheed Hwy, Suite 100, Burnaby, BC V5A 1W9 Canada | Phone: +1 604 253 4188 | Fax: +1 604 253 6700

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1531711-1 Water 10-OCT-14 10:20 GSI-DC-06B	L1531711-2 Water 10-OCT-14 10:20 FB4	L1531711-3 Water 10-OCT-14 11:10 GSI-DC-08B	L1531711-4 Water 09-OCT-14 17:45 CH-P-13-03/50	L1531711-5 Water 10-OCT-14 14:30 CH-P-13-04/10
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (uS/cm)	1130	<2.0	999	2630	912
	Hardness (as CaCO3) (mg/L)	734	<0.50	560	1820	541
	pH (pH)	7.90	5.59	7.36	7.71	8.03
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	702	<2.0	403	382	217
	Ammonia, Total (as N) (mg/L)	2.90	<0.0050		0.190 ^{DLA}	0.0444
	Chloride (Cl) (mg/L)	10.3	<0.50	3.2	<10 ^{DLA}	1.80
	Fluoride (F) (mg/L)	0.33 ^{DLA}	<0.020	0.14 ^{DLA}	<0.40	0.112
	Nitrate (as N) (mg/L)	<0.050 ^{DLA}	<0.0050	<0.025 ^{DLA}	0.27	0.0159
	Nitrite (as N) (mg/L)	<0.010 ^{DLA}	<0.0010	0.0200	0.072	<0.0010
	Total Kjeldahl Nitrogen (mg/L)	8.39	<0.050		2.52	0.577
	Sulfate (SO4) (mg/L)	5.0	<0.50	190	1390	306
	Sulphide as S (mg/L)	0.020	<0.020		0.025	<0.020
	Anion Sum (meq/L)	14.4	<0.10	12.1	36.5	10.8
	Cation Sum (meq/L)	17.3	<0.10	19.4	39.7	11.4
	Cation - Anion Balance (%)	9.0	0.0	23.1	4.2	2.7
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)	105	<0.50		87.0	
	Total Organic Carbon (mg/L)	79.6	<0.50		57.8	13.1
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 Description Sampled Date Sampled Time Client ID		L1531711-6 Water 10-OCT-14 12:59 GSI-DC-10B	L1531711-7 Water 10-OCT-14 11:59 GSI-DC-09B	L1531711-8 Water 10-OCT-14 09:02 MW09-07	L1531711-9 Water 10-OCT-14 11:50 GSI-DC-07B	L1531711-10 Water 10-OCT-14 15:13 CH-P-13-01/10
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (uS/cm)	1050	411	1780	525	1030
	Hardness (as CaCO3) (mg/L)	548	194	971	261	624
	pH (pH)	6.83	7.40	7.40	7.75	8.17
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	138	81.0	212	149	167
	Ammonia, Total (as N) (mg/L)	1.61	1.74 ^{RRV}	2.00	1.39	0.0209
	Chloride (Cl) (mg/L)	<5.0 ^{DLA}	<0.50	<5.0 ^{DLA}	0.56	2.5 ^{DLA}
	Fluoride (F) (mg/L)	<0.20 ^{DLA}	0.054	<0.20 ^{DLA}	0.081	<0.10 ^{DLA}
	Nitrate (as N) (mg/L)	<0.050 ^{DLA}	<0.0050	<0.050 ^{DLA}	<0.0050	0.259 ^{DLA}
	Nitrite (as N) (mg/L)	<0.010 ^{DLA}	<0.0010	<0.010 ^{DLA}	<0.0010	<0.0050 ^{DLA}
	Total Kjeldahl Nitrogen (mg/L)	2.80	2.61	3.65	1.87	0.472
	Sulfate (SO4) (mg/L)	496	128	893	135	437
	Sulphide as S (mg/L)	0.024	<0.020	0.54	0.024	
	Anion Sum (meq/L)	13.1	4.28	22.8	5.80	12.5
	Cation Sum (meq/L)	16.3	5.28	22.6	6.76	13.0
	Cation - Anion Balance (%)	11.0	10.4	-0.6	7.7	1.7
	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	
	Cyanide, Free (mg/L)	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Organic / Inorganic Carbon	Total Inorganic Carbon (mg/L)	25.4	16.1	42.2	30.2	
	Total Organic Carbon (mg/L)	35.2	21.2	29.8	18.1	12.4
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 Description Sampled Date Sampled Time Client ID		L1531711-11 Water 10-OCT-14 13:15 MP09-09	L1531711-12 Water 10-OCT-14 14:00 MP09-10	L1531711-13 Water 10-OCT-14 11:50 DUP6	L1531711-15 Water 11-OCT-14 TRIP BLANK 1	L1531711-16 Water 11-OCT-14 TRIP BLANK 2
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (uS/cm)	513	629	523	<2.0	<2.0
	Hardness (as CaCO3) (mg/L)	216	261	260	<0.50	<0.50
	pH (pH)	8.90	8.59	7.32	5.55	5.49
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)	82.6	90.5	148	<2.0	<2.0
	Ammonia, Total (as N) (mg/L)	3.71	5.21	1.39	0.0093 ^{RRV}	<0.0050
	Chloride (Cl) (mg/L)	2.47	2.63	0.58	<0.50	<0.50
	Fluoride (F) (mg/L)	1.77	1.54	0.062	<0.020	<0.020
	Nitrate (as N) (mg/L)	0.0124	0.0270	<0.0050	<0.0050	<0.0050
	Nitrite (as N) (mg/L)	0.0058	0.0841	<0.0010	<0.0010	<0.0010
	Total Kjeldahl Nitrogen (mg/L)	5.59	12.0	1.91	<0.050	<0.050
	Sulfate (SO4) (mg/L)	148	212	135	<0.50	<0.50
	Sulphide as S (mg/L)	<2.0 ^{DLM}	<0.020	0.024	<0.020	<0.020
	Anion Sum (meq/L)	4.89	6.39	5.80	<0.10	<0.10
	Cation Sum (meq/L)	5.91	7.05	6.73	<0.10	<0.10
	Cation - Anion Balance (%)	9.4	4.9	7.4	0.0	0.0
Cyanides	Cyanide, Weak Acid Diss (mg/L)	0.602	1.11 ^{DLA}	<0.0050	<0.0050	<0.0050
	Cyanide, Total (mg/L)	1.98	11.1 ^{DLA}	<0.0050	<0.0050	<0.0050
	Thiocyanate (SCN) (mg/L)	<0.50	<0.50	<0.50	<0.50	<0.50
	Cyanide, Free (mg/L)	0.356	1.04 ^{DLA}	<0.0050	<0.0050	<0.0050
Organic / Inorganic Carbon	Total Inorganic Carbon (mg/L)	8.8	28.0	36.0	<0.50	<0.50
	Total Organic Carbon (mg/L)	33.3	46.6	17.9	<0.50	<0.50
Total Metals	Aluminum (Al)-Total (mg/L)				<0.0030	<0.0030
	Antimony (Sb)-Total (mg/L)				<0.00010	<0.00010
	Arsenic (As)-Total (mg/L)				<0.00010	<0.00010
	Barium (Ba)-Total (mg/L)				<0.000050	<0.000050
	Beryllium (Be)-Total (mg/L)				<0.00010	<0.00010
	Bismuth (Bi)-Total (mg/L)				<0.00050	<0.00050
	Boron (B)-Total (mg/L)				<0.010	<0.010
	Cadmium (Cd)-Total (mg/L)				<0.000010	<0.000010
	Calcium (Ca)-Total (mg/L)				<0.050	<0.050
	Chromium (Cr)-Total (mg/L)				<0.00010	<0.00010
	Cobalt (Co)-Total (mg/L)				<0.00010	<0.00010
	Copper (Cu)-Total (mg/L)				<0.00050	<0.00050
	Iron (Fe)-Total (mg/L)				<0.010	<0.010
	Lead (Pb)-Total (mg/L)				<0.000050	<0.000050
	Lithium (Li)-Total (mg/L)				<0.00050	<0.00050

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1531711-17 Water 10-OCT-14 12:59 GSI-DC-10B DISSOLVED METALS TEST	L1531711-18 Water 10-OCT-14 13:15 MP09-09 DISSOLVED METALS TEST	L1531711-19 Water 10-OCT-14 10:20 GSI-DC-06B DISSOLVED METALS TEST		
Grouping	Analyte					
WATER						
Physical Tests	Conductivity (uS/cm)					
	Hardness (as CaCO3) (mg/L)	555	213	749		
	pH (pH)					
Anions and Nutrients	Alkalinity, Total (as CaCO3) (mg/L)					
	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 Description Sampled Date Sampled Time Client ID		L1531711-1 Water 10-OCT-14 10:20 GSI-DC-06B	L1531711-2 Water 10-OCT-14 10:20 FB4	L1531711-3 Water 10-OCT-14 11:10 GSI-DC-08B	L1531711-4 Water 09-OCT-14 17:45 CH-P-13-03/50	L1531711-5 Water 10-OCT-14 14:30 CH-P-13-04/10
Grouping	Analyte					
WATER						
Total Metals	Magnesium (Mg)-Total (mg/L)					
	Manganese (Mn)-Total (mg/L)					
	Mercury (Hg)-Total (mg/L)					
	Molybdenum (Mo)-Total (mg/L)					
	Nickel (Ni)-Total (mg/L)					
	Phosphorus (P)-Total (mg/L)					
	Potassium (K)-Total (mg/L)					
	Selenium (Se)-Total (mg/L)					
	Silicon (Si)-Total (mg/L)					
	Silver (Ag)-Total (mg/L)					
	Sodium (Na)-Total (mg/L)					
	Strontium (Sr)-Total (mg/L)					
	Sulfur (S)-Total (mg/L)					
	Thallium (Tl)-Total (mg/L)					
	Tin (Sn)-Total (mg/L)					
	Titanium (Ti)-Total (mg/L)					
	Uranium (U)-Total (mg/L)					
	Vanadium (V)-Total (mg/L)					
	Zinc (Zn)-Total (mg/L)					
Dissolved Metals	Dissolved Mercury Filtration Location	NA	NA	NA	NA	NA
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	0.0169	<0.0010	0.394	0.0065	0.0033
	Antimony (Sb)-Dissolved (mg/L)	0.00029	<0.00010	0.00185	0.00103	0.00107
	Arsenic (As)-Dissolved (mg/L)	0.326	<0.00010	0.0945	0.00195	0.00128
	Barium (Ba)-Dissolved (mg/L)	0.240	<0.000050	0.180	0.0623	0.0317
	Beryllium (Be)-Dissolved (mg/L)	<0.00010	<0.00010	<0.00010	<0.00020 ^{DLA}	<0.00010
	Bismuth (Bi)-Dissolved (mg/L)	<0.00050	<0.00050	<0.00050	<0.0010 ^{DLA}	<0.00050
	Boron (B)-Dissolved (mg/L)	<0.010	<0.010	0.110	<0.020 ^{DLA}	0.019
	Cadmium (Cd)-Dissolved (mg/L)	<0.000010	<0.000010	0.000038	0.000192	0.000674
	Calcium (Ca)-Dissolved (mg/L)	177	<0.050	154	455 ^{DLA}	107
	Chromium (Cr)-Dissolved (mg/L)	0.00181	<0.00010	0.0737	<0.00020 ^{DLA}	0.00027
	Cobalt (Co)-Dissolved (mg/L)	0.00220	<0.00010	0.0190	0.0213	0.0122
	Copper (Cu)-Dissolved (mg/L)	0.00052	<0.00020	0.00179	0.00068	0.00210
	Iron (Fe)-Dissolved (mg/L)	23.2	<0.010	125	1.05 ^{DLA}	0.146
	Lead (Pb)-Dissolved (mg/L)	0.000059	<0.000050	0.00180	<0.00010 ^{DLA}	0.000098
	Lithium (Li)-Dissolved (mg/L)	<0.00050	<0.00050	0.00129	0.0037	0.0113
	Magnesium (Mg)-Dissolved (mg/L)	71.0	<0.10	42.6	166	66.2

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1531711-6 Water 10-OCT-14 12:59 GSI-DC-10B	L1531711-7 Water 10-OCT-14 11:59 GSI-DC-09B	L1531711-8 Water 10-OCT-14 09:02 MW09-07	L1531711-9 Water 10-OCT-14 11:50 GSI-DC-07B	L1531711-10 Water 10-OCT-14 15:13 CH-P-13-01/10
Grouping	Analyte					
WATER						
Total Metals	Magnesium (Mg)-Total (mg/L)					
	Manganese (Mn)-Total (mg/L)					
	Mercury (Hg)-Total (mg/L)					
	Molybdenum (Mo)-Total (mg/L)					
	Nickel (Ni)-Total (mg/L)					
	Phosphorus (P)-Total (mg/L)					
	Potassium (K)-Total (mg/L)					
	Selenium (Se)-Total (mg/L)					
	Silicon (Si)-Total (mg/L)					
	Silver (Ag)-Total (mg/L)					
	Sodium (Na)-Total (mg/L)					
	Strontium (Sr)-Total (mg/L)					
	Sulfur (S)-Total (mg/L)					
	Thallium (Tl)-Total (mg/L)					
	Tin (Sn)-Total (mg/L)					
	Titanium (Ti)-Total (mg/L)					
	Uranium (U)-Total (mg/L)					
	Vanadium (V)-Total (mg/L)					
	Zinc (Zn)-Total (mg/L)					
Dissolved Metals	Dissolved Mercury Filtration Location	NA	NA	NA	NA	NA
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD	FIELD	FIELD
	Aluminum (Al)-Dissolved (mg/L)	0.142	0.0477	0.0491	0.0103	0.0087
	Antimony (Sb)-Dissolved (mg/L)	0.00035	0.00021	0.00568	0.00017	0.00220
	Arsenic (As)-Dissolved (mg/L)	0.130	0.0453	0.556	0.144	0.00206
	Barium (Ba)-Dissolved (mg/L)	0.424	0.0341	0.0220	0.0715	0.0635
	Beryllium (Be)-Dissolved (mg/L)	<0.00020 ^{DLA}	<0.00010	<0.00020 ^{DLA}	<0.00010	<0.00010
	Bismuth (Bi)-Dissolved (mg/L)	<0.0010 ^{DLA}	<0.00050	<0.0010 ^{DLA}	<0.00050	<0.00050
	Boron (B)-Dissolved (mg/L)	<0.020 ^{DLA}	0.012	0.058	0.011	0.017
	Cadmium (Cd)-Dissolved (mg/L)	<0.000020 ^{DLA}	<0.000010	0.000223	<0.000010	0.000168
	Calcium (Ca)-Dissolved (mg/L)	152	49.7	297	73.7	150
	Chromium (Cr)-Dissolved (mg/L)	0.00231	0.00086	0.00096	0.00045	0.00018
	Cobalt (Co)-Dissolved (mg/L)	0.0215	0.00096	0.0264	0.00155	0.00048
	Copper (Cu)-Dissolved (mg/L)	0.00097	<0.00020	0.00606	<0.00020	0.0101
	Iron (Fe)-Dissolved (mg/L)	68.7	14.2	9.16	14.3	0.057
	Lead (Pb)-Dissolved (mg/L)	0.00014	<0.000050	<0.00010 ^{DLA}	<0.000050	0.000217
	Lithium (Li)-Dissolved (mg/L)	<0.0010 ^{DLA}	<0.00050	0.0029	0.00110	0.00325
	Magnesium (Mg)-Dissolved (mg/L)	40.7	16.9	55.7	18.8	60.9

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1531711-11 Water 10-OCT-14 13:15 MP09-09	L1531711-12 Water 10-OCT-14 14:00 MP09-10	L1531711-13 Water 10-OCT-14 11:50 DUP6	L1531711-15 Water 11-OCT-14 TRIP BLANK 1	L1531711-16 Water 11-OCT-14 TRIP BLANK 2
Grouping	Analyte					
WATER						
Total Metals	Magnesium (Mg)-Total (mg/L)				<0.10	<0.10
	Manganese (Mn)-Total (mg/L)				<0.000050	<0.000050
	Mercury (Hg)-Total (mg/L)				<0.000010	<0.000010
	Molybdenum (Mo)-Total (mg/L)				<0.000050	<0.000050
	Nickel (Ni)-Total (mg/L)				<0.00050	<0.00050
	Phosphorus (P)-Total (mg/L)				<0.050	<0.050
	Potassium (K)-Total (mg/L)				<0.10	<0.10
	Selenium (Se)-Total (mg/L)				<0.00010	<0.00010
	Silicon (Si)-Total (mg/L)				<0.050	<0.050
	Silver (Ag)-Total (mg/L)				<0.000010	<0.000010
	Sodium (Na)-Total (mg/L)				<0.050	<0.050
	Strontium (Sr)-Total (mg/L)				<0.00020	<0.00020
	Sulfur (S)-Total (mg/L)				<0.50	<0.50
	Thallium (Tl)-Total (mg/L)				<0.000010	<0.000010
	Tin (Sn)-Total (mg/L)				<0.00010	<0.00010
	Titanium (Ti)-Total (mg/L)				<0.010	<0.010
	Uranium (U)-Total (mg/L)				<0.000010	<0.000010
	Vanadium (V)-Total (mg/L)				<0.0010	<0.0010
	Zinc (Zn)-Total (mg/L)				<0.0030	<0.0030
Dissolved Metals	Dissolved Mercury Filtration Location	NA	NA	NA		
	Dissolved Metals Filtration Location	FIELD	FIELD	FIELD		
	Aluminum (Al)-Dissolved (mg/L)	0.0041	0.0037	0.0102		
	Antimony (Sb)-Dissolved (mg/L)	0.101	0.0951	0.00015		
	Arsenic (As)-Dissolved (mg/L)	20.6	9.93	0.150		
	Barium (Ba)-Dissolved (mg/L)	0.00174	0.000633	0.0698		
	Beryllium (Be)-Dissolved (mg/L)	<0.00020 ^{DLA}	<0.00010	<0.00010		
	Bismuth (Bi)-Dissolved (mg/L)	<0.0010 ^{DLA}	<0.00050	<0.00050		
	Boron (B)-Dissolved (mg/L)	0.306	0.307	0.013		
	Cadmium (Cd)-Dissolved (mg/L)	0.000322	0.000287	<0.000010		
	Calcium (Ca)-Dissolved (mg/L)	85.8	103	73.5		
	Chromium (Cr)-Dissolved (mg/L)	<0.00020 ^{DLA}	<0.00010	0.00036		
	Cobalt (Co)-Dissolved (mg/L)	0.0458	0.0447	0.00153		
	Copper (Cu)-Dissolved (mg/L)	0.714	0.215	0.00060		
	Iron (Fe)-Dissolved (mg/L)	0.214	0.279	14.1		
	Lead (Pb)-Dissolved (mg/L)	0.00099	0.000806	<0.000050		
	Lithium (Li)-Dissolved (mg/L)	<0.0010 ^{DLA}	<0.00050	0.00092		
	Magnesium (Mg)-Dissolved (mg/L)	0.41	0.76	18.6		

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

		Sample ID	L1531711-17	L1531711-18	L1531711-19		
		Description	Water	Water	Water		
		Sampled Date	10-OCT-14	10-OCT-14	10-OCT-14		
		Sampled Time	12:59	13:15	10:20		
		Client ID	GSI-DC-10B DISSOLVED METALS TEST	MP09-09 DISSOLVED METALS TEST	GSI-DC-06B DISSOLVED METALS TEST		
Grouping	Analyte						
WATER							
Total Metals	Magnesium (Mg)-Total (mg/L)						
	Manganese (Mn)-Total (mg/L)						
	Mercury (Hg)-Total (mg/L)						
	Molybdenum (Mo)-Total (mg/L)						
	Nickel (Ni)-Total (mg/L)						
	Phosphorus (P)-Total (mg/L)						
	Potassium (K)-Total (mg/L)						
	Selenium (Se)-Total (mg/L)						
	Silicon (Si)-Total (mg/L)						
	Silver (Ag)-Total (mg/L)						
	Sodium (Na)-Total (mg/L)						
	Strontium (Sr)-Total (mg/L)						
	Sulfur (S)-Total (mg/L)						
	Thallium (Tl)-Total (mg/L)						
	Tin (Sn)-Total (mg/L)						
	Titanium (Ti)-Total (mg/L)						
	Uranium (U)-Total (mg/L)						
	Vanadium (V)-Total (mg/L)						
	Zinc (Zn)-Total (mg/L)						
Dissolved Metals	Dissolved Mercury Filtration Location		FIELD	FIELD	FIELD		
	Dissolved Metals Filtration Location		FIELD	FIELD	FIELD		
	Aluminum (Al)-Dissolved (mg/L)		0.134	0.0051	0.0155		
	Antimony (Sb)-Dissolved (mg/L)		0.00033	0.0987	0.00026		
	Arsenic (As)-Dissolved (mg/L)		0.107	20.7	0.342		
	Barium (Ba)-Dissolved (mg/L)		0.408	0.00146	0.232		
	Beryllium (Be)-Dissolved (mg/L)		<0.00020 ^{DLA}	<0.00050 ^{DLA}	<0.00010		
	Bismuth (Bi)-Dissolved (mg/L)		<0.0010 ^{DLA}	<0.0025 ^{DLA}	<0.00050		
	Boron (B)-Dissolved (mg/L)		<0.020 ^{DLA}	0.313	<0.010		
	Cadmium (Cd)-Dissolved (mg/L)		<0.000020 ^{DLA}	0.000318	<0.000010		
	Calcium (Ca)-Dissolved (mg/L)		154	84.7	181		
	Chromium (Cr)-Dissolved (mg/L)		0.00221	<0.00050 ^{DLA}	0.00158		
	Cobalt (Co)-Dissolved (mg/L)		0.0218	0.0469	0.00219		
	Copper (Cu)-Dissolved (mg/L)		<0.00040 ^{DLA}	0.657	0.00020		
	Iron (Fe)-Dissolved (mg/L)		66.7	0.322	22.4		
	Lead (Pb)-Dissolved (mg/L)		0.00014	0.00080	<0.000050		
	Lithium (Li)-Dissolved (mg/L)		<0.0010 ^{DLA}	<0.0025 ^{DLA}	<0.00050		
	Magnesium (Mg)-Dissolved (mg/L)		41.1	0.40	71.7		

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1531711-1 Water 10-OCT-14 10:20 GSI-DC-06B	L1531711-2 Water 10-OCT-14 10:20 FB4	L1531711-3 Water 10-OCT-14 11:10 GSI-DC-08B	L1531711-4 Water 09-OCT-14 17:45 CH-P-13-03/50	L1531711-5 Water 10-OCT-14 14:30 CH-P-13-04/10
Grouping	Analyte					
WATER						
Dissolved Metals	Manganese (Mn)-Dissolved (mg/L)	5.07	<0.000050	4.58	12.5	1.35
	Mercury (Hg)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Molybdenum (Mo)-Dissolved (mg/L)	0.00380	<0.000050	0.0110	0.00285	0.00273
	Nickel (Ni)-Dissolved (mg/L)	0.00368	<0.00050	0.190	0.0392	0.0457
	Phosphorus (P)-Dissolved (mg/L)	0.251	<0.050	0.218	<0.050	<0.050
	Potassium (K)-Dissolved (mg/L)	3.95	<0.10	6.82	9.18	3.86
	Selenium (Se)-Dissolved (mg/L)	0.00054	<0.00010	0.00105	0.00445	0.00012
	Silicon (Si)-Dissolved (mg/L)	8.00	<0.050	10.6	6.69	4.92
	Silver (Ag)-Dissolved (mg/L)	<0.000010	<0.000010	0.000020	<0.000020 ^{DLA}	<0.000010
	Sodium (Na)-Dissolved (mg/L)	20.3	<0.050	25.1	58.6	8.85
	Strontium (Sr)-Dissolved (mg/L)	0.897	<0.00020	0.585	1.05	0.623
	Sulfur (S)-Dissolved (mg/L)	3.23	<0.50	73.1	501	106
	Thallium (Tl)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000020 ^{DLA}	0.000045
	Tin (Sn)-Dissolved (mg/L)	<0.00010	<0.00010	0.00050	0.00092 ^{DLA}	0.00143
	Titanium (Ti)-Dissolved (mg/L)	<0.010	<0.010	0.028	<0.020 ^{DLA}	<0.010
	Uranium (U)-Dissolved (mg/L)	0.000155	<0.000010	0.00205	0.0101 ^{DLA}	0.000980
	Vanadium (V)-Dissolved (mg/L)	0.0085	<0.0010	0.0816	<0.0020 ^{DLA}	<0.0010
	Zinc (Zn)-Dissolved (mg/L)	0.0018	<0.0010	0.0170	0.0239	0.156

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1531711-6 Water 10-OCT-14 12:59 GSI-DC-10B	L1531711-7 Water 10-OCT-14 11:59 GSI-DC-09B	L1531711-8 Water 10-OCT-14 09:02 MW09-07	L1531711-9 Water 10-OCT-14 11:50 GSI-DC-07B	L1531711-10 Water 10-OCT-14 15:13 CH-P-13-01/10
Grouping	Analyte					
WATER						
Dissolved Metals	Manganese (Mn)-Dissolved (mg/L)	13.0	0.510	20.5	1.06	0.401
	Mercury (Hg)-Dissolved (mg/L)	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
	Molybdenum (Mo)-Dissolved (mg/L)	0.00060	0.000210	0.00156	0.000378	0.00145
	Nickel (Ni)-Dissolved (mg/L)	0.0045	0.00059	0.0207	0.00054	0.00365
	Phosphorus (P)-Dissolved (mg/L)	<0.050	0.164	<0.050	0.083	<0.050
	Potassium (K)-Dissolved (mg/L)	2.22	2.22	12.0	2.37	2.85
	Selenium (Se)-Dissolved (mg/L)	0.00036	0.00013	0.00020	0.00016	0.00016
	Silicon (Si)-Dissolved (mg/L)	7.77	8.13	9.98	7.10	7.37
	Silver (Ag)-Dissolved (mg/L)	<0.000020 ^{DLA}	<0.000010	0.000168	<0.000010	<0.000010
	Sodium (Na)-Dissolved (mg/L)	23.7	10.2	33.5	13.2	9.30
	Strontium (Sr)-Dissolved (mg/L)	0.579	0.159	0.706	0.239	0.452
	Sulfur (S)-Dissolved (mg/L)	155	44.7	274	46.2	146
	Thallium (Tl)-Dissolved (mg/L)	<0.000020 ^{DLA}	<0.000010	<0.000020 ^{DLA}	<0.000010	0.000028
	Tin (Sn)-Dissolved (mg/L)	<0.00020 ^{DLA}	<0.00010	<0.00020 ^{DLA}	<0.00010	0.00328
	Titanium (Ti)-Dissolved (mg/L)	<0.020 ^{DLA}	<0.010	<0.020 ^{DLA}	<0.010	<0.010
	Uranium (U)-Dissolved (mg/L)	0.000300	0.000109	0.00117	0.000034	0.00211
	Vanadium (V)-Dissolved (mg/L)	0.0113	0.0046	0.0026	0.0020	<0.0010
	Zinc (Zn)-Dissolved (mg/L)	0.0101	0.0015	0.360	0.0017	0.0203

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1531711-11 Water 10-OCT-14 13:15 MP09-09	L1531711-12 Water 10-OCT-14 14:00 MP09-10	L1531711-13 Water 10-OCT-14 11:50 DUP6	L1531711-15 Water 11-OCT-14 TRIP BLANK 1	L1531711-16 Water 11-OCT-14 TRIP BLANK 2
Grouping	Analyte					
WATER						
Dissolved Metals	Manganese (Mn)-Dissolved (mg/L)	0.0409	0.0300	1.05		
	Mercury (Hg)-Dissolved (mg/L)	0.000021	0.000028	<0.000010		
	Molybdenum (Mo)-Dissolved (mg/L)	0.0146	0.0148	0.000379		
	Nickel (Ni)-Dissolved (mg/L)	0.0184	0.0124	<0.00050		
	Phosphorus (P)-Dissolved (mg/L)	0.168	0.220	0.081		
	Potassium (K)-Dissolved (mg/L)	8.78	9.44	2.36		
	Selenium (Se)-Dissolved (mg/L)	0.00233	0.00161	0.00019		
	Silicon (Si)-Dissolved (mg/L)	9.60	6.09	7.08		
	Silver (Ag)-Dissolved (mg/L)	0.0299	0.0533	<0.000010		
	Sodium (Na)-Dissolved (mg/L)	24.5	27.6	13.1		
	Strontium (Sr)-Dissolved (mg/L)	0.158	0.162	0.230		
	Sulfur (S)-Dissolved (mg/L)	90.0	86.2	46.0		
	Thallium (Tl)-Dissolved (mg/L)	0.000040	0.000051	<0.000010		
	Tin (Sn)-Dissolved (mg/L)	<0.00020 ^{DLA}	<0.00010	<0.00010		
	Titanium (Ti)-Dissolved (mg/L)	<0.020 ^{DLA}	<0.010	<0.010		
	Uranium (U)-Dissolved (mg/L)	0.000514	0.00138	0.000032		
	Vanadium (V)-Dissolved (mg/L)	<0.0020 ^{DLA}	<0.0010	0.0019		
	Zinc (Zn)-Dissolved (mg/L)	0.0045	0.0021	<0.0010		

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

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID Description Sampled Date Sampled Time Client ID		L1531711-17 Water 10-OCT-14 12:59 GSI-DC-10B DISSOLVED METALS TEST	L1531711-18 Water 10-OCT-14 13:15 MP09-09 DISSOLVED METALS TEST	L1531711-19 Water 10-OCT-14 10:20 GSI-DC-06B DISSOLVED METALS TEST		
Grouping	Analyte					
WATER						
Dissolved Metals	Manganese (Mn)-Dissolved (mg/L)	13.4	0.0385	5.19		
	Mercury (Hg)-Dissolved (mg/L)	<0.000010	0.000021	<0.000010		
	Molybdenum (Mo)-Dissolved (mg/L)	0.00057	0.0146	0.00368		
	Nickel (Ni)-Dissolved (mg/L)	0.0046	0.0197	0.00362		
	Phosphorus (P)-Dissolved (mg/L)	<0.050	0.154	0.244		
	Potassium (K)-Dissolved (mg/L)	2.23	8.58	3.94		
	Selenium (Se)-Dissolved (mg/L)	0.00031	0.00238	0.00057		
	Silicon (Si)-Dissolved (mg/L)	7.81	9.47	8.00		
	Silver (Ag)-Dissolved (mg/L)	<0.000020 ^{DLA}	0.0280	<0.000010		
	Sodium (Na)-Dissolved (mg/L)	23.1	24.6	19.4		
	Strontium (Sr)-Dissolved (mg/L)	0.560	0.160	0.869		
	Sulfur (S)-Dissolved (mg/L)	157	66.6	3.16		
	Thallium (Tl)-Dissolved (mg/L)	<0.000020 ^{DLA}	0.000066 ^{DLA}	<0.000010		
	Tin (Sn)-Dissolved (mg/L)	<0.00020 ^{DLA}	<0.00050 ^{DLA}	<0.00010		
	Titanium (Ti)-Dissolved (mg/L)	<0.020 ^{DLA}	<0.050 ^{DLA}	<0.010		
	Uranium (U)-Dissolved (mg/L)	0.000306	0.000540 ^{DLA}	0.000160		
	Vanadium (V)-Dissolved (mg/L)	0.0102	<0.0050 ^{DLA}	0.0079		
	Zinc (Zn)-Dissolved (mg/L)	0.0099	<0.0050 ^{DLA}	0.0020		

* 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
L1531711-17	GSI-DC-10B DISSOLVED ME	WSMD	Water sample(s) for dissolved mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.
L1531711-18	MP09-09 DISSOLVED META	WSMD	Water sample(s) for dissolved mercury analysis was not submitted in glass or PTFE container with HCl preservative. Results may be biased low.
L1531711-19	GSI-DC-06B DISSOLVED ME	WSMD	Water sample(s) for dissolved 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)
Duplicate	Beryllium (Be)-Dissolved	DLA	L1531711-1, -10, -11, -12, -13, -17, -18, -19, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Bismuth (Bi)-Dissolved	DLA	L1531711-1, -10, -11, -12, -13, -17, -18, -19, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Chromium (Cr)-Dissolved	DLA	L1531711-1, -10, -11, -12, -13, -17, -18, -19, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Lead (Pb)-Dissolved	DLA	L1531711-1, -10, -11, -12, -13, -17, -18, -19, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Silver (Ag)-Dissolved	DLA	L1531711-1, -10, -11, -12, -13, -17, -18, -19, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Thallium (Tl)-Dissolved	DLA	L1531711-1, -10, -11, -12, -13, -17, -18, -19, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Titanium (Ti)-Dissolved	DLA	L1531711-1, -10, -11, -12, -13, -17, -18, -19, -2, -3, -4, -5, -6, -7, -8, -9
Duplicate	Vanadium (V)-Dissolved	DLA	L1531711-1, -10, -11, -12, -13, -17, -18, -19, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Fluoride (F)	MS-B	L1531711-1, -10, -11, -12, -13, -15, -16, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sulfate (SO4)	MS-B	L1531711-1, -10, -11, -12, -13, -15, -16, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Calcium (Ca)-Dissolved	MS-B	L1531711-1, -10, -11, -12, -13, -17, -18, -19, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sulfur (S)-Dissolved	MS-B	L1531711-1, -10, -11, -12, -13, -17, -18, -19, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1531711-1, -10, -11, -12, -13, -17, -18, -19, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1531711-1, -10, -11, -12, -13, -17, -18, -19, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Total Inorganic Carbon	MS-B	L1531711-13
Matrix Spike	Total Kjeldahl Nitrogen	MS-B	L1531711-1, -10, -11, -12, -13, -2, -4, -5, -6, -9
Matrix Spike	Total Kjeldahl Nitrogen	MS-B	L1531711-1, -10, -11, -12, -13, -2, -4, -5, -6, -9
Matrix Spike	Barium (Ba)-Dissolved	MS-B	L1531711-1, -10, -11, -12, -13, -17, -18, -19, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Manganese (Mn)-Dissolved	MS-B	L1531711-1, -10, -11, -12, -13, -17, -18, -19, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Nickel (Ni)-Dissolved	MS-B	L1531711-1, -10, -11, -12, -13, -17, -18, -19, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Sodium (Na)-Dissolved	MS-B	L1531711-1, -10, -11, -12, -13, -17, -18, -19, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Strontium (Sr)-Dissolved	MS-B	L1531711-1, -10, -11, -12, -13, -17, -18, -19, -2, -3, -4, -5, -6, -7, -8, -9
Matrix Spike	Barium (Ba)-Total	MS-B	L1531711-15, -16
Matrix Spike	Strontium (Sr)-Total	MS-B	L1531711-15, -16
Matrix Spike	Total Kjeldahl Nitrogen	MSTN	L1531711-16, -7

Qualifiers for Individual Parameters Listed:

Qualifier	Description
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.
MSTN	TKN Matrix Spike recovery was low due to interference from high nitrate, which causes negative bias on TKN. Reported Result Verified By Repeat Analysis

Reference Information

RRV

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
ALK-COL-VA	Water	Alkalinity by Colourimetric (Automated)	EPA 310.2
This analysis is carried out using procedures adapted from EPA Method 310.2 "Alkalinity". Total Alkalinity is determined using the methyl orange colourimetric method.			
ALK-PCT-VA	Water	Alkalinity by Auto. Titration	APHA 2320 "Alkalinity"
This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.			
ALK-PCT-VA	Water	Alkalinity by Auto. Titration	APHA 2320 Alkalinity
This analysis is carried out using procedures adapted from APHA Method 2320 "Alkalinity". Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.			
ANIONS-CL-IC-WR	Water	Chloride by Ion Chromatography	EPA 300.1
This analysis is carried out using procedures adapted from EPA Method 300.1, "Determination of Inorganic Anions by Ion Chromatography", Revision 1.0, April 1999 and from "Determination of Inorganic Anions in Environmental Waters Using a Hydroxide-Selective Column", Application Note 154 v.19, Dionex 2003.			
ANIONS-F-IC-WR	Water	Fluoride by Ion Chromatography	EPA 300.1
This analysis is carried out using procedures adapted from EPA Method 300.1, "Determination of Inorganic Anions by Ion Chromatography", Revision 1.0, April 1999 and from "Determination of Inorganic Anions in Environmental Waters Using a Hydroxide-Selective Column", Application Note 154 v.19, Dionex 2003.			
ANIONS-NO2-IC-WR	Water	Nitrite Nitrogen by Ion Chromatography	EPA 300.1
This analysis is carried out using procedures adapted from EPA Method 300.1, "Determination of Inorganic Anions by Ion Chromatography", Revision 1.0, April 1999 and from "Determination of Inorganic Anions in Environmental Waters Using a Hydroxide-Selective Column", Application Note 154 v.19, Dionex 2003. Nitrate is detected by UV absorbance.			
ANIONS-NO3-IC-WR	Water	Nitrate Nitrogen by Ion Chromatography	EPA 300.1
This analysis is carried out using procedures adapted from EPA Method 300.1, "Determination of Inorganic Anions by Ion Chromatography", Revision 1.0, April 1999 and from "Determination of Inorganic Anions in Environmental Waters Using a Hydroxide-Selective Column", Application Note 154 v.19, Dionex 2003. Nitrate is detected by UV absorbance.			
ANIONS-SO4-IC-WR	Water	Sulphate by Ion Chromatography	EPA 300.1
This analysis is carried out using procedures adapted from EPA Method 300.1, "Determination of Inorganic Anions by Ion Chromatography", Revision 1.0, April 1999 and from "Determination of Inorganic Anions in Environmental Waters Using a Hydroxide-Selective Column", Application Note 154 v.19, Dionex 2003.			
CARBONS-TIC-VA	Water	Total inorganic carbon by CO2 purge	APHA 5310 TOTAL ORGANIC CARBON (TOC)
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".			
CARBONS-TOC-VA	Water	Total organic carbon by combustion	APHA 5310 TOTAL ORGANIC CARBON (TOC)
This analysis is carried out using procedures adapted from APHA Method 5310 "Total Organic Carbon (TOC)".			
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.			
HARDNESS-CALC-VA	Water	Hardness	APHA 2340B

Reference Information

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

HG-DIS-LOW-CVAFS-VA Water Dissolved Mercury in Water by CVAFS(Low) EPA SW-846 3005A & EPA 245.7

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by filtration (EPA Method 3005A) and involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry or atomic absorption spectrophotometry (EPA Method 245.7).

HG-TOT-LOW-CVAFS-VA Water Total Mercury in Water by CVAFS(Low) EPA 245.7

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves a cold-oxidation of the acidified sample using bromine monochloride prior to reduction of the sample with stannous chloride. Instrumental analysis is by cold vapour atomic fluorescence spectrophotometry or atomic absorption spectrophotometry (EPA Method 245.7).

IONBALANCE-VA Water Ion Balance Calculation APHA 1030E

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

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

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

MET-D-CCMS-VA Water Dissolved Metals in Water by CRC ICPMS APHA 3030 B&E / EPA SW-846 6020A

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using hotblock, or filtration (APHA 3030B&E). Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modified from EPA Method 6020A).

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

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedure involves filtration (EPA Method 3005A) and analysis by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

MET-T-CCMS-VA Water Total Metals in Water by CRC ICPMS APHA 3030 B&E / EPA SW-846 6020A

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using hotblock, or filtration (APHA 3030B&E). Instrumental analysis is by collision cell inductively coupled plasma - mass spectrometry (modified from EPA Method 6020A).

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

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven (EPA Method 3005A). Instrumental analysis is by inductively coupled plasma - optical emission spectrophotometry (EPA Method 6010B).

NH3-F-VA Water Ammonia in Water by Fluorescence J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Weston et al.

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

Reference Information

This analysis is carried out using procedures adapted from "Standard Methods for the Examination of Water and Wastewater" published by the American Public Health Association, and with procedures adapted from "Test Methods for Evaluating Solid Waste" SW-846 published by the United States Environmental Protection Agency (EPA). The procedures may involve preliminary sample treatment by acid digestion, using either hotblock or microwave oven, 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 methylene blue colourimetric method.

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

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

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
WR	ALS ENVIRONMENTAL - WHITEHORSE, YUKON, CANADA
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

1 2

GLOSSARY OF REPORT TERMS

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

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

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

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

mg/L - milligrams per litre.

< - Less than.

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

N/A - Result not available. Refer to qualifier code and definition for explanation.

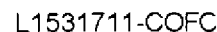
Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.



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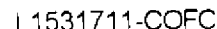
REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

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APPENDIX D

Description of Frozen Monitoring Wells Encountered During 2014 Sampling Events

DESCRIPTION OF FROZEN MONITORING WELLS ENCOUNTERED DURING 2014 SAMPLING EVENTS

Based on a comparison of well monitoring data (June and October 2014) and available well logs, as assessment of frozen monitoring wells was completed to determine which wells are likely situated in zones of discontinuous permafrost (Table 1), and which were likely frozen due to seasonal conditions (Table 2). As noted in the report, for those wells believed to be situated in discontinuous permafrost where samples were collected in the fall of 2014, there is believed to be a potential influence of permafrost melt on the samples collected.

Table D 1 Frozen Monitoring Wells Influenced by Discontinuous Permafrost

Well ID	2014 Event (Spring/Fall)	Depth to Water (m TOC)	Sampled (Yes/No)
W14103083BH01	Spring	6.646	No
	Fall	6.460	No
W14103083BH02	Spring	6.897	No
	Fall	6.130	Yes
W14103083BH04	Spring	6.730	No
	Fall	6.230	Yes
MW09-13	Spring	8.995	No
	Fall	9.020	No
MW09-14	Spring	5.098	No
	Fall	6.940	No
MW09-15	Spring	13.947	No
	Fall	13.970	No
CH-P-13-01/10	Spring	2.630	No
	Fall	2.710	Yes
GLL07-01	Spring	12.876	No
	Fall	13.890	No


Notes: m meters
TOC top of casing
 permafrost melt water

Table D - 2 Frozen Monitoring Wells Influenced by Seasonal Conditions (i.e., ice plugs at top of water column broken mechanically or thawed using hot deionized water)

Well ID	2014 Event (Spring/Fall)	Depth to Water (m TOC)	Sampled (Yes/No)
MW09-08	Fall	1.140	Yes
MP09-03	Fall	0.730	Yes
MP09-11	Fall	1.700	Yes
MP09-12	Fall	1.680	Yes
GSI-PC-02B	Fall	0.890	No
GSI-DC-05B	Fall	0.570	No

Notes: m meters
TOC top of casing

APPENDIX E

Response to Comments Received on Draft Report

Response to Comments from Draft Report Version (as Received November 25, 2014).

Comment No.	Page	Comment	Response
1	4	In previous report, it stated that the well was damaged....	CH-P-13-03/10 was damaged at the top coupler of the PVC pipe, the field crew was able to successfully repair the well during the fall. The well casing material (sand) was missing and presumed to have fallen into the well (this was also observed in the spring), as indicated by the DTB measurement of 5.2 m which was less than that previously documented DTB (10 m). Re-developing the well and removing the sand was not possible using a hydrolift due to an absence of groundwater. Due to the variation in DTB the well was recorded as 'blocked', but we have changed the status to Damaged to better represent the condition observed.
2	4	In the previous report, stated that obstruction may be a plastic bailer. Can this be removed?	During both the spring and fall sampling events the field crew described a hollow plastic sound when measuring depth-to-blockage at this location. The blockage was assumed to be a plastic bailer, although this was not confirmed. Efforts were made to remove the blockage during the fall event with no success. A small diameter camera could be used during future monitoring events to investigate the blockage in more detail.
3	5	Previous report stated that there was an obstruction.	Sample location MW09-01 could not be sampled due to an excessive quantity of tailings present in the groundwater. Presence of tailings may indicate the well screen has been damaged or compromised.
4	5	Is it repairable?	CH-P-13-02/10 needs to be re-developed. Although sample site CH-P-13-02/10 was recorded as a dry well, ~90 ml of standing water was measured. This volume was determined to be insufficient for sampling. Bentonite was also present at the bottom of the well. Standing water volume was insufficient for re-development of this well.
5	9	AAM's	Report has been revised accordingly.
6	9	consultant (AMEC) prior to the.....	Report has been revised accordingly.
7	9	AAM's consultant (AMEC) and employed.....	Report has been revised accordingly.
8	10	What about dissolved oxygen?	Report has been revised accordingly.
9	10	Notation appears to be in the wrong spot.	Report has been revised accordingly.
10	10	Where's number 2?	Report has been revised accordingly.
11	11	Please ensure notation are correct.	Notation has been revised accordingly.
12	14	Why are we comparing to October 13 data? Shouldn't we not be comparing to June 14 (the most recent)? Or is it a seasonal reason for why we choose October 13.	Table 3-1 is a summary of parameters collected for October 2014. The table title has been revised accordingly.

Comment No.	Page	Comment	Response
13	17	Why is it measured as a percentage?	The meters used to measure headspace gases were sourced from two rental companies and each unit had been setup differently, therefore units for CO2 varied. One meter malfunctioned in the field and also reported CO2 in % rather than ppm. Only four measurements were taken using this meter, and the readings did not appear to be accurate. These have been removed from the final version.
14	17	What is the size and are all the drive points the same size?	All drive points were ½" in diameter.
15	18	Ensure to make changes once analytical data (table A and B) has been reviewed with respects to comments provided.	Analytical tables have been reviewed and no changes to CCME guideline exceedances were required.
16	18	Is this common practice?	It is common practice for the laboratory to use dilution to analyse samples that contain elevated quantities of certain materials. No evidence exists to suggest that these samples exceed CCME guidelines and the results are therefore not flagged as exceedances.
17	20	Can it be removed?	As stated in comment 2, the blockage was assumed to be a plastic bailer. Efforts were made to remove the blockage during the fall event with no success. Further efforts could be made to remove the blockage, including using a camera to investigate the obstruction in more detail. Once we get a better look at the obstruction we can decide on the most effective approach for removal.
18	20	Were you able to go deeper? And was this an issue during the last event?	The blockage was observed at the same depth during the spring and fall sampling event. We were not able to get below the obstruction, a bailer was lowered to the depth of the blockage to confirm there was no water in the accessible portion of the well.
19	22	Says in table that it's damaged.....?	This well was listed as damaged due to the bentonite observed in the bottom of the well. This well should be redeveloped. Due to the low volume of standing water present in the well, redevelopment was not possible during the October 2014 sampling event.
20	23	This seems high. Does it mean MP09-05 results should be disregarded?	We do not recommend disregarding the MP09-05 sample altogether. RPD values for sulphate and total cyanide (25.8% and 22.9%) are only slightly above the 20% threshold and should therefore be considered satisfactory. RPD values for TOC however were 63.3%, in this case, the TOC value recorded may not be representative and additional sampling may need to be completed to confirm TOC concentration. No variations from laboratory or field methods were identified that may have caused sample variation. Although turbidity was at an acceptable level in this sample (7.68 NTU), it is possible that sediment and/or particles in the water sample and duplicate varied, which could give a different TOC value. It is also possible that when the lab implements their sampling protocol we could see variations (i.e. they may shake the bottle right before analysis).
21	23	spelling	Report has been revised accordingly.

Comment No.	Page	Comment	Response
22	23	Provide overall QA/QC conclusion. Are they acceptable or not?	Conclusion section has been added.
23	24	Identify how many wells require this and which ones?	Location ID for wells at risk of contamination have been added to the report recommendations.
24	24	I thought that this was going to be addressed during this program?	<p>CH-P-13-03/10 was damaged at the top coupler of the PVC pipe, the loose PVC stickup was repaired (glued) at the end of the spring 2014 program. The well casing material (sand) was missing and presumed to have fallen into the well, as indicated by the DTB measurement of 5.2 m which was less than that previously documented DTB (10 m) during the spring sampling event. Re-developing the well and removing the sand was not possible using a hydrolift due to an absence of groundwater. Removal of nearly 5m column of sand/sediment that extends over the water table may be challenging. A potential way to clear out the sand includes filling the well with water and simultaneously air-lifting the water (with an air compressor). Depending on the well's hydraulic conductivity large volumes of water may be required. For example, if the well accepts large volumes of water without significant pooling inside the well, an air-lift redevelopment method may be effective. An alternative approach (better but much more expensive) would include using a hydrovac with narrow tubing (1.5") to vacuum the sand/sediment out of the well.</p> <p>CH-P-13-04/35 had blockage at 6.505 m below the surface. As mentioned earlier, this blockage could potentially be equipment associated with a previous piezometer installation. A deployable camera would be recommended to be used during future monitoring events to further investigate the blockage.</p> <p>MW09-01 could not be sampled due to an excessive quantity of tailings present in the groundwater. Presence of tailing may indicate the well screen has been damaged or compromised. Not much can be done to remedy this well other than reinstalling it if the condition persists.</p> <p>CH-P-13-02/10 had only 90 ml of standing water present in the well. This volume was determined to be insufficient for sampling. Bentonite was also present at the bottom of the well. CH-P-13-02/10 was treated as dry well and therefore not sampled. Again, this well should be redeveloped but requires a larger quantity of standing water to complete the task. Similar redevelopment method as described above could be employed.</p>
25	24	How many locations?	The majority of monitoring wells have slits installed in the PVC casing that release headspace gases. Each well varies slightly in where and how these slits were installed. A complete record of these features were not captured during the 2014 events. If fitting these wells for proper headspace gas monitoring is of interest to AAM, this detail could be added to field forms for a future monitoring event. This would help to generate an inventory of how this could be completed for individual wells. The DP sites are properly sealed with threaded caps.

Comment No.	Page	Comment	Response
26	24	For 5 and 6..... Shouldn't this not be a requirement? Is this common practice.... does it follow typical procedure?	It is not common procedure, and Hemmera/ELR have made this as a suggestion only as AAM's Consultant (AMEC) have designed the monitoring program through 2014. In our opinion, these suggestions would help to collect more representative samples, particularly at a site where there is significant metal contamination (i.e. an abandoned hard rock mine). The reason we would recommend field-filtered samples for acidity, alkalinity and hardness is because it reduces the particles that metals could attach to. If there are metals attached to the particles this could impact the acidity, alkalinity and/or hardness that would result in the groundwater. We recommend collecting alkalinity samples separately in a bottle with zero headspace because when the water sample interacts with oxygen there is the possibility of ion transfer that could result in an artificial alkalinity results.
27	28	You will see that we went through all the data and highlighted ones that we thought needed clarity (either should of been highlighted or were highlighted when they didn't need to be).... Could you guys do a check and based on any errors found, please change any analytical results provided in the previous section.	We have reviewed each of the values highlighted in the table and found that no changes to CCME exceedances were necessary.
28	29	Please insert detection limit column...	We have not included a detection limit column due to inconsistencies in detection limit among samples. Due to the need to dilute some samples, detection limits vary from sample to sample and cannot be provided in a single column.
29	29	Insert field test parameters here too!	Table has been revised accordingly.
30	29	Is there parameters missing here? (i.e. TSS)	No parameters were found to missing. TSS was not included in the original scope of work.
31	30	On notes sheet, rage for cadmium is given at 0.04 - 0.37. why is it at 0.016 - 0.37 here?	The ranges for parameter exceedences were listed according to the actual range of guideline levels based on individual site conditions. As per discussions with AAM, these ranges have now been replaced with the text "Varies" and a reference to guideline details.
32	33	Where is CH-P-13-02?	Table has been revised accordingly.