

**Mount Nansen
Water Resources Investigations
Quarterly Report (Q1)
April - June 2014**

Prepared for:

Yukon

Energy Mines and Resources
Assessment and Abandoned Mines

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EXECUTIVE SUMMARY

EDI Environmental Dynamics Inc. (EDI) was retained by Yukon Government, Assessment and Abandoned Mines (AAM) in 2014 to conduct the Water Resource Investigations 2014/15 program at the Mount Nansen Site. This program involves surface water hydrometric and water quality monitoring, and meteorology for four watersheds at the Mount Nansen Site. The data presented in this report comprises the first quarter of the program (Q1), from April 1, 2014 to June 30, 2014. The monitoring objectives during this period were to collect surface water data from early-spring into early-summer and to capture the spring freshet period.

Over the course of the Q1 period, four monitoring events took place:

- April 14-15, 2014
- May 8-9, 2014
- May 20-21, 2014
- June 23-25, 2014

Hydrometric monitoring was completed at up to 14 hydrometric stations. Monitoring at each station included discharge measurements and water level surveys where continuous stage data loggers are installed. The four continuous loggers that remained in place over the winter captured the peak freshet stage that occurred between May 5 and May 9, 2014. The timing of the peak varied between watersheds; where smaller drainages peaked first. Stream gauging methods included the velocity-area method (mid-section method), salt dilution gauging and volumetric method.

Water quality sampling was completed at the 23 regular water quality sites, in addition to five sites during the freshet period (May 2014 trips). Water samples were collected at each site along with *in situ* water quality parameters including water temperature, specific conductivity, pH and turbidity. Water samples were analyzed for total and dissolved metals, anions and nutrients, routine parameters, and cyanides, in addition to a drinking water samples from a drinking water well. An LT50 sample was also collected from one site, every second month.

This report summarizes the site conditions between April 1, 2014 and June 30, 2014 and presents the collected data for the same time period. A description of the methodologies used for each component is also provided. Hydrometric results include stream discharge measurements, updated rating curve expressions for each station (where possible) and hydrographs. Water quality results include a summary of parameters that exceed the Canadian Council of Ministers of Environment Aquatic Life guidelines and/or the Mount Nansen Effluent Quality Standards, as well as a summary of *in situ* water quality parameters. A brief description of the daily and hourly meteorological data for the Q1 period is also presented. A copy of the updated hydrometric, water quality and meteorological databases, containing all raw data, accompanies this report.



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TABLE OF CONTENTS

1	INTRODUCTION	1
1.1	SITE CONDITIONS.....	2
2	METHODOLOGY	3
2.1	MONITORING NETWORK DESCRIPTION.....	3
2.2	METEOROLOGY.....	7
2.3	HYDROLOGY.....	7
2.3.1	<i>Velocity-Area Mid-Section.....</i>	9
2.3.2	<i>Salt Dilution Gauging.....</i>	10
2.3.3	<i>Volumetric.....</i>	12
2.3.4	<i>Ice-cover Hydrometrics.....</i>	13
2.3.5	<i>Hydrometric Leveling Surveys.....</i>	13
2.3.6	<i>Hydrometric Validation & QA/QC Program.....</i>	14
2.3.7	<i>Rating Curve Development.....</i>	14
2.3.8	<i>Continuous Stage and Discharge.....</i>	15
2.3.9	<i>Hydrometric Data Management.....</i>	16
2.4	WATER QUALITY.....	16
2.4.1	<i>Field Sampling Methods.....</i>	18
2.4.2	<i>Laboratory Analysis.....</i>	19
2.4.3	<i>QA/QC Program.....</i>	20
2.4.4	<i>Data Analysis.....</i>	20
3	RESULTS.....	23
3.1	METEOROLOGY.....	23
3.1.1	<i>Air and Ground Temperature.....</i>	23
3.1.2	<i>Precipitation.....</i>	23
3.1.3	<i>Wind.....</i>	24
3.1.4	<i>Short and Long Wave Radiation.....</i>	24



3.1.5 *Relative Humidity*..... 24

3.2 HYDROLOGY 24

3.2.1 *Dome Creek*..... 25

3.2.1.1 H-DC-DX+10525

3.2.1.2 H-DC-D1b.....26

3.2.1.3 H-DC-B.....26

3.2.1.4 H-TP27

3.2.1.5 H-SEEP27

3.2.1.6 H-DC-M.....27

3.2.1.7 H-DC-R.....29

3.2.2 *Back Creek*..... 29

3.2.2.1 Back Creek (H-BC)29

3.2.3 *Victoria Creek*..... 30

3.2.3.1 Upper Victoria Creek (H-VC-U).....30

3.2.3.2 Victoria Creek, downstream of Back Creek (H-VC-DBC).....31

3.2.3.3 Victoria Creek, upstream of Minnesota Creek (H-VC-UMN)32

3.2.3.4 Victoria Creek at Road (H-VC-R).....33

3.2.4 *Pony Creek* 34

3.2.4.1 Upper Pony Creek (H-PC-U).....34

3.2.4.2 Pony Creek Downstream of Pit (H-PC-DSP)34

3.3 WATER QUALITY..... 35

3.3.1 *Dome Creek*..... 35

3.3.2 *Regular Seep Sites* 37

3.3.3 *Brown-McDade Pit Lake* 40

3.3.4 *Tailings Pond & Seepage Pond Discharge* 41

3.3.5 *Victoria Creek*..... 42

3.3.6 *Back Creek*..... 44

3.3.7 *Pony Creek* 44

3.3.8 *Pump House Well*..... 46



3.3.9 *Additional Freshet Sites*..... 46

3.3.10 *QA/QC Program*..... 48

4 **CONCLUSIONS & RECOMMENDATIONS** 49

5 **REFERENCES**..... 50

5.1 SPATIAL DATA..... 51

LIST OF APPENDICES

- APPENDIX A Q1 SITE AND STATION PHOTOGRAPHS
- APPENDIX B Q1 MONITORING VISIT RECORD
- APPENDIX C Q1 EDI FIELD DATA SHEETS
- APPENDIX D Q1 SURFACE WATER HYDROLOGY DATA
- APPENDIX E Q1 SURFACE WATER QUALITY DATA
- APPENDIX F Q1 METEOROLOGICAL DATA

LIST OF TABLES

Table 1. Summary of meteorology, hydrology and water quality data included in this report.1

Table 2. List of hydrometric stations and water quality sites at the Mount Nansen Site as of April 1, 2014 based on 2014/15 Scope of Work as well as additional freshet monitoring sites (denoted by an *).4

Table 3. Summary of weather data parameters collected at Mount Nansen Meteorological Station (ATM-ROAD AAM)7

Table 4. Mount Nansen hydrometric station information, April 1 to June 30, 2014.9

Table 5. Mount Nansen water quality site and sampling information. 17

Table 6. Laboratory analysis parameters included in various ‘packages’ created for surface water quality sampling at Mount Nansen (continues on next page). 19

Table 7. CCME-AL guidelines applicable to Mount Nansen surface water quality sampling program (CCME 2014). 21

Table 8. Mount Nansen Effluent Quality Standards outlined in Yukon Water License #QZ94-004.... 22



Table 9.	Applicable Guidelines for Canadian Drinking Water Quality for WQ-PW (Health Canada 2012).....	22
Table 10.	Middle Dome Creek (H-DC-M) open water rating curve equations.....	28
Table 11.	Dome Creek at the Road (H-DC-R) open water rating equations.....	29
Table 12.	Back Creek (H-BC) open water rating curve equations.....	30
Table 13.	Upper Victoria Creek (H-VC-U) open water rating curve equations.....	31
Table 14.	Victoria Creek, downstream of Back Creek (H-VC-DBC) open water rating curve equations.	32
Table 15.	Victoria Creek, upstream of Minnesota Creek (H-VC-UMN) open water rating curve equations.....	33
Table 16.	Victoria Creek at Road (H-VC-R) open water rating curve equations.....	34
Table 17.	Summary of parameters that exceeded CCME-AL guidelines and/or Mount Nansen EQS at the upper Dome Creek sites for the Q1 period (April 1 to June 30, 2014). Parameters in bold exceed both standard and guideline values.....	36
Table 18.	Summary of parameters that exceeded CCME-AL guidelines and/or Mount Nansen EQS for the lower Dome Creek sites for the Q1 period (April 1 to June 30, 2014). Parameters in bold exceed both standard and guideline values.....	36
Table 19.	<i>In-situ</i> water quality data for the Dome Creek sites for the Q1 period (April 1 to June 30, 2014).....	37
Table 20.	Summary of parameters that exceeded CCME-AL guidelines and/or Mount Nansen EQS for the WQ-DESS-01-03 sites for the Q1 period (April 1 to June 30, 2014). Parameters in bold exceed both standard and guideline values.....	38
Table 21.	Summary of parameters that exceeded CCME-AL guidelines and/or Mount Nansen EQS for the WQ-CH-P-13-01 and WQ-MS-S-08 sites for the Q1 period (April 1 to June 30, 2014). Parameters in bold exceed both standard and guideline values.....	39
Table 22.	<i>In situ</i> water quality data for the WQ-DESS-01-03, WQ-CH-P-13-01 and WQ-MS-S-08 sites for the Q1 period (April 1 to June 30, 2014).....	39
Table 23.	Summary of parameters that exceeded CCME-AL guidelines and/or Mount Nansen EQS for the Brown McDade Pit Lake for the Q1 period (April 1 to June 30, 2014). Parameters in bold exceed both standard and guideline values.....	40



Table 24.	<i>In-situ</i> water quality data for the Brown McDade Pit Lake for the Q1 period (April 1 to June 30, 2014).....	41
Table 25.	Summary of parameters that exceeded CCME-AL guidelines and/or Mount Nansen EQS for WQ-TP and WQ-SEEP for the Q1 period (April 1 to June 30, 2014). Parameters in bold exceed both standard and guideline values.....	41
Table 26.	<i>In situ</i> water quality data for WQ-TP and WQ-SEEP for the Q1 period (April 1 to June 30, 2014).....	42
Table 27.	Summary of parameters that exceeded CCME-AL guidelines and/or Mount Nansen EQS for sites within the Victoria Creek watershed for the Q1 period (April 1 to June 30, 2014). Parameters in bold exceed both standard and guideline values.....	43
Table 28.	<i>In situ</i> water quality data for sites within Victoria Creek for the Q1 period (April 1 to June 30, 2014).....	43
Table 29.	Summary of parameters that exceeded CCME-AL guidelines and/or Mount Nansen EQS for WQ-BC for the Q1 period (April 1 to June 30, 2014). Parameters in bold exceed both standard and guideline values.	44
Table 30.	<i>In situ</i> water quality data for WQ-BC for the Q1 period (April 1 to June 30, 2014).	44
Table 31.	Summary of parameters that exceeded CCME-AL guidelines and/or Mount Nansen EQS for the Pony Creek sites for the Q1 period (April 1 to June 30, 2014). Parameters in bold exceed both standard and guideline values.....	45
Table 32.	<i>In situ</i> water quality data for the Pony Creek sites for the Q1 period (April 1 to June 30, 2014).	45
Table 33.	<i>In situ</i> water quality data for WQ-PW for the Q1 period (April 1 to June 30, 2014).	46
Table 34.	Summary of parameters that exceeded CCME-AL guidelines and/or Mount Nansen EQS for the additional freshet sites (WQ-ET-1 and WQ-MS-S-03) for the Q1 period (April 1 to June 30, 2014). Parameters in bold exceed both standard and guideline values.....	47
Table 35.	Summary of parameters that exceeded CCME-AL guidelines and/or Mount Nansen EQS for the additional freshet sites (WQ-L2, WQ-NW-SEEP-02, WQ-ORE) for the Q1 period (April 1 to June 30, 2014). Parameters in bold exceed both standard and guideline values.	47
Table 36.	<i>In situ</i> water quality data for the additional freshet monitoring sites for the Q1 period (April 1 to June 30, 2014).....	48
Table 37.	Summary of sites randomly selected as replicate samples for each sampling trip over the Q1 period.	48



LIST OF FIGURES

Figure 1.	Regional overview map of Mount Nansen Site Area.....	5
Figure 2.	Mount Nansen Site: Hydrometric Stations and Water Quality Sites.....	6



1 INTRODUCTION

Yukon Government Assessment and Abandoned Mines (AAM) retained the services of EDI Environmental Dynamics Inc. (EDI) in 2014 to conduct the Water Resource Investigations 2014/15 program at the Mount Nansen Site. This program involves three monitoring components: surface water hydrology, surface water quality, and meteorology. This report represents the data report for the first quarter (Q1) of the program, from April 1, 2014 to June 30, 2014.

The Q1 period consisted of a single monthly monitoring event in April 2014 and June 2014, with two trips in May 2014 to capture spring freshet. The dates of each monitoring event were:

- April 14-15, 2014
- May 8-9, 2014
- May 20-21, 2014
- June 23-25, 2014

This report outlines the methodology used for all program components, presents the results for each monitoring event and provides recommendations to implement within the program. The data included in this report for each component is summarized in Table 1, below.

Table 1. Summary of meteorology, hydrology and water quality data included in this report.

Monitoring Component	Data Included	Section
Meteorology	• Summary of daily meteorological data	• 3.1
	• Hourly meteorological plots	• Appendix F
Hydrology	• Rating curve data summary tables	• 3.2
	• Database tables	• Appendix D
	• Field data sheets	• Appendix C
Water Quality	• Guideline/standard exceedance summary tables	• 3.3
	• <i>In situ</i> water quality data summary tables	• 3.3
	• Lab results table and QA/QC analysis	• Appendix E
	• Field data sheets	• Appendix C



1.1 SITE CONDITIONS

Site conditions during the Q1 period were typical of the spring and early summer period with a gradual warming trend from April to May 2014, increased snow and ice melt, followed by freshet, and then green up of vegetation on site. The following specific observations were made during each trip to the Mount Nansen Site:

- **April 14-15, 2014** – Air temperatures varied from 0°C to +8°C during the April 2014 investigation. All streams and waterbodies still had ice cover, with ice thicknesses varying from 5 cm to 1 m. There was between 20 cm and 40 cm of snow on the ground during the site visit. Water levels at most sites/stations were very low, which is common for the early-spring period. Several sites and stations remained frozen to substrate from the winter (*i.e.*, Pony Creek, sections of Dome Creek, and Back Creek). Significant quantities of aufies remain present within the Dome Creek watercourse, on Back Creek, and at the Victoria Creek at Road station/site.
- **May 8-9, 2014** – Air temperatures during the trip ranged from 5°C to 17°C for the duration of the field sampling, with clear to overcast conditions and occasional light rain. From inspection of the site and channel conditions, discharge conditions in most drainages were descending from peak flows. Water levels at all hydrometric stations and water quality sites were high with turbidity levels elevated above typical background levels. Nearly all sites and stations were ice free, with the exception of two sites on Dome Creek and shore ice along the lower portions of Victoria Creek near the road. The tailings pond was nearly ice free, with a small area of ice cover in the centre of the pond. The ice in the pit lake was in the process of melting, but was not safe for sampling.
- **May 20-21, 2014** – Air temperatures were unseasonably cold during the trip, ranging from -2°C to +5°C with partly cloudy skies and periods of light snow and light winds. Water levels had dropped slightly from the previous freshet trip, but were still considered high. The pit lake remained partially ice covered and sampling was not possible. The tailings pond was ice free. Some shore ice remained along Victoria Creek near the road as well as at one site on Dome Creek.
- **June 23-25, 2014** – Air temperatures during the trip ranged from 9°C to 19°C. Weather conditions were sunny to overcast during the monitoring program, with light wind and rain on June 24, 2014. Water levels had dropped considerably from the previous May trips, and were considered low or were dry. The pit lake was ice free.



2 METHODOLOGY

The Mount Nansen surface water and meteorological monitoring network consists of several discrete components: meteorology, surface water hydrology, and surface water quality. The following sections describe the monitoring network and the various meteorological, hydrometric, and water quality sampling methods used during the Q1 period (April 1, 2014 to June 30, 2014).

Methods have remained consistent from the previous investigation periods (2013/14), with slight changes to the monitoring network due to program scope changes.

2.1 MONITORING NETWORK DESCRIPTION

The Mount Nansen Site lies within the Victoria Creek drainage which is a tributary to the Nisling River. Several smaller watercourses drain the mine site area, including Dome Creek and Pony Creek. Dome Creek is a tributary to Victoria Creek and originates upstream of the mill, flows through the valley and is diverted around the tailings pond. Pony Creek lies within the northern portion of the mine site area to the north of the Brown-McDade pit lake. Pony Creek is a tributary to Back Creek, which flows into Victoria Creek upstream of the Dome Creek confluence. Minnesota Creek also flows into Victoria Creek downstream of the Dome Creek confluence. See Figure 1 and Figure 2 for a regional overview of the watersheds present within the study area as well as water resources investigation site and station locations.

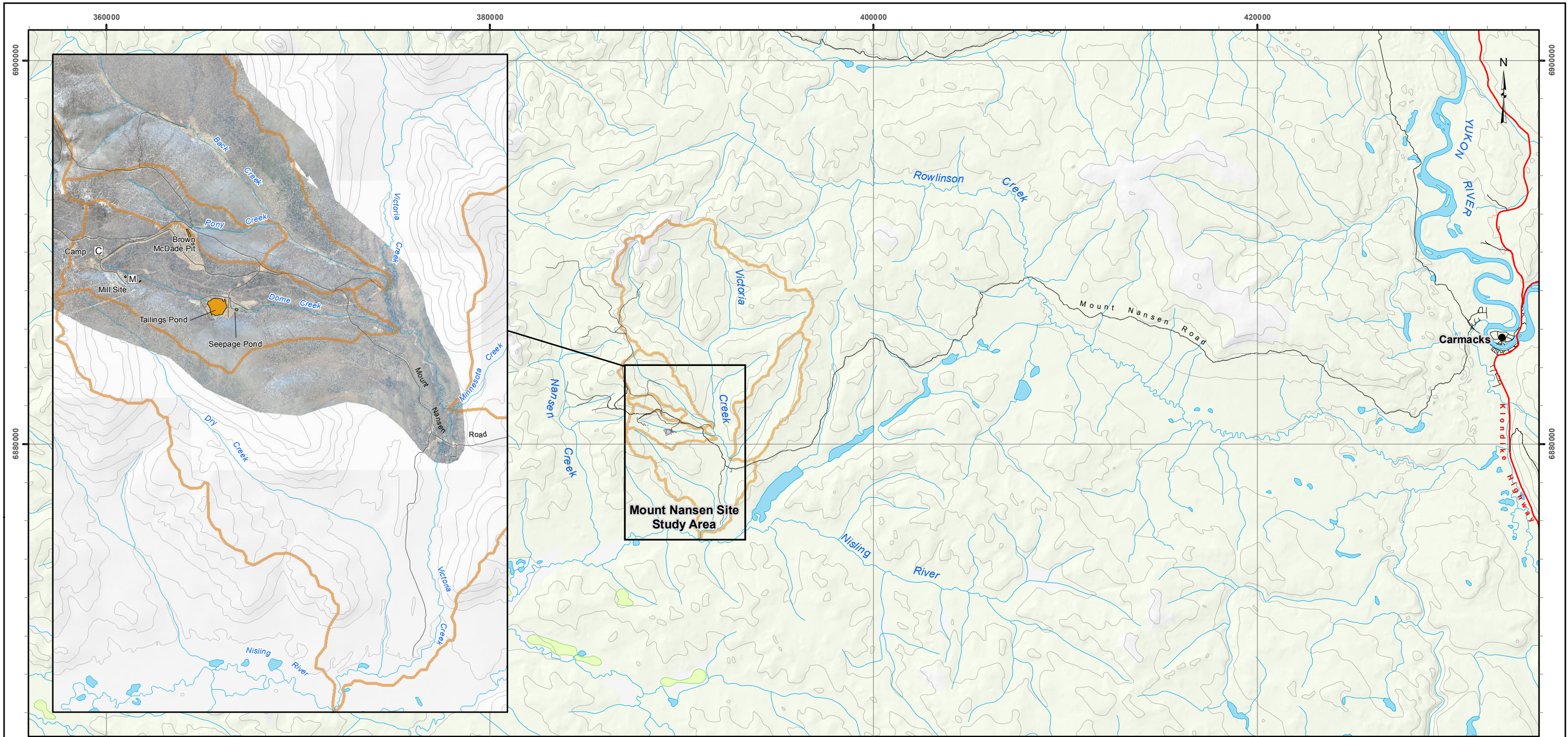
The 2014/15 project scope has some differences from the previous year's programs (2013/14, 2012/13), particularly the addition of several surface water quality sites, including the Dome Creek east slope seeps (WQ-DESS sites 01, 02, 03), the WQ-CH-P-13-01 seep and WQ-LW-SEEP-01. The list and location of water quality sites and hydrometric stations are presented below (Table 2; Figure 2).

In addition to the regular scope of work, AAM requested that several additional, opportunistic sites be investigated during the freshet trips in May 2014. The additional water quality sites included seeping water from the ore ramp leading down into the pit lake, a seep on the west lower waste rock dump, the lysimeter 2 on the waste rock dump, up to two samples from the various exploration trenches surrounding the mill site, and the mill site seep 03 (which was a regular site during the 2013/14 program). AAM also asked that water levels be measured in two groundwater wells within the pit area (GLL07-03 and CH-P-13-05/50m; Table 2; Figure 2) as well measurement of the water level in the pit lake itself.



Table 2. List of hydrometric stations and water quality sites at the Mount Nansen Site as of April 1, 2014 based on 2014/15 Scope of Work as well as additional freshet monitoring sites (denoted by an *).

Station/Site Name	Hydrology	Water Quality	Station/Site ID
Upper Pony Creek	✓	✓	H/WQ-PC-U
Pony Creek Downstream of Pit	✓	✓	H-PC-DSP/WQ-PC-D
Dome Creek at DX	-	✓	WQ-DC-DX
Dome Creek at DX+105	✓	✓	H/WQ-DC-DX+105
Dome Creek at D1b	✓	✓	H/WQ-DC-D1b
Diversion Channel at Bridge	✓	✓	H/WQ-DC-B
Middle Dome Creek	✓	✓	H-DC-M/WQ-DC-U
Dome Creek at Road	✓	✓	H/WQ-DC-R
Seepage Pond Outflow	✓	✓	H/WQ-SEEP
Tailings Pond	✓	✓	H/WQ-TP
Brown-McDade Pit Lake	-	✓	WQ-PIT-1,2,3
Mill Site Seep 08	-	✓	WQ-MS-S-08
Back Creek	✓	✓	H/WQ-BC
Upper Victoria Creek	✓	✓	H/WQ-VC-U
Victoria Creek Downstream of Back Creek	✓	✓	H/WQ-VC-DBC
Victoria Creek Upstream of Minnesota Creek	✓	✓	H/WQ-VC-UMN
Victoria Creek at Road	✓	✓	H/WQ-VC-R
Pump House Well	-	✓	WQ-PW
Dome East Slope Seep 01	-	✓	WQ-DESS-01
Dome East Slope Seep 02	-	✓	WQ-DESS-02
Dome East Slope Seep 03	-	✓	WQ-DESS-03
CH-P-13-01	-	✓	WQ-CH-P-13-01
Lower West Toe of Waste Rock Dump Seep 01	-	✓	WQ-LW-SEEP-01
Ore Ramp Seep*	-	✓	WQ-ORE
Lysimeter 2*	-	✓	WQ-L2
North West Toe of Waste Rock Dump Seep 01*	-	✓	WQ-NW-SEEP-01
Mill Site Seep 03*	-	✓	WQ-MS-S-03
Exploration Trench 1*	-	✓	WQ-ET-1
Pit Groundwater Well GLL07-03*	✓	-	GLL07-03
Pit Groundwater Well CH-P-13-05/50m*	✓	-	CH-P-13-05/50m



Regional Overview Map of Mount Nansen Site Area

Legend

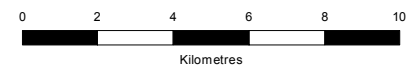
- Secondary Road
- Highway
- Topographic Contour
- Watercourse
- Waterbody
- Wetland Area
- Drainage Areas (Local)

1:50,000 and 1:250,000 Topographic Spatial Data courtesy of Her Majesty the Queen in Right of Canada, Department of Natural Resources. All Rights Reserved.

Digital Elevation Model provided by Geomatics - Yukon Government via online source (Corporate Spatial Warehouse) www.geomaticsyukon.ca.

Watercourse, drainage areas and Mount Nansen Road layers digitized / modified by EDI (2011) using orthophotos provided by Yukon Government, Energy, Mines and Resources (2011).

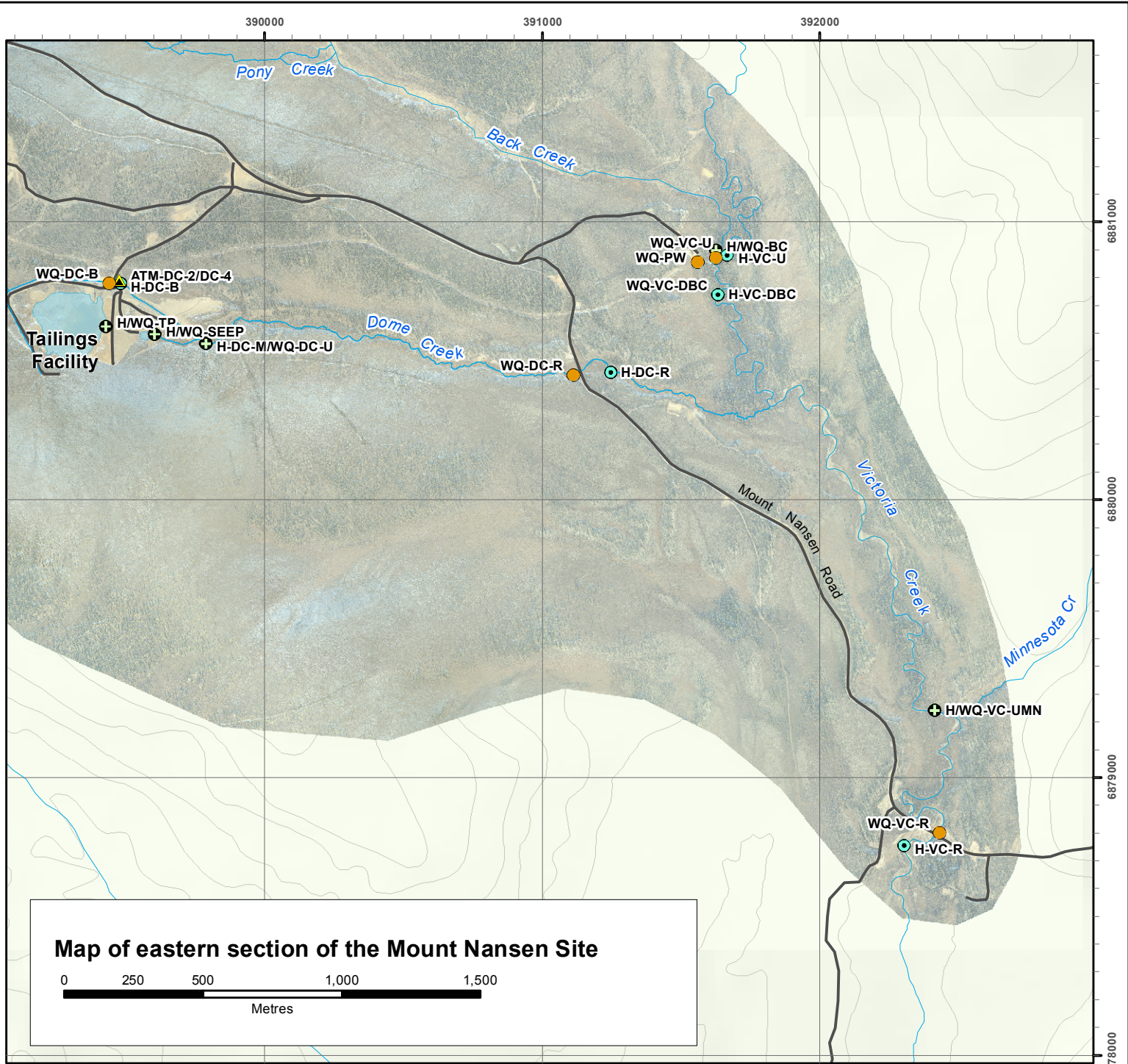
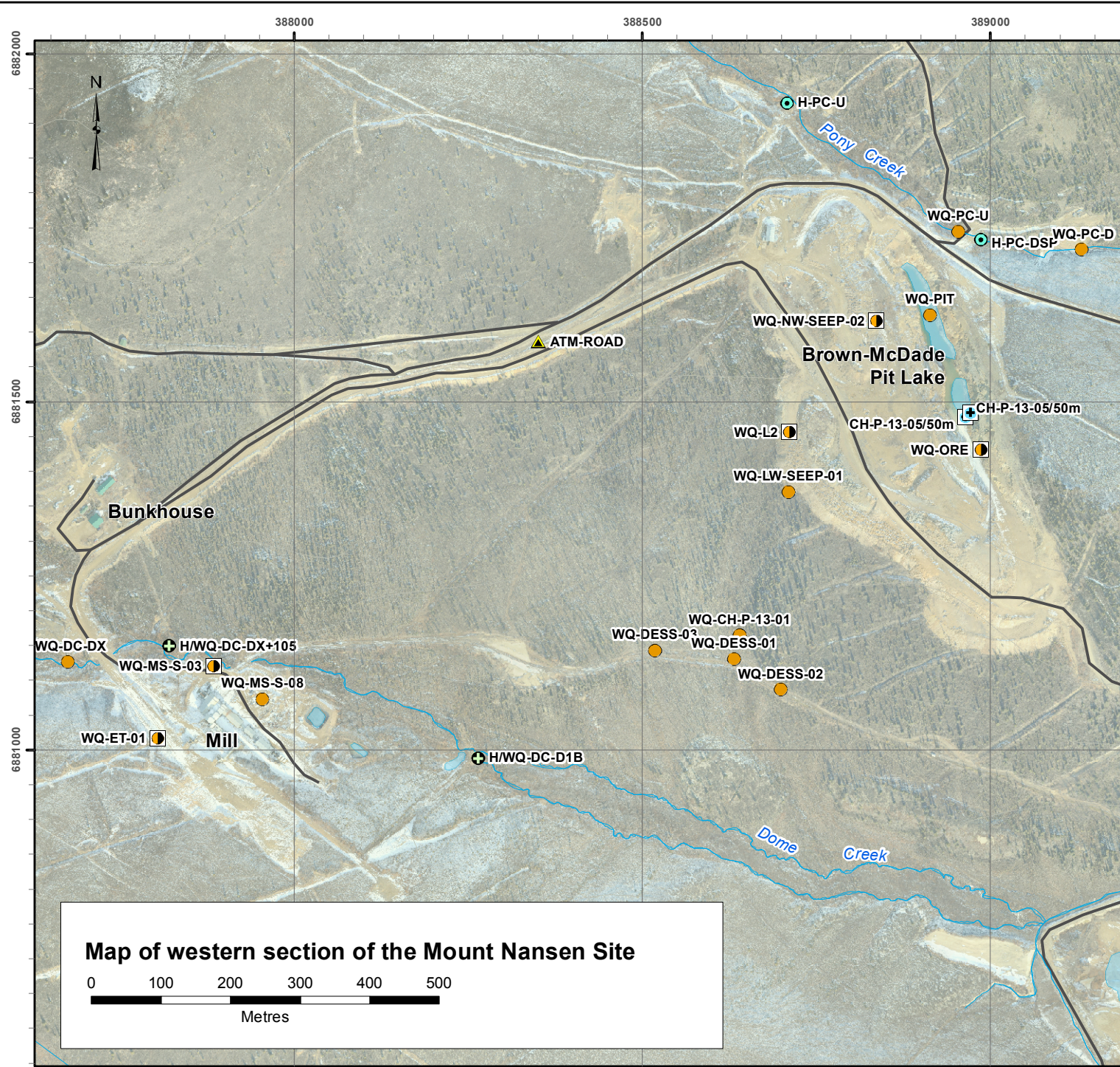
This document is not an official land survey and the spatial data presented is subject to change.



Map Scale = 1:200,000 (printed on 11 x 17)
 Map Projection: North American Datum 1983 UTM Zone 8N

Drawn: LG	Checked: MM	FIGURE 1	Date: 20/03/2014
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Mount Nansen Site: Hydrometric Stations and Water Quality Sites

Legend

- Atmospheric Station (label ex: ATM-DC-2)
- Hydrometric Station and Water Quality Site (label ex: H/WQ-VC-UMN)
- Hydrometric Station (label ex: H-VC-R)
- Water Quality Site (label ex: WQ-PC-U)
- Temporary Hydrometric Station
- Temporary Water Quality Site
- Unpaved Road/Access

Notes:

1:50,000 and 1:250,000 Topographic Spatial Data provided by Geomatics - Yukon Government via online source (Corporate Spatial Warehouse) www.geomaticsyukon.ca.

Digital Elevation Model provided by Geomatics - Yukon Government via online source (Corporate Spatial Warehouse) www.geomaticsyukon.ca.

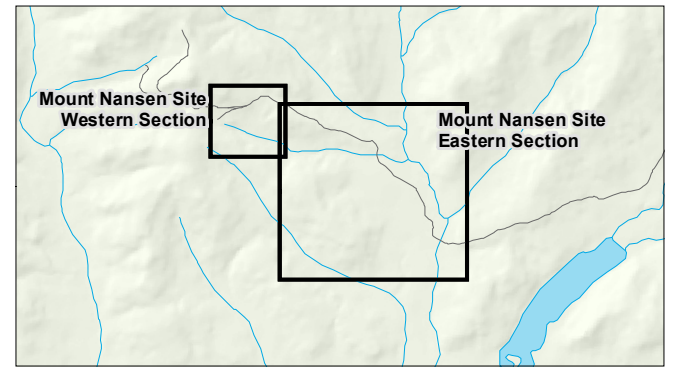
Watercourse, drainage areas and Mount Nansen Road layers digitized / modified by EDI (2011) using orthophotos provided by Yukon Government, Energy, Mines and Resources (2011).

Imagery provided by Yukon Government - Energy, Mines and Resources - Abandoned Mines Branch.

Project data displayed is site specific. Data collected by EDI Environmental Dynamics Inc. (2014) was obtained using Garmin GPS technology.

This document is not an official land survey and the spatial data presented is subject to change.

Map Projection: North American Datum 1983 UTM Zone 8N



Drawn: LG	Checked: MM	FIGURE 2	Date: 28/05/2014
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2.2 METEOROLOGY

A Campbell Scientific meteorological station (ATM-ROAD AAM) was established at the Mount Nansen Site in October 2011. The station is located adjacent to the Mount Nansen Road, east of the camp (Figure 2). The ATM-ROAD AAM station is administered by Northern Avcom and data is accessible through an internet download. EDI is responsible for downloading and compiling these raw data into a database. A copy of the updated database is provided with this report. A basic quality control/quality assurance review is completed upon data retrieval; however, EDI is not responsible for meteorological station instrumentation maintenance or sensor calibration. During the Q1 period, the station underwent calibration and maintenance and was re-installed on April 10, 2014.

The ATM-ROAD AAM station records air temperature, ground temperature, humidity, rainfall, snow depth, net shortwave and long-wave radiation, total radiation, wind speed, wind direction and battery voltage (Table 3).

Table 3. Summary of weather data parameters collected at Mount Nansen Meteorological Station (ATM-ROAD AAM)

Meteorological Parameter	Units	Notes
Daily Collection		
Air Temperature Maximum	°C	Measured every 5 minutes. Daily maximum value is reported.
Air Temperature Minimum	°C	Measured every 5 minutes. Daily minimum value is reported.
Humidity Maximum	%	Measured every 5 minutes. Daily maximum value is reported.
Humidity Minimum	%	Measured every 5 minutes. Daily minimum value is reported.
Snow Depth	cm	Reports the depth of snow at the end of the day.
Battery Voltage	Volts	Measured every 5 minutes. Daily minimum value is reported
Hourly Collection		
Net Shortwave	W/m ²	Measured every 5 minutes. Hourly average is reported.
Net Longwave	W/m ²	Measured every 5 minutes. Hourly average is reported.
Net Total Radiation	W/m ²	Measured every 5 minutes. Hourly average is reported.
Wind Speed	m/s	Measured every 5 minutes. Hourly average is reported.
Wind Direction	degrees	Measured every 5 minutes. Hourly average is reported.
Precipitation	mm	Total precipitation recorded hourly.
Snow Depth	cm	Hourly sample recorded.
Air Temperature	°C	Measured every 5 minutes. Hourly average is reported.
Humidity	%	Measured every 5 minutes. Hourly average is reported.
Ground Temperature Surface	°C	Hourly sample recorded.
Barometric Pressure	mbar	Hourly sample recorded.

2.3 HYDROLOGY

Discharge and/or stage were measured at 14 different hydrometric stations either continuously with water level loggers or instantaneously during each site visit depending on field conditions. There were ten combined continuous/instantaneous hydrometric stations and four instantaneous hydrometric stations



(Table 4). Only four of these stations (H-DC-M, H-VC-U, H-VC-DBC, and H-VC-R) remained active through the previous year's winter period (Q3 and Q4). During each monitoring event, instantaneous discharge measurements were made at all sites (continuous/instantaneous) as long as channel conditions allowed.

A detailed description of each hydrometric station is found in Appendix D. Table 4 summarizes the hydrometric station characteristics that comprise the monitoring network at the Mount Nansen Site.

Methods employed for discharge measurement in 2014 included:

- the velocity-area mid-section method;
- volumetric measurements at perched outlets such as culverts and pipes; and,
- salt dilution gauging (brine salt slug injection) methods.

The velocity-area mid-section method is standardized by British Columbia's Resources Information Standards Committee (RISC 2009), however many of the channels at the Site are inappropriate for using this method (*i.e.*, too shallow, too narrow or low discharge). In such cases, alternative methods including salt-dilution gauging and volumetric measurements are used. When salt dilution or volumetric measurements are made, field crews collect replicate measurements and mean resultant discharge estimates are calculated. An elevation survey is completed during each hydrometric station visit where there are continuous data loggers installed. These surveys were used to monitor shifts in benchmarks, station, and staff gauge elevations. Due to periglacial processes, shifting installations are common and require post-collection data adjustments.

Given the small channel sizes and relatively low discharge at many stations, the minimum reportable discharge is set to 0.001 m³/s or 1 L/s; this value is lower than what is typically reported for other hydrometric programs (e.g., Water Survey of Canada uses +/-0.01 m³/s for open water conditions). Field methods used at Mount Nansen can accommodate this higher resolution of discharge under ideal conditions, however measurement uncertainty for each method should be considered when interpreting results. Measurement uncertainty is partly based on instrument accuracy (Appendix D, Table D-1). Discharges calculated for several stations were less than 0.001 m³/s and reported as 0.000 m³/s, below reportable confidence limits.

All velocity-area measurements of stream discharge used the Sontek Acoustic Doppler Velocimeter (ADV). The ADV is advantageous to the hydrometric program because it has the ability to collect velocity measurements in two dimensions and thus compensate for measurement error associated with velocity angles. The ADV also provides a variety of quality control and assurance assessments in real-time, reducing field measurement error. The absence of moving parts on the acoustic sensor also decreases measurement error during winter conditions when moving parts tend to freeze.



Table 4. Mount Nansen hydrometric station information, April 1 to June 30, 2014.

HID ¹	Hydrometric Station Name	Type ²	Location ³		Drainage Area (km ²)	Elevation ⁴ (m)
			Easting	Northing		
ATM-DC2	Barometric at Diversion Channel	ATM	389476	6880792	-	1099
ATM-DC4	Barometric at Diversion Channel	ATM	389476	6880792	-	1100
H-PC-U	Upper Pony Creek	I	388709	6881930	0.8	1227
H-PC-DSP	Pony Creek Downstream of Pit	C	388986	6881734	1.0	1191
H-DC-DX+105	Dome Creek at DX+105	I	387820	6881150	0.9	1204
H-DC-D1b	Dome Creek at D1b	I	388262	6881000	1.4	1156
H-DC-B	Diversion Channel at Bridge	C	389480	6880780	3.0	1095
H-DC-M	Middle Dome Creek	C/CW	389788	6880565	3.3	1065
H-TP	Tailings Pond	I	389427	6880625	-	1093
H-SEEP	Seepage Pond Outflow	I	389604	6880598	-	1072
H-DC-R	Dome Creek at Road	C	392540	6879249	4.5	1020
H-BC	Back Creek	C	391626	6880901	10.4	1021
H-VC-U	Upper Victoria Creek	C/CW	391667	6880882	64.6	1019
H-VC-DBC	Victoria Creek Downstream of Back Creek	C/CW	391627	6880840	75.0	1017
H-VC-UMN	Victoria Creek Upstream of Minnesota Creek	C	392413	6879244	83.4	986
H-VC-R	Victoria Creek at Road	C/CW	392305	6878755	97.7	975

Notes:

1 - HID = unique station identifier that corresponds with hydrometric database tables.

2 - Station Type: ATM = atmospheric pressure monitoring; C = continuous water level monitoring with instantaneous discharge rating measurements; I = instantaneous discharge measurement; CW = continuous winter water level monitoring with instantaneous discharge rating measurements.

3 - NAD 83, UTM Zone 8.

4 - Elevations for hydrometric stations are estimates based on field data collected by handheld Garmin GPS units.

2.3.1 Velocity-Area Mid-Section

The velocity-area mid-section method was used to determine discharge at hydrometric stations where channel criteria met those outlined in standard guidance documents (RISC 2009; WSC 1999). Cross-section locations were established for each hydrometric station where this method was applied; these cross-sections were located in close proximity to continuous data logger installations.



Using the continuity relationship for discharge (Q),

$$Q = v \cdot A = b d v \quad [1]$$

Depth (d), velocity (v) and width (b) measurements were obtained for at least 20 panels across the metering cross-section. The cross-section panel width and depth were multiplied by the velocity and averaged over 40 seconds (RISC 2009) to obtain an instantaneous discharge measurement (q) for each panel. Panel discharges were subsequently summed to obtain total discharge. The discharge for the first and last panels was calculated using half the distance from the edge to the first and last mid-panel verticals.

The velocity-area discharge calculation is described by the following equations:

$$q_n = v_n d_n \frac{(b_{n+1} - b_{n-1})}{2} \quad [2]$$

$$Q = q_1 + q_2 + q_3 + q_4 + q_5 + \dots q_n \quad [3]$$

Where SI units of m^3/s , m/s , and m are used for discharge, velocity and depth respectively.

The current meter used to obtain the velocity measurements is a 2-dimension, side looking, FlowTracker Handheld Acoustic Doppler Velocimeter (ADV) (Sontek/YSI Inc. 2009). The FlowTracker is used by both the Water Survey of Canada and the U.S. Geological Survey. The FlowTracker computer calculates discharge using the mid-section method and calculates the statistical discharge uncertainty based on methods developed by the U.S. Geological Survey (Cohn *et al.* 2006). This method of calculating uncertainty accounts for the uncertainty associated with width, depth and accuracy of the FlowTracker calibration and the effects of channel variability on depth and velocity across the cross-section (Sontek/YSI 1999). The statistical discharge uncertainty calculated by the FlowTracker at Mount Nansen was typically less than $\pm 5\%$. An uncertainty of $\pm 10\%$ is considered by industry as acceptable for the velocity-area mid-section method. The statistical uncertainty was applied for all velocity-area discharge measurements obtained with the ADV.

2.3.2 Salt Dilution Gauging

Salt dilution gauging was used at hydrometric stations where the channel conditions were not suitable for using a current meter. Typically this occurred when water depths were less than 0.05 m, channel widths were less than 3.0 m or during winter months when ice was prohibitively thick for conducting velocity-area measurements beneath the ice.

There are three different methods of salt dilution gauging: constant rate injection (brine); slug injection (brine) and dry salt injection. Method selection depends on the magnitude of discharge to be measured, channel conditions and feasibility for remote sites as the required equipment varies for each method. All methods require the selection of an input (injection) site and a downstream electrical conductivity measurement site. The distance between these sites (mixing length) is optimized for the minimum distance required for complete mixing of the fully dissolved salt tracer.



Specific channel conditions during open water and winter periods are required for successful salt dilution gauging. These criteria ensure that complete lateral and vertical mixing occurs in as short a distance as possible: minimal pools; no backwater areas; no braiding; little to no in-stream vegetation; and no losses or gains of water (Moore 2004a; Moore 2004b; Laberge Environmental Services 1999).

Channel geomorphology and winter temperatures required some adaptations to the methodology presented in Moore (2004; 2005), therefore field protocols and subsequent calculations were modified to incorporate methods presented in Kite (1994) and Laberge Environmental Services (1999). Laberge Environmental Services (1999) describes practical, field tested and validated protocols for winter low flow measurements in the Yukon with a focus on streams with high background conductivities similar to the Mount Nansen region. However, the methods and calculations provided by Moore (2004a; 2004b; 2005) were used as they were thought to be significantly more robust and adaptable to site-specific stream conditions.

The gram conductivity of salt, the conductivity of 1 g NaCl in 1 m³ of solution at 25 °C, is non-linear at higher background conductivities (Laberge Environmental Services 1999). Background specific conductance at the hydrometric stations range widely, from ~29 µS/cm to upwards of 1,500 µS/cm. The field protocol presented in Moore (2004a; 2004b; 2005) accounts for the non-linearity of the gram conductivity but requires additional field calibration tests for each visit and each gauging location. This method was not practical during extremely cold temperatures but was employed whenever possible in the Q1 period.

The slug injection (brine) method was selected for use at the Mount Nansen Site hydrometric stations because this method was most feasible for the remote sites, channel conditions, discharges and the most efficient method for the field monitoring program. In addition, the use of brine slugs allows for shorter mixing lengths to be used; ideal for channels at Mount Nansen. Measurement reaches were carefully selected to meet the measurement criteria and overlap with the physical location of continuous water level loggers. Salt injection sites were located upstream of constrictions (e.g., culverts) where possible to facilitate full mixing. A conductivity meter records specific conductance approximately 60 m downstream for the smaller creeks and approximately 90 m for Victoria Creek, depending on channel conditions.

The same measurement reach was used for each field visit unless changes to the channel conditions warranted minor adjustments to the measurement locations. The slug injection method requires an electrical conductivity meter (YSI ProPlus Multi-Meters with logging capabilities) to be set up at the downstream end of the measurement reach. Background electrical conductivity was logged for several minutes before the slug injection to allow for the instrument to equilibrate and to measure background variability. Specific electrical conductance¹ (SPC) is measured (logged) because the values are compensated for water temperature. A known mass of salt (NaCl) is dissolved into a graduated bucket of stream water at the injection site. Once fully dissolved, the salt slug is injected at the upstream site and the electrical conductivity of the salt wave is measured at the downstream location at two to five second intervals depending on the stream velocity. Two trials were conducted at each station. When possible, a secondary method of discharge

¹ Specific electrical conductivity measured by the YSI ProPlus and the YSI 556 multi-meters are linearly compensated for temperature. The multi-meters are calibrated daily during each field visit before use.



measurement was used to validate the salt dilution measurement (*i.e.*, volumetric discharge measurement, ADV measurement).

The formula used to calculate discharge for the Mount Nansen salt slug injections is:

$$Q = \frac{V_{ss}}{1000 \cdot CF \cdot T \cdot \tau \cdot \sum(SPC_t - SPC_o)} \quad [4]$$

Where Q is discharge (m^3/s), V_{ss} is the volume of salt slug injection (L), τ is the time interval in seconds and SPC_t and SPC_o are the measured and background conductivity at time interval t , respectively. The $CF \cdot T$ value is the calibration factor that accounts for the non-linearity of electrical conductance and salt concentration in stream water. The $CF \cdot T$ value is taken as the slope of the line of SPC and relative concentration of the salt slug in an aliquot of sample stream water. The target peak specific conductance for the salt wave was an increase of at least ten-times the resolution of the conductivity meter used. Typically, an increase between 10% and 50% of SPC_o was achieved, above the required increase of 2 to 5 $\mu S/cm$.

Stream discharge was calculated for each salt slug trial using Equation [4] and averaged to provide a discharge estimate. The average estimated measurement accuracy for the salt dilution gauging method is $\pm 20\%$. However, salt dilution gauging accuracy will vary between each station due to differences in individual channel conditions and stream water velocities.

In some instances where ambient air temperatures were prohibitively cold (*i.e.*, $< -30^\circ C$), the dry salt slug injection method using a mass-balance approach was used. This was due to limitations that rapidly freezing water placed on equipment, field procedures and safety of field personnel. The formula for calculating discharge using the dry salt slug injection differs slightly from equation [4], and follows the calculations provided by Moore (2004). The discharge calculation formula for the dry salt slug injection is:

$$Q = \frac{m}{\sum(EC - EC_o) \cdot CF \cdot t_{int}} \quad [5]$$

Where m is the mass of salt used for the dry slug injection, EC is the electrical conductivity measured at a defined time interval (t_{int}), EC_o is the background electrical conductivity. CF is a site-specific constant that is determined by measuring changes in specific conductivity with known masses of salt. Stream discharge was calculated using equation 5 for each salt slug trial during the monitoring period. The estimated measurement accuracy for dry salt slug injection is $\pm 30\%$. However, the discharge uncertainty varies considerably between each station due to differences in channel conditions and stream water velocities.

2.3.3 Volumetric

Volumetric discharge measurement is ideal for low flows because all the stream flow is captured in a bucket of a known volume at a confined outlet or constriction in the channel. Channel constrictions created by culverts, pipes and weirs provided an opportunity to measure stream flow by measuring the time to fill a bucket of known volume. The volumetric method for measuring discharge is used periodically at two



stations at Mount Nansen where a culvert or pipe is available (H-PC-U; H-SEEP). During extreme low flows it is also possible to obtain volumetric estimates at H-DC-DX+105.

The volumetric measurement is completed using a graduated 20 L bucket and a timing device. The time required to fill the volume is recorded over five separate volumetric trials. All five volumetric trials are averaged to provide a discharge estimate. The estimated measurement accuracy is $\pm 30\%$.

The volumetric measurement method employed at H-SEEP (Tailings Dam Seepage Pond pump pipe outlet) is used to validate daily instantaneous measurements read at the flow meter attached to the pump that is used to manage water levels in the Seepage Pond. Daily flow meter readings were collected by the site maintenance crews and data is maintained by AAM. EDI staff collects concurrent flow meter readings when volumetric measurements are made at the pipe outlet.

2.3.4 Ice-cover Hydrometrics

Hydrologic measurements completed during periods when the channel is covered with ice have lower accuracy than open channel measurements because the standard hydrometric methods are based on open channel hydraulic relationships between the impelling and resisting forces of flow. Ice increases the resistance to flow, slowing velocities and increasing the water surface elevation (backwater effect). Frazil ice, anchor ice, slush and ice jams influence the water surface profile and effective depth of flow in the channel. As a result, the relationship between stage and discharge changes during the winter. Cold temperatures frequently cause problems with measurement equipment, including continuous water level loggers. In the Yukon, winter measurement instruments are usually working at or beyond the cold temperature operating limits and resultant data is carefully analyzed and often excluded from analysis. All measurements collected when ice was observed in the channel were flagged in the data record with 'B'; the standard data flag used by the WSC indicating backwater or ice effects. Measurements influenced by ice are not included in the open water stage-discharge rating curve development.

In Victoria Creek, the velocity-area and salt dilution methods were feasible during ice-cover periods when ice thicknesses and ambient air temperatures were not prohibitive. Salt dilution was used on the smaller channels if they were not frozen to the bed. Regardless of the technique used, careful attention was paid to ice and flow conditions. In many of the streams at the Mount Nansen Site, multiple layers of ice are present with flow travelling through complex networks within and on the surface of the ice. In such conditions, discharge measurements become increasingly uncertain and are not performed.

2.3.5 Hydrometric Leveling Surveys

Hydrometric leveling surveys are performed during each visit at stations where continuous data loggers are installed. The purpose of the survey is to tie the data logger water levels to the local station datum. Each station has a local, relative datum defined by benchmarks in close proximity to the data logger and stilling well. Three benchmarks are installed at each continuous station as per RISC (2009) Data Grade A guidelines. Each survey includes a survey with a level and rod for Benchmark 1 (BM1), Benchmark 2 (BM2), Benchmark 3 (BM3), the top of the staff gauge (TOS), the water surface elevation (WATER) and the



elevation of the fixed-length logger apparatus (named LOGGERROD). The elevation of Benchmark 1 at every station defines a local elevation of 3.000 m above datum. The local datum is always located below the elevation of zero flow. The benchmarks and the top of the staff gauge are regularly checked for shifting as a result of periglacial processes and survey error. While there is some apparent movement in the benchmark elevations and occasionally anomalous survey data, the water surface elevation data was carefully reviewed using staff gauge readings and the field records of stilling well maintenance (logger or staff gauge shifts) before applying local datum offsets to the raw data logger record. All suspect data is excluded from the corrected data. All stage data is presented in metres referenced to the local datum (L.D.) unless otherwise noted.

2.3.6 Hydrometric Validation & QA/QC Program

The velocity-area, weir and volumetric hydrometric measurement methods used for the Mount Nansen hydrometric program are standardized by the WSC and the USGS. Several stations do not meet standardized criteria. At these stations, alternative methods (e.g., salt dilution) are used. In some cases, concurrent standardized methods (e.g., velocity-area measurements) allow for the validation and calibration of alternate methods. Concurrent measurements also facilitate uncertainty estimates for stream discharge measurements.

Quality control and quality assurance (QA/QC) checks begin during field visits. The Flow Tracker ADV provides numerous QA/QC checks in real-time during velocity measurements that allow the field crew to increase the precision of the measurements. Upon return from the field, data entry staff performs preliminary checks and reviews of the raw data and discharge calculations prior to the production of trip and quarterly reports. A third round of QA/QC is completed during data entry into the hydrometric database. A final QA/QC is completed during the development of rating curves and hydrographs for each hydrometric station.

2.3.7 Rating Curve Development

Rating curves are based on open channel hydraulic relationships between stage (water level) and discharge. They are based on open-water conditions only and are not representative of ice-cover channel conditions. The y-axis represents the recorded stage level at the gauge and the x-axis the discharge. The rating curve equation represents the hydraulic reaction of flow a smoothly varying channel with increasing stage (or a constant control point at all stages) (Maidment 1993). The rating curve equation [6] has the form:

$$Q = C(h + a)^N \quad [6]$$

Where Q is discharge in m^3/s , C is typically proportional to the channel width, $(h+a)$ represents the depth of water above the stage of zero flow (water level where flow becomes zero) and the value of N is a function of the channel geometry (Maidment, 1993). If the pressure transducer is below the point of zero flow, the value of 'a' is negative; conversely a positive 'a' value indicates that it is above. Typically as the stage increases, the hydraulic control shifts from low flow hydraulic control to channel friction control or to ice



related controls. As a result multiple rating curve expressions for a single channel and various stages are often required to accurately represent the full range of flows.

By taking the log of both sides of the rating curve in equation [7], we obtain:

$$\log Q = \log C + N \log(h + a) \quad [7]$$

the rating curve equation [8] takes the linear form $y=mx+b$ and can be fit to the discharge rating points as a straight line. Rating curves may be developed using several different methods including fitting the calibration points by eye and the maximum likelihood solution. Given the small size of the channels at the Mount Nansen Site, the narrow range of stage changes, and channel instabilities, each rating curves is developed by fitting by eye within the Aquarius Time-Series Software environment (Aquarius Informatics Inc. 2014).

Rating curves are developed for stations with continuous water level loggers using surveyed water levels (stage) and instantaneous discharge measurements. A rating curve is considered preliminary if the following conditions are met: there are less than 10 reliable rating measurements (RISC 2009), if rating measurements do not capture an acceptable range of flows (*i.e.*, 10 %-200 % of mean discharge (MD)), or, if there is a high rating curve error.

Rating curves are developed with rating measurements obtained when the channel is ice free. Any rating measurement obtained during ice conditions are reported simply as instantaneous measurements. Rating curves are valid only for a defined rating period. A rating period represents a section of time where both the channel and hydrometric installation are stable.

Timely monitoring events during the spring freshet period allow the capture of higher spring flows. A conservative approach was adopted for presenting the continuous hydrometric record in this report. Predicting flood or low flows can introduce error into hydrologic analysis and should be carefully considered in the context of channel hydraulic geometry.

2.3.8 Continuous Stage and Discharge

A combination of HOBO (Model: U20-001-04, Onset Corporation) and Levellogger (Model Gold 3001, Solinst) pressure transducers are used on site. Two barometric and temperature data loggers (ATM-DC2 (HOBO) and ATM-DC4 (Solinst)) were maintained in the middle of the watershed near hydrometric station H-DC-B. All of the data loggers are non-vented pressure transducers that record water or air temperature and pressure.

The hydrostatic pressure data was compensated for atmospheric pressure using data from the barometric pressure logger located at ATM-DC4. Data from the redundant barometric loggers was not required.

Sensor depth below the surface of the water was calculated manually for the HOBO loggers submerged in the streams using the following relationship from the Euler equation [8] where:



$$H = \frac{P}{\gamma} + z \quad [8]$$

Hydraulic head (H) or water depth above the sensor, hydrostatic pressure (P) in Pa, the specific weight of water $\gamma = \rho g$ where ρ is the density of water at a given temperature (kg m^{-3}), g is acceleration due to gravity (m s^{-2}) and z is elevation above a datum. Density of water varies with temperature and given the wide range in stream temperatures throughout the year, the density was computed using the Thiesen-Scheel-Diesselhorst equation [9] (Maidment 1993):

$$\rho = 1000 \left[1 - \frac{t+288.94}{508929.2(t+68.12963)} (t - 3.9863)^2 \right] \quad [9]$$

Where t = temperature ($^{\circ}\text{C}$). The Solinst logger records at stream sites did not require water depth conversions because water depth is automatically calculated as an output from the record.

Continuous stage records are collected at 15 minute intervals and re-sampled to 30 minute intervals. Continuous discharge is calculated using the stage-discharge rating curve developed for the rating period at each respective station. The continuous stage record (rather than discharge record) is presented for stations where developing reliable rating curves is considered unsuitable due to channel conditions and available measurement techniques.

2.3.9 Hydrometric Data Management

Hydrometric data is compiled into a MS Access database after each visit to the Mount Nansen Site (*EDI 14-Y-0455 Hydrology Database.accdB*). The hydrometric database is designed to hold raw field data including hydrometric station metadata, station history, field measurements, survey data and data logger files. The hydrometric database is also used for QA/QC.

2.4 WATER QUALITY

During the Q1 period from April 1, 2014 to June 30, 2014, sampling occurred on a monthly basis except for in May 2014 when two sampling events took place to capture spring freshet. Water samples were collected at each of the 23 water quality sites, if conditions allowed, along with *in situ* data, photo documentation, and general site comments during each field visit. A list of sites, locations and sampling information are provided in Table 5. Note the sampling frequency varies by site, as some sites are sampled monthly, seasonally or only three times per year. AAM also requested that additional seep sites be sampled during the freshet period, including specific sites as well as opportunistic sites encountered by crews, focusing on the toe of the waste rock pile, exploration trenches, mill runoff, and the ore ramp. These additional freshet investigations resulted in an additional five sites being sampled during the May 2014 trips, at the request of AAM (Table 5). Details on the field methodology, laboratory analysis, QA/QC program and data analysis are provided in the following sections.



Table 5. Mount Nansen water quality site and sampling information.

Water Quality Site Name	Site ID	Site Location ¹		Sampling Frequency	Parameters Included in Lab Analysis ²
		Easting	Northing		
Pony Creek upstream	WQ-PC-U	388955	6881745	Monthly	Standard Package
Pony Creek downstream	WQ-PC-D	389131	6881719	Monthly	Standard Package
Pit Lake (3 samples)	WQ-PIT-1,2,3	388913	6881625	Monthly	Pit Lake Package
Dome Creek at DX	WQ-DC-DX	387674	6881127	Monthly	Standard Package
Dome Creek at DX+105	WQ-DC-DX+105	387820	6881150	Monthly	Standard Package
Dome Creek at D1b	WQ-DC-D1b	388264	6880989	Monthly	Standard Package
Diversion Channel at Bridge	WQ-DC-B	389439	6880781	Monthly	Standard Package
Upper Dome Creek	WQ-DC-U	389788	6880565	Monthly	Standard Package
Dome Creek at Road	WQ-DC-R	391111	6880449	Monthly	Standard Package
Tailings Pond	WQ-TP	389427	6880625	Monthly	Standard Package
Seepage Pond Outlet Pipe	WQ-SEEP	389604	6880598	Variable ³	Standard Package, LT50
Mill Site Seep 08	WQ-MS-S-08	387954	6881073	3X Per Year	Standard Package
Back Creek	WQ-BC	391626	6880901	Monthly	Standard Package
Upper Victoria Creek	WQ-VC-U	391626	6880872	Monthly	Standard Package
Victoria Creek downstream Back Creek	WQ-VC-DBC	391633	6880740	Monthly	Standard Package
Victoria upstream of Minnesota	WQ-VC-UMN	392413	6879244	Monthly	Standard Package
Victoria Creek at Road	WQ-VC-R	392431	6878802	Monthly	Standard Package
Pump House Well	WQ-PW	391558	6880856	Monthly	Drinking Water Package
Dome East Slope Seep 01	WQ-DESS-01	388632	6881131	Seasonal ⁴	Standard Package
Dome East Slope Seep 02	WQ-DESS-02	388699	6881087	Seasonal ⁴	Standard Package
Dome East Slope Seep 03	WQ-DESS-03	388518	6881143	Seasonal ⁴	Standard Package
Upwelling near CH-P-13-01	WQ-CH-P-13-01	388640	6881165	Monthly	Standard Package



Water Quality Site Name	Site ID	Site Location ¹		Sampling Frequency	Parameters Included in Lab Analysis ²
		Easting	Northing		
Lower West Toe of Waste Rock Pile Seep	WQ-LW-Seep-01	388711	6881371	Seasonal ⁴	Standard Package
East Toe of NW Waste Rock Pile Seep	WQ-NW-SEEP-02	388837	6881617	Freshet ⁵	Standard Package
Ore Ramp	WQ-ORE	388986	6881432	Freshet ⁵	Standard Package
Exploration Trench 01	WQ-ET-01	387804	6881017	Freshet ⁵	Standard Package
Lysimeter 2	WQ-L2	388712	6881457	Freshet ⁵	Standard Package
Mill Site Seep 03	WQ-MS-S-03	387884	6881121	Freshet ⁵	Standard Package

1 - NAD 83, UTM Zone 8.

2 - Parameters included in various sampling packages are explained in greater detail in Section 2.4.2, below.

3 - Sampling frequency for this site was variable as the WQ-SEEP site is sampled on a monthly basis for the standard package samples and every second month for the LT50 samples.

4 - Sampling frequency for these sites is seasonal as these seeps are to be sampled during freshet and every three months thereafter.

5 - These sites were only sampled during the freshet period in May 2014, as per special request by AAM.

2.4.1 Field Sampling Methods

An Oakton T100 turbidity meter was used to collect *in situ* turbidity (NTU). This meter was calibrated on a monthly basis according to instrument specifications. A YSI ProPlus multi-meter was used to collect *in situ* water temperature (degrees Celsius), pH (pH units), specific conductivity ($\mu\text{S}/\text{cm}$), and in some cases dissolved oxygen (mg/L, for the pit lake). Field crews calibrated the YSI meter on a daily basis prior to each field day. Field data was recorded on standard field datasheets including site name, sample identifier, sample date and time, water temperature, specific conductivity, pH, photo numbers and a record of qualitative site conditions including flow stage (low, moderate, high), turbidity (clear, low, moderate, high), and ice observations (if present).

Laboratory-cleaned bottles were filled using clean techniques (*i.e.*, nitrile gloves, appropriate bottle handling) and samples were filtered and preserved on site, as directed by the lab (ALS Laboratories). Samples from the pit lake were taken from the same general location on the lake at three different depths, from the surface, at mid depth and just off the bottom. There was ice cover during a portion of the Q1 period (April to May), and the surface sample was collected from just below the base of the ice surface through an augered (during the April 2014 sampling event). A Van Dorn sampler was used to collect all samples and is also used to measure the depth. Once the pit lake was ice free (June 2014), a boat was used to access the sampling location, and samples were collected with a Van Dorn.

Samples were kept in coolers immediately following collection, and later transferred to the Mount Nansen Site sample refrigerator until they could be transferred to Whitehorse on the final day of each sampling event. For chemical analysis, Chain of Custody forms, supplied by the lab, were included in each sample



cooler, and samples were delivered to ALS Laboratories upon arrival back in Whitehorse, YT to ensure lab holding times were met.

2.4.2 Laboratory Analysis

All surface water quality laboratory analysis was conducted by ALS. Several lab analysis packages have been organized for the Mount Nansen Site, including a pit lake package (WQ-PIT), a drinking water package (WQ-PW), an LT50 package (WQ-SEEP), and a standard site package (all other sites). The parameters included in each package are outlined in Table 6.

Table 6. Laboratory analysis parameters included in various ‘packages’ created for surface water quality sampling at Mount Nansen (continues on next page).

Analysis Package	Parameters Included
Standard Site Package	<p>Cyanides: Cyanate, Total Cyanide (as Strong Acid Dissociable), Weak Acid Dissociable, Thiocyanate</p> <p>Physical Tests: Conductivity, Hardness, pH, Total Dissolved Solids, Total Suspended Solids</p> <p>Anions and Nutrients: Bicarbonate, Carbonate, Hydroxide, Total Alkalinity, Total Ammonia, Chloride, Fluoride, Nitrate, Nitrite, Sulphate</p> <p>Total Metals: Aluminum, Antimony, Arsenic, Barium, Beryllium, Bismuth, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Phosphorus, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Sulfur, Thallium, Tin, Titanium, Uranium, Vanadium, Zinc.</p> <p>Dissolved Metals: Aluminum, Antimony, Arsenic, Barium, Beryllium, Bismuth, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Phosphorus, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Sulfur, Thallium, Tin, Titanium, Uranium, Vanadium, Zinc.</p>
Pit Lake Package	<p>Physical Tests: Conductivity, Hardness, pH, Total Dissolved Solids, Total Suspended Solids</p> <p>Anions and Nutrients: Bicarbonate, Carbonate, Hydroxide, Total Alkalinity, Total Ammonia, Chloride, Fluoride, Nitrate, Nitrite, Sulphate</p> <p>Total Metals: Aluminum, Antimony, Arsenic, Barium, Beryllium, Bismuth, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Phosphorus, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Sulfur, Thallium, Tin, Titanium, Uranium, Vanadium, Zinc.</p> <p>Dissolved Metals: Aluminum, Antimony, Arsenic, Barium, Beryllium, Bismuth, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Phosphorus, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Sulfur, Thallium, Tin, Titanium, Uranium, Vanadium, Zinc.</p>
Drinking Water Package	<p>Physical Tests: True Colour, Conductivity, Hardness, pH, Total Dissolved Solids, Turbidity</p> <p>Anions and Nutrients: Alkalinity, Total, Chloride, Fluoride, Nitrate, Nitrite,</p>



Analysis Package	Parameters Included
	Sulphate Total Metals: Aluminum, Antimony, Arsenic, Barium, Boron, Cadmium, Calcium, Chromium, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Potassium, Selenium, Sodium, Uranium, Zinc.
LT50	LT50 test, 96-hr test to be conducted with Rainbow trout.

2.4.3 QA/QC Program

A QA/QC sampling program was conducted as part of the monitoring program, including two to three duplicate samples, a field blank sample and a trip blank sample. These are described in detail below:

- Duplicate samples are essentially sample replicates collected at the same date, time and location as the regular sample. All sampling methodology is the same, as if it is a separate site. Duplicates were collected from two to three sites, randomly selected, during each trip. The number of duplicates collected per trip depended on the total number of sites being sampled, to cover approximately 10% of the total sites sampled. The duplicate samples were conducted to check the accuracy and precision of the laboratory analysis.
- The field blank sample was collected on site as well, where a set of sample bottles was filled with deionized water at some point during the sampling trip. Sampling methodology was the same as if sampling from a stream, with filtering and preserving as required. The purpose of a field blank is to identify any contamination introduced to the sample during the act of field sampling (*i.e.*, sample filling/handling, exposure to questionable air quality) or via the supplies (filter, syringe, bottle, or preservative).
- The travel blank was a sample set provided by the laboratory to be carried by the staff to and from site during the field work. The travel blank was not opened at any time during the trip. The purpose of including a travel blank is to identify any contamination of the sample caused during transportation or storage.

Following receipt of the laboratory analysis results, a review of the QA/QC sample results was completed. This involved comparing the duplicate samples and the regular samples collected at the randomly selected replicate sites to ensure they were within acceptable limits of each other (within +/-10%). Field and travel blank sample data was also reviewed to ensure that concentrations of all potential contaminants were low to below detection limits.

2.4.4 Data Analysis

For the purpose of this data report, the data were reviewed and parameters of concern were graphed and compared with the Canadian Council of Ministers of the Environment (CCME) guidelines for the protection of freshwater aquatic life (CCME-AL; CCME 2014; Table 7), and with the Effluent Quality Standards (EQS) outlined in Yukon Water Board Water license No. QZ94-004, issued to BYG Natural



Resources Inc. on February 13, 1996 (Table 8). Drinking water quality from the WQ-PW site was compared to the applicable Guidelines for Canadian Drinking Water Quality (Health Canada 2012; Table 9).

Table 7. CCME-AL guidelines applicable to Mount Nansen surface water quality sampling program (CCME 2014).

Water Quality Parameter	CCME-AL Guideline	Units	Comments
Aluminum (Al)	0.1	mg/L	CCME is 0.1 at pH > 6.5, if pH is lower than 6.5, guideline is set at 0.005 mg/L
Ammonia (Total N)	0.75	mg/L	Guideline is temperature and pH dependent. This represents a highly conservative guideline calculated for a pH of 8.5 and a water temperature of 0°C. Guideline decreases with increasing pH and temperature.
Arsenic (As)	0.005	mg/L	-
Cadmium (Cd)	0.000033	mg/L	Guideline is hardness dependent; this value is for a hardness of 100 mg/L, conservative for the Mount Nansen Site.
Chloride (Cl)	120	mg/L	-
Chromium (Cr)	0.0089	mg/L	-
Copper (Cu)	0.002	mg/L	Guideline is hardness dependent; this value is for a hardness of 100 mg/L, conservative for the Mount Nansen Site.
Total Cyanide	0.005	mg/L	SAD Cyanide is used as a measure of total cyanide
Fluoride (F)	0.120	mg/L	-
Iron (Fe)	0.3	mg/L	-
Lead (Pb)	0.003	mg/L	Guideline is hardness dependent; this value is for a hardness of 100 mg/L, conservative for the Mount Nansen Site.
Mercury (Hg)	0.000026	mg/L	-
Molybdenum (Mo)	0.0073	mg/L	-
Nickel (Ni)	0.1	mg/L	Guideline is hardness dependent; this value is for a hardness of 100 mg/L, conservative for the Mount Nansen Site.
Nitrate (N)	13	mg/L	-
Nitrite (N)	0.06	mg/L	-
pH	6.5 - 9.0	pH	-
Selenium (Se)	0.001	mg/L	-
Silver (Ag)	0.0001	mg/L	-
Thallium (Tl)	0.0008	mg/L	-
Uranium (U)	0.015	mg/L	-
Zinc (Zn)	0.03	mg/L	-



Table 8. Mount Nansen Effluent Quality Standards outlined in Yukon Water License #QZ94-004.

Water Quality Parameter	Effluent Discharge Standard
pH	6.0 to 8.5 pH
Total Suspended Solids (TSS)	50 mg/L
Toxicity (LT50 – 96 hr. for rainbow trout, pH non-adjusted)	100%
WAD Cyanide	0.1 mg/L
Total (SAD) Cyanide	0.3 mg/L
Antimony (Total)	0.15 mg/L
Arsenic (Dissolved)	0.15 mg/L
Barium (Total)	1.0 mg/L
Cadmium (Total)	0.02 mg/L
Chromium (Total)	0.04 mg/L
Copper (Total)	0.2 mg/L
Iron (Total)	1.0 mg/L
Lead (Total)	0.1 mg/L
Manganese (Total)	0.5 mg/L
Mercury (Total)	0.005 mg/L
Nickel (Total)	0.3 mg/L
Silver (Total)	0.10 mg/L
Zinc (Total)	0.30 mg/L

Table 9. Applicable Guidelines for Canadian Drinking Water Quality for WQ-PW (Health Canada 2012).

Water Quality Parameter	Health Canada Guideline
Antimony	0.006 mg/L
Arsenic	0.010 mg/L
Barium	1.0 mg/L
Boron	5.0 mg/L
Cadmium	0.005 mg/L
Chromium	0.05 mg/L
Fluoride	1.5 mg/L
Lead	0.010 mg/L
Mercury	0.001 mg/L
Nitrate	45 mg/L
Selenium	0.01 mg/L
Uranium	0.02 mg/L



3 RESULTS

Results are separated into the three program components: meteorology, hydrology, and water quality results. Select field photographs for the Q1 period and for each site and station are provided in Appendix A. A record of which sites were sampled during each field visit during the Q1 period is available in Appendix B. All field datasheets for hydrology and water quality are provided in Appendix C. Hydrometric data is provided in Appendix D and water quality data in Appendix E. Meteorological data is provided in Appendix F. All raw data is provided in the corresponding Microsoft Excel databases.

The description and discussion of the results presented in this document is limited to the data collected in the Q1 period.

3.1 METEOROLOGY

Meteorological data from the ATM-ROAD AAM station is summarized below for the Q1 period. Meteorological data is only available between April 10 to June 30, 2014 as a result of calibration tests and reinstallation of the components on April 10, 2014. All relevant data from ATM-ROAD AAM station is plotted in Appendix F (Figures F-1 to F-8), with selected summary statistics described below for air and ground temperature, precipitation, wind direction and wind speed, radiation and relative humidity. Daily summary statistics for the Q1 period from the meteorological station are provided in Appendix F – Table F-1. All raw data is provided in the meteorological database (*EDI 14Y0455 Meteorological Database 2014-2015.acddb*).

3.1.1 Air and Ground Temperature

Minimum mean daily air temperature at the ATM-ROAD-AAM station for the Q1 period, was -14.2°C on April 12, 2014 (Appendix F: Figure F-1). Mean daily air temperatures started staying above zero degrees on April 26, 2014. However, there was also a period in late May, when mean daily air temperatures dropped below zero degrees again (-0.9°C on May 21, 2014 and -0.016°C on May 22, 2014). This colder period corresponded with precipitation falling as snow (see Section 3.1.2). Maximum mean daily air temperature during the same period was 19.7°C on June 30, 2014.

Mean daily ground temperatures reached a maximum of 23.6°C on June 29, 2014 (Appendix F: Figure F-1). Minimum mean daily ground temperatures reached -8.7°C on April 12, 2014. Mean daily ground temperatures reached temperatures great than 0° C starting in May 4, 2014.

3.1.2 Precipitation

Precipitation measured as rainfall occurred sporadically between April 8, 2014 and June 30, 2014 (Appendix F: Figure F-2). A total of 53.8 mm of rain fell during the Q1 period, with 4.5 mm of rain in April 2014, 23.5



mm of rain in May 2014, and 25.8 mm of rain in June 2014. The maximum hourly rainfall event recorded at the station occurred during June 15, 2014 at 16:00 hours, when a max of 4 mm/hr fell.

The max snow depth during the Q1 period was measured on April 13, 2014, at 62.83 cm (Appendix F: Figure F-2). Cumulative snow depth at the station gradually declined from 62.83 cm on April 13, 2014 to around zero centimetres by May 4, 2014 (Appendix F: Figure F-3, Table F-1). The highest hourly snowfall event during the Q1 period was 3.2 cm on April 22, 2014. Of note, during the May 20-21, 2014 sampling event precipitation was falling as snow, this corresponded with a slight increase in snow depth at the meteorological station (total snow depth 0.626 cm).

3.1.3 Wind

Wind speeds are generally low, with average wind speeds for the Q1 period 2.5 m/s (9.00 km/hr) (Appendix F: Figure F-4). Average monthly wind speed was highest in June, at 2.97 m/s (10.69 km/hr). The maximum mean daily wind speed recorded for the Q1 period was 9.92 m/s (35.71 km/hr) occurring on June 18, 2014. Dominant wind directions at the Mount Nansen Site are south, southwest and southeast (Appendix F: Figure F-5).

3.1.4 Short and Long Wave Radiation

Net radiation is the balance of solar energy emitted from the sun in the form of short- and long-wave radiation and the surface of the earth. The balance of radiation fluxes exhibits the seasonal pattern typical of northern latitudes with similar vegetation cover. As ground surface attributes change (*i.e.*, the accumulation and disappearance of snow) and solar insolation angles shift in the spring and fall, the net solar radiation swings from ~ 0 W/m² to over 600 W/m² in the summer months. Net radiation exhibits a diurnal cycle associated with increases and decreases in received solar insolation (Appendix F: Figure F-6). During the Q1 period, net radiation values gradually increased from April to June 2014, with values fluctuating between -100 W/m² and 100 W/m² in early April 2014 and around -100 W/m² to up to 500 W/m² in May and June 2014. Some lower radiative flux values occurred late-May and late-June 2014, likely due to reduced solar insolation.

3.1.5 Relative Humidity

Relative humidity at Mount Nansen generally remains above 30%, and fluctuates up to 100% (Appendix F: Figure F-7, Table F-1). Average relative humidity during the Q1 period was 55.5%. Minimum and maximum relative humidity for the Q1 period were 15.6% (April 16, 2014) and 99.1% (April 19, 2014).

3.2 HYDROLOGY

Up to a total of four discharge measurement events were performed between April 1 and June 30, 2014 and are included in this quarterly report. The peak flow associated with snowmelt occurred between May 5 and May 9, 2014 depending on the watershed. Many of the continuous data loggers were not installed due to ice at the time of the snowmelt peak, but those that remained in place over winter captured the peak stage. At



Middle Dome Creek (H-DC-M) the peak occurred on May 5 while in Victoria Creek (H-VC-U), the peak snowmelt stage occurred on May 9, 2014. A summary of each hydrometric measurement event is presented in Appendix D, in addition to the measured discharge, river stage elevations and hydrographs are presented for each station. All raw data is provided in the hydrology database (*EDI 14-Y-0455 Hydrology Database 2014-2015.acddb*).

The following sections describe the results from each gauging station. All stations remained frozen to substrate or with ice cover during the first site visit of the Q1 period on April 14-15, 2014. The following visit on May 8-9, 2014 ice was still present on the banks at several hydrometric station, but all channels had open water and high flows. In Victoria Creek and Back Creek, it appeared that the peak water level had occurred prior to the visit, as evidenced by flow markers at or above bankfull, but the high water markers may be a result of meltwater flowing over ice in the channel. Based on continuous logger data, it appears that the peak snowmelt occurred just before the site visit on May 8-9, 2014. At H-DC-D1b, ice was observed in the channel until May 21, 2014.

Some hydrometric stations in the upper reaches of the Dome Creek watershed have higher discharge estimate uncertainty or an absence of measurement because of environmental factors complicating field measurements. These environmental factors included discharge below reportable confidence limits (*i.e.*, $<0.001 \text{ m}^3/\text{s}$), excessive vegetation in the channel, and the presence and accumulation of aufeis into spring. Professional judgement was used to assess the limits of stream gauging instruments and appropriate methods for low-flow and ice-cover conditions.

A full summary of hydrometric monitoring records for the quarterly monitoring period is recorded in Appendix D, Table D-3. Barometric pressure time-series, hydrographs, water surface stage elevations and rating curves are presented in Appendix D for all stations. A copy of the updated hydrometric database containing all raw field data accompanies this report.

Hydrometric gauging and data collection at all stations is designed to meet the Grade A data standard defined by British Columbia's RISC (see RISC, 2009). The Grade A data standard is the highest level of data quality in the hierarchy of provincial standards and is similar to that in the National standards. Grade A criteria are met when instrumentation, stream channel conditions, field procedures, data calculation and assessment meet the requirements specified in RISC (2009). However, due to small channel sizes, discharge rating accuracy and challenging operating conditions at the site, data is considered to be on average Grade B. Uncertainties associated with the instruments used for hydrometric monitoring is presented in Table D-1 in Appendix D.

3.2.1 Dome Creek

3.2.1.1 H-DC-DX+105

Located 105 m downstream of WQ-DC-DX, station H-DC-DX+105 represents a drainage area of 0.52 km^2 . The station receives groundwater contributions associated with the road and mill building pad cut out upstream of the station. The channel is poorly defined with a bed of predominantly sand and silts.



Channel depth averages 0.60 m wide and 0.05 m deep and is generally unsuitable for cross-section area and salt dilution gauging. The station typically has thinner ice or remains ice-free in the winter months, however the station was frozen to bed on April 14, 2014 and zero flow was observed. Three discharge measurements were completed at this station between April 1, 2014 and June 30, 2014. On May 8, 2014 there was moderate flow with a saturated floodplain and a salt tracer measurement was obtained ($0.019 \text{ m}^3/\text{s}$). On May 21, the flow remained moderately high for the station ($0.011 \text{ m}^3/\text{s}$). Flow declined at the end of June; a discharge of $0.001 \text{ m}^3/\text{s}$ was obtained on June 24, 2014. The measurements on May 21 and June 24 are flagged as estimates due to poor channel conditions for a salt tracer measurement. The poor channel conditions were a result of substantial algal growth and pools that have developed in the channel that could attenuate the salt tracer flow. Background specific conductivity measured during the tracer measurements increased through the Q1 monitoring period from $73.1 \text{ }\mu\text{S}/\text{cm}$ to $1,186 \text{ }\mu\text{S}/\text{cm}$.

3.2.1.2 H-DC-D1b

The channel at H-DC-D1b is approximately 0.35 m wide, 0.13 m deep, and is unsuitable for cross-section velocity and often unsuitable for salt dilution gauging. Similar to other stations within the Dome Creek watershed, thick layers of aufeis (commonly referred to as creek ‘glaciation’) develops through the winter period as a surface expression of groundwater contribution to the channel. Complex, braided channels develop within the ice cover during the spring melt period, making hydrometric gauging nearly impossible. No discharge measurements were obtained during the first three site visits as a result of significant ice accumulation and complex flow networks. One discharge measurement was collected at H-DC-D1b using a salt tracer during the Q1 period, however there is increased uncertainty associated with the measurement due to unstable background conductivity readings. The salt tracer discharge estimate for June 24, 2014 was $0.005 \text{ m}^3/\text{s}$. Station discharge measurements collected at H-DC-D1b are presented in Appendix D.

3.2.1.3 H-DC-B

The H-DC-B station is a continuous gauging station during the open water season established at the downstream end of the Dome Creek diversion channel, downstream of the bridge. The channel is approximately 1.27 m wide and 0.15 m deep with significant quantities of sediment transport downstream as a result of channel disturbance through the winter period, non-cohesive bank material and erosion of upstream bank material during rain events.

Three salt tracers were used at the station during the Q1 period. Ice was present in the channel on the April 14, 2014 site visit with water flowing through multiple layers of ice (unsuitable for measurement). Salt tracers on May 8, May 20 and June 24, 2014 indicated that the discharge was $0.119 \text{ m}^3/\text{s}$, $0.040 \text{ m}^3/\text{s}$ and $0.010 \text{ m}^3/\text{s}$ respectively. The continuous gauging station was re-established on June 24, 2014 when the channel was ice-free after removal during the winter due to ongoing channel maintenance work to reduce icing issues at the bridge location. Station discharge measurements collected at H-DC-B are presented in Appendix D.



3.2.1.4 H-TP

The tailings pond station (H-TP) is a water level monitoring station only. There are two staff gauges installed at the tailings pond. Staff gauge readings are collected when the tailings pond is ice free. On April 14, 2014, and May 9, 2014 no staff gauge readings were collected because ice cover was still present. Readings were collected on May 21, 2014 (0.877 m (lower staff gauge) and June 24, 2014 (0.629 m lower staff gauge).

3.2.1.5 H-SEEP

The Seepage Pond Outlet (H-SEEP) is an instantaneous hydrometric monitoring station where a volumetric measurement is collected during each site visit. Volumetric measurements are collected at the pipe outlet that discharges to Dome Creek. In addition, readings are obtained from the flow meter operated by AAM in the Seepage Pond pump house. The pump house flow meter units of measurement are litres per minute (L/min). DES manages pumping rates from the seepage pond on a daily basis by maintaining pond levels at 0.2 m on the staff gauge installed at the pump house (based on communications with R. Wilkinson, DES).

Volumetric measurements at the pipe outlet and readings observed at the flow meter (shown in *italics*) were collected on April 14, 2014 (0.003 m³/s, *147.771 L/min*) May 9, 2014 (volumetric not collected, *298.251 L/min*), May 21, 2014 (0.001 m³/s, *51.422 L/min*) and June 26, 2014 (0.003 m³/s, *34.281L/min to 154.138 L/min - changed while on site*). Measurements collected by EDI (Appendix D, Table D-5) are plotted with daily instantaneous measurements observed on the flow meter by DES at the end of each day (Appendix D, and Figure D-5). On May 21, 2014 the measurement obtained by EDI was substantially lower than that report by DES. Communications with DES about this measurement indicated that EDI had collected the measurement during power shut down during the day and the measurements reflects siphon flow that occurs when the pump is shut down. DES's measurement for that same day reflects the flow after power and seepage pond pumping was restored later in the day. Similarly on June 26, 2014 the change of flow meter readings is assumed to be associated with pumping and/or power shut downs.

3.2.1.6 H-DC-M

A continuous monitoring station operates within the middle reaches of Dome Creek at H-DC-M, downstream of the seepage pond outlet. This station is intended to measure the cumulative flow from the seepage pond outlet and the diversion channel (H-SEEP and H-DC-B). The channel is moderately well defined within fine grained substrate. Some cobble to boulder sized material persists upstream in the diversion channel where stream gradients are greater. The channel averages 1.08 m in width and 0.16 m in depth. Salt dilution gauging was the primary discharge method measurement due to channel conditions being unsuitable for the ADV.

EDI identified that the hydrometric measurements obtained at this site could be improved (by reducing discharge measurement uncertainty) with the installation of a v-notch weir at a location approximately 15 m upstream of the existing station. A weir provides an opportunity for volumetric measurements and discharge



measurements based on a rating equation for the weir structure; both methods would reduce uncertainty associated with salt tracers at this station.

Discussions with AAM resulted in a plan to construct the weir and install a new water level logger in the head pond. A v-notch weir was installed on May 20 and completed on June 23, 2014 by EDI. The field crew encountered frozen soils in the banks and high flows in the channel during construction therefore the final sealant around the weir was held off for the next visit in June when flows were expected to be lower.

Continuous stage measurements were collected over Q1 period using the original water level logger. Discharge measurements were obtained using salt tracers. Once the weir and new water level logger were in place, a volumetric measurement and weir head measurement will be obtained instead.

Continuous water stage elevations and discharge measurements are presented in Appendix D which covers the Q1 monitoring period. Discharge measurements during the Q1 period were collected on April 14, 2014 (salt = 0.002 m³/s), May 8, 2014 (salt = 0.154 m³/s), May 20, 2014 (salt = 0.045 m³/s) and June 23, 2014 (volumetric = 0.009 m³/s; salt = 0.012 m³/s). Ice was still present in the channel on April 14, 2014. H-DC-M stage time-series are presented in Appendix D.

A rating curve for H-DC-M was established for the station following the 2012-2013 monitoring year (EDI 2014a). This rating curve was subsequently updated with additional measurements collected during high flows and additional measurements obtained in Q1 through Q3 of 2013-2014. Table 10 summarizes the rating curve expressions presented for the 2012-2013, 2013-2014 rating periods. There were insufficient data points to develop a rating curve for H-DC-M for the open water season of 2014. A rating curve will be produced at the end of the Q2 period.

Table 10. Middle Dome Creek (H-DC-M) open water rating curve equations.

Stage (m)	Discharge (m ³ /s)	Offset (m)	Slope	Equation
Rating Curve, April, 2012 to March, 2013 (EDI 2013c)				
1.556	0.005	1.5	-	-
1.701	0.060	1.5	1.986	$Q = 1.44074 (h - 1.5)^{1.98631}$
2.003	0.356	1.5	1.950	$Q = 1.35912 (h - 1.5)^{1.94996}$
Rating Curve, April, 2013 to March, 2014 (EDI 2014a)				
1.550	0.001	1.52	-	-
1.891	0.771	1.52	2.558	$Q = 10.60 (h - 1.52)^{2.64}$
Rating Curve, April, 2014 to June, 2014				
Insufficient measurement events to produce a curve for Q1	-	-	-	-



3.2.1.7 H-DC-R

The station at H-DC-R was re-established on June 23, 2014. The station was re-established at this time because this section of Dome Creek accumulates significant quantities of ice due to the broad, flat nature of the valley bottom. The station was removed prior to the winter months in October, 2013. As a result of ice accumulation within the Dome Creek valley throughout the winter period, no discharge measurements were collected during the 2013/14 Q4 period at the H-DC-R station and ice still prohibited measurements on April 14, 2014 at the beginning of Q1. During the Q1 period three discharge measurements were obtained; each used the salt tracer method however the May 8, 2014 measurement was still influenced by ice in the channel. The discharges on May 8, May 20 and June 23, 2014 were 0.152 m³/s, 0.056 m³/s and 0.014 m³/s. There were insufficient data points to develop a rating curve for H-DC-R for the open water season of 2014. A rating curve will be produced at the end of the Q2 period. The continuous logger was re-installed after ice melt on June 23, 2014 and a new rating period will be established for the 2014 open water season following Q2. The rating curve equations for H-DC-R are shown in Table 11.

Table 11. Dome Creek at the Road (H-DC-R) open water rating equations.

Stage (m)	Discharge (m ³ /s)	Offset (m)	Slope	Equation
Rating Curve, April, 2012 to March, 2013 (EDI 2013c)				
0.2747	0.002	0.16	-	-
0.6621	0.100	0.16	2.758	$Q = 0.666494 (h - 0.16)^{2.75760}$
1.062	0.477	0.16	2.671	$Q = 0.628053 (h - 0.16)^{2.67137}$
Rating Curve, April, 2013 to March, 2014 (EDI 2014a)				
0.274	0.002	0.125	-	-
1.062	0.477	0.125	2.98	$Q = 0.579 (h - 0.125)^{2.98}$
Rating Curve, April 2014 to June, 2014				
Insufficient measurement events to produce a curve for Q1	-	-	-	-

3.2.2 Back Creek

3.2.2.1 Back Creek (H-BC)

A continuous station on Back Creek at H-BC was re-installed on May 21, 2014 when the channel was ice-free. The channel is stable and entrenched into alluvial sediments of both the Back Creek and Victoria Creek floodplains. Wetted channel width averages 1.30 m and 0.20 m in depth. Small channel sizes prohibit the use of the ADV as a standard discharge measurement method; therefore, all discharge measurements were made using the salt dilution method. Typically upstream placer activity increases the sediment load observed within the creek, however during the Q1 period the channel was completely dry (zero flow) on one occasion



(June 24, 2014); an unusual observation for this station. EDI suspects that placer operations upstream are now withdrawing from the Back Creek channel resulting in de-watering in the channel.

No discharge measurements were collected on April 15, 2014 due to overflow ice accumulation or June 24, 2014 due to the absence of flow, therefore two discharge measurements were obtained during the Q1 period on May 9 and May 21, 2014 using salt tracer methods; the discharges were 0.373 m³/s and 0.047m³/s. Observations on May 9, 2014 indicated that overbank flows were present prior to the site visit. The high water levels may have been the result of peak freshet flows or high water flowing over ice during the melt, artificially elevating the stage.

Previously reported open water rating curves in the 2013-2014 reports remain unchanged for the Q1 reporting period. The continuous logger was re-installed after winter on May 21, 2014 and a new rating period will be established for the 2014 open water season, following Q2. Rating curves are presented in Table 12. Time-series water stage and hydrographs for the Q1 monitoring period are presented in Appendix D.

Table 12. Back Creek (H-BC) open water rating curve equations.

Stage (m)	Discharge (m ³ /s)	Offset (m)	Slope	Equation
Rating Curve, April, 2012 to March, 2013 (EDI 2013c)				
1.630	0.001	1.62	-----	-----
1.893	0.063	1.62	1.252	$Q = 0.319 (h - 1.62)^{1.252}$
2.168	0.602	1.62	3.244	$Q = 4.239 (h - 1.62)^{3.244}$
Rating Curve, April, 2013 to March, 2014 (EDI 2014a)				
1.63	0.001	1.49	-	-
2.168	0.602	1.49	4.057	$Q = 2.91 (h - 1.49)^{4.06}$
Rating Curve, April, 2014 to June 2014				
Insufficient measurement events to produce a curve for Q1	-	-	-	-

3.2.3 Victoria Creek

3.2.3.1 Upper Victoria Creek (H-VC-U)

The Upper Victoria Creek gauging station (H-VC-U) continuously monitors Victoria Creek stage elevations downstream of the former H-VC-REF station (decommissioned in January 2014), and approximately 65 metres upstream of the Back Creek confluence. A thin ice cover during the winter months indicates the presence of groundwater contributions to the channel in the vicinity.

Discharge measurements were collected under ice conditions at H-VC-U on April 15, 2014 using the velocity-area mid-section method with a Swoffer current meter (0.033 m³/s) and also using a salt tracer



(0.083 m³/s). Measurements were obtained on May 9, 2014 (1.929 m³/s), May 21, 2014 (0.556 m³/s) and June 24, 2014 (0.172 m³/s) using the ADV in the Q1 monitoring period.

Rating curves for the 2012-2013 and 2013-2014 rating periods are presented in Table 13. Continuous stage records and time-series hydrographs for April 1, 2014 through June 30, 2014 are presented in Appendix D. Based on the 2014 water level data, the peak stage occurred on May 9, 2014, after the site visit. Winter discharge measurements were not used in rating curve expressions due to the presence of ice in the channel.

Table 13. Upper Victoria Creek (H-VC-U) open water rating curve equations.

Stage (m)	Discharge (m ³ /s)	Offset (m)	Slope	Equation
Rating Curve, April, 2012 to March, 2013 (EDI 2013c)				
1.986	0.038	1.85	-	-
2.385	2.632	1.85	3.098	$Q = 18.2757 (h-1.85)^{3.09810}$
2.641	8.465	1.85	2.987	$Q = 17.0539 (h-1.85)^{2.98748}$
Rating Curve, April, 2013 to March, 2014 (EDI 2014a)				
2.018	0.109	1.86	-	-
2.516	5.770	1.86	2.789	$Q = 18.702 (h - 1.86)^{2.789}$
Rating Curve, April 2013 to June, 2014				
Insufficient measurement events to produce a curve for Q1	-	-	-	-

3.2.3.2 Victoria Creek, downstream of Back Creek (H-VC-DBC)

The Victoria Creek gauging station downstream of Back Creek (H-VC-DBC) continuously monitors Victoria Creek stage elevations downstream of the Back Creek confluence. The continuous gauging station H-VC-DBC was visited four times during the Q1 period. The ice cover at this station during the winter is thicker than that observed upstream at H-VC-U (approximately 5 to 6 cm). Ice cover was present on the channel during the April 15, 2014 visit where salt tracer and velocity-area mid-section methods were used to obtain discharge measurements. Three additional station visits occurred in Q1 where discharge measurements were collected using the ADV on May 9, 2014 (2.388 m³/s), May 21, 2014 (0.627 m³/s) and June 24, 2014 (0.177 m³/s). Based on continuous measurements collected from the station, the peak stage occurred on May 9, 2014 after the site visit.

Continuous stage measurements and hydrograph is presented in Appendix D. Rating curve expressions are shown in Table 14 and include previously reported rating curve expressions for the 2012-2013 and 2013-2014 rating periods. Winter discharge measurements were not used in rating curve expressions due to the presence of ice in the channel. There were insufficient rating measurements during Q1 during the new rating curve period and therefore there was insufficient data to produce a new curve; the curve will be developed with subsequent quarterly reports.



Table 14. Victoria Creek, downstream of Back Creek (H-VC-DBC) open water rating curve equations.

Stage (m)	Discharge (m ³ /s)	Offset (m)	Slope	Equation
Rating Curve, April, 2012 to March, 2013 (EDI 2013c)				
1.681	0.178	1.316	-	-
2.048	2.090	1.316	3.538	$Q = 6.30234 (h - 1.316)^{3.53797}$
2.315	9.631	1.316	4.913	$Q = 9.67846 (h - 1.316)^{4.91302}$
Rating Curve, April, 2013 to March, 2014 (EDI 2014a)				
1.720	0.109	1.65	-	-
2.147	5.220	1.65	1.568	$Q = 6.189 (h - 1.65)^{1.568}$
Rating Curve, April, 2013 to June, 2014				
Insufficient measurement events to produce a curve for Q1	-	-	-	-

3.2.3.3 Victoria Creek, upstream of Minnesota Creek (H-VC-UMN)

Victoria Creek upstream of Minnesota Creek (H-VC-UMN) is located in a straight reach upstream of the Minnesota Creek confluence. The channel averages 5.7 m in width and 0.20 m in depth, with channel conditions suitable for standard discharge measurement methods using the ADV. Four discharge measurements were collected during the Q1 monitoring period. Measured discharge was 0.022 m³/s (Swoffer) on April 15, 2014 under ice conditions. Discharge was measured using the ADV on May 9, 2014 (2.605 m³/s), May 21, 2014 (0.702 m³/s) and on June 24, 2014 (0.188 m³/s).

Originally established as an instantaneous discharge measurement location, a continuous station was deployed in 2012. The logger was removed on October 16, 2013 for the winter period and re-installed on May 21, 2014. There was some ice damage to the station over winter and repairs were required. As a result, a new rating period (new rating curve) was initiated on May 21, 2014.

Rating curve expressions for H-VC-UMN are presented in Table 15 and include previously reported rating curve expressions for the 2012-2013 and 2013-2014 rating periods. Winter discharge measurements were not used in rating curve expressions due to the presence of ice in the channel. There were only two rating measurements during Q1 during the new rating curve period and therefore there was insufficient data to produce a new curve; the curve will be developed with subsequent quarterly reports.

According to continuous logger records over the period of record, peak stage associated spring freshet occurred on May 9, 2014 after the site visit. The continuous stage and hydrograph records for H-VC-UMN are found in Appendix D.



Table 15. Victoria Creek, upstream of Minnesota Creek (H-VC-UMN) open water rating curve equations.

Stage (m)	Discharge (m ³ /s)	Offset (m)	Slope	Equation
Rating Curve, April, 2012 to March, 2013 (EDI 2013c)				
1.382	0.019	0.979	-----	-----
1.780	1.214	0.979	6.037	$Q = 4.63406 (h-0.979)^{6.03671}$
1.954	3.684	0.979	5.647	$Q = 4.25022 (h-0.979)^{5.64705}$
2.140	9.980	0.979	5.708	$Q = 4.25676 (h-0.979)^{5.70783}$
Rating Curve, April, 2013 to March, 2014 (EDI 2014a)				
1.411	0.049	0.98		
2.066	6.271	0.98	4.250	$Q = 4.066 (h - 0.979)^{5.250}$
Rating Curve, May, 2014 to June, 2014				
Insufficient measurement events to produce a curve for Q1	-	-	-	-

3.2.3.4 Victoria Creek at Road (H-VC-R)

Victoria Creek at Road (H-VC-R) station was established in 2011 as a continuous gauging station. The station is located 90 metres downstream of the Mount Nansen Road culvert in a low gradient, meandering section of the channel. Channel widths average 6.7 m and 0.25 m in depth at the discharge measurement location. The channel geometry and downstream hydraulic control (riffle) shifted after the 2014 freshet due to a large slug of sediment deposited in the immediate vicinity of the hydrometric station. This change to channel geometry also caused the relationship between stage and discharge to change therefore a new rating period was initiated on May 20, 2014.

Four discharge measurements were collected during the Q1 monitoring period using the ADV and salt slug injection methods. Measured discharge was 0.261 m³/s on April 14, 2014, 3.204 m³/s on May 8, 2014, 0.758 m³/s on May 20, 2014 and 0.179 m³/s on June 23, 2014.

Rating curve expressions for the H-VC-R station are presented in Table 16 in addition to the 2012-2013 monitoring period rating curve expressions. Continuous stage measurements are collected at H-VC-R. There was only one rating measurement during Q1 during the new rating curve period and therefore there was insufficient data to produce a new curve; the curve will be developed with subsequent quarterly reports. Stage time-series and hydrographs are presented in Appendix D.



Table 16. Victoria Creek at Road (H-VC-R) open water rating curve equations.

Stage (m)	Discharge (m ³ /s)	Offset (m)	Slope	Equation
Rating Curve, April, 2012 to March, 2013 (EDI 2013c)				
1.849	0.057	1.51	-	-
2.196	4.015	1.51	6.041	$Q = 39.1267 (h-1.51)^{6.04113}$
2.307	9.974	1.51	6.067	$Q = 39.5133 (h-1.51)^{6.06722}$
Rating Curve, April, 2013 to September, 2013 (EDI 2014a)				
2.010	0.149	1.90	-	-
2.541	10.340	1.90	2.406	$Q = 30.139 (h - 1.90)^{2.406}$
Rating Curve, May 2014 to June 2014				
Insufficient measurement events to produce a curve for Q1	-	-	-	-

3.2.4 Pony Creek

3.2.4.1 Upper Pony Creek (H-PC-U)

The Upper Pony Creek gauging station was established in 2009 to supplement a hydrogeological investigation (AECOM, 2010). Located in the upper reaches of Pony Creek, the station drains an area of 0.84 km² which has been historically disturbed by mineral exploration activities and more recently, by placer mining activities. The channel near the station is approximately 0.1 to 0.3 metres deep and 0.25 to 0.75 metres wide and is dominated by shrubs, mosses and grasses along the banks of the channel. A v-notch weir was installed to measure discharges at the station and used for hydrometric measurements in 2012-2013. Following freshet in 2013, the channel at the H-PC-U gauging station had bifurcated around the weir structure and backwater pond, re-joining its original channel immediately downstream. After discussion with AAM, plans were made to reconstruct a weir and continue measurements at this location in the upper Pony Creek watershed. A v-notch weir was constructed on June 23, 2014 but high flows and frozen banks required the weir to be completed during the next site visit in July.

Due to the absence of flow at the H-PC-U station, no discharge measurements were collected on April 14, 2014. Three discharge measurements were obtained at this station during Q1 using a salt tracer. The discharges measured on May 8, May 20 and June 23, 2014 were 0.24 m³/s, 0.006 m³/s and 0.001 m³/s respectively. The continuous data logger was removed from this site for the 2013-2014 winter period and not replaced due to the poor channel conditions to develop a rating curve. Instantaneous discharge measurements collected at H-PC-U are presented in Appendix D.

3.2.4.2 Pony Creek Downstream of Pit (H-PC-DSP)

A second hydrometric station is located downstream of H-PC-U below the Back Creek access road culvert and is named H-PC-DSP. The station was originally installed to supplement a hydrogeological investigation. Average widths for the channel at the station range from 0.15 to 0.50 m while depths range from 0.05 to 0.20 m. Due to channel morphology and conditions, only salt dilution gauging and volumetric methods are



used to estimate discharge at H-PC-DSP. A small rock weir was installed as a control immediately downstream of the stilling well and appears to be functioning as an effective control. Due to the large uncertainty associated with the collected rating measurements and stage data, no rating curve is applied to water stage recordings at the H-PC-DSP station. On May 8, 2014, a Solinst data logger was re-deployed at the station for the purpose of obtaining stage data only.

Due to the absence of flow along the Pony Creek channel during the April 14, 2014 visit, only three discharge measurements were collected during the Q1 period. These were collected using salt tracer and volumetric methods where appropriate. The discharge was 0.027 m³/s (salt tracer) on May 8, 2014; 0.005 m³/s (volumetric) and 0.006 m³/s (salt tracer) on May 20, 2014 and <0.001 m³/s (volumetric) on June 24, 2014.

Continuous time-series stage elevations and instantaneous discharge measurements are presented in Appendix D.

3.3 WATER QUALITY

Water quality results for sampling within the Q1 period are discussed for each sampling area in the sections below. The results include a summary of samples that exceeded guidelines and/or standards for each site and sampling trip, as well as *in situ* water quality parameters. Detailed lab result data is provided in Appendix E. All raw data is provided in the hydrology database (*EDI_14Y0455_Water_Quality_Database_2014-2015.acddb*).

3.3.1 Dome Creek

During the first sampling event of the Q1 period (April 14-15, 2014), only two of the six sites on Dome Creek could be sampled (WQ-DC-B and WQ-DC-U), as the remaining sites were frozen to substrate. By the May 8-9, 2014 trip all sites were flowing again.

The samples from the most upstream site, WQ-DC-DX, north of the mill site, consistently exceeded the CCME-AL guideline criteria for aluminum, arsenic and iron, as well as occasionally for cadmium and copper during the Q1 period (Table 17; Appendix E). Iron concentrations also often exceeded the Mount Nansen EQS values (Appendix E). The samples from WQ-DC-DX+105 site, which lies 105 m downstream from WQ-DC-DX, also typically exceeded the CCME-AL guidelines for aluminum, arsenic, cadmium and copper, while also exceeding guidelines and/or standards for iron, lead, silver, manganese and zinc (Table 17; Appendix E). The WQ-DC-D1b site lies down valley from the mill and downstream of an old tailings pond. Samples from this site typically exceeded the CCME-AL guidelines for arsenic, cadmium, copper, iron, lead, and zinc. Iron, zinc and manganese concentrations exceeded the Mount Nansen EQS criteria on a few occasions as well (Table 17; Appendix E).

The WQ-DC-B site within the Dome Creek diversion channel exceeded guidelines and/or standards for total suspended solids, aluminum, arsenic, cadmium, copper, and iron during all Q1 sampling events (Table 18; Appendix E). Samples also exceeded guidelines for lead, silver and zinc during the April 14-15, 2014 and



May 8-9, 2014 sampling event, as well as manganese on the May 8-9, 2014 and June 24-26, 2014 sampling events. The WQ-DC-U site, which lies downstream of the diversion channel and the seepage pond discharge site, typically had samples that exceeded the guideline and/or standards for ammonia, total suspended solids, aluminum, arsenic, cadmium, copper, iron, lead, manganese, silver and zinc (Table 18; Appendix E). The most downstream site on Dome Creek, WQ-DC-R, had samples that exceeded the guidelines and/or standards for aluminum, arsenic, cadmium, copper, iron, and manganese on all trips, with the addition of lead and total suspended solids during the June 2014 trip (Table 18; Appendix E).

Cyanide concentrations did not exceed water quality criteria during the Q1 investigation period. These results are similar to results from previous quarters during the 2013/14 investigations.

Table 17. Summary of parameters that exceeded CCME-AL guidelines and/or Mount Nansen EQS at the upper Dome Creek sites for the Q1 period (April 1 to June 30, 2014). Parameters in bold exceed both standard and guideline values.

Sampling Trip Date	WQ-DC-DX	WQ-DC-DX+105	WQ-DC-D1b
April 14-15, 2014	No sample	No sample	No sample
May 8-9, 2014	TSS, Al, As, Cd, Cu, Fe	Al, As, Cd, Cu, Fe, Pb, Ag, Zn	Al, As, Cd, Cu, Fe , Pb, Ag, Zn
May 20-21, 2014	Al, As, Cu, Fe	Al, As, Cd, Cu, Zn	As, Cd, Cu, Fe, Pb, Mn, Zn
June 24-26, 2014	Al, As, Cd, Fe	As, Cd, Fe, Mn, Zn	As, Cd, Fe, Pb, Mn, Zn

Table 18. Summary of parameters that exceeded CCME-AL guidelines and/or Mount Nansen EQS for the lower Dome Creek sites for the Q1 period (April 1 to June 30, 2014). Parameters in bold exceed both standard and guideline values.

Sampling Trip Date	WQ-DC-B	WQ-DC-U	WQ-DC-R
April 14-15, 2014	TSS, Al, As, Cd, Cu, Fe , Pb, Ag, Zn	NH ₃ , Al, As, Cd, Cu, Fe , Mn	No sample
May 8-9, 2014	TSS, Al, As, Cd, Cu, Fe, Pb, Mn, Ag, Zn	TSS, Al, As, Cd, Cu, Fe , Pb, Mn, Ag, Zn	Al, As, Cd, Cu, Fe , Mn
May 20-21, 2014	TSS, Al, As, Cd, Cu, Fe	TSS, Al, As, Cd, Cu, Fe , Mn	Al, As, Cd, Cu, Fe , Mn
June 24-26, 2014	TSS, Al, As, Cd, Cu, Fe , Mn	NH ₃ , Al, As, Cd, Fe , Mn	TSS, Al, As, Cd, Cu, Fe , Pb, Mn

In situ water quality parameters for the Dome Creek sites for Q1 were summarized (Table 19). In general, water temperatures stayed around zero degrees for most sites from April 2014 to mid-May 2014. The WQ-DC-DX+105 and WQ-DC-U sites had the highest water temperatures during the earlier portion of Q1, around 1.1°C to 1.4°C (Table 19). This is likely due to groundwater influence at WQ-DC-DX+105 and the inputs to WQ-DC-U from the seepage pond upstream. By June 2014, water temperatures lower in the



watershed ranged from 6.6°C to 7.7°C while water temperatures higher in the watershed ranged from 1.1°C to 3.8°C (Table 19). Specific conductivity was lowest during the early May 2014 freshet trip as runoff from snow and ice melt entered the creek, increasing towards late May and June 2014. The pH across Dome Creek was variable during the Q1 period, ranging from pH 6.99 to 8.01. Turbidity was also variable, ranging from 2.20 to 65.6 NTU during the sampling events.

Table 19. *In-situ* water quality data for the Dome Creek sites for the Q1 period (April 1 to June 30, 2014).

Site ID	Date	Water Temp. (°C)	Specific Conductivity (µS/cm)	pH	Turbidity (NTU)
WQ-DC-DX	14-Apr-14		frozen to substrate		
WQ-DC-DX	9-May-14	0.1	25.4	7.23	4.81
WQ-DC-DX	21-May-14	0.3	202.9	7.54	3.32
WQ-DC-DX	24-Jun-14	2.4	556.5	7.28	3.47
WQ-DC-DX+105	14-Apr-14		frozen to substrate		
WQ-DC-DX+105	9-May-14	1.4	95.3	7.54	11.33
WQ-DC-DX+105	21-May-14	1.1	377.9	7.34	2.20
WQ-DC-DX+105	24-Jun-14	1.1	1187.0	7.01	2.66
WQ-DC-D1b	14-Apr-14		frozen to substrate		
WQ-DC-D1b	9-May-14	0.0	468.5	7.95	17.21
WQ-DC-D1b	20-May-14	0.0	1166.0	8.01	7.59
WQ-DC-D1b	24-Jun-14	3.8	1307.0	7.76	3.99
WQ-DC-B	14-Apr-14	0.3	2863.0	6.99	36.60
WQ-DC-B	9-May-14	0.2	393.0	7.56	26.70
WQ-DC-B	21-May-14	3.6	580.6	7.54	40.70
WQ-DC-B	24-Jun-14	7.6	1339.0	7.81	12.30
WQ-DC-U	14-Apr-14	1.2	1677.0	7.31	13.17
WQ-DC-U	9-May-14	1.4	433.6	7.82	65.60
WQ-DC-U	21-May-14	4.0	658.9	7.87	35.50
WQ-DC-U	24-Jun-14	6.6	1415.0	7.69	13.80
WQ-DC-R	14-Apr-14		frozen to substrate		
WQ-DC-R	9-May-14	0.0	436.0	7.73	11.54
WQ-DC-R	21-May-14	0.3	552.0	7.56	3.96
WQ-DC-R	24-Jun-14	7.7	1200.0	7.60	26.60

3.3.2 Regular Seep Sites

The WQ-LW-SEEP-01 site on the lower west waste rock dump was dry during all visits and no samples were collected during the Q1 period. This site was scheduled to be sampled during freshet trips and every three months thereafter.

The Dome East Slope Seeps (WQ-DESS-01, -02, -03) were sampled starting during the freshet period. Of the three DESS seeps, the WQ-DESS-01 site contributes the most flow. This site consistently exceeded



guidelines and/or standards for pH, aluminum, cadmium and zinc (Table 20). The zinc and pH values exceeded both the CCME-AL guideline and Mount Nansen EQS on all three sampling events (Appendix E). The samples in May 2014 also exceeded the copper and iron CCME-AL guidelines.

The WQ-DESS-02 site was dry during the May 8-9, 2014 sampling event but was flowing during the May 20-21, 2014 and June 24-26, 2014 events. Results varied for these two trips; the May 20-21, 2014 samples exceeded guidelines and/or standards for a large suite of parameters, including TSS, aluminum, arsenic, cadmium, chromium, copper, iron, lead, manganese, mercury, silver and zinc (Table 20; Appendix E). The June 2014 samples only exceeded the Mount Nansen standard for TSS and the CCME-AL guideline for aluminum (Table 20; Appendix E). The TSS concentrations were much higher during the late-May 2014 trip versus the June 2014 trip, which would explain the higher concentrations of total metals in the May 20-21, 2014 samples; a large component of these metals were likely bound to the TSS in the water column rather than dissolved in the water itself (Appendix E). The dissolved metals concentrations for these samples support this assumption, in that concentrations of dissolved metals are similar between the two trips.

The WQ-DESS-03 site samples exceeded guidelines for aluminum, cadmium and copper during both May 2014 trips as well as for the TSS standard criteria in early-May and the iron CCME-AL guideline for late-May. The site was dry during the June 2014 trip. The WQ-CH-P-13-01 site which lies north of WQ-DESS-01 was sampled only during the June 24-26, 2014 trip as the site was dry during the May 2014 visits. The samples from June 2014 exceeded the guidelines and/or standards for pH, aluminum, cadmium, manganese and zinc.

The WQ-MS-S-08 site, located near the mill site was sampled during both May 2014 trips. There was no flow during the June 2014 trip. Both May 2014 samples exceeded the guidelines and/or standards for aluminum, arsenic, cadmium, copper, iron, lead, selenium, silver and zinc (Table 21; Appendix E). The late-May 2014 samples also exceeded guidelines and/or standards for TSS, manganese and mercury. The water was very turbid during both sampling trips, as the water flows across the road from the mill area.

Table 20. Summary of parameters that exceeded CCME-AL guidelines and/or Mount Nansen EQS for the WQ-DESS-01-03 sites for the Q1 period (April 1 to June 30, 2014). Parameters in bold exceed both standard and guideline values.

Sampling Trip Date	WQ-DESS-01	WQ-DESS-02	WQ-DESS-03
May 8-9, 2014	pH , Al, Cd, Cu, Fe, Mn, Zn	No sample	pH , TSS, Al, Cd, Cu
May 20-21, 2014	pH , Al, Cd, Cu, Fe, Zn	TSS, Al, As, Cd, Cr, Cu, Fe , Pb, Mn, Hg, Ag, Zn	pH , Al, Cd, Cu, Fe,
June 24-26, 2014	pH , Al, Cd, Zn	TSS, Al	No sample



Table 21. Summary of parameters that exceeded CCME-AL guidelines and/or Mount Nansen EQS for the WQ-CH-P-13-01 and WQ-MS-S-08 sites for the Q1 period (April 1 to June 30, 2014). Parameters in bold exceed both standard and guideline values.

Sampling Trip Date	WQ-CH-P-13-01	WQ-MS-S-08
May 8-9, 2014	No sample	Al, As, Cd, Cu, Fe , Pb, Se, Ag, Zn
May 20-21, 2014	No sample	TSS, Al, As, Cd, Cu, Fe , Pb, Mn, Hg, Se, Ag, Zn
June 24-26, 2014	pH , Al, Cd, Mn, Zn	No sample

The *in situ* water quality at the three WQ-DESS sites was quite different from site to site (Table 22). The WQ-DESS-01 site was characterized by a low pH and a high conductivity, the WQ-DESS-02 site had high conductivity but a neutral pH, and the WQ-DESS-03 site had low conductivity and a neutral pH (Table 22). The WQ-CH-P-13-01 seep site had a high conductivity and slightly acidic pH, similar to WQ-DESS-01 site (Table 22), which is located downslope. It is also important to note that these two sites also had similar concentrations of aluminum, cadmium and zinc (Appendix E, Table E4) and may be coming from the same seep water source. The WQ-MS-S-08 site had a relatively high conductivity and neutral pH (Table 22). This site had very turbid water (617 NTU) as it was running across the mine access road.

Table 22. *In situ* water quality data for the WQ-DESS-01-03, WQ-CH-P-13-01 and WQ-MS-S-08 sites for the Q1 period (April 1 to June 30, 2014).

Site ID	Date	Water Temp. (°C)	Specific Conductivity (µS/cm)	pH	Turbidity (NTU)
WQ-DESS-01	9-May-14	1.9	284.0	5.93	n/a ¹
WQ-DESS-01	20-May-14	0.3	831.6	5.71	2.59
WQ-DESS-01	24-Jun-14	2.9	1570.0	7.09	0.33
WQ-DESS-02	9-May-14			Dry	
WQ-DESS-02	20-May-14	0.6	1374.0	7.26	86.50
WQ-DESS-02	24-Jun-14	8.7	1450.0	7.98	0.89
WQ-DESS-03	9-May-14	1.9	97.2	6.85	n/a ¹
WQ-DESS-03	20-May-14	0.4	74.3	7.88	2.13
WQ-DESS-03	24-Jun-14			Dry	
WQ-CH-P-13-01	9-May-14			Dry	
WQ-CH-P-13-01	20-May-14			Dry	
WQ-CH-P-13-01	24-Jun-14	3.0	1818.0	6.23	0.19
WQ-MS-S-08	9-May-14	1.8	292.6	6.95	n/a ¹
WQ-MS-S-08	21-May-14	6.5	1798.0	7.93	617.00
WQ-MS-S-08	24-Jun-14			Dry	

Notes:

1 – insufficient samples available to collect turbidity *in situ*.



3.3.3 Brown-McDade Pit Lake

The Brown-McDade pit lake was sampled during two events over the Q1 investigation period, the April 2014 trip and the June 2014 trip. Ice conditions were unsafe for sampling in May 2014 during the melt period. Note during the April 2014 trip the surface samples were collected 0.3 m below the base of the ice surface. The mid-depth April sample was collected from 3 m below the ice, and the bottom sample was collected from 5.5 m below the ice. The June 2014 surface sample was taken from 0.3 m below the water surface, the mid-depth sample was taken at 2.5 m and the bottom sample was collected from 5.0 m.

All pit lake samples consistently exceeded the CCME-AL guidelines for arsenic, cadmium, copper, and zinc, which is common for the site (Table 23; Appendix E). The zinc concentrations from all samples also exceeded the Mount Nansen EQS value. The Mount Nansen EQS value for manganese was also exceeded from the WQ-PIT-3 samples (Table 23; Appendix E). Concentrations of fluoride in all pit samples also exceeded the CCME-AL guideline during the April 2014 trip and the June 2014 trip (only for the mid-depth sample WQ-PIT-2) (Table 23; Appendix E). The WQ-PIT-3 sample from April 2014 also exceeded the CCME-AL guideline for iron. In general, the WQ-PIT-3 samples taken from the bottom of the water column typically had the highest metal concentrations as this sample location has the most contact with the bed material of the pit lake (Appendix E).

Table 23. Summary of parameters that exceeded CCME-AL guidelines and/or Mount Nansen EQS for the Brown McDade Pit Lake for the Q1 period (April 1 to June 30, 2014). Parameters in **bold** exceed both standard and guideline values.

Sampling Trip Date	WQ-PIT-1 (surface)	WQ-PIT-2 (mid-depth)	WQ-PIT-3 (bottom)
April 14-15, 2014	F, As, Cd, Cu, Zn	F, As, Cd, Cu, Zn	F, As , Cd, Cu, Fe , Mn, Zn
May 8-9, 2014	No sample	No sample	No sample
May 20-21, 2014	No sample	No sample	No sample
June 24-26, 2014	As, Cd, Cu, Zn	F, As, Cd, Cu, Zn	As, Cd, Cu, Mn, Zn

Water temperatures from below the ice surface in April 2014 ranged from 0.3°C to 3.8°C (Table 24). Water temperatures of the pit lake sample depths in June 2014 ranged from 8.2°C to 9.5°C. Specific conductivity was highest typically from the bottom sample depth (WQ-PIT-3), where it is associated with higher suspended particulate matter, evidenced by higher turbidity and dissolved oxygen was lowest at the lowermost sample depth, likely due to higher biological demand and less recharge through wave action. The pH varied from pH 6.65 to 7.96 from all sample depths. Turbidity of all samples ranged from 0.82 to 2.88 NTU.



Table 24. *In-situ* water quality data for the Brown McDade Pit Lake for the Q1 period (April 1 to June 30, 2014).

Site ID	Date	Sample Depth (m)	Water Temp. (°C)	Specific Conductivity (µS/cm)	pH	Turbidity (NTU)	Dissolved Oxygen (mg/L)
WQ-PIT-1	14-Apr-14	0.3	0.3	2150.0	7.30	1.19	4.33
WQ-PIT-2	14-Apr-14	3.0	1.8	2127.0	7.24	0.82	4.04
WQ-PIT-3	14-Apr-14	5.0	8.2	2346.0	6.65	2.88	7.25
WQ-PIT-1	9/21-May-14						
WQ-PIT-2	9/21-May-14			unsafe sampling conditions			
WQ-PIT-3	9/21-May-14						
WQ-PIT-1	25-Jun-14	0.3	9.5	1426.0	7.96	1.76	9.72
WQ-PIT-2	25-Jun-14	2.5	9.5	1426.0	7.90	1.23	9.83
WQ-PIT-3	25-Jun-14	5.0	8.2	2346.0	6.65	2.88	7.25

3.3.4 Tailings Pond & Seepage Pond Discharge

The tailings pond (WQ-TP) and seepage pond discharge site (WQ-SEEP) were sampled during every visit of the Q1 period and results remained relatively consistent during the entire quarter. Water quality at the WQ-TP site consistently exceeded the CCME-AL guidelines and/or the Nansen EQS for arsenic, cadmium, copper, lead, silver and zinc, in addition to ammonia, aluminum, iron, fluoride and manganese on a few occasions (Table 25; Appendix E). The WQ-SEEP site consistently exceeded the CCME-AL guidelines and/or the Mount Nansen EQS for ammonia, aluminum, arsenic, cadmium, copper, iron and manganese, as well as for silver and fluoride on some occasions (Table 25; Appendix E). These results are similar to results from the 2013/14 program.

LT50 samples from the WQ-SEEP site are scheduled on a bi-monthly basis, and were collected on April 14, 2014 and May 21, 2014. Both samples passed the tests, with the 96 hour LT50 result being greater than 96 hours, with no fish showing signs of stress or mortality.

Table 25. Summary of parameters that exceeded CCME-AL guidelines and/or Mount Nansen EQS for WQ-TP and WQ-SEEP for the Q1 period (April 1 to June 30, 2014). Parameters in **bold** exceed both standard and guideline values.

Sampling Trip Date	WQ-TP	WQ-SEEP
April 14-15, 2014	NH ₃ , F, As , Cd, Cu, Fe , Pb, Mn, Ag, Zn	NH ₃ , F, Al, As, Cd, Cu, Fe , Mn
May 8-9, 2014	Al, As, Cd, Cu, Fe , Pb, Mn, Ag, Zn	NH ₃ , Al, As, Cd, Cu, Fe , Mn, Ag
May 20-21, 2014	F, Al, As, Cd, Cu, Fe, Pb, Mn, Ag, Zn	NH ₃ , Al, As, Cd, Cu, Fe , Mn
June 24-26, 2014	Al, As, Cd, Cu, Pb, Ag, Zn	NH ₃ , Al, As, Cd, Cu, Fe , Mn



In situ water quality parameters for the WQ-TP and WQ-SEEP sites for each trip of Q1 are summarized in Table 26. Water temperatures recorded in the tailings pond ranged from 0.3°C to 12.8°C from April to June 2014. Specific conductivity was highest in April 2014 in the tailings pond as water levels were low and concentrated under the ice surface (2,901.0 µS/cm). During the spring melt, specific conductivity in the tailings pond decreased significantly (166.4 µS/cm) in early May 2014. By June 2014 conductivity was relatively high again (1,115.0 µS/cm). The WQ-TP pH for the Q1 period ranged from pH 7.38 to pH 8.30. Turbidity was moderate to high during most events, ranging from 5.68 NTU to 24.80 NTU.

The WQ-SEEP site water temperatures ranged from 1.8°C to 7.5°C from April to June 2014 (Table 26). Specific conductivity ranged from 980 µS/cm to 1815 µS/cm during the Q1 period and pH ranged from pH 6.75 to pH 7.12. Turbidity ranged from 11.41 NTU to 64.00 NTU during the Q1 period.

Table 26. *In situ* water quality data for WQ-TP and WQ-SEEP for the Q1 period (April 1 to June 30, 2014).

Site ID	Date	Water Temp. (°C)	Specific Conductivity (µS/cm)	pH	Turbidity (NTU)
WQ-SEEP	14-Apr-14	1.8	1799.0	6.95	13.37
WQ-SEEP	9-May-14	2.8	980.0	7.12	11.41
WQ-SEEP	21-May-14	3.6	1566.0	6.97	64.00
WQ-SEEP	24-Jun-14	7.5	1815.0	6.75	13.10
WQ-TP	14-Apr-14	0.3	2901.0	7.38	6.31
WQ-TP	9-May-14	2.5	166.4	7.76	14.76
WQ-TP	21-May-14	8.2	805.0	7.79	24.80
WQ-TP	24-Jun-14	12.8	1115.0	8.30	5.68

3.3.5 Victoria Creek

Victoria Creek was sampled at five sites during the Q1 period. Samples and measurements for the WQ-VC-R site were collected at the winter sampling location, WQ-VC-R+150, located 150 m downstream of the culvert, for the April 14-15, 2014 and May 8-9, 2014 trips.

Prior to freshet during the April 2014 trip, samples from sites WQ-VC-U, WQ-VC-DBC, and WQ-VC-UMN exceeded the CCME-AL guidelines for aluminum and cadmium (Table 27; Appendix E). The WQ-VC-R+150 samples in April 2014 only exceeded the cadmium guideline. These results are typical of the winter period in Victoria Creek. During the early May 2014 trip all sites had total suspended solids, aluminum, cadmium, copper and iron concentrations that exceeded the CCME-AL guidelines and/or Mount Nansen EQS (Table 27; Appendix E). The samples from WQ-VC-DBC and WQ-VC-UMN also exceeded the arsenic and lead guidelines during the May 8-9, 2014 sampling event. During the May 20-21, 2014 sampling event, all sites had samples that exceeded the aluminum and copper guidelines, while WQ-VC-DBC and WQ-VC-R samples also exceeded the cadmium and iron guidelines. During the June 2014 sampling event, only aluminum concentrations were above the guideline value at all sites (Table 27; Appendix E).



Table 27. Summary of parameters that exceeded CCME-AL guidelines and/or Mount Nansen EQS for sites within the Victoria Creek watershed for the Q1 period (April 1 to June 30, 2014). Parameters in **bold** exceed both standard and guideline values.

Sampling Trip Dates	WQ-VC-U	WQ-VC-DBC	WQ-VC-UMN	WQ-VC-R+150 ¹	WQ-VC-R
April 14-15, 2014	Al, Cd	Al, Cd	Al, Cd	Cd	-
May 8-9, 2014	TSS, Al, Cd, Cu, Fe	TSS, Al, As, Cd, Cu, Fe , Pb	TSS, Al, As, Cd, Cu, Fe , Pb	TSS, Al, Cd, Cu, Fe	-
May 20-21, 2014	Al, Cu	Al, Cd, Cu, Fe	Al, Cu	-	Al, Cd, Cu, Fe
June 24-26, 2014	Al	Al	Al	-	Al

Note:

1- The WQ-VC-R+150 site is the WQ-VC-R winter sampling location (150 m downstream of the culvert), as the regular WQ-VC-R site freezes to substrate with thick overflow ice.

In situ water quality parameters for the Victoria Creek sites during each trip in Q1 are summarized in Table 28. Water temperatures remained near zero degrees at all Victoria Creek sites up until the June 2014 trip, when temperatures had risen up to a high of 7.9°C (Table 28). In general, water temperatures increase from the most upstream site (WQ-VC-U) to the most downstream site (WQ-VC-R). Specific conductivity was lowest in early May 2014 (<100 µS/cm) as snow and ice melted around site. The pH across the Victoria Creek sites ranged from pH 6.70 to pH 7.95. The highest turbidity levels measured *in situ* occurred during the May 8-9, 2014 trip which correspond with freshet timing.

Table 28. *In situ* water quality data for sites within Victoria Creek for the Q1 period (April 1 to June 30, 2014).

Site ID	Date	Water Temp. (°C)	Specific Conductivity (µS/cm)	pH	Turbidity (NTU)
WQ-VC-U	15-Apr-14	0.1	213.7	7.05	0.02
WQ-VC-U	9-May-14	0.6	51.4	7.34	12.58
WQ-VC-U	21-May-14	1.5	116.1	7.68	1.20
WQ-VC-U	25-Jun-14	5.6	183.7	7.40	0.54
WQ-VC-DBC	15-Apr-14	0.1	245.2	7.11	0.01
WQ-VC-DBC	9-May-14	0.6	55.2	7.37	21.20
WQ-VC-DBC	21-May-14	1.7	125.0	7.68	3.68
WQ-VC-DBC	24-Jun-14	6.9	185.5	7.59	0.27
WQ-VC-UMN	15-Apr-14	0.0	315.3	7.27	0.07
WQ-VC-UMN	9-May-14	0.1	71.4	7.27	20.50
WQ-VC-UMN	21-May-14	0.5	167.9	7.64	2.78
WQ-VC-UMN	24-Jun-14	7.4	257.1	7.73	1.44
WQ-VC-R+150 ¹	14-Apr-14	0.0	298.0	6.70	1.65
WQ-VC-R+150	9-May-14	0.0	67.2	7.07	15.53
WQ-VC-R	21-May-14	0.4	151.5	7.41	3.80
WQ-VC-R	24-Jun-14	7.9	241.4	7.95	1.08

Note: 1 – The WQ-VC-R+150 site is the WQ-VC-R winter sampling location (150 m downstream of the culvert), as the regular WQ-VC-R site freezes to substrate with thick overflow ice.



3.3.6 Back Creek

The Back Creek site was frozen to substrate during the April 14-15, 2014 trip. In May 2014, the creek was flowing and samples were collected during both May trips. The samples collected on May 8-9, 2014 exceeded guideline and/or standard criteria for total suspended solids, aluminum, arsenic, cadmium, chromium, copper, iron, lead, manganese, mercury, silver and zinc (Table 29). Two weeks later, the samples collected on May 20-21, 2014 exceeded the guideline and/or standard criteria for aluminum, arsenic, cadmium, copper and iron (Table 29). By the June 24-26, 2014 sampling trip, the creek was dry, which is an unusual occurrence in the summer; however it is likely that placer activities upstream are responsible for the change.

Table 29. Summary of parameters that exceeded CCME-AL guidelines and/or Mount Nansen EQS for WQ-BC for the Q1 period (April 1 to June 30, 2014). Parameters in **bold** exceed both standard and guideline values.

Sampling Trip Date	WQ-BC
April 14-15, 2014	No sample
May 8-9, 2014	TSS, Al, As, Cd, Cr, Cu, Fe , Pb, Mn, Hg, Ag, Zn
May 20-21, 2014	Al, As, Cd, Cu, Fe
June 24-26, 2014	No sample

In situ water quality data at the Back Creek site for the Q1 period is shown in Table 30, with water temperature ranging from 1.9°C to 4.1°C from May 9 to May 21, 2014, respectively. The lowest conductivity measured for Back Creek during Q1 was 73.9 µS/cm on May 9, 2014, which then rose to 185.0 µS/cm on May 21, 2014. The pH at the site in May 2014 ranged from pH 7.42 to pH 7.86. Turbidity was highest on May 9, 2014 at 498 NTU, which also corresponded with the lab samples having total suspended solids concentrations above the Mount Nansen EQS.

Table 30. *In situ* water quality data for WQ-BC for the Q1 period (April 1 to June 30, 2014).

Site ID	Date	Water Temp. (°C)	Specific Conductivity (µS/cm)	pH	Turbidity (NTU)
WQ-BC	14-Apr-14		frozen to substrate		
WQ-BC	9-May-14	1.9	73.9	7.42	498.00
WQ-BC	21-May-14	4.1	185.0	7.86	26.80
WQ-BC	24-Jun-14				dry

3.3.7 Pony Creek

Both Pony Creek sites could not be sampled during the first trip of Q1 as both sites remained frozen to substrate at the time of the trip (April 14-15, 2014). In May 2014 during the two freshet trips, the creek was flowing at both sampling locations, and EDI collected samples from both the upstream and downstream sites.



The WQ-PC-U site sample from early-May 2014 exceeded the CCME-AL guidelines for aluminum, cadmium and copper (Table 31; Appendix E). The May 20-21, 2014 sample exceeded the aluminum guideline criteria, and the June 24-26, 2014 sample exceeded the aluminum and cadmium guidelines. This site was upstream of the impacts of the Mount Nansen Mine; however, it is currently affected by placer mining activities upstream, particularly in the vicinity of the H-PC-U hydrometric station described in Section 3.2.4.1. Recent activity in that area has resulted in a portion of the stream being ploughed over with an excavator (June 2014) and additional activities may affect both the WQ-PC-U and WQ-PC-D sites.

The WQ-PC-D site sample from the early-May 2014 trip exceeded the CCME-AL guidelines for aluminum, arsenic, cadmium, copper, iron, lead, silver and zinc (Table 31; Appendix E). During the late-May trip, aluminum, cadmium and copper concentrations exceeded the CCME-AL guideline. Note the portion of the creek just upstream from the WQ-PC-D sampling location runs through an old waste rock pile which results in higher total metals concentrations than found in samples from the WQ-PC-U samples (which is upstream of the waste rock area). The WQ-PC-D site was dry during the June 24-26, 2014 trip as the creek typically does go to ground during periods with minimal precipitation and/or hot weather.

Table 31. Summary of parameters that exceeded CCME-AL guidelines and/or Mount Nansen EQS for the Pony Creek sites for the Q1 period (April 1 to June 30, 2014). Parameters in bold exceed both standard and guideline values.

Sampling Trip Date	WQ-PC-U	WQ-PC-D
April 14-15, 2014	No sample	No sample
May 8-9, 2014	Al, Cd, Cu	Al, As, Cd, Cu, Fe, Pb, Ag, Zn
May 20-21, 2014	Al	Al, Cd, Cu
June 24-26, 2014	Al, Cd	No sample

In situ water quality data at the Pony Creek sites for the Q1 period is shown in Table 32. Water temperatures at the upstream site ranged from 0.1°C to 5.0°C from May 9 to June 24, 2014, respectively. Water temperature for the downstream site ranged from 0.7°C to 2.2°C from May 9 to May 21, 2014. Specific conductivity for the WQ-PC-U site ranged from 72.0 µS/cm to 453.6 µS/cm. Specific conductivity at the WQ-PC-D site ranged from 76.0 µS/cm to 181.8 µS/cm. The pH at the both sites remained around neutral for the Q1 period. Turbidity ranged from 0.22 NTU to 12.50 NTU, and was highest on the May 9, 2014 trip due to high water levels and runoff associated with freshet.

Table 32. *In situ* water quality data for the Pony Creek sites for the Q1 period (April 1 to June 30, 2014).

Site ID	Date	Water Temp. (°C)	Specific Conductivity (µS/cm)	pH	Turbidity (NTU)
WQ-PC-U	14-Apr-14		frozen to substrate		
WQ-PC-U	9-May-14	0.1	72.0	7.27	8.23
WQ-PC-U	21-May-14	1.5	179.2	7.37	0.22



Site ID	Date	Water Temp. (°C)	Specific Conductivity (µS/cm)	pH	Turbidity (NTU)
WQ-PC-U	24-Jun-14	5.0	453.6	7.62	0.42
WQ-PC-D	14-Apr-14		frozen to substrate		
WQ-PC-D	9-May-14	0.7	76.0	7.37	12.60
WQ-PC-D	21-May-14	2.2	181.8	7.66	1.08
WQ-PC-D	24-Jun-14		dry		

3.3.8 Pump House Well

The pump house well was sampled during all visits of the Q1 period. Drinking water package samples were collected in addition to bacteriological samples when possible based on samplings schedule. There were no water quality criteria that were exceeded from the Health Canada Guidelines for Canadian Drinking Water, the CCME-AL guidelines or the Mount Nansen EQS. All bacteriological samples collected were absent of *E. coli* and total coliforms. Water quality parameters collected in the field are presented in Table 33, and remained relatively constant during the Q1 period. Turbidity was high on the May 9, 2014 trip, 6.32 NTU compared to the normal turbidity value range of 0.06 NTU to 0.10 NTU (Table 33).

Table 33. *In situ* water quality data for WQ-PW for the Q1 period (April 1 to June 30, 2014).

Site ID	Date	Water Temp. (°C)	Specific Conductivity (µS/cm)	pH	Turbidity (NTU)
WQ-PW	15-Apr-14	1.3	382.4	7.58	0.07
WQ-PW	9-May-14	1.1	354.5	7.40	6.32
WQ-PW	21-May-14	1.3	373.1	7.64	0.06
WQ-PW	25-Jun-14	1.3	404.9	6.72	0.10

3.3.9 Additional Freshet Sites

Five additional sites were included in the freshet sampling trips (May 8-9, 2014 and May 20-21, 2014), and involved opportunistic sampling of additional seepage sites and runoff from exploration trenches, the ore ramp, and mill site.

During the May 8-9, 2014 trip, a sample was collected from runoff in one of the exploration trenches (WQ-ET-1) upslope from the mill (Figure 2; Table 5). This site was dry during the later trip, May 20-21, 2014. The results from the early May sample, showed that several parameters exceeded guideline and/or standard criteria, including total suspended solids, aluminum, arsenic, cadmium, copper, iron, lead and silver (Table 34). The *in situ* parameters during the sampling event for WQ-ET-1 showed water temperatures of 0.8°C, specific conductivity of 63.5 µS/cm and pH 6.60 (Table 36).



The WQ-MS-S-03 site was sampled during both freshet trips in May 2014. On both occasions, the sampled exceeded guidelines and/or standards for arsenic, cadmium, iron, manganese and zinc (Table 34). The early May sample also exceeded the CCME-AL guidelines for aluminum, copper, lead and silver. The late-May sample also exceeded the CCME-AL guideline for fluoride. During both trips *in situ* water temperatures were 1.2°C, and specific conductivity ranged from 1,041.0 µS/cm in early May 2014 to 1,188.0 µS/cm in late May 2014 (Table 36). The *in situ* pH was neutral for all trips and turbidity was around 6 NTU.

The lysimeter 2 (WQ-L2) was sampled during the May 20-21, 2014 freshet trip. Note, there are two lysimeters on site, but AAM only requested that lysimeter 2 be sampled - lysimeter 1 is located on another part of the waste rock pile. The samples exceeded the CCME-AL guidelines for fluoride, arsenic and cadmium (Table 35). The site had a water temperature of 2.0°C, a specific conductivity of 548.5 µS/cm, pH 7.62 and turbidity of 3.37 NTU at the time of sampling (Table 36).

The WQ-NW-SEEP-02 site was sampled on May 8-9, 2014 and samples exceeded the guidelines and/or standards for fluoride, aluminum, arsenic, cadmium, copper, iron, lead, silver and zinc (Table 35). During sampling, the site had a water temperature of 1.9°C, a specific conductivity of 591.3 µS/cm, pH 7.55 and a turbidity of 7.63 NTU (Table 36).

The ore ramp down to the pit lake was sampled during the May 20-21, 2014 freshet trip. The samples exceeded the guidelines and/or standards for total suspended solids, fluoride, aluminum, arsenic, cadmium, copper, iron, lead, manganese, mercury, silver and zinc (Table 35). The WQ-ORE site had a water temperature of 4.7°C, a specific conductivity of 817.0 µS/cm, pH 7.22 and 407.00 NTU (Table 36).

Table 34. Summary of parameters that exceeded CCME-AL guidelines and/or Mount Nansen EQS for the additional freshet sites (WQ-ET-1 and WQ-MS-S-03) for the Q1 period (April 1 to June 30, 2014). Parameters in bold exceed both standard and guideline values.

Sampling Trip Date	WQ-ET-1	WQ-MS-S-03
May 8-9, 2014	TSS, Al, As, Cd, Cu, Fe , Pb, Ag	Al, As, Cd, Cu, Fe , Pb, Mn, Ag, Zn
May 20-21, 2014	No sample	F, As, Cd, Fe , Mn, Zn

Table 35. Summary of parameters that exceeded CCME-AL guidelines and/or Mount Nansen EQS for the additional freshet sites (WQ-L2, WQ-NW-SEEP-02, WQ-ORE) for the Q1 period (April 1 to June 30, 2014). Parameters in bold exceed both standard and guideline values.

Sampling Trip Date	WQ-L2	WQ-NW-SEEP-02	WQ-ORE
May 8-9, 2014	No sample	F, Al, As, Cd, Cu, Fe, Pb, Ag, Zn	No sample
May 20-21, 2014	F, As, Cd	No sample	TSS, F, Al, As , Cd, Cu, Fe , Pb, Mn, Hg, Ag, Zn



Table 36. *In situ* water quality data for the additional freshet monitoring sites for the Q1 period (April 1 to June 30, 2014).

Site ID	Date	Water Temp. (°C)	Specific Conductivity (µS/cm)	pH	Turbidity ¹ (NTU)
WQ-ET-1	9-May-14	0.8	63.5	6.60	-
WQ-ET-1	21-May-14			dry	
WQ-L2	9-May-14		insufficient water for sample		
WQ-L2	21-May-14	2.0	548.5	7.62	3.37
WQ-MS-S-03	9-May-14	1.2	1041.0	7.02	6.40
WQ-MS-S-03	21-May-14	1.2	1188.0	7.17	6.31
WQ-NW-SEEP-02	9-May-14	1.9	591.3	7.55	7.63
WQ-NW-SEEP-02	21-May-14			dry	
WQ-ORE	9-May-14			dry	
WQ-ORE	21-May-14	4.7	817.0	7.22	407.00

Notes: 1 – turbidity was not measured for these sites due to insufficient water available for measurement.

3.3.10 QA/QC Program

Field blank and travel blank samples were included on every trip during the Q1 period, except for during the May 8-9, 2014 trip when the lab did not provide field blank sampling supplies. At least, two duplicate samples were also collected during each sampling event. Table 37 summarizes the sample trip dates and sites were collected during each trip, aside from three duplicate samples during the June 2014 trip. All field blank and travel blank samples showed no contamination through field sampling methodologies, transportation or storage (Appendix E).

Replicate samples were compared for each trip to check the accuracy and precision of the laboratory analysis. Differences were within +/-10% for most parameters; however, some differences of over +/-10% were identified (Appendix E). Average percent differences for QA/QC sample sets ranged from 4% to 31%. The April 2014 QA/QC for the WQ-SEEP and WQ-VC-U samples had some parameters with very high percent differences, mostly for concentrations of total metals (Appendix E). Some of the duplicate sites with larger differences had either relatively high total suspended solids and/or large differences in total suspended solid values within the replicate sample sets. Total suspended solid concentrations are generally associated with total metals concentrations as metals are often bound to the suspended sediments. Some differences may also be attributed to sampling conditions based on ice conditions. See Appendix E - Tables E1-E4 for parameters that were flagged as greater than +/-10%.

Table 37. Summary of sites randomly selected as replicate samples for each sampling trip over the Q1 period.

Sampling Trip Date	Replicate #1	Replicate #2	Replicate #3
April 14-15, 2014	WQ-SEEP-r	WQ-VC-U-r	-
May 8-9, 2014	WQ-DC-R-r	WQ-SEEP-r	-
May 20-21, 2014	WQ-BC-r	WQ-VC-R-r	-
June 23-25, 2014	WQ-DC-B-r	WQ-VC-U-r	WQ-PIT-1-r



4 CONCLUSIONS & RECOMMENDATIONS

Based on results of the Q1 period of the Mount Nansen Water Resources Investigations Program from April 1, 2014 to June 30, 2014, EDI recommends that monitoring should continue as scheduled for 2014/15 investigations with added consideration of several recommendations outlined below. These recommendations attempt to improve the overall program data quality and efficiency.

- Volumetric measurements at H-SEEP are redundant based on available flow meter (totalizer) instrumentation in the pump house. Flow records maintained by on-going care and maintenance staff should be considered sufficient for hydrometric monitoring of the H-SEEP location, which has been confirmed by concurrent measurements over the last 2 years. Confirmation measurements can periodically be taken to confirm flow meter readings.
- Continue to monitor and compare results from **WQ-CH-P-13-01** and **WQ-DESS-01** during Q2, as these two sites appear to have similar water quality and may originate from the same seep water source. If water quality continues to be similar for the two sites, AAM may be able to shift monitoring to one of the sites minimizing costs to the program and improving field efficiency.
- Since the **WQ-LW-SEEP-01** site has been found to be dry during all trips of the Q1 period and is only scheduled to be sampled again three months after freshet (September 2014), it may be warranted to monitor this site on all trips of the open water season and to opportunistically sample the site if and when water is observed.



5 REFERENCES

- AECOM. 2010. Memorandum Re: Mount Nansen Hydrology Program Progress Summary (2009). Prepared for Assessment and Abandoned Mines Branch, Yukon Government. February 4, 2010
- Aquatic Informatics. 2014. Aquarius Time-Series Hydrologic Workstation. Version 3.5.124.
- Canadian Council Ministers of the Environment (CCME). 2014. Canadian Environmental Quality Guidelines Summary Table. <http://st-ts.ccme.ca/>, accessed April 2014.
- Cohn T., Kiang, J. Mason, R. 2006. U.S. Geological Survey. Personal Communication. June-August 2006.
- EDI 2014a. Mount Nansen Water Resources Investigations 2013 Quarterly Report (Q4): January – March, 2014. Prepared for Assessment and Abandoned Mines Branch, Yukon Government. Prepared by C. Light and M. Marjanovic. April, 2014.
- EDI 2014b. Mount Nansen Water Resources Investigations 2013 Quarterly Report: (Q3): October – December, 2013. Prepared for Assessment and Abandoned Mines Branch, Yukon Government. Prepared by C. Light and M. Marjanovic. January, 2014.
- EDI 2013a. Mount Nansen Water Resources Investigations 2013 Quarterly Report (Q1): April – June 2013. Prepared for Assessment and Abandoned Mines Branch, Yukon Government. Prepared by C. Light and M. Marjanovic. October, 2013.
- EDI 2013b. Mount Nansen Water Resources Investigations 2013 Quarterly Report (Q2): July – September 2013. Prepared for Assessment and Abandoned Mines Branch, Yukon Government. Prepared by C. Light and M. Marjanovic. October, 2013.
- Health Canada. 2012. Guidelines for Canadian Drinking Water Quality Summary Table. Prepared by the Federal-Provincial-Territorial Committee on Drinking Water.
- Laberge Environmental Services. 1999. Winter low flow stream discharge measurements using the salt slug injection method: Field trials and method development for use in location mine monitoring applications. Report prepared for the Mining Environment Research Group (MERG).
- LWBC. 2004. Hydrological Guidelines for Water Power Projects. Land and Water British Columbia Inc. Surrey, British Columbia. October 2004.
- Maidment, D.R. (Editor in Chief). 1993. Handbook of Hydrology. McGraw-Hill Inc. 1,424 pages.
- Moore, R.D. 2004a. Introduction to Salt Dilution Gauging for Streamflow Measurement: Part I. *Streamline Watershed Management Bulletin*. 7 (4). 20-25.
- Moore, R.D. 2004b. Introduction to Salt Dilution Gauging for Streamflow Measurement Part 2: Constant-rate Injection. *Streamline Watershed Management Bulletin*. 8 (1). 11-15.



- Moore, R.D. 2005. Slug Injection Using Salt in Solution. *Streamline Watershed Management Bulletin*. 8 (2). 1-6.
- Hudson, R. and Fraser, J. 2005. Introduction to Salt Dilution Gauging for Streamflow Measurement Part IV: The Mass Balance (or Dry Injection) Method. *Streamline Watershed Management Bulletin*. 9 (1). 6-12.
- Kite, G. 1994. Measuring glacier outflows using a computerized conductivity system. *Journal of Glaciology*, 40 (134), 93-96.
- RISC. 2009. Manual of British Columbia Hydrometric Standards. Resources Inventory Standards Committee (RISC), Ministry of Environment, Science and Information Branch, Government of British Columbia.
- Smith, C.A.S., J.C. Meikle, and C.F. Roots (editors). 2004. Ecoregions of the Yukon Territory: Biophysical Properties of Yukon Landscapes. Agriculture and Agri-Food Canada, PARC Technical Bulletin No. 04-01, Summerland, British Columbia. 313 p.
- Sontek/YSI Inc. 2009. FlowTracker Handheld ADV Technical Manual Firmware Version 3.7, Software Version 2.30
- WSC. 1999. Hydrometric Technician Career Development Program. Principles of Discharge Measurement. Volume 2 No. 10.1 Prepared for The Water Survey of Canada (WSC) by R. J. Lane of WSC. Environment Canada.

5.1 SPATIAL DATA

- EDI Environmental Dynamics Inc. (EDI). 2011. Detailed Watercourse, Drainage Areas and Road Layers for the Mount Nansen Area. Digitized / modified by EDI using orthophotos provided by Yukon Government, Energy, Mines and Resources (2011).
- EDI Environmental Dynamics Inc. (EDI). 2012. Mount Nansen Area Sampling Data. Collected by EDI Environmental Dynamics Inc. (2012) and was obtained using Garmin GPS technology.
- Government of Canada. 2012a. 1:50,000 Topographic Spatial Data (CanVec Edition 10.0). Department of Natural Resources Canada (NRCAN), Earth Sciences Sector. Provided by Geomatics Yukon, Corporate Spatial Warehouse, Yukon Government. Accessed in 2012. www.geomaticsyukon.ca.
- Government of Canada. 2012b. 1:250,000 Topographic Spatial Data (National Topographic Data Base [NTDB]). Department of Natural Resources Canada (NRCAN), Earth Sciences Sector, Mapping Services Branch, Centre for Topographic Information, Sherbrooke. Provided by Geomatics Yukon, Corporate Spatial Warehouse, Yukon Government. Accessed in 2012. www.geomaticsyukon.ca.
- Yukon Government, 2011. Mount Nansen Area Orthophoto (10 cm resolution). Department of Energy, Mines and Resources. Provided by Yukon Government, Department of Energy, Mines and Resources (2011).



Yukon Government, 2012. Mount Nansen Area Detailed Contours (1 metre interval). Department of Energy, Mines and Resources. Provided by Yukon Government, Department of Energy, Mines and Resources (2012).

Yukon Government, 2002. Digital Elevation Model (30 m resolution). Yukon Department of Environment, Information Management & Technology Branch. Yukon Department of the Environment. Provided by Geomatics Yukon, Corporate Spatial Warehouse, Yukon Government. Accessed in 2012. www.geomaticsyukon.ca.

Disclaimer:

Maps presented in this document are a geographical representation of known features. Although the data collected and presented herein has been obtained with the utmost attention to quality, this document is not an official land survey and should not be considered for spatial calculation. EDI Environmental Dynamics Inc. does not accept any liability for errors, omissions or inaccuracies in the data.



APPENDIX A Q1 SITE AND STATION PHOTOGRAPHS

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Dome Creek Sites/Stations



**Photo 1. WQ-DC-DX, looking upstream
(May 21, 2014).**



**Photo 2. H/WQ-DC-DX+105, looking upstream
(May 21, 2014).**



**Photo 3. H/WQ-DC-D1b, looking downstream
(May 20, 2014).**



**Photo 4. WQ-H-DC-B, looking downstream from
WQ-DC-B site towards H-DC-B station
(May 21, 2014).**



Photo 5. H-DC-M/WQ-DC-U, looking towards right downstream bank (May 20, 2014).



Photo 6. New weir construction at H-DC-M, looking upstream (June 24, 2014).



Photo 7. H-DC-R, looking upstream towards road and typical salt slug location (May 8, 2014).



Photo 8. WQ-DC-R looking downstream (June 24, 2014).



Victoria Creek & Back Creek Sites/Stations



**Photo 9. H-VC-U, looking downstream
(May 21, 2014).**



**Photo 10. WQ-VC-U, looking downstream
(May 21, 2014).**



**Photo 11. H-VC-DBC, looking upstream
(May 21, 2014).**



**Photo 12. WQ-VC-DBC, looking downstream
(May 21, 2014).**



Photo 13. H/WQ-VC-UMN, looking upstream (May 21, 2014).



Photo 14. H-VC-R, looking downstream (May 20, 2014).



Photo 15. WQ-VC-R, looking upstream (May 21, 2014).



Photo 16. H/WQ-BC, looking downstream (May 9, 2014).



Pit Lake/Tailings Pond/Seepage Pond Discharge



**Photo 17. H/WQ-SEEP
(May 21, 2014).**



Photo 18. H/WQ-TP (May 21, 2014).



**Photo 19. WQ-PIT overview
(May 20, 2014).**



Photo 20. WQ-PIT (June 25, 2014).



Pony Creek Sites/Stations



Photo 21. H-PC-U, looking downstream (May 20, 2014).



Photo 22. H-PC-U placer activity observed on June 24, 2014.



Photo 23. H-PC-DSP, looking upstream (May 20, 2014).



Photo 24. WQ-PC-D, looking upstream (May 21, 2014).



Photo 25. WQ-PC-U, looking downstream (May 21, 2014).

Regular Seep Sites

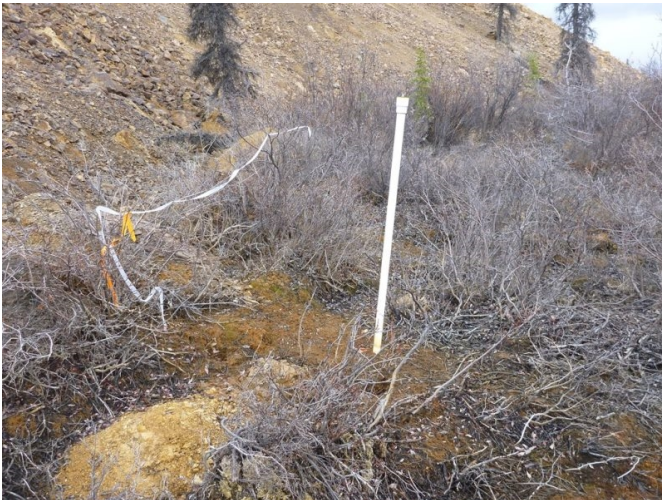


Photo 26. WQ-LW-SEEP-01 (May 9, 2014).



Photo 27. WQ-MS-S-08 (May 21, 2014).



Photo 28. WQ-CH-P-13-01, looking upstream (June 24, 2014).



Photo 29. WQ-DESS-01, looking upstream (June 24, 2014).



Photo 30. WQ-DESS-02, looking upstream (June 24, 2014).



Photo 31. WQ-DESS-03, looking upstream (June 24, 2014).



Additional Freshet Seep Sites

(Note: no photo available for NW-SEEP-02)



Photo 32. WQ-MS-S-03, looking upstream (May 21, 2014).



Photo 33. WQ-ET-01, looking upstream (May 9, 2014).



Photo 34. WQ-L2 (May 21, 2014).



Photo 35. WQ-ORE, looking down to pit lake (May 21, 2014).



Pumphouse Well & Atmospheric Station



Photo 36. Overview of WQ-PW (June 25, 2014).



Photo 37. Overview of ATM-DC-2,-4 with H-DC-B station in background (May 20, 2014).



APPENDIX B Q1 MONITORING VISIT RECORD

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Table B-1. Record of sites sampled and stations monitored during each site visit during the Q1 period, April 1 to June 30, 2014 (note additional freshet sites are marked with an “*”).

Station/Site Name	April 14-15, 2014	May 8-9, 2014	May 20-21, 2014	June 23-25, 2014
H/WQ-PC-U	N	Y	Y	Y
H/WQ-PC-D	N	Y	Y	Y _h
WQ-PIT-1,2,3	Y	N	N	Y
WQ-DC-DX	N	Y	Y	Y
H/WQ-DC-DX+105	N	Y	Y	Y
H/WQ-DC-D1b	N	Y _w	Y _w	Y
H/WQ-DC-B	Y _w	Y	Y	Y
H-DC-M/WQ-DC-U	Y	Y	Y	Y
H/WQ-DC-R	N	Y	Y	Y
H/WQ-TP	Y _w	Y _w	Y	Y
H/WQ-SEEP	Y	Y	Y	Y
WQ-MS-S-08	N	Y	Y	N
H/WQ-BC	N	Y	Y	N
H/WQ-VC-U	Y	Y	Y	Y
H/WQ-VC-DBC	Y	Y	Y	Y
H/WQ-VC-UMN	Y	Y	Y	Y
H/WQ-VC-R	Y _h	Y _h	Y	Y
WQ-VC-R+150	Y	Y	N	N
WQ-PW	Y	Y	Y	Y
WQ-DESS-01	N	Y	Y	Y
WQ-DESS-02	N	N	Y	Y
WQ-DESS-03	N	Y	Y	N
WQ-CH-P-13-01	N	N	N	Y
WQ-LW-Seep-01	N	N	N	N
WQ-NW-SEEP-02*	n/a	Y	N	n/a
WQ-ORE*	n/a	N	Y	n/a
WQ-ET-01*	n/a	Y	N	n/a
WQ-L2*	n/a	N	Y	n/a
WQ-MS-S-03*	n/a	Y	Y	n/a
Pit Water Levels*	n/a	N	Y	n/a
CH-P-13-05/50m*	n/a	Y	Y	n/a
GLL07-03*	n/a	N	Y	n/a

Codes

N - site or station not sampled due to no observations of flow or lack of suitable conditions for sampling

Y - water sampling conducted and/or discharge measurement collected

Y_w - water quality only (if a combined hydrology station and water quality site)

Y_h - hydrology only (if a combined hydrology station and water quality site)

n/a - not applicable as sampling/monitoring not required (removed from scope)

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APPENDIX C Q1 EDI FIELD DATA SHEETS

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- 1) Download ALL data loggers present.
- 2) If a measurement is not feasible, fully document why and take photos.
- 3) Fill in ALL data boxes & Site Comment boxes on field sheets to document site conditions (even if site is unchanged).
- 4) During salt slugs, minimum SPC rise is only +10x resolution of conductivity meter.
- 5) Salt slug calibration tests can be done at the end of the day at the bunkhouse.
- 6) Attempt to get paired SS and ADV measurements where ice cover is sufficiently thin to measure with the ADV.

**General Site Tasks/
Communications**

#	Complete	HID	Station Name	Station Type	Site Tasks	Survey Required	Logger Type Serial #	Q Method	Additional Materials Required	Date	Time	SG	Logger
						Yes/No				yy.mm.dd	HH:MM	(m)	(m)
1	<input checked="" type="checkbox"/>	ATM-DC2	Atmospheric at Diversion Channel	Continuous Baro Logger	1) HOBO download	NO	HOBO	None	None	2014-APR-	16:49	n/a	
2	<input checked="" type="checkbox"/>	ATM-DC4	Atmospheric at Diversion Channel (Back-up)	Continuous Baro Logger	1) Solinst download 2) Clear Solinst logger data	NO	Solinst Baro-logger	None	None	2014-APR-14	16:38	n/a	
3	<input checked="" type="checkbox"/>	H-PC-U	Upper Pony Creek	Instantaneous	Unsuitable for sampling Dry/Frozen/Overflow	NO	n/a	Salt (0.01 kg) CF.T	None	2014-APR-14	/	/	/
4	<input checked="" type="checkbox"/>	H-PC-DSP	Pony Creek Downstream of Pit	Instantaneous	Unsuitable for sampling Dry/Frozen/Overflow	NO	n/a	Volumetric Salt (0.01 kg) CF.T	None	2014-APR-14	19:10	/	/
5	<input checked="" type="checkbox"/>	H-DC-DX+105	Dome Creek DX+105	Instantaneous	1) Q measurement	n/a	n/a	Salt (0.01 kg) CF.T	None	2014-APR-14	17:18	n/a	/
6	<input checked="" type="checkbox"/>	H-DC-D1b	Dome Creek D1b	Instantaneous	Unsuitable for sampling Dry/Frozen/Overflow	n/a	n/a	Salt (0.01 kg) CF.T	None	2014-APR-	/	n/a	/
7	<input checked="" type="checkbox"/>	H-DC-B	Diversion Channel at Bridge	Continuous	1) Q measurement (if channel conditions permit)	NO	n/a	Salt (0.05 kg) CF.T	None	2014-APR-14	16:15	/	/
8	<input checked="" type="checkbox"/>	H-DC-M	Middle Dome Creek	Continuous	1) Q measurement 2) Logger download	YES	Solinst 1050018	Salt (0.1 kg) CF.T	None	2014-APR-14	14:18	/	/
9	<input checked="" type="checkbox"/>	H-DC-R	Dome Creek at Road	Continuous	Unsuitable for sampling Dry/Frozen/Overflow	n/a	n/a	Volumetric Salt (0.1 kg) CF.T	None	2014-APR-14	13:58	/	/
10	<input checked="" type="checkbox"/>	H-VC-U	Upper Victoria Creek	Continuous	1) Q measurement (ADV + SS) 2) Logger download	YES	Solinst 1049522	ADV SS (0.2 kg)	None	2014-APR-15	11:12	-0.3544	
11	<input checked="" type="checkbox"/>	H-VC-DBC	Victoria Creek D/S of Back Creek	Continuous	1) Q measurement (ADV + SS) 2) Logger download	YES	Solinst 1049137	ADV SS (0.2 kg)	None	2014-APR-15	9:43	-0.0856	
12	<input checked="" type="checkbox"/>	H-BC	Back Creek	Continuous	Unsuitable for sampling Dry/Frozen/Overflow	NO	n/a	Salt (0.025 kg) CF.T	None	2014-APR-15	11:50	/	/
13	<input checked="" type="checkbox"/>	H-VC-UMN	Victoria Creek U/S of Minnesota Creek	Continuous	1) Q measurement (ADV + SS)	NO	n/a	ADV SS (0.2 kg)	None	2014-APR-15	8:40	/	/
14	<input checked="" type="checkbox"/>	H-VC-R	Victoria Creek at Road	Continuous	1) Q measurement (ADV + SS) 2) Logger download	YES	Solinst 1041103	ADV SS (0.2 kg) CF.T	None	2014-APR-14	12:50	/	/
15	<input checked="" type="checkbox"/>	H-SEEP	Seepage Pond Outlet	Instantaneous / Water Level	1) Q measurement at pipe outlet 2) Q measurement at flow meter in pumphouse 3) Staff Gauge Reading in Pond	NO	n/a	Volumetric	None	2014-APR-14	15:40	/	/
16	<input checked="" type="checkbox"/>	H-TP	Tailings Pond	Water Level Only	1) Staff Gauge Reading (if possible)	NO	n/a	None	None	2014-APR-	/	/	/

* ASK DES to give
 Sit REP on VC @
 PW every day starting
 2nd wk in May for flow # flow

Dry/Frozen to bed.
 Culvert Frozen dry.
 U/S 0053 D/S 0054 overviews 0055
 Dry/Frozen to bed. Photos 37-39 show 2 sites that are dry.
 Photos 2DB36, RDB35, D/S 34, U/S 33
 0.05 kg x 2 → *Not Measured due to
 water flowing through layers of ice
 & road run off @ Bridge.
 U/S 0029 D/S 0030 LDB 0032 RDB 0031
 Overflow. Photo 0009.

0.2 kg x 2
 0.2 kg x 2
 Frozen to bed
 8 kg
 0.2 kg x 2
 0.2 kg x 2



Weather: +1°C, overcast but bright

HID	A-VC-R		Date	14 APRIL 2014		Discharge Measurement Instruments + Methods								
Station Name	Victoria Creek at Road.		Q Measurement Start Time:	(HH:MM) PDT PST	YSI SWOFFER PYGMY ADV MID-SECT POINT									
			Q Measurement End Time:	(HH:MM) PDT PST	SALT TRACER WEIR VOLUMETRIC FLOAT ROD									
			Logger Download/Inst Time:	(HH:MM) PDT PST	Channel Conditions									
		Logger Reading (m)	[] downloaded	NONE ICE BACKWATER > BANKFULL ZERO FLOW HIGH SUSP. SED.										
Logger:	Serial #	HOBO (Solinst) N/A			GPS Waypoint	ZONE	EASTING	NORTHING						
Photo #	[U/S] 0001	[D/S] 0002	[RDB]	0003	[LDB]	0004	[STAFF/WEIR]							
Site Comments			Salt Tracer			SLUG CONSTANT RATE DRY LOGGED MANUAL SPC EC C.F.T. YES NO Trial Time SPC _B SPC _P Mix Length Mass of Salt Mix Vol. [Salt Slug] EC _B (uS/cm) EC _P (uS/cm) L _m (m) M _S (kg) Volume (L) C _{SS} (kg/L)								
Well site photos: 0008 LDB, 0007 RDB, 0006 d/s, 0005 w/s logger not downloaded; "cable error".														
Channel Measurements														
Staff Gauge Height (m):														
Weir Head (m):														
Water Temperature (°C): 0.0°C														
Water Surface Slope (%):														
Average Width (m):														
Average Depth (m):														
Measurement Summary														
Meas. Type: SALT														
Measurement ID (MID):														
Average Q (m³/s):														
Q Meas. Accuracy +/- [%]:														
Average Velocity (m/s):														
Cross-Sectional Area (m²):														
			Volum.			V _i for Sec. Mix (mL) 50 mL Csec (g/L): 1 g/L Vol. Calib. Tank (L): 1 L SPC ₀ Calib. Tank C.F.T = Qsalt = Notes: 50 mL S.S into 1L of CK.			Vol. Added (mL) SPC (uS/cm) Temp 1. 0 295.0 0.2 2. 10 317.2 0.3 3. 0 295.4 0.2 4. 2 299.4 0.2 5. 2 302.9 0.3 6. 2 308.0 0.4 7. 8. 9.					
			Volume (L) =			[1]			[2]					
			Time (sec) [1]			[2]			[3]					
			Average Q (L/s) =			[4]			[5]					
			Avg. Q _{vol} (L/s) =			Avg Q _{vol} (m³/s) =								
Hydrometric Levels - Survey														
YES NO REASON:			Survey Time (HH:MM): (WATER) 13:20			BM Shift: Yes No			Logger Shift: Yes No			Staff Gauge Shifted?: Yes No		
Circuit #1	HI	Rod Read	Elevation (m)	± 0.003	Circuit #2	HI	Rod Read	Elevation (m)	Station Measurements					
Station	A	B	C		Station	A	B	C						
BM1	4209	1209	3.000		BM1			3.000	Log'r Rod Length:					
BM2		0.778	3.431		BM2				Log'r Rod to Bolm:					
BM3		1.039	3.170		BM3									
TOS					TOS									
WATER					WATER									
LOG'R ROD:		1397	2812		LOG'R ROD:									
HWM/CON					HWM/CON									
BANKFULL					BANKFULL									
BM2		12208	3.001		BS (BM1)									

Field Staff: J.M., D.H., D.S.
 Data Entry By: _____ Date: _____
 Reviewed By: _____ Date: _____



HID: H-DC-M		Date: 14 APRIL-2014		Discharge Measurement Instruments + Methods					
Station Name: Middle Dome Creek	Q Measurement Start Time: (HH:MM) PDT PST		<input checked="" type="checkbox"/> SWOFFER <input checked="" type="checkbox"/> PYGMY <input checked="" type="checkbox"/> ADV <input checked="" type="checkbox"/> MID-SECT <input checked="" type="checkbox"/> POINT						
	Q Measurement End Time: (HH:MM) PDT PST		<input checked="" type="checkbox"/> SALT TRACER <input checked="" type="checkbox"/> WEIR <input checked="" type="checkbox"/> VOLUMETRIC <input checked="" type="checkbox"/> FLOAT <input checked="" type="checkbox"/> ROD						
	Logger Download/Inst Time: 14:18 (HH:MM) PDT PST		Channel Conditions						
Logger Reading (m)		<input checked="" type="checkbox"/> downloaded		<input checked="" type="checkbox"/> NONE <input checked="" type="checkbox"/> CE <input checked="" type="checkbox"/> BACKWATER <input checked="" type="checkbox"/> > BANKFULL <input checked="" type="checkbox"/> ZERO FLOW <input checked="" type="checkbox"/> HIGH SUSP SED					
Logger: Serial # 1050018	HOBO <input checked="" type="checkbox"/> Solinst <input checked="" type="checkbox"/> N/A		GPS Waypoint		ZONE	EASTING	NORTHING		
Photo # [U/S] 0010	[D/S] 0011	[RDB] 0012	[LDB] 0013	[STAFF/WEIR] 0014					
Site Comments		Salt Tracer		<input checked="" type="checkbox"/> SLUG <input checked="" type="checkbox"/> CONSTANT RATE <input checked="" type="checkbox"/> DRY <input checked="" type="checkbox"/> LOGGED <input checked="" type="checkbox"/> MANUAL <input checked="" type="checkbox"/> SPC <input checked="" type="checkbox"/> EC <input checked="" type="checkbox"/> CF.T <input checked="" type="checkbox"/> YES <input checked="" type="checkbox"/> NO					
Directory cable damaged while getting water level, cable no longer functioning - No loss of data, logger reset last trip.				Trial Time	SPC _B SPC _P	Mix Length	Mass of Salt	Mix Vol.	[Salt Slug]
					EC ₀ (uS/cm) EC _{pk} (uS/cm)	L _m (m)	M _{sa} (kg)	Volume (L)	C _{ss} (kg/L)
Channel Measurements		Volum.		V ₁ for Sec. Mix (mL)		Vol. Added (mL)	SPC (uS/cm)	Temp	
Staff Gauge Height (m): 12.8	Csec (g/L): 1 g/L			1. 0 mL		1679	1.6		
Weir Head (m):	Vol. Calib. Tank (L): 1 L			2. 10 mL		1683	1.7		
Water Temperature (°C): 1.20C	SPC ₀ Calib. Tank			3. 30 mL		1712	1.7		
Water Surface Slope (%):	CF.T =			4. 30 mL		1734	1.9		
Average Width (m):	Qsalt =			5. 60 mL		1793	1.8		
Average Depth (m):	Notes: 50 mL S.S into 500 mL ck.			6. 60 mL		1815	2.1		
Measurement Summary				7. 120 mL		1895	2.2		
Primary	Secondary			8. 180 mL		1981	2.4		
Meas. Type:				9. 240 mL		2106	1.9		
Measurement ID (MID):		10. 270 mL		2144	2.4				
Average Q (m³/s):		Volume (L) =		[3]	[4]	[5]			
Q Meas. Accuracy +/- [%]:		Time (sec) [1]	[2]						
Average Velocity (m/s):		Average Q (L/s) =							
Cross-Sectional Area (m²):		Avg. Q _{vol} (L/s) =							
Hydrometric Levels - Survey									
<input checked="" type="checkbox"/> YES <input checked="" type="checkbox"/> NO REASON:		Survey Time (HH:MM) (WATER) 14:32		BM Shift: Yes No		Logger Shift: Yes No		Staff Gauge Shifted?: Yes No	
Circuit #1	HI	Rod Read	Elevation (m)	± 0.003	Circuit #2	HI	Rod Read	Elevation (m)	Station Measurements
Station	A	B	C		Station	A	B	C	
BM1	4.474	1.474	3.000		BM1			3.000	Log'r Rod Length:
BM2		1.761	2.713		BM2				Log'r Rod to Botm:
BM3		2.155	2.319		BM3				
TOS		1.994	2.480		TOS				
WATER		2.857	1.617		WATER				
LOG'R ROD:		1.763	2.711		LOG'R ROD:				
HWM/CON		1.473	3.001		HWM/CON				
BANKFULL					BANKFULL				
BM1		1.473	3.001		BS (BM1)				

Field Staff: **JM, DH, DS**
 Data Entry By: _____ Date: _____
 Reviewed By: _____ Date: _____



Weather: +10°C, sunny

HID	H-SEEP		Date	14 APRIL 2014		Discharge Measurement Instruments + Methods			
Station Name	Seepage pond outlet		Q Measurement Start Time:	(HH:MM) PDT PST	YSI SWOFFER PYGMY ADV MID-SECT POINT				
			Q Measurement End Time:	(HH:MM) PDT PST	SALT TRACER WEIR VOLUMETRIC FLOAT ROD				
			Logger Download/Inst Time:	(HH:MM) PDT PST	Channel Conditions				
			Logger Reading (m)	[] downloaded	NONE ICE BACKWATER > BANKFULL ZERO FLOW HIGH SUSP SED				
Logger: Serial #			HOBO Solinst N/A		GPS Waypoint		ZONE EASTING NORTHING		
Photo # [U/S]	0016	[D/S]			[RDB]	[LDB]	[STAFF/WEIR]		
Site Comments			SLUG CONSTANT RATE DRY LOGGED MANUAL SPC EC CF T YES NO						
Water looks Flow meter photos: 0017 + 0018. In line flow reading 147.771 LPM			Trial Time		SPC _B SPC _P	Mix Length	Mass of Salt	Mix Vol.	[Salt Slug]
					EC ₀ (uS/cm) EC _{pk} (uS/cm)	L _m (m)	M _s (kg)	Volume (L)	C _{ss} (kg/L)
			1 (:)						
			2 (:)						
Channel Measurements			V ₁ for Sec. Mix (mL)				Vol. Added (mL)	SPC (uS/cm)	Temp
Staff Gauge Height (m):			Csec (g/L):	1 g/L		1.			
Weir Head (m):			Vol. Calib. Tank (L):	1 L		2.			
Water Temperature (°C):	1.8°C		SPC ₀ Calib. Tank			3.			
Water Surface Slope (%):			CF.T =			4.			
Average Width (m):			Qsalt =			5.			
Average Depth (m):			Notes:			6.			
Measurement Summary	Primary	Secondary					7.		
Meas. Type:							8.		
Measurement ID (MID):							9.		
Average Q (m³/s):			Volume (L) =	15 L	15 L	15 L	15 L	15 L	15 L
Q Meas. Accuracy +/- [%]:			Time (sec) [1]	5.97	[2] 6.19	[3] 6.10	[4] 6.25	[5] 5.72	
Average Velocity (m/s):			Average Q (L/s) =						
Cross-Sectional Area (m²):			Avg. Q _{vol} (L/s) =						
Hydrometric Levels - Survey									
YES NO REASON	N/A		Survey Time (HH:MM):	(WATER)	BM Shift: Yes No	Logger Shift: Yes No	Staff Gauge Shifted? Yes No		
Circuit #1	HI	Rod Read	Elevation (m)	± 0.003	Circuit #2	HI	Rod Read	Elevation (m)	Station Measurements
Station	A	B	C		Station	A	B	C	
BM1			3.000		BM1			3.000	Log'r Rod Length:
BM2					BM2				Log'r Rod to Botm:
BM3					BM3				
TOS					TOS				
WATER					WATER				
LOG'R ROD:					LOG'R ROD:				
HWM/CON					HWM/CON				
BANKFULL					BANKFULL				
					BS (BM1)				

Field Staff: JM, DH, DS
 Data Entry By: _____ Date: _____
 Reviewed By: _____ Date: _____



HID: H-VC-DBC		Date: 15 APRIL-2014		Discharge Measurement Instruments + Methods			
Station Name: Victoria Creek D/S Back Creek	Q Measurement Start Time: (HH:MM) PDT PST		YES SWOFFER PYGMY ADV MID-SECT POINT				
	Q Measurement End Time: (HH:MM) PDT PST		SALT TRACER WEIR VOLUMETRIC FLOAT ROD				
	Logger Download/Inst Time: 9:43 (HH:MM) PDT PST		Channel Conditions				
Logger Reading (m): -0.0856 [Y] downloaded		NONE CE BACKWATER > BANKFULL ZERO FLOW HIGH SUSP. SED.					
Logger: Serial # 1049137	HOBO (Solinst) N/A		GPS Waypoint		CON FACTS NOTHING		
Photo # [U/S] 0064	[D/S] 0065	[RDB] 0066	[LDB] 0067	[STAFF/WEIR] 0068			
Site Comments: see JM's notes for swatter		SLUG CONSTANT RATE DRY		LOGGED MANUAL		SPC EC CF.T YES NO	
Channel Measurements		Salt Tracer		Volum.			
Staff Gauge Height (m): 3.48 3.68		Trial Time		SPC _B SPC _P Mix Length Mass of Salt Mix Vol. [Salt Slug]			
Weir Head (m):		EC _O (uS/cm) EC _{pk} (uS/cm) L _m (m)		Ms _s (kg) Volume (L) C _{ss} (kg/L)			
Water Temperature (°C): 0.0°C		1 (09:52) 247.9 351.3 25m 0.200kg 10L 0.02 kg/L		2 (10:08) 248.5 25m 0.200kg 10L 0.02 kg/L			
Water Surface Slope (%):		3 (:)		V ₁ for Sec. Mix (mL) 50 mL			
Average Width (m):		Csec (g/L): 1 g/L		Vol. Added (mL) SPC (uS/cm) Temp			
Average Depth (m):		Vol. Calib. Tank (L): 1 L		1. 0 mL 251.2 0.0			
Measurement Summary		CF.T =		2. 2 mL 255.9 0.0			
Primary Secondary		Qsalt =		3. 8 mL 273.5 0.1°C			
Meas. Type: Swatter Salt		Notes: 50 mL S.S. into 1L ck		4. 10 mL 291.1 0.0°C			
Measurement ID (MID):		Notes: 50 mL S.S. into 1L ck		5. 10 mL 309.6 0.1°C			
Average Q (m³/s):		Notes: 50 mL S.S. into 1L ck		6. 10 mL 328.5 0.1°C			
Q Meas. Accuracy +/- [%]:		Notes: 50 mL S.S. into 1L ck		7. 10 mL 346.4 0.1°C			
Average Velocity (m/s):		Notes: 50 mL S.S. into 1L ck		8. 10 mL 365.2 0.1°C			
Cross-Sectional Area (m²):		Notes: 50 mL S.S. into 1L ck		9.			
Hydrometric Levels - Survey							
YES NO REASON:		Survey Time (HH:MM) (WATER) 10:40		BM Shift: Yes No		Logger Shift: Yes No	
Staff Gauge Shifted?: Yes No							
Circuit #1	HI	Rod Read	Elevation (m)	± 0.003	Circuit #2	HI	
Station	A	B	C		Station	A	
BM1	4.433	1.433	3.000		BM1	B	
BM2		1.404	3.029		BM2	C	
BM3		1.514	2.919		BM3		
TOS		2.079	2.354		TOS		
WATER		2.709	1.724		WATER		
LOG'R ROD:		1.862	2.571		LOG'R ROD:		
HWM/CON					HWM/CON		
BANKFULL					BANKFULL		
BM1		1.433	3.06		BS (BM1)		

Field Staff: JM, DH, DS
 Data Entry By: _____ Date: _____
 Reviewed By: _____ Date: _____



Weather: +1, Clear + calm,
sunny

HID: H-VC-UMN		Date: 15 APRIL-2014		Discharge Measurement Instruments + Methods													
Station Name: Victoria Creek U/S of Minnesota Creek	Q Measurement Start Time:		PDT PST		YSI SWOFFER PYGMY ADV MID-SECT. POINT												
	Q Measurement End Time:		PDT PST		SALT TRACER WEIR VOLUMETRIC FLOAT ROD												
	Logger Download/Inst Time:		PDT PST		Channel Conditions												
Logger Reading (m)		[] downloaded		NONE ICE BACKWATER > BANKFULL ZERO FLOW HIGH SUSP. SED													
Logger: Serial #	HOBO Solinst N/A		GPS Waypoint		ZONE		CASTING		RECORDING								
Photo # [U/S] 0059	[D/S] 0060	[RDB] 0061	[LDB] 0062	[STAFF/WEIR]													
Site Comments			SLUG CONSTANT RATE DRY		LOGGED MANUAL		SPC EC		CF.T YES NO								
*See SM's notes for swoffer info.			Trial Time		SPC _B SPC _P		Mix Length		Mass of Salt		Mix Vol.		[Salt Slug]				
					EC _B (uS/cm) EC _P (uS/cm)		L _m (m)		M _{sa} (kg)		Volume (L)		C _{ss} (kg/L)				
			1 (08:40)		314.0 764.2		10 m		0.200 kg		10 L		0.02				
			2 (08:43)		315.1 731		10 m		0.200 kg		10 L		0.02 kg/L				
Channel Measurements			V ₁ for Sec. Mix (mL)		50 mL		Vol. Added (mL)		SPC (uS/cm)		Temp						
Staff Gauge Height (m): 5.28 m		Csec (g/L): 1 g/L		Vol. Calib. Tank (L): 1 L		SPC ₀ Calib. Tank		CF.T =		Qsalt =							
Weir Head (m):		CF.T =		Notes: 50mL S.S into 1L CK.		1. 0 mL		317.0		0.0°C							
Water Temperature (°C): 0.0°C		2. 6 mL		3. 14 mL		4. 30 mL		408.1		0.0°C							
Water Surface Slope (%):		4. 60 mL		5. 60 mL		6. 60 mL		591.8		0.0°C							
Average Width (m):		6. 60 mL		7. 60 mL		8. 60 mL		674.3		0.0°C							
Average Depth (m):		8. 60 mL		9. 120 mL				864.0		0.0°C							
Measurement Summary		Primary		Secondary		Volume (L) =		Time (sec) [1]		[2]		[3]		[4]		[5]	
Meas. Type: Swoffer		Salt		Average Q (L/s) =		Avg. Q _{vol} (L/s) =		Avg Q _{vol} (m³/s) =									
Measurement ID (MID):																	
Average Q (m³/s):																	
Q Meas. Accuracy +/- [%]:																	
Average Velocity (m/s):																	
Cross-Sectional Area (m²):																	
Hydrometric Levels - Survey																	
YES (NO) REASON: No logger			Survey Time (HH MM): (WATER)		BM Shift: Yes No		Logger Shift: Yes No		Staff Gauge Shifted?: Yes No								
Circuit #1	HI	Rod Read	Elevation (m)	± 0.003	Circuit #2	HI	Rod Read	Elevation (m)	Station Measurements								
Station	A	B	C		Station	A	B	C									
BM1			3.000		BM1			3.000	Log'r Rod Length:								
BM2					BM2				Log'r Rod to Botm:								
BM3					BM3												
TOS					TOS												
WATER					WATER												
LOG'R ROD:					LOG'R ROD:												
HWM/CON					HWM/CON												
BANKFULL					BANKFULL												
					BS (BM1)												

Field Staff: DH, SM, DS
 Data Entry By: _____ Date: _____
 Reviewed By: _____ Date: _____



HID	H-VC-U		Date	15 APRIL 2014		Discharge Measurement Instruments + Methods								
Station Name	Upper Victoria Creek		Q Measurement Start Time:	(HH:MM) PDT PST		YSI SWOFFER PYGMY ADV MID-SECT POINT								
			Q Measurement End Time:	(HH:MM) PDT PST		SALT TRACER WEIR VOLUMETRIC FLOAT ROD								
			Logger Download/Inst Time:	11:12 (HH:MM) PDT PST		Channel Conditions								
			Logger Reading (m)	-0.3544 [downloaded]		NONE ICE BACKWATER > BANKFULL ZERO FLOW HIGH SUSP. SED								
Logger: Serial #	1049522		HOBO	Solinst N/A		GPS Waypoint	ZONE		EASTING	NORTHING				
Photo # [U/S]	0069		[D/S]	0070		[RDB]	0071		[LDB]	0072		[STAFF/WEIR]	0073	
Site Comments			Salt Tracer			SLUG CONSTANT RATE DRY LOGGED MANUAL SPC EC CFT YES NO								
See SM's notes for swoffer data Well frozen to bed.						Trial Time	SPC _B SPC _P		Mix Length	Mass of Salt		Mix Vol.	[Salt Slug]	
						EC _B (uS/cm) EC _P (uS/cm)		L _m (m)	M _S (kg)		Volume (L)	C _{SS} (kg/L)		
						1 (11:25)	243.6 426.2			0.200		10L	0.02	
						2 (11:34)	244.4 421.0			0.200		10L	0.02	
						3 (:)								
Channel Measurements						V ₁ for Sec. Mix (mL)	50		Volum.	Vol. Added (mL)		SPC (uS/cm)	Temp	
Staff Gauge Height (m):						Csec (g/L):	1 g/L			1. 0 mL	248.1		0.3°C	
Weir Head (m):						Vol. Calib. Tank (L):	1 L			2. 2 mL	253.3		0.3°C	
Water Temperature (°C):						SPC ₀ Calib. Tank				3. 10 mL	271.0		0.3°C	
Water Surface Slope (%):			CFT =			4. 10 mL	291.4			0.4°C				
Average Width (m):			Q _{salt} =			5. 20 mL	327.8			0.4°C				
Average Depth (m):			Notes: 50 mL SS. into 2L ck.			6. 20 mL	363.0			0.5°C				
Measurement Summary			*11:39, SPC 251.1 Logger memory full - stopped logging 4 sec back.			7. 30 mL	414.4			0.6°C				
Meas. Type:						8. 10 mL	432.0			0.6°C				
Primary						9. 10 mL	449.9		0.6°C					
Secondary														
Meas. ID (MID):						Volume (L) =								
Average Q (m³/s):						Time (sec) [1]	[2]		[3]	[4]		[5]		
Q Meas. Accuracy +/- [%]:						Average Q (L/s) =								
Average Velocity (m/s):						Avg. Q _{vol} (L/s) =								
Cross-Sectional Area (m²):														
Hydrometric Levels - Survey														
YES NO REASON			Survey Time (HH:MM): (WATER) N/A			BM Shift: Yes No		Logger Shift: Yes No		Staff Gauge Shifted?: Yes No				
Circuit #1	HI	Rod Read	Elevation (m)	± 0.003	Circuit #2	HI	Rod Read	Elevation (m)	Station Measurements					
Station	A	B	C		Station	A	B	C						
BM1	4.367	1.367	3.000		BM1			3.000	Log'r Rod Length:					
BM2		1.008	A-B =		BM2				Log'r Rod to Botm:					
BM3		1.124	A-B =		BM3									
TOS		1.463	A-B =		TOS									
WATER			A-B =		WATER									
LOG'R ROD:		1.217	A-B =		LOG'R ROD:									
HWM/CON			A-B =		HWM/CON									
BANKFULL			A-B =		BANKFULL									
BM1		1.367	A-B =		BS (BM1)									

Field Staff: DH, SM, DS
 Data Entry By: _____ Date: _____
 Reviewed By: _____ Date: _____



HID														Date (dd.mm.yyyy)			
Velocity-Area Method		SWOFFER PYGMY ADV		Salt Tracer Trial 1				LOGGED MANUAL				Salt Tracer Trial 2				LOGGED MANUAL	
Station	Distance (m)	Depth (m)	Velocity (m/s)	Time (sec)	SPC (uS/cm)	Time (sec)	SPC (uS/cm)	Time (sec)	SPC (uS/cm)	Time (sec)	SPC (uS/cm)	Time (sec)	SPC (uS/cm)	Time (sec)	SPC (uS/cm)		
1				$t_0 =$		260		520		$t_0 =$		260		520			
2				11:39:50	246.3	270		530		10		270		530			
3				20	245.8	280		540		20		280		540			
4				30	245.1	290		550		30		290		550			
5				40	245.0	300		560		40		300		560			
6				50	244.8	310		570		50		310		570			
7				60		320		580		60		320		580			
8				70		330		590		70		330		590			
9				80		340		600		80		340		600			
10				90		350		610		90		350		610			
11				100		360		620		100		360		620			
12				110		370		630		110		370		630			
13				120		380		640		120		380		640			
14				130		390		650		130		390		650			
15				140		400		660		140		400		660			
16				150		410		670		150		410		670			
17				160		420		680		160		420		680			
18				170		430		690		170		430		690			
19				180		440		700		180		440		700			
20				190		450		710		190		450		710			
21				200		460		720		200		460		720			
22				210		470		730		210		470		730			
23				220		480		740		220		480		740			
24				230		490		750		230		490		750			
25				240		500		760		240		500		760			
25				250		510		770		250		510		770			

Comments:

Field Staff: _____
 Data Entry By: _____ Date: _____
 Reviewed By: _____ Date: _____



**General Site Tasks/
Communications**

- 1) Download ALL data loggers present
- 2) If a measurement is not feasible, fully document why and take photos.
- 3) Fill in ALL data boxes & Site Comment boxes on field sheets to document site conditions (even if site is unchanged).
- 4) During salt slugs, minimum SPC rise is only +10x resolution of conductivity meter.
- 5) Attempt to get paired SS and ADV measurements where ice cover is sufficiently thin to measure with the ADV.

#	Complete	HID	Station Name	Station Type	Site Tasks	Survey Required	Logger Type Serial #	Q Method	Additional Materials Required	Date	Time	SG	Logger
						Yes/No				yy.mm.dd	HH:MM	(m)	(m)
1	[]	ATM-DC2	Atmospheric at Diversion Channel	Continuous Baro Logger	1) HOBO download	NO	HOBO	None	None	2014-MAY-		n/a	
2	[]	ATM-DC4	Atmospheric at Diversion Channel (Back-up)	Continuous Baro Logger	1) Solinst download 2) Clear Solinst logger data	NO	Solinst Baro-logger	None	None	2014-MAY-		n/a	
3	[✓]	H-PC-U	Upper Pony Creek	Instantaneous	1) Q measurement (SS)	YES	n/a	Salt (0.01 kg) C.F.T	None	2014-MAY-8	1632	n/a	✓
4	[✓]	H-PC-DSP	Pony Creek Downstream of Pit	Instantaneous	1) Q measurement (SS) 2) Survey of WSL/stations if no ice/snow.	YES	n/a	Volumetric Salt (0.01 kg) C.F.T	None	2014-MAY-8	1556	0.318	✓
5	[✓]	H-DC-DX+105	Dome Creek DX+105	Instantaneous	1) Q measurement	n/a	n/a	Salt (0.01 kg) C.F.T	None	2014-MAY-8	17:11	n/a	✓
6	[✓]	H-DC-D1b	Dome Creek D1b	Instantaneous	1) Q measurement if clear channel present	n/a	n/a	Salt (0.01 kg) C.F.T	None	2014-MAY-8	1500	n/a	✓
7	[✓]	H-DC-B	Diversion Channel at Bridge	Continuous	1) Q measurement (if channel conditions permit) 2) install data logger/stilling well if possible	NO	n/a	Salt (0.05 kg) C.F.T	None	2014-MAY-8	1459	NP	✓
8	[✓]	H-DC-M	Middle Dome Creek	Continuous	1) Q measurement 2) Logger download	YES	Solinst 1050018	Salt (0.2 kg) C.F.T	None	2014-MAY-8	1437	0.322	?
9	[✓]	H-DC-R	Dome Creek at Road	Continuous	1) Q measurement if clear channel present	NO	n/a	Volumetric Salt (0.2 kg) C.F.T	None	2014-MAY-8	1342	n/a	✓
10	[✓]	H-VC-U	Upper Victoria Creek	Continuous	1) Q measurement (ADV + SS) 2) Logger download.	YES	Solinst 1049522	ADV SS (0.2 kg)	None	2014-MAY-9	11:43	0.415	
11	[✓]	H-VC-DBC	Victoria Creek D/S of Back Creek	Continuous	1) Q measurement (ADV + SS) 2) Logger download.	YES	Solinst 1049137	ADV SS (0.2 kg)	None	2014-MAY-9	11:20	0.432	
12	[✓]	H-BC	Back Creek	Continuous	1) Q measurement (ADV + SS) 2) Logger install (if possible)	YES	n/a	Salt (0.025 kg) C.F.T	None	2014-MAY-9	11:30		
13	[✓]	H-VC-UMN	Victoria Creek U/S of Minnesota Creek	Continuous	1) Q measurement (ADV + SS)	YES	n/a	ADV SS (0.2 kg)	None	2014-MAY-9	9:00		
14	[✓]	H-VC-R	Victoria Creek at Road	Continuous	1) Q measurement (ADV + SS) 2) Logger download and/or direct read replacement.	YES	Solinst 1041103	ADV SS (0.2 kg) C.F.T	None	2014-MAY-8	12:58	0.365	—
15	[]	H-SEEP	Seepage Pond Outlet	Instantaneous / Water Level	1) Q measurement at pipe outlet 2) Q measurement at flow meter in pumphouse 3) Staff Gauge Reading in Pond	NO	n/a	Volumetric	None	2014-MAY-			
16	[]	H-TP	Tailings Pond	Water Level Only	1) Staff Gauge Reading (if possible)	NO	n/a	None	None	2014-MAY-			
17	[]	GLL07-03	GW Well, Pit	Water level only	1) water level from TOC	YES				2014-MAY-			
18	[]	CH-P-13-05/50m	GW Well, Pit	Water level only	1) water level from TOC	YES				2014-MAY-			
19	[]	Pit WL	Pit	Water level only	1) Survey water level	YES				2014-MAY-			

Handwritten notes:

10mm/0.00

H-VC-R WQ

H-VC-UMN - no similar (compare logs)

H-VC-PBC

H-VC-U

H-BC

PLAN

WQ-DC-R

WQ-DC-R

WQ/H-VC-UMN (logger)

H-VC-PBC

WQ-VC-PBC

WQ-VC-U

H-VC-U

H-B (logger)

WQ PH

WQ-DC-M

WQ-SEEP

WQ-DCB

WQ-PC-PSP

WQ-PC-U

WQ-DC-D1b

WQ-DC-D105

Get 07:03 → Mill Seeps

PIT

CH-1305 run

PIT WL

occ ramp WQ

← NO Q possible

larger not doing

Project #: 14-7-0382
 Project Name: mi. Park



Weather: over cast, light rain

HID	14-VC-R		Date	08 MAY-2014		Discharge Measurement Instruments + Methods					
Station Name	Victoria Ch. P Road		Q Measurement Start Time:	11:54 (HH:MM)	PDT PST	YSI SWOFFER PYGMY ADV MID-SECT. POINT					
			Q Measurement End Time:	12:50 (HH:MM)	PDT PST	SALT TRACER WEIR VOLUMETRIC FLOAT ROD					
			Logger Download/Inst Time:	12:50 (HH:MM)	PDT PST	Channel Conditions					
			Logger Reading (m)		[] downloaded	NONE ICE BACKWATER > BANKFULL ZERO FLOW HIGH SUSP. SED					
Logger: Serial #			HOBO Solinst N/A		GPS Waypoint		08 0392300 68478706				
(LG) Photo #	[U/S] 001	[D/S] 002	[RDB] 0004	[LDB] 003	[STAFF/WEIR] 0005						
Site Comments			SLUG CONSTANT RATE DRY LOGGED MANUAL SPC EC C.F.T. YES NO								
Logger removed @ 12:58 NO real time logger reading because direct read cable broken -LOGGER STATUS STOPPED (LOGGER PULLED AND REPROGRAMMED DEPLETED ON 9 MAY 2014 @ 8:00 AM)			Trial Time	SPC _B SPC _P	Mix Length	Mass of Salt	Mix Vol.	[Salt Slug]			
				EC _O (uS/cm) EC _{PK} (uS/cm)	L _m (m)	Ms _s (kg)	Volume (L)	Css (kg/L)			
			1 (:)	_____ _____							
			2 (:)	_____ _____							
Channel Measurements			V ₁ for Sec. Mix (mL)			Vol. Added (mL)	SPC (uS/cm)	Temp			
Staff Gauge Height (m):	0.785		Csec (g/L):	1 g/L		1.					
Weir Head (m):	-		Vol. Calib. Tank (L):	1 L		2.					
Water Temperature (°C):	0.1°C		SPC ₀ Calib. Tank			3.					
Water Surface Slope (%):			CF.T =			4.					
Average Width (m):	5.3		Qsalt =			5.					
Average Depth (m):	0.410		Notes:			6.					
Measurement Summary	Primary	Secondary	NO SS performed.				7.				
Meas. Type:	ADV		Volume (L) =			8.					
Measurement ID (MID):	2014019		Time (sec) [1]	[2]	[3]	[4]	[5]				
Average Q (m³/s):	3.2042		Average Q (L/s) =								
Q Meas. Accuracy +/- [%]:	2.9		Avg. Q _{vol} (L/s) =								
Average Velocity (m/s):	1.475										
Cross-Sectional Area (m²):	2.172										
Hydrometric Levels - Survey											
(YES) NO REASON			Survey Time (HH:MM):	(WATER) 12:20	BM Shift: Yes No	Logger Shift: Yes No	Staff Gauge Shifted?: Yes No				
Circuit #1	HI	Rod Read	Elevation (m)	± 0.003	Circuit #2	HI	Rod Read	Elevation (m)	Station Measurements		
Station	A	B	C		Station	A	B	C			
BM1	4.022	1.022	3.000		BM1	3.993	0.993	3.000	Log'r Rod Length:		
BM2	4.022	0.591	3.431	0.001	BM2	3.993	0.561	3.432	Log'r Rod to Botm:		
BM3	4.022	0.851	3.171	0.000	BM3	3.993	0.822	3.171			
TOS	4.022	1.449	2.573	0.001	TOS	3.993	1.421	2.572			
WATER	4.022	1.684	2.338	0.002	WATER	3.993	1.648	2.345			
LOG'R ROD:	4.022	1.211	2.811	0.000	LOG'R ROD:	3.993	1.182	2.811			
HWM/CON	N/A	N/A	N/A	N/A	HWM/CON	N/A	N/A	N/A			
BANKFULL	4.022	1.375	2.647	0.001	BANKFULL	3.993	1.347	2.646			
	A-B=C		A-B=		BS (BM1)	3.993	0.992	2.999			

Salt logger re-deployed on 9 May/14
 Salt logger re-deployed on 9 May/14
 Salt logger re-deployed on 9 May/14

Salt Tracer
 95% @ Deploy
 Volum.

Field Staff: CL/LG/DS
 Data Entry By: _____ Date: _____
 Reviewed By: _____ Date: _____
 1 of 2
 WATER 3.987 1.650 2.337 ✓

Project #: 13-Y-0352
 Project Name: Mt. Mansfield



Weather: overcast light rain 10°C

HID	H-DC-R		Date	08 MAY-2014		Discharge Measurement Instruments + Methods			
Station Name	Dome Creek at Road		Q Measurement Start Time:	13:25	PDT PST	YSI SWOFFER PYGMY ADV MID-SECT POINT			
			Q Measurement End Time:	13:42	PDT PST	SALT TRACER WEIR VOLUMETRIC FLOAT ROD			
			Logger Download/Inst Time:		PDT PST	Channel Conditions			
Logger	Serial #	HOBO Solinst N/A			GPS Waypoint	28W 391155 1890478			
Photo #	[U/S] 006	[D/S] 007	[RDB] 009	[LDB] 008	[STAFF/WEIR]	N/A			
Site Comments			SLUG CONSTANT RATE DRY LOGGED MANUAL SPC EC C.F.T. YES NO						
SS taken @ culvert when channel is defined and not braided for present in flood plain us/05 of road. Unable to install station due to ice.			Trial Time	SPC _B SPC _P	Mix Length	Mass of Salt	Mix Vol.	[Salt Slug]	
				EC ₀ (uS/cm) EC _{pk} (uS/cm)	L _m (m)	Ms _s (kg)	Volume (L)	Css (kg/L)	
			1 (13:24)	408.4 1150		0.100	10	0.01	
Channel Measurements			2 (13:30)	408.4 1160		0.100	10	0.01	
Staff Gauge Height (m):			3 (:)						
Weir Head (m):			V ₁ for Sec. Mix (mL)	100 mL		Vol. Added (mL)	SPC (uS/cm)	Temp	
Water Temperature (°C): 0.1°C			Csec (g/L):	1 g/L		1. 0	410.1	1.2	
Water Surface Slope (%):			Vol. Calib. Tank (L):	1 L		2. 20	445.2	1.3	
Average Width (m):			SPC ₀ Calib. Tank	408.4		3. 10	461.	1.5	
Average Depth (m):			C.F.T =	5.43x10 ⁻⁵		4. 10	479.4	1.6	
Measurement Summary			Qsalt =	0.1521		5. 10	491.2	1.8	
Meas. Type: SS			Notes:	- 2 second (corrod) interval		6. 10	505.0	2.0	
Measurement ID (MID): 2014020			C.F.T.						
Average Q (m³/s): 0.1521			Volum.						
Q Meas. Accuracy +/- [%]:			Volume (L) =						
Average Velocity (m/s):			Time (sec) [1]	[2]	[3]	[4]	[5]		
Cross-Sectional Area (m²):			Average Q (L/s) =						
			Avg. Q _{vol} (L/s) =						
Hydrometric Levels - Survey									
YES NO	REASON: no station + BM's frozen.	Survey Time (HH:MM):	(WATER)	BM Shift: Yes No	Logger Shift: Yes No	Staff Gauge Shifted?: Yes No			
Circuit #1	H I	Rod Read	Elevation (m)	± 0.003	Circuit #2	H I	Rod Read	Elevation (m)	Station Measurements
Station	A	B	C		Station	A	B	C	
BM1	A-B =		3.000		BM1			3.000	Log'r Rod Length:
BM2	A-B =				BM2				Log'r Rod to Botm:
BM3	A-B =				BM3				
TOS	A-B =				TOS				
WATER	A-B =				WATER				
LOG'R ROD:	A-B =				LOG'R ROD:				
HWM/CON	A-B =				HWM/CON				
BANKFULL	A-B =				BANKFULL				
	A-B =				BS (BM1)				

Field Staff: CL LG DS
 Data Entry By: _____ Date: _____
 Reviewed By: _____ Date: _____

Project #: 13-7-0352
 Project Name: M. Naxin



Weather: Overcast light rain

HID	H-DC-14		Date	8 MAY-2014		Discharge Measurement Instruments + Methods						
Station Name	Dome ck. middle		Q Measurement Start Time:	13:59 (HH:MM)	PDT PST	SWOFFER PYGMY ADV MID-SECT. POINT						
			Q Measurement End Time:	14:03 (HH:MM)	PDT PST	SALT TRACER WEIR VOLUMETRIC FLOAT ROD						
			Logger Download/Inst Time:	14:03 (HH:MM)	PDT PST	Channel Conditions						
Logger Reading (m)	not possible		[] downloaded		NONE ICE BACKWATER BANKFULL ZERO FLOW HIGH SUSP. SED.							
Logger: Serial #	-		HOBO Solinst N/A		GPS Waypoint		018 3819780 618 80573					
Photo # [U/S]	12		[D/S]	13		[RDB]	15		[LDB]	14		
Site Comments			SLUG CONSTANT RATE DRY LOGGED MANUAL SPC EC C.F.T. YES NO									
Solinst logger cable broken removed & logged then re-installed @ 13:59 4 removed random + glycol from logger			Trial Time		SPC _B SPC _P		Mix Length		Mass of Salt		Mix Vol.	
					EC _B (uS/cm) EC _P (uS/cm)		L _m (m)		Ms _s (kg)		Volume (L)	
Channel Measurements			V ₁ for Sec. Mix (mL)		100 mL		Vol. Added (mL)		SPC (uS/cm)		Temp	
Staff Gauge Height (m):	0.322		Csec (g/L):		1 g/L		1. 0		367.8		3.2	
Weir Head (m):	0.1°C		Vol. Calib. Tank (L):		2 L X 900		2. 10		4070		3.2	
Water Temperature (°C):			SPC ₀ Calib. Tank				3. 10		420.2		3.1	
Water Surface Slope (%):			C.F.T. =		4.67 x 10 ⁻⁵		4. 20		454.9		3.3	
Average Width (m):			Qsalt =		0.1535		5. 20		480.0		3.5	
Average Depth (m):			Notes:				6.					
Measurement Summary	Primary		Secondary				7.					
Meas. Type:	SS						8.					
Measurement ID (MID):	H 704021						9.					
Average Q (m³/s):	0.1535											
Q Meas. Accuracy +/- [%]:												
Average Velocity (m/s):												
Cross-Sectional Area (m²):												
Hydrometric Levels - Survey												
YES NO REASON			Survey Time (HH:MM): (WATER)		14:10		BM Shift: Yes No		Logger Shift: Yes No		Staff Gauge Shifted?: Yes No	
Circuit #1	H I		Rod Read		Elevation (m)		± 0.003		Circuit #2		H I	
Station	A		B		C				Station		A	
BM1	4.441		1.441		3.000				BM1		4.475	
BM2	4.441		2.123		2.313		0.003		BM2		4.475	
BM3	4.441		1.723		2.713		0.001		BM3		4.475	
TOS	4.441		1.962		2.479		0.003		TOS		4.475	
WATER	4.441		2.643		2.798		0.001		WATER		4.275	
LOG'R ROD:	4.441		1.714		2.72				LOG'R ROD:		4.475	
HWM/CON	N/A		N/A		N/A				HWM/CON		N/A	
BANKFULL	N/A		N/A		N/A				BANKFULL		N/A	
A-B=C			A-B=C		A-B=C				BS (BM1)		4.474	

Field Staff: CL DS LG
 Data Entry By: _____ Date: _____
 Reviewed By: _____ Date: _____

Project #: H-Y-0352
 Project Name: H-DC-B



Weather: Overcast

HID	H-DC-B		Date	08 MAY-2014		Discharge Measurement Instruments + Methods			
Station Name	H-DC-B		Q Measurement Start Time:	1437	PDT PST	YSI SWOFFER PYGMY ADV MID-SECT POINT			
			Q Measurement End Time:	1507	PDT PST	SALT TRACER WEIR VOLUMETRIC FLOAT ROD			
			Logger Download/Inst Time:		PDT PST	Channel Conditions			
Logger Reading (m)			[] downloaded		NONE ICE BACKWATER > BANKFULL ZERO FLOW HIGH SUSP. SED				
Logger: Serial #			HOBO Solinst <u>NTA</u>		GPS Waypoint		08 0389506 6880760		
Photo # [U/S]	17	[D/S]	18	[RDB]	20	[LDB]	19	[STAFF/WEIR]	
Site Comments			SLUG CONSTANT RATE DRY LOGGED MANUAL SPC EC CF T YES NO						
- Need to install wick/stilling well on next visit - See details on work to river mounts.			Trial Time		SPC _G SPC _P	Mix Length	Mass of Salt	Mix Vol.	[Salt Slug]
					EC _G (uS/cm) EC _P (uS/cm)	L _m (m)	M _s (kg)	Volume (L)	C _{ss} (kg/L)
			1 (14:37)	351.9	41	0.100	10	0.01	
			2 (14:39)		352.9	41	0.100	10	0.01
			3 (:)						
Channel Measurements			V ₁ for Sec. Mix (mL)		100	Vol. Added (mL)		SPC (uS/cm)	Temp
Staff Gauge Height (m):			Csec (g/L):		1 g/L	1. 0		349.5	1.3
Weir Head (m):			Vol. Calib. Tank (L):		1 L	2. 10		362.9	2.0
Water Temperature (°C):			SPC ₀ Calib. Tank		349.5	3. 10		371.0	2.0
Water Surface Slope (%):			CF.T =		5.34 x 10 ⁻⁵	4. 20		410.0	2.4
Average Width (m):			Q _{salt} =		0.1191	5. 20		443.0	2.6
Average Depth (m):			Notes:			6.			
Measurement Summary			Primary	Secondary			7.		
Meas. Type:			55				8.		
Measurement ID (MID):			2014022				9.		
Average Q (m ³ /s):			0.1191						
Q Meas. Accuracy +/- [%]:									
Average Velocity (m/s):									
Cross-Sectional Area (m ²):									
Hydrometric Levels - Survey									
(ES) NO REASON	Survey Time (HH:MM):		(WATER)	BM Shift: Yes No		Logger Shift: Yes No		Staff Gauge Shifted? Yes No	
Circuit #1	H I	Rod Read	Elevation (m)	± 0.003	Circuit #2	H I	Rod Read	Elevation (m)	Station Measurements
Station	A	B	C		Station	A	B	C	
BM1	4.235	1.235	3.000		BM1	4.223	1.223	3.000	Log'r Rod Length:
BM2		0.880	2.8355	0.000	BM2		1.2205	3.0035	Log'r Rod to Botm:
BM3		1.243	2.992		BM3		0.8685	3.1355	
TOS			A-B		TOS			A-B	
WATER		2.427	1.808	0.002	WATER		2.413	1.810	
LOG'R ROD:	A-B+C		A-B=		LOG'R ROD:			A-B=	
HWM/CON	A-B+C		A-B=		HWM/CON			A-B=	
BANKFULL	A-B+C		A-B=		BANKFULL			A-B=	
	A-B=C		A-B=		BS (BM1)			A-B=	

Field Staff: CL/LG/DS
 Data Entry By: _____ Date: _____
 Reviewed By: _____ Date: _____

Project #: 14-4-0352
 Project Name: Mt. Hansen



Weather: Overcast, Warm

HID	A-PC-DSP		Date	08 MAY-2014		Discharge Measurement Instruments + Methods													
Station Name	Pony Cr. Downstream of Pit		Q Measurement Start Time:	15:29	PDT PST	YSI SWOFFER PYGMY ADV MID-SECT. POINT													
			Q Measurement End Time:	15:56	PDT PST	SALT TRACER WEIR VOLUMETRIC FLOAT ROD													
			Logger Download/Inst Time:	15:27	PDT PST	Channel Conditions													
Logger Reading (m)	-		[] downloaded			NONE ICE BACKWATER > BANKFULL ZERO FLOW HIGH SUSP. SED													
Logger: Serial #	0021045354		HOBO Sonst N/A			GPS Waypoint		08 308985 6881731											
Photo # [U/S]	21		[D/S]	22		[RDB]	24		[LDB]	23		[STAFF/WEIR]	25						
Site Comments						SLUG CONSTANT RATE DRY LOGGED MANUAL SPC EC C.F.T. YES NO													
Deployed Solinst logger @ 15:29 * PC DSPIT on logger						Trial Time		SPC _B SPC _P		Mix Length		Mass of Salt		Mix Vol.		[Salt Slug]			
								EC _O (uS/cm) EC _{pk} (uS/cm)		L _m (m)		M _s (kg)		Volume (L)		C _{ss} (kg/L)			
						1 (15:38)		69.6 1846		26		0.100		10		0.01			
2 (:)		---		24		0.100		10		0.01									
3 (:)		---																	
Channel Measurements						Salt Tracer													
Staff Gauge Height (m):		3.180 0.3180		V ₁ for Sec. Mix (mL)		100		Vol. Added (mL)		SPC (uS/cm)		Temp							
Weir Head (m):				Csec (g/L):		1 g/L		1. 0		64.4		1.1							
Water Temperature (°C):		0.9		Vol. Calib. Tank (L):		1 L		2. 10		79		1.0							
Water Surface Slope (%):				SPC ₀ Calib. Tank		69.4		3. 10		94.5		1.0							
Average Width (m):				C.F.T. =		4.81 x 10 ⁻⁵		4. 20		141.8		1.1							
Average Depth (m):				Qsalt =		0.0269		5. 20		167.5		1.1							
Measurement Summary						Notes:													
Meas. Type:		55		Volume (L) =				6. 20		206.9		1.1							
Measurement ID (MID):		2014023		Time (sec) [1]		[2]		7. 20		229.		1.0							
Average Q (m³/s):		0.0269		Average Q (L/s) =				8.											
Q Meas. Accuracy +/- [%]:				Avg. Q _{vol} (L/s) =				9.											
Average Velocity (m/s):				Avg. Q _{vol} (m³/s) =															
Cross-Sectional Area (m²):																			
Hydrometric Levels - Survey																			
YES NO REASON			Survey Time (HH:MM):		(WATER)		BM Shift: Yes No		Logger Shift: Yes No		Staff Gauge Shifted?: Yes No								
Circuit #1	HI	Rod Read	Elevation (m)	± 0.003	Circuit #2	HI	Rod Read	Elevation (m)	Station Measurements										
Station	A	B	C		Station	A	B	C											
BM1	4.347	1.347	3.000		BM1	4.335	1.335	3.000	Log'r Rod Length: 1.180										
BM2	3.658	0.689 1.33	3.659 3.173		BM2	1.088	1.088	3.247	Log'r Rod to Botm:										
BM3	3.658	1.098	3.249		BM3	0.679	0.679	3.658											
TOS	3.174	1.173	3.174		TOS	1.164	1.164	3.171											
WATER	2.491	1.856	2.491		WATER	1.842	1.842	2.493											
LOG'R ROD:	3.425	0.922	3.425		LOG'R ROD:	0.912	0.912	3.423											
HWM/CON		/	A-B=		HWM/CON	/	/	A-B=											
BANKFULL		/	A-B=		BANKFULL	/	/	A-B=											
			A-B=		BS (BM1)			A-B=											

Field Staff: CL LG 25
 Data Entry By: _____ Date: _____
 Reviewed By: _____ Date: _____

Project #: 14-4-0352
 Project Name: mi-Narsco



Weather: Overcast, Rain

HID	PCU		Date	08 MAY-2014		Discharge Measurement Instruments + Methods				
Station Name	UPPER PONY CREEK		Q Measurement Start Time:	16:12	PDT PST	YSI SWOFFER PYGMY ADV MID-SECT POINT				
			Q Measurement End Time:	16:35	PDT PST	SALT TRACER WEIR VOLUMETRIC FLOAT ROD				
			Logger Download/Inst Time:		PDT PST	Channel Conditions				
Logger: Serial #	/		HOBO Solinst	(N/A)		GPS Waypoint	08 388118/608191			
Photo # [U/S]	26		[D/S]	27		[RDB]	29		[LDB]	28
Site Comments			SLUG CONSTANT RATE DRY <u>LOGGED</u> MANUAL SPC EC CF.T YES NO							
High flow but susp. sed. is low. Good place for water relocation is N10 on DS of shilling well placement. Advancing place actually remote.			Trial Time		SPC _B SPC _P	Mix Length	Mass of Salt	Mix Vol.	[Salt Slug]	
					EC _B (uS/cm) EC _P (uS/cm)	L _m (m)	Ms _s (kg)	Volume (L)	Css (kg/L)	
			1 (16:12)	484.7 143			0.100			
			2 (16:18)		47.0 142					
			3 (:)							
Channel Measurements			V ₁ for Sec. Mix (mL)		100		Vol. Added (mL)		SPC (uS/cm)	Temp
Staff Gauge Height (m):			Csec (g/L):		1 g/L		1. 0		48.3	0.9
Weir Head (m):			Vol. Calib. Tank (L):		1 L		2. 10		68.0	1.0
Water Temperature (°C):			SPC ₀ Calib. Tank				3. 10		89.0	1.1
Water Surface Slope (%):			CF.T =		5.15 x 10 ⁻⁵		4. 20		121.0	1.2
Average Width (m):			Qsalt =		0.0237		5. 20		146.2	1.3
Average Depth (m):			Notes:				6. 20		152.3	1.6
Measurement Summary			Primary		Secondary		7.			
Meas. Type:			SS				8.			
Measurement ID (MID):			2014024				9.			
Average Q (m³/s):			0.0237							
Q Meas. Accuracy +/- [%]:										
Average Velocity (m/s):										
Cross-Sectional Area (m²):										
			Volum.		Volume (L) =					
					Time (sec) [1]		[2]		[3]	[4]
					Average Q (L/s) =					[5]
					Avg. Q _{vol} (L/s) =					
Hydrometric Levels - Survey										
YES (NO) REASON			Survey Time (HH:MM)		(WATER)	BM Shift: Yes No		Logger Shift: Yes No		Staff Gauge Shifted?: Yes No
Circuit #1	H I	Rod Read	Elevation (m)	± 0.003	Circuit #2	H I	Rod Read	Elevation (m)	Station Measurements	
Station	A	B	C		Station	A	B	C		
BM1	A-B =		3.000		BM1			3.000	Log'r Rod Length:	
BM2	A-B =		A-B =		BM2			A-B =	Log'r Rod to Botm:	
BM3	A-B =		A-B =		BM3			A-B =		
TOS	A-B =		A-B =		TOS			A-B =		
WATER	A-B =		A-B =		WATER			A-B =		
LOG'R ROD:	A-B =		A-B =		LOG'R ROD:			A-B =		
HWM/CON	A-B =		A-B =		HWM/CON			A-B =		
BANKFULL	A-B =		A-B =		BANKFULL			A-B =		
	A-B =		A-B =		BS (BM1)			A-B =		

Field Staff: CL LG DS
 Data Entry By: _____ Date: _____
 Reviewed By: _____ Date: _____

Project #: 14-4-0352
 Project Name: Mt Nansen



Weather: overcast, 10°C

HID	H-DC-DX105		Date	08 MAY-2014		Discharge Measurement Instruments + Methods						
Station Name	Dome Creek DX 105		Q Measurement Start Time:	17:11	PDT PST	S SWOFFER PYGMY ADV MID-SECT POINT						
			Q Measurement End Time:	17:21	PDT PST	SALT TRACER WEIR VOLUMETRIC FLOAT ROD						
			Logger Download/Inst Time:	n/a	PDT PST	Channel Conditions						
	Logger Reading (m)		—		NONE ICE BACKWATER > BANKFULL ZERO FLOW HIGH SUSP. SED							
Logger: Serial #	—		HOBO Solinst MFA		GPS Waypoint		8N 03894842 6881139					
Photo #	[U/S] 33	[D/S] 34	[RDB] 35	[LDB] 36	[STAFF/WEIR]							
Site Comments			SLUG CONSTANT RATE DRY LOGGED MANUAL SPC EC CF.T YES NO									
Moderate flow. Saturated floodplain. Mixing length shortened to accommodate only channelized flow -Too much flow for volumetric calculations			Trial Time		SPC _B SPC _P		Mix Length		Mass of Salt		Mix Vol.	[Salt Slug]
					EC _a (uS/cm) EC _{cal} (uS/cm)		L _m (m)		M _s (kg)		Volume (L)	C _{ss} (kg/L)
			1 (17:13)		73.1 109.5		~25m		0.020		10	0.002
Channel Measurements			2 (17:17)		73.1 110.8		~25m		0.020		10	0.002
			3 (:)		— —							
Staff Gauge Height (m):			V ₁ for Sec. Mix (mL)		500/125		Vol. Added (mL)		SPC (uS/cm)		Temp	
Weir Head (m):			Csec (g/L):		1 g/L		1. 0		75.2		1.8	
Water Temperature (°C):			Vol. Calib. Tank (L):		1 L 250		2. 20		100.4		2.0	
Water Surface Slope (%):			SPC ₀ Calib. Tank		75.2 ± 0.16		3. 20		127.5		2.1	
Average Width (m):			CF.T =		2.43 x 10 ⁻⁴		4. 20		152.4		2.2	
Average Depth (m):			Qsalt =		0.0193		5.					
Measurement Summary			Notes:		Temp = 1.5		6.					
Meas. Type:			Primary		Secondary		7.					
Measurement ID (MID):			SS				8.					
Average Q (m³/s):			2014025				9.					
Q Meas. Accuracy +/- [%]:			0.0193									
Average Velocity (m/s):												
Cross-Sectional Area (m²):												
Hydrometric Levels - Survey												
YES NO REASON: no stabin installed			Survey Time (HH:MM): (WATER)		BM Shift: Yes No		Logger Shift: Yes No		Staff Gauge Shifted? Yes No			
Circuit #1	HI	Rod Read	Elevation (m)	± 0.003	Circuit #2	HI	Rod Read	Elevation (m)	Station Measurements			
Station	A	B	C		Station	A	B	C				
BM1	A-B=C		3.000		BM1			3.000	Log'r Rod Length:			
BM2	A-B=C		A-B=		BM2			A-B=	Log'r Rod to Botm:			
BM3	A-B=C		A-B=		BM3			A-B=				
TOS	A-B=C		A-B=		TOS			A-B=				
WATER	A-B=C		A-B=		WATER			A-B=				
LOG'R ROD:	A-B=C		A-B=		LOG'R ROD:			A-B=				
HWM/CON	A-B=C		A-B=		HWM/CON			A-B=				
BANKFULL	A-B=C		A-B=		BANKFULL			A-B=				
	A-B=C		A-B=		BS (BM1)			A-B=				

Field Staff: CUDDS LG
 Data Entry By: _____ Date: _____
 Reviewed By: _____ Date: _____

Project #: 14-4-0352
 Project Name: MH-Hansen



Weather: slight overcast

HID	VC UMN		Date	09 MAY-2014		Discharge Measurement Instruments + Methods			
Station Name	Victoria Cr		Q Measurement Start Time:	0830 (MM)	PDT PST	YSI SWOFFER PYGMY (ADV) MID-SECT POINT			
	upstream of Minnesota Cr.		Q Measurement End Time:	9:00 (HH:MM)	RDT PST	SALT TRACER WEIR VOLUMETRIC FLOAT ROD			
			Logger Download/Inst Time:	9:00 (HH:MM)	PDT PST	Channel Conditions			
			Logger Reading (m)	- [] downloaded		NONE ICE BACKWATER > BANKFULL ZERO FLOW HIGH SUSP. SED			
Logger:	Serial #	HOBO Solinst N/A			GPS Waypoint		000 3924029 60879233		
Photo #	[U/S] 0041	[D/S] 0042	[RDB] 44	[LDB] 43	[STAFF/WEIR] 45				
Site Comments			SLUG CONSTANT RATE DRY LOGGED MANUAL SPC EC CF.T YES NO						
Well was damaged from ice - surveyed damaged well. NEED WELL MAINTENANCE - INSTALL FOUNDED T-POST OR LOGS INTO BANK TO STABILIZE STILLING WELL. - SOME MATERIAL (ANGLE IRON) AVAILABLE AT SITE.			Trial Time	SPC _B SPC _P	Mix Length	Mass of Salt	Mix Vol.	[Salt Slug]	
				EC _O (uS/cm) EC _{pd} (uS/cm)	L _m (m)	Ms _s (kg)	Volume (L)	Css (kg/L)	
			1 (:)						
			2 (:)						
Channel Measurements			V ₁ for Sec. Mix (mL)	1 L		Vol. Added (mL)	SPC (uS/cm)	Temp	
Staff Gauge Height (m):	0.9		Csec (g/L):	1 g/L		1.			
Weir Head (m):	/		Vol. Calib. Tank (L):	1 L		2.			
Water Temperature (°C):	0.0		SPC _O Calib. Tank			3.			
Water Surface Slope (%):	-		CF.T =			4.			
Average Width (m):	6.0		Qsalt =			5.			
Average Depth (m):	0.364		Notes			6.			
Measurement Summary	Primary	Secondary	no SS taken				7.		
Meas. Type:	ADV						8.		
Measurement ID (MID):	2014026						9.		
Average Q (m³/s):	2.6054		Volume (L) =						
Q Meas. Accuracy +/- [%]:	2.2		Time (sec) [1]	[2]	[3]	[4]	[5]		
Average Velocity (m/s):	1.193		Average Q (L/s) =						
Cross-Sectional Area (m²):	2.184		Avg. Q _{vol} (L/s) =						
Hydrometric Levels - Survey									
YES NO REASON:			Survey Time (HH:MM): (WATER)		BM Shift: Yes No		Logger Shift: Yes No		Staff Gauge Shifted?: Yes No
Circuit #1	H I	Rod Read	Elevation (m)	± 0.003	Circuit #2	H I	Rod Read	Elevation (m)	Station Measurements
Station	A	B	C		Station	A	B	C	
BM1	4.139	1.139	3.000		BM1	4.118	1.118	3.000	Log'r Rod Length:
BM2	2.800	1.131	3.0008	0	BM2		1.110	3.0008	Log'r Rod to Botm:
BM3	4.800	1.401	2.678	0	BM3		1.440	2.678	
TOS	2.800	2.155	1.984	0	TOS		2.134	1.984	
WATER	A=B+C	2.220	1.919	0.001	WATER		2.200	1.918	
LOG'R ROD:	A=B+C	1.948	2.191	0	LOG'R ROD:		1.927	2.191	
HWM/CON	A=B+C	-	A=B=		HWM/CON	-	-	A=B=	
BANKFULL	A=B=	-	A=B=		BANKFULL	-	-	A=B=	
	A=B+C	-	A=B=		BS (BM1)	4.118	-	A=B=	

Field Staff: LG / CL / DS
 Data Entry By: _____ Date: _____
 Reviewed By: _____ Date: _____

Project #: 14-y-0352
 Project Name: Mt. Hansen



Weather: Overcast, 15°C

May?

HID	VC DBC		Date	09 MARCH 2014		Discharge Measurement Instruments + Methods									
Station Name	Downstream of Back CK		Q Measurement Start Time:	11:40	(HH:MM)	PDT PST	YSI SWOFFER PYGMY (ADV) MID-SECT. POINT								
			Q Measurement End Time:	11:47	(HH:MM)	PDT PST	SALT TRACER WEIR VOLUMETRIC FLOAT ROD								
			Logger Download/Inst Time:		(HH:MM)	PDT PST	Channel Conditions								
	Logger Reading (m)		[] downloaded			NONE ICE BACKWATER > BANKFULL ZERO FLOW HIGH SUSP. SED.									
Logger:	Serial #		HOBO Solinst N/A			GPS Waypoint		08 391629 6880984							
Photo #	[U/S]	53	[D/S]	54	[RDB]	56	[LDB]	55	[STAFF/WEIR]	57					
Site Comments						SLUG CONSTANT RATE DRY LOGGED MANUAL SPC EC CF.T YES NO									
- ice chunks floating down channel. - YSI Sinterk ADV not working properly - shut off 2x during cross section. - high turb + DL logger & removed waterization						Trial Time	SPC _B SPC _P	Mix Length	Mass of Salt	Mix Vol.	[Salt Slug]				
							EC _B (uS/cm) EC _P (uS/cm)	L _m (m)	Ms _s (kg)	Volume (L)	Css (kg/L)				
						1 (:)									
Channel Measurements						V ₁ for Sec. Mix (mL) = 1 / C _{ss}									
Staff Gauge Height (m):	0.742		Salt Tracer			Csec (g/L):	1 g/L	C.F.T.		Vol. Added (mL)	SPC (uS/cm)	Temp			
Weir Head (m):	-					Vol. Calib. Tank (L):	1 L			1.					
Water Temperature (°C):	0.80					SPC ₀ Calib. Tank				2.					
Water Surface Slope (%):	-					CF.T =				3.					
Average Width (m):	5.28					Q _{salt} =				4.					
Average Depth (m):	0.430					Notes:	no SS taken			5.					
Measurement Summary	Primary	Secondary	Volum.						Volume (L) =						
Meas. Type:	ADV								Time (sec) [1]			[2]	[3]	[4]	[5]
Measurement ID (MID):	2014027								Average Q (L/s) =						
Average Q (m³/s):	2.3879								Avg. Q _{vol} (L/s) =						
Q Meas. Accuracy +/- [%]:	1.7%								Avg. Q _{vol} (m³/s) =						
Average Velocity (m/s):	1.091														
Cross-Sectional Area (m²):	2.273														
Hydrometric Levels - Survey															
YES NO REASON:			Survey Time (HH:MM): (WATER)		9:50	BM Shift: Yes No		Logger Shift: Yes No		Staff Gauge Shifted?: Yes No					
Circuit #1	H I	Rod Read	Elevation (m)	± 0.003	Circuit #2	H I	Rod Read	Elevation (m)	Station Measurements						
Station	A	B	C		Station	A	B	C							
BM1	4.471	1.471	3.000		BM1	4.464	1.464	3.000	Log'r Rod Length:						
BM2	A=B+C	1.448	3.023	0.002	BM2	1.439	1.440	3.025	Log'r Rod to Botm:						
BM3	A=B+C	1.555	2.916	0.002	BM3	1.546	2.918								
TOS	A=B+C	2.136	2.335		TOS	2.117	2.347		* this one is correct						
WATER	A=B+C	2.388	2.085	0.003	WATER	2.378	2.086								
LOG'R ROD:	A=B+C	1.906	2.565	0	LOG'R ROD:	1.899	2.565								
HWM/CON	A=B	-	A=B		HWM/CON	-	A=B								
BANKFULL	A=B+C	-	A=B		BANKFULL	-	A=B								
	A=B+C		A=B		BS (BM1)		A=B								

Field Staff: LG/CL/DS
 Data Entry By: _____ Date: _____
 Reviewed By: _____ Date: _____

Project #: 14-4-0352
 Project Name: Mt Manscha



Weather: clear

HID	HVCU		Date	09 MARCH-2014		Discharge Measurement Instruments + Methods				
Station Name	UPPER VICTORIA CR		Q Measurement Start Time:	10:30 (HH:MM)	PDT PST	YSI SWOFFER PYGMY (ADV) MID-SECT. POINT				
			Q Measurement End Time:	12:00 (HH:MM)	PDT PST	SALT TRACER WEIR VOLUMETRIC FLOAT ROD				
			Logger Download/Inst Time:			Channel Conditions				
Logger: Serial #		HOBO Solinst N/A			GPS Waypoint		08 391668 6880880			
Photo # [U/S]	010	[D/S]	07	[RDB]	69	[LDB]	68	[STAFF/WEIR]	70	
Site Comments				SLUG CONSTANT RATE DRY LOGGED MANUAL SPC EC CF.T YES NO						
- High Flow, ice chunks floating down channel - Downloaded logger and removed winterization.				Trial Time		SPC _B SPC _P	Mix Length	Mass of Salt	Mix Vol.	[Salt Slug]
						EC ₀ (uS/cm) EC _{pk} (uS/cm)	L _m (m)	Ms _s (kg)	Volume (L)	Css (kg/L)
				1 (:)						
2 (:)										
3 (:)										
Channel Measurements				V ₁ for Sec. Mix (mL)		Vol. Added (mL)		SPC (uS/cm)		Temp
Staff Gauge Height (m):	0.415			Csec (g/L):		1 g/L		1		
Weir Head (m):	-			Vol. Calib. Tank (L):		1 L		2		
Water Temperature (°C):	0.80			SPC ₀ Calib. Tank				3		
Water Surface Slope (%):	-			CF.T =				4		
Average Width (m):	5.00			Qsalt =				5		
Average Depth (m):	0.439			Notes				6		
Measurement Summary	Primary	Secondary		No SS taken		CF.T		7		
Meas. Type:	ADV		8							
Measurement ID (MID):	2014028		9							
Average Q (m³/s):	1.929			Volume (L) =						
Q Meas. Accuracy +/- [%]:	1.9			Time (sec) [1]		[2]		[3]		[4]
Average Velocity (m/s):	0.879			Average Q (L/s) =						[5]
Cross-Sectional Area (m²):	2.195			Avg. Q _{vol} (L/s) =						
Hydrometric Levels - Survey										
YES NO REASON			Survey Time (HH:MM): (WATER)		10:40	BM Shift: Yes No		Logger Shift: Yes No		Staff Gauge Shifted?: Yes No
Circuit #1	HI	Rod Read	Elevation (m)	± 0.003	Circuit #2	HI	Rod Read	Elevation (m)	Station Measurements	
Station	A	B	C		Station	A	B	C		
BM1	4.325	1.325	3.000		BM1	4.348	1.348	3.000	Log'r Rod Length:	
BM2	A=B+C	0.964	3.0361	0	BM2		0.987	3.0361	Log'r Rod to Botm:	
BM3	A=B+C	1.081	3.244	0.001	BM3		1.103	3.245		
TOS	A=B+C	1.423	2.902	0.001	TOS		1.445	2.903		
WATER	A=B+C	2.010	2.315	0.002	WATER		2.035	2.313		
LOG'R ROD:	A=B+C	1.176	3.149	0	LOG'R ROD:		1.199	3.149		
HWM/CON	A=B+C	-	A-B=		HWM/CON		-	A-B=		
BANKFULL	A=B+C	-	A-B=		BANKFULL		-	A-B=		
	A=B+C		A-B=		BS (BM1)		1.248	A-B=		

Field Staff: LG/LL/DS
 Data Entry By: _____ Date: _____
 Reviewed By: _____ Date: _____

Project #: 14-4-0352
 Project Name: Mt. Rancho



Weather: overcast

HID	H-BC		Date	MAY 09 MARCH 2014		Discharge Measurement Instruments + Methods						
Station Name	Back Creek		Q Measurement Start Time:	1125	PDT PST	YSI SWOFFER PYGMY ADV MID-SECT POINT						
			Q Measurement End Time:	1140	PDT PST	SALT TRACER WEIR VOLUMETRIC FLOAT ROD						
			Logger Download/Inst Time:		PDT PST	Channel Conditions						
			Logger Reading (m)		[] downloaded	NONE ICE BACKWATER > BANKFULL ZERO FLOW HIGH SUSP. SED						
Logger: Serial #	HOBO Solinst N/A			GPS Waypoint		08 391626 6880599						
Photo # [U/S]	71	[D/S]	72	[RDB]	75	[LDB]	73	[STAFF/WEIR]	74			
Site Comments			High flow. Evidence of overbank water previous to trip. - SS & Smog. Need to deploy logger.									
Channel Measurements			Trial Time SPC _B SPC _P Mix Length Mass of Salt Mix Vol. [Salt Slug] EC ₀ (uS/cm) EC _{pk} (uS/cm) L _m (m) Ms _s (kg) Volume (L) C _{ss} (kg/L)									
Staff Gauge Height (m):			0.420			V ₁ for Sec. Mix (mL)			200 / 100 mL soln ¹ into			
Weir Head (m):			-			Csec (g/L):			1 g/L ↓			
Water Temperature (°C):			1.9			Vol. Calib. Tank (L):			EE / 500 mL stream water			
Water Surface Slope (%):			-			SPC ₀ Calib. Tank			CF.T =			
Average Width (m):						CF.T =			9.78 x 10 ⁻⁵			
Average Depth (m):						Q _{salt} =			0.3729			
Measurement Summary			Primary		Secondary		Notes:			C.F.T.		
Meas. Type:			SS							1. 0 75.5 3.3		
Measurement ID (MID):			2014029		2014032					2. 10 93.6 3.3		
Average Q (m ³ /s):			0.3729							3. 10 110.6 3.3		
Q Meas. Accuracy +/- [%]:										4. 10 125.8 3.5		
Average Velocity (m/s):										5. 10 141.2 3.6		
Cross-Sectional Area (m ²):										6.		
										7.		
										8.		
										9.		
Hydrometric Levels - Survey												
YES NO REASON			Survey Time (HH:MM)		(WATER)	BM Shift: Yes No		Logger Shift: Yes No		Staff Gauge Shifted?: Yes No		
Circuit #1	H I	Rod Read	Elevation (m)	± 0.003	Circuit #2	H I	Rod Read	Elevation (m)	Station Measurements			
Station	A	B	C		Station	A	B	C				
* BM1	4.366	1.366	3.000		BM1	4.345	1.345	3.000	Log'r Rod Length:			
* BM2	A=B+C	1.375	2.991	0	BM2		1.354	2.991	Log'r Rod to Botm:			
BM3	A=B+C	1.348	3.018	0.001	BM3		1.326	3.019				
TOS	A=B+C	1.726	2.64	0	TOS		1.705	2.64				
WATER	A=B+C	2.306	2.060	0	WATER		2.285	2.060				
LOG'R ROD:	A=B+C	1.490	2.876	0	LOG'R ROD:		1.469	2.876				
HWM/CON	A=B	-	A-B		HWM/CON	-	-	A-B				
BANKFULL	A=B+C	-	A-B		BANKFULL	-	-	A-B				
	A=B+C	-	A-B		BS (BM1)	-	-	A-B				

* #166164 worn out, might be switched
 check prev. data to compare if same
 acc (instrument BM1 on RDB, BM2 + 3 on LDB?)

Field Staff: LG/DS/CL
 Data Entry By: _____ Date: _____
 Reviewed By: _____ Date: _____

**General Site Tasks/
 Communications**

- 1) Download ALL data loggers present
- 2) If a measurement is not feasible, fully document why and take photos
- 3) Fill in ALL data boxes & Site Comment boxes on field sheets to document site conditions (even if site is unchanged).
- 4) During salt slugs, minimum SPC rise is only +10x resolution of conductivity meter.
- 5) Attempt to get paired SS and ADV measurements where ice cover is sufficiently thin to measure with the ADV.

#	Complete	HID	Station Name	Station Type	Site Tasks	Survey Required	Logger Type Serial #	Q Method	Additional Materials Required	Date	Time	SG	Logger	
						Yes/No				yy.mm.dd	HH:MM	(m)	(m)	
1	[?]	ATM-DC2	Atmospheric at Diversion Channel	Continuous Baro Logger	1) HOBO download	NO	HOBO	None	None	2014-MAY-20	/	n/a	/	Would not download.
2	[✓]	ATM-DC4	Atmospheric at Diversion Channel (Back-up)	Continuous Baro Logger	1) Solinst download 2) Clear Solinst logger data	NO	Solinst Baro-logger	None	None	2014-MAY-20	15:24	n/a	-0.5218	
3	[✓]	H-PC-U	Upper Pony Creek	Instantaneous	1) Q measurement (SS)	YES	n/a	Salt (0.01 kg) C.F.T	None	2014-MAY-20	16:46	/	/	
4	[✓]	H-PC-DSP	Pony Creek Downstream of Pit	Instantaneous	1) Q measurement (SS) 2) Survey of WSL stations if no ice/snow	YES	n/a	Volumetric Salt (0.01 kg) C.F.T	None	2014-MAY-20	15:56	0.296	-0.6210	
5	[✓]	H-DC-DX+105	Dome Creek DX+105	Instantaneous	1) Q measurement	n/a	n/a	Salt (0.01 kg) C.F.T	None	2014-MAY-21	15:08	n/a	/	
6	[X]	H-DC-D1b	Dome Creek D1b	Instantaneous	1) Q measurement if clear channel present	n/a	n/a	Salt (0.01 kg) C.F.T	None	2014-MAY-20	/	n/a	/	Water flowing all through ice. Not single channel. See WQ photos.
7	[M]	H-DC-B	Diversion Channel at Bridge	Continuous	1) Q measurement (if channel conditions permit) 2) install data logger/stilling well if possible	NO	n/a	Salt (0.05 kg) C.F.T	None	2014-MAY-20	15:17	/	/	
8	[M]	H-DC-M	Middle Dome Creek	Continuous	1) Q measurement 2) Logger download	YES	Solinst 1050018	Salt (0.1 kg) C.F.T	None	2014-MAY-20	14:30	/	/	
9	[✓]	H-DC-R	Dome Creek at Road	Continuous	1) Q measurement if clear channel present	NO	n/a	Volumetric Salt (0.1 kg) C.F.T	None	2014-MAY-20	13:43	/	/	
10	[M]	H-VC-U	Upper Victoria Creek	Continuous	1) Q measurement (ADV + SS) 2) Logger download	YES	Solinst 1049522	ADV SS (0.2 kg)	None	2014-MAY-21	11:21	0.227	-0.2524	
11	[✓]	H-VC-DBC	Victoria Creek D/S of Back Creek	Continuous	1) Q measurement (ADV + SS) 2) Logger download	YES	Solinst 1049137	ADV SS (0.2 kg)	None	2014-MAY-21	10:25	0.226	-0.4145	logger on shore where read.
12	[✓]	H-BC	Back Creek	Continuous	1) Q measurement (ADV + SS) 2) Logger install (if possible) 3) Deploy solinst data logger & measure logger rod from data logger markings	YES	Solinst n/a	Salt (0.05 kg) C.F.T	None	2014-MAY-21	12:10	0.201	Deployed	
13	[M]	H-VC-UMN	Victoria Creek U/S of Minnesota Creek	Continuous	1) Q measurement (ADV + SS) 2) Repair/support stilling well so it is properly anchored 3) Place a cap on the solinst logger (or tape)	YES	Solinst n/a 1049534	ADV SS (0.2 kg)	None	2014-MAY-21	08:51	0.277	-0.3364	
14	[M]	H-VC-R	Victoria Creek at Road	Continuous	1) Q measurement (ADV + SS) 2) Logger download and/or direct read replacement	YES	Solinst 1041103	ADV SS (0.2 kg) C.F.T	None	2014-MAY-20	13:05	0.594	/	
15	[✓]	H-SEEP	Seepage Pond Outlet	Instantaneous / Water Level	1) Q measurement at pipe outlet 2) Q measurement at flow meter in pumphouse 3) Staff Gauge Reading in Pond	NO	n/a	Volumetric	None	2014-MAY-21	13:15	/	/	
16	[✓]	H-TP	Tailings Pond	Water Level Only	1) Staff Gauge Reading (if possible)	NO	n/a	None	None	2014-MAY-21	13:35	/	/	
17	[✓]	GLL07-03	GW Well, Pit	Water level only	1) water level from TOC	YES				2014-MAY-21	17:02			Water level = 7.527m
18	[✓]	CH-P-13-05/50m	GW Well, Pit	Water level only	1) water level from TOC	YES				2014-MAY-21	16:57			Water level = 25.180m



#	Complete	HID	Station Name	Station Type	Site Tasks	Survey Required	Logger Type Serial #	Q Method	Additional Materials Required	Date	Time	SG	Logger
						Yes/No				yy.mm.dd	HH:MM	(m)	(m)
19	<input checked="" type="checkbox"/>	Pit WL	Pit	Water level only	1) Survey water level	YES				2014-MAY-21			

Project #: 14-Y-0352
 Project Name: Nansen



Weather: +5°C, overcast + windy
light snow

May 2014

HID	H-VC-Ur		Date	21 Nov 2013	Discharge Measurement Instruments + Methods						
Station Name	Upper Victoria Creek		Q Measurement Start Time:	11:21 (HH:MM)	PDT PST	YSI SWOFFER PYGMY ADV MID-SECT. POINT					
			Q Measurement End Time:		PDT PST	SALT TRACER WEIR VOLUMETRIC FLOAT ROD					
			Logger Download/Inst Time:	11:15 (HH:MM)	PDT PST	Channel Conditions					
			Logger Reading (m)	-0.2524	[✓downloaded]	(NONE) ICE BACKWATER > BANKFULL ZERO FLOW HIGH SUSP. SED					
Logger:	Serial #	1049522	HOBO	Solinst	N/A	GPS Waypoint	ZONE	EASTING	NORTHING		
Photo #	[U/S]	8394	[D/S]	8395	[RDB]	8396	[LDB]	8398	[STAFF/WEIR]	8399	
Site Comments					<input checked="" type="checkbox"/> SLUG <input type="checkbox"/> CONSTANT RATE <input type="checkbox"/> DRY <input checked="" type="checkbox"/> LOGGED <input type="checkbox"/> MANUAL <input checked="" type="checkbox"/> SPC <input checked="" type="checkbox"/> EC CF.T <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO						
Water bl. moderate clear water. No ice + snow is no longer sticking to ground.					Trial Time		SPC _B SPC _P	Mix Length	Mass of Salt	Mix Vol.	[Salt Slug]
							EC _B (uS/cm) EC _P (uS/cm)	L _m (m)	M _s (kg)	Volume (L)	C _{ss} (kg/L)
					1 (:)		115.3 143.1	31m	0.200kg	10L	0.02
					2 (:)		115.4 144.2	31m	0.200kg	10L	0.02
					3 (:)		— —				
					V _i for Sec. Mix (mL)		50mL		Vol. Added (mL)	SPC (uS/cm)	Temp
					Csec (g/L):		1 g/L		1. 0mL	115.7	1.8
					Vol. Calib. Tank (L):		1 L		2. 2mL	120.0	1.8
					SPC ₀ Calib. Tank				3. 10mL	135.2	1.8
					CF.T =				4. 10mL	150.0	1.8
Q _{salt} =				5.							
Notes:		50mL S.S. into 1000mL ck.									
Measurement Summary		Primary	Secondary	Volum.		Volume (L) =	n/a				
Meas. Type:		ADV	S.S.			Time (sec)	[1]	[2]	[3]	[4]	[5]
Measurement ID (MID):						Average Q (L/s) =					
Average Q (m³/s):		0.5535				Avg. Q _{vol} (L/s) =					
Q Meas. Accuracy +/- [%]:		2.6%									
Average Velocity (m/s):		0.456									
Cross-Sectional Area (m²):		1.212									
Hydrometric Levels - Survey											
<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO REASON			Survey Time (HH:MM):	(WATER)	11:45	BM Shift: Yes No	Logger Shift: Yes No	Staff Gauge Shifted?: Yes No			
Circuit #1	H I	Rod Read	Elevation (m)	± 0.003	Circuit #2	H I	Rod Read	Elevation (m)	Station Measurements		
Station	A	B	C		Station	A	B	C			
BM1	4.120	4.20	3.000		BM1				Log'r Rod Length:	1166	
BM2		0.761	3.359		BM2				Log'r Rod to Botm:		
BM3		0.878	3.242		BM3						
TOS		1.216	2.904		TOS						
WATER		1.987	2.133		WATER						
LOG'R ROD:		0.972	3.148		LOG'R ROD:						
HWM/CON					HWM/CON						
BANKFULL					BANKFULL						
BM1		1.119	3.001		BS (BM1)						

Field Staff: MM, DH, DS
 Data Entry By: _____ Date: _____
 Reviewed By: _____ Date: _____

Project #: 14-4-0352
 Project Name: Alaska



Weather: -1°C, Snowing, windy

May 2014

HID	H-DC-B		Date	20 DECEMBER 2014		Discharge Measurement Instruments + Methods						
Station Name	Diversion Channel at Creek.	Q Measurement Start Time:	15:17	(HH:MM)	PDT PST	(YS) SWOFFER PYGMY ADV	MID-SECT. POINT					
		Q Measurement End Time:		(HH:MM)	PDT PST	SALT TRACER WEIR VOLUMETRIC FLOAT ROD						
		Logger Download/Inst Time:		(HH:MM)	PDT PST	Channel Conditions						
Logger Reading (m)			[] downloaded	NONE ICE BACKWATER > BANKFULL ZERO FLOW HIGH SUSP. SED.								
Logger: Serial #			HOBO Solinst	N/A		GPS Waypoint	ZONE		NORTHING			
Photo # [U/S]	0808	[D/S]	0809	[RDB]	0811	[LDB]	0810	[STAFF/WEIR]				
Site Comments			High water level. Organic + sediment debris in water. No ice or snow.									
Channel Measurements			SLUG CONSTANT RATE DRY LOGGED MANUAL SPC EC CF.T. YES NO									
Staff Gauge Height (m):			V ₁ for Sec. Mix (mL)			Mix Length			Mass of Salt		Mix Vol.	[Salt Slug]
Weir Head (m):			Csec (g/L):			L _m (m)			Ms _s (kg)		Volume (L)	Css (kg/L)
Water Temperature (°C):			SPC ₀ Calib. Tank									
Water Surface Slope (%):			CF.T =									
Average Width (m):			Qs _{alt} =									
Average Depth (m):			Notes: 100 mL S.S. into 500 mL CK.									
Measurement Summary			Volum.			Volume (L) =			Vol. Added (mL)		SPC (uS/cm)	Temp
Meas. Type: Salt.			Time (sec) [1]			[2]			[3]		[4]	[5]
Measurement ID (MID):			Average Q (L/s) =			Avg. Q _{vol} (L/s) =			Avg Q _{vol} (m ³ /s) =			
Average Q (m ³ /s):			Avg. Q _{vol} (m ³ /s) =									
Q Meas. Accuracy +/- [%]:												
Average Velocity (m/s):												
Cross-Sectional Area (m ²):												
Hydrometric Levels - Survey												
YES NO REASON: N/A			Survey Time (HH:MM)		(WATER)	BM Shift: Yes No		Logger Shift: Yes No		Staff Gauge Shifted?: Yes No		
Circuit #1	H I	Rod Read	Elevation (m)	± 0.003	Circuit #2	H I	Rod Read	Elevation (m)	Station Measurements			
Station	A	B	C		Station	A	B	C				
BM1	A-B-C		3.000		BM1			3.000	Log'r Rod Length:			
BM2	A-B-C		A-B=		BM2			A-B=	Log'r Rod to Botm:			
BM3	A-B-C		A-B=		BM3			A-B=				
TOS	A-B-C		A-B=		TOS			A-B=				
WATER	A-B-C		A-B=		WATER			A-B=				
LOG'R ROD:	A-B-C		A-B=		LOG'R ROD:			A-B=				
HWM/CON	A-B-C		A-B=		HWM/CON			A-B=				
BANKFULL	A-B-C		A-B=		BANKFULL			A-B=				
	A-B-C		A-B=		BS (BM1)			A-B=				

Field Staff: MM, DH, DS

Data Entry By: _____ Date: _____
 Reviewed By: _____ Date: _____

Project #: 14-4-0352
 Project Name: Nansen



Weather: -10C, snowing + windy

20 May 2014

HID	H-PC-DSP	Date	20 May 2014	Discharge Measurement Instruments + Methods						
Station Name	Pony Creek Downstream of P.I.	Q Measurement Start Time:	15:56 (HH:MM) PDT PST	<input checked="" type="checkbox"/> YSI SWOFFER PYGMY ADV	MID-SECT POINT					
		Q Measurement End Time:	(HH:MM) PDT PST	<input checked="" type="checkbox"/> SALT TRACER WEIR VOLUMETRIC FLOAT ROD						
		Logger Download/Inst Time:	16:02 (HH:MM) PDT PST	Channel Conditions						
		Logger Reading (m)	-0.6210 (downloaded)	<input checked="" type="checkbox"/> NONE ICE BACKWATER > BANKFULL ZERO FLOW HIGH SUSP. SED.						
Logger:	Serial # 1045354	HOBO (Solinst) N/A		GPS Waypoint	ZONE	EASTING	NORTHING			
Photo #	[U/S] 8335	[D/S] 8336	[RDB] 8338	[LDB] 8339	[STAFF/WEIR] 8337	8341 + 8345				
Site Comments			<input checked="" type="checkbox"/> SLUG <input checked="" type="checkbox"/> CONSTANT RATE <input checked="" type="checkbox"/> DRY <input checked="" type="checkbox"/> LOGGED <input checked="" type="checkbox"/> MANUAL <input checked="" type="checkbox"/> SPC <input checked="" type="checkbox"/> EC <input checked="" type="checkbox"/> CF.T. <input checked="" type="checkbox"/> YES <input checked="" type="checkbox"/> NO							
Water level high, submerged grass, clear water ~2cm snow. Water clear.			Trial Time			SPC _B SPC _P	Mix Length	Mass of Salt	Mix Vol.	[Salt Slug]
						EC _B (uS/cm) EC _P (uS/cm)	L _m (m)	Ms _s (kg)	Volume (L)	Css (kg/L)
Channel Measurements			Salt Tracer			C.F.T.				
Staff Gauge Height (m):	0.296		V ₁ for Sec. Mix (mL)	1000 mL		Vol. Added (mL)	SPC (uS/cm)	Temp		
Weir Head (m):	n/a		Csec (g/L):	1 g/L		1. 0 mL	187.5	0.5		
Water Temperature (°C):	0.6°C		Vol. Calib. Tank (L):	1 L		2. 5 mL	189.5	0.6		
Water Surface Slope (%):	-		SPC ₀ Calib. Tank			3. 10 mL	199.3	0.6		
Average Width (m):	-		CF.T =			4. 10 mL	209.8	0.6		
Average Depth (m):	-		Qsalt =			5.				
Measurement Summary	Primary	Secondary	Notes: 500 mL S.S. into 500 mL Creek,							
Meas. Type:	SS	VOL								
Measurement ID (MID):										
Average Q (m³/s):			Volum.							
Q Meas. Accuracy +/- (%):			Volume (L) =	15.0	16.5	16.0	16.5	16.0		
Average Velocity (m/s):			Time (sec) [1]	344	[2] 3.50	[3] 3.44	[4] 3.56	[5] 3.56		
Cross-Sectional Area (m²):			Average Q (L/s) =							
			Avg. Q _{vol} (L/s) =							
Hydrometric Levels - Survey										
<input checked="" type="checkbox"/> YES <input checked="" type="checkbox"/> NO REASON:	Survey Time (HH:MM)		(WATER)	16:09	BM Shift: Yes <input checked="" type="checkbox"/> No	Logger Shift: Yes <input checked="" type="checkbox"/> No	Staff Gauge Shifted?: Yes <input checked="" type="checkbox"/> No			
Circuit #1	H I	Rod Read	Elevation (m)	± 0.003	Circuit #2	H I	Rod Read	Elevation (m)	Station Measurements	
Station	A	B	C		Station	A	B	C		
BM1	4.067	1.067	3.000		BM1			3.000	Log'r Rod Length: 1.74 m	
BM2	A-B+C	0.817	3.250		BM2			A-B=C	Log'r Rod to Botm:	
BM3	A+B+C	0.432	3.635		BM3			A-B=C		
TOS	A+B+C	0.898	3.169		TOS			A-B=C		
WATER	A+B+C	1.611	2.456		WATER			A-B=C		
LOG'R ROD:	A+B+C	0.649	3.418		LOG'R ROD:			A-B=C		
HWM/CON	A+B+C		A-B=C		HWM/CON			A-B=C		
BANKFULL	A+B+C		A-B=C		BANKFULL			A-B=C		
BM 1	A+B+C	1.067	3.000		BS (BM1)			A-B=C		

Field Staff: MM, OH, DS
 Data Entry By: _____ Date: _____
 Reviewed By: _____ Date: _____

Project #: 14-4-0352
 Project Name: Mt. Nansen



* Top line to top 117.2
 Bottom line to top 118

Weather: -1°C, Snowing + Windy

May 2014

HID	H-VC-R	Date	20 14-05-14	Discharge Measurement Instruments + Methods	
Station Name	Victoria Creek at Road.	Q Measurement Start Time:	(HH:MM) PDT PST	YSI SWOFFER PYGMY ADV MID-SECT POINT	
		Q Measurement End Time:	(HH:MM) PDT PST	SALT TRACER WEIR VOLUMETRIC FLOAT ROD	
		Logger Download/Inst Time:	13:05 (HH:MM) PDT PST	Channel Conditions	
	Logger Reading (m)	118cm / 117.2cm	[M] downloaded	(NONE) ICE BACKWATER > BANKFULL ZERO FLOW HIGH SUSP. SED.	

Logger: Serial #	1041103	HOBO	(Solinst) N/A	GPS Waypoint	ZONE	EASTING	NORTHING
MM Photo # [U/S]	8288	[D/S]	8285	[RDB]	8286	[LDB]	8289
						[STAFF/WEIR]	8287

Site Comments
 Water level still high; but not at bankfull. Some submerged grasses/wilow.
 Well had silt build up - cleared so that logger isn't sitting in it.
 Ice still present on LDB, none on creek.

Channel Measurements	
Staff Gauge Height (m):	0.594
Weir Head (m):	
Water Temperature (°C):	2.0°C
Water Surface Slope (%):	
Average Width (m):	6.2
Average Depth (m):	0.193
Measurement Summary	
Meas. Type:	ADV
Measurement ID (MID):	
Average Q (m³/s):	0.7576
Q Meas. Accuracy +/- [%]:	1.8%
Average Velocity (m/s):	0.633
Cross-Sectional Area (m²):	1.197

SLUG CONSTANT RATE DRY		LOGGED	MANUAL	SPC EC	CF.T YES NO
Trial Time	SPC _B SPC _P	Mix Length	Mass of Salt	Mix Vol.	[Salt Slug]
	EC _B (uS/cm) EC _P (uS/cm)	L _m (m)	Ms _s (kg)	Volume (L)	Css (kg/L)
1 (:)	_____ _____				
2 (:)	_____ _____				
3 (:)	_____ _____				
V _i for Sec. Mix (mL)	_____		Vol. Added (mL)	SPC (uS/cm)	Temp
Csec (g/L):	1 g/L		1.		
Vol. Calib. Tank (L):	1 L		2.		
SPC ₀ Calib. Tank			3.		
CF.T =			4.		
Q _{salt} =			5.		
Notes:			6.		
			7.		
			8.		
			9.		
Volume (L) =					
Time (sec) [1]		[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q _{vol} (L/s) =				Avg Q _{vol} (m³/s) =	

Hydrometric Levels - Survey									
YES NO REASON		Survey Time (HH:MM): (WATER)		13:16	BM Shift: Yes No		Logger Shift: Yes No		Staff Gauge Shifted?: Yes No
Circuit #1	H I	Rod Read	Elevation (m)	± 0.003	Circuit #2	H I	Rod Read	Elevation (m)	Station Measurements
Station	A	B	C		Station	A	B	C	
BM1	4.063	3.063	3.000		BM1			3.000	Log'r Rod Length: 1.180m / 1.172m
BM2		0.637	3.426		BM2				Log'r Rod to Botm:
BM3		0.891	3.172		BM3				
TOS		1.488	2.575		TOS				
WATER		1.896	2.167		WATER				
LOG'R ROD:		1.193	2.870		LOG'R ROD:				
HWM/CON					HWM/CON				
BANKFULL					BANKFULL				
BM1		1.063	3.000		BS (BM1)				

Field Staff: MM, DH, DS
 Data Entry By: _____ Date: _____
 Reviewed By: _____ Date: _____

Project #: 14-4-0352
 Project Name: Nansen



Weather: +5°C overcast, windy

May

HID	H-BC	Date	21 MAR 2014	Discharge Measurement Instruments + Methods					
Station Name	Back Creek	Q Measurement Start Time:	12:10	(HH:MM) PDT PST	(YSI) SWOFFER PYGMY ADV MID-SECT POINT				
		Q Measurement End Time:		(HH:MM) PDT PST	(SALT TRACER) WEIR VOLUMETRIC FLOAT ROD				
		Logger Download/Inst Time:		(HH:MM) PDT PST					
		Logger Reading (m)	[]	downloaded	Channel Conditions				
					(NONE) ICE BACKWATER > BANKFULL ZERO FLOW HIGH SUSP. SED.				
Logger:	Serial #	HOBO (Solinst) N/A		GPS Waypoint		ZONE	EASTING	NORTHING	
Photo #	[U/S] 0386	[D/S] 0387	[RDB] 0833	[LDB] 0835	[STAFF/WEIR] 0832				
Site Comments			<input checked="" type="checkbox"/> SLUG <input type="checkbox"/> CONSTANT RATE <input type="checkbox"/> DRY <input type="checkbox"/> LOGGED <input type="checkbox"/> MANUAL <input checked="" type="checkbox"/> SPC <input type="checkbox"/> EC CF.T. <input type="checkbox"/> YES <input type="checkbox"/> NO						
logger deployed 11:49. logger length 117.6cm. Solinst s/n covered by tape. Get next trip. Water moderately turbid.			Salt Tracer	Trial Time	SPC _B SPC _P	Mix Length	Mass of Salt	Mix Vol.	[Salt Slug]
					EC ₀ (uS/cm) EC _{pk} (uS/cm)	L _m (m)	Ms _s (kg)	Volume (L)	Css (kg/L)
				1 (12 : 10)	184.9 220.6	26	0.05	10L	0.005
				2 (12 : 13)	184.9 221.2	26	0.05	10L	0.005
			Volum.	V ₁ for Sec. Mix (mL)	200 mL		Vol. Added (mL)	SPC (uS/cm)	Temp
Channel Measurements				Csec (g/L):	1 g/L		1. 0 mL	182.8	4.3°C
Staff Gauge Height (m):	0.201			Vol. Calib. Tank (L):	1 L		2. 5 mL	194.9	4.3°C
Weir Head (m):				SPC ₀ Calib. Tank			3. 5 mL	203.8	4.3°C
Water Temperature (°C):	4.1°C		CF.T =			4. 5 mL	212.6	4.3°C	
Water Surface Slope (%):			Qsalt =			5. 5 mL	220.8	4.3°C	
Average Width (m):			Notes: 100mL S.S. into 500mLck			6. 5 mL	229.7	4.3°C	
Average Depth (m):						7.			
Measurement Summary	Primary	Secondary				8.			
Meas. Type:	S.S.					9.			
Measurement ID (MID):									
Average Q (m³/s):									
Q Meas. Accuracy +/- [%]:									
Average Velocity (m/s):									
Cross-Sectional Area (m²):									
Hydrometric Levels - Survey									
<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO REASON:			Survey Time (HH:MM):	(WATER) 12:21	BM Shift: Yes No	Logger Shift: Yes No	Staff Gauge Shifted?: Yes No		
Circuit #1	H I	Rod Read	Elevation (m)	± 0.003	Circuit #2	H I	Rod Read	Elevation (m)	Station Measurements
Station	A	B	C		Station	A	B	C	
BM1	4.231	1.231	3.000		BM1			3.000	Log'r Rod Length: 117.6cm
BM2	A=B+C	1.222	3.009		BM2			A-B =	Log'r Rod to Botm:
BM3	A=B+C	1.203	3.028		BM3			A-B =	
TOS	A=B+C	1.586	2.645		TOS			A-B =	
WATER	A=B+C	2.384	1.847		WATER			A-B =	
LOG'R ROD:	A=B+C	1.350	2.881		LOG'R ROD:			A-B =	
HWM/CON	A=B+C		A-B =		HWM/CON			A-B =	
BANKFULL	A=B+C		A-B =		BANKFULL			A-B =	
BM1	A=B+C	1.231	3.000		BS (BM1)			A-B =	

*last trip BM1 and BM2 were called each others. Correctly flagged them this time)

Field Staff: MM, DH, DS
 Data Entry By: _____ Date: _____
 Reviewed By: _____ Date: _____

Project #: 14-4-0352
 Project Name: Nansen



Weather: +2°C, overcast, windy

May

HID: <u>H-SEEP</u>		Date: <u>21</u> MAY <u>MAY</u> 2014	Discharge Measurement Instruments + Methods							
Station Name: <u>Seepage Pond Outlet.</u>	Q Measurement Start Time: <u>13:15</u>		(HH:MM) PDT PST	YSI SWOFFER PYGMY ADV MID-SECT POINT						
	Q Measurement End Time: _____		(HH:MM) PDT PST	SALT TRACER WEIR <u>VOLUMETRIC</u> FLOAT ROD						
	Logger Download/Inst Time: _____		(HH:MM) PDT PST	Channel Conditions						
Logger Reading (m): _____		[] downloaded	<u>NONE</u> ICE BACKWATER > BANKFULL ZERO FLOW HIGH SUSP. SED.							
Logger: Serial # _____	HOBO Solinst <u>N/A</u>		GPS Waypoint			ZONE	EASTING	NORTHING		
Photo # [U/S] _____	[D/S] <u>0844</u>	[RDB] _____	[LDB] _____	[STAFF/WEIR] _____						
Site Comments		SLUG CONSTANT RATE DRY LOGGED MANUAL SPC EC CF.T. YES NO								
Flow seems less than usual. Pump meter photos 845-848. Refer to photos for flow rate		Trial Time	SPC _B SPC _P	Mix Length	Mass of Salt	Mix Vol.	[Salt Slug]			
			EC ₀ (uS/cm) EC _{pot} (uS/cm)	L _m (m)	Ms _s (kg)	Volume (L)	Css (kg/L)			
		1 (:)	_____ <u>300</u>							
Channel Measurements		Salt Tracer								
Staff Gauge Height (m): _____	Weir Head (m): _____		V ₁ for Sec. Mix (mL)	≈ 1 / C _{ss}	Vol. Added (mL)		SPC (uS/cm)	Temp		
Water Temperature (°C): <u>3.6°C</u>	Average Width (m): _____		Csec (g/L):	1 g/L	1.					
Average Depth (m): _____	Average Depth (m): _____		Vol. Calib. Tank (L):	1 L	2.					
Measurement Summary	Primary	Secondary	SPC ₀ Calib. Tank		3.					
Meas. Type: <u>Vol.</u>			CF.T =		4.					
Measurement ID (MID): _____			Q _{salt} =		5.					
Average Q (m ³ /s): _____			Notes:		6.					
Q Meas. Accuracy +/- [%]: _____					7.					
Average Velocity (m/s): _____					8.					
Cross-Sectional Area (m ²): _____					9.					
Volume:		Volume (L) = <u>18.0L</u>	Time (sec) [1] <u>20.72</u>	[2] <u>20.65</u>	[3] <u>20.40</u>	[4] <u>20.75</u>	[5] <u>20.59</u>			
		Average Q (L/s) = _____	Avg. Q _{vol} (L/s) = _____		Avg Q _{vol} (m ³ /s) = _____					
Hydrometric Levels - Survey										
YES NO REASON <u>N/A</u>	Survey Time (HH:MM): (WATER)		BM Shift: Yes No		Logger Shift: Yes No		Staff Gauge Shifted?: Yes No			
Circuit #1	H I	Rod Read	Elevation (m)	± 0.003	Circuit #2	H I	Rod Read	Elevation (m)	Station Measurements	
Station	A	B	C		Station	A	B	C		
BM1	A=B+C		<u>3.000</u>		BM1			<u>3.000</u>	Log'r Rod Length:	
BM2	A=B+C		A-B =		BM2			A-B =	Log'r Rod to Botm:	
BM3	A=B+C		A-B =		BM3			A-B =		
TOS	A=B+C		A-B =		TOS			A-B =		
WATER	A=B+C		A-B =		WATER			A-B =		
LOG'R ROD:	A=B+C		A-B =		LOG'R ROD:			A-B =		
HWM/CON	A=B+C		A-B =		HWM/CON			A-B =		
BANKFULL	A=B+C		A-B =		BANKFULL			A-B =		
	A=B+C		A-B =		BS (BM1)			A-B =		

Field Staff: MM, DH, DS

Data Entry By: _____ Date: _____
 Reviewed By: _____ Date: _____

Project #: 14-Y-0352
 Project Name: Nasson



Weather: -0 °C, overcast & windy

May 2014

HID: <u>H-VC-UMN</u>		Date: <u>21 DECEMBER 2013</u>		Discharge Measurement Instruments + Methods					
Station Name: <u>Victoria Creek U/S of Minnesota Creek</u>	Q Measurement Start Time: <u>08:51</u> (HH:MM) PDT PST		<u>(YSI) SWOFFER PYGMY (ADV) MID-SECT POINT</u>						
	Q Measurement End Time: (HH:MM) PDT PST		<u>(SALT TRACER) WEIR VOLUMETRIC FLOAT ROD</u>						
	Logger Download/Inst Time: <u>8:36</u> (HH:MM) PDT PST		Channel Conditions						
Logger Reading (m): <u>-0.2764 m</u> Mdownloaded		<u>(NONE) ICE BACKWATER > BANKFULL ZERO FLOW HIGH SUSP. SED.</u>							
Logger: Serial # <u>1049534</u>	HOBO <u>(Solinst) N/A</u>		GPS Waypoint		ZONE	EASTING	NORTHING		
Photo # [U/S] <u>8374</u>	[D/S] <u>8375</u>	[RDB] <u>8378</u>	[LDB] <u>8376</u>	[STAFF/WEIR] <u>8377</u>					
Site Comments		<input checked="" type="checkbox"/> SLUG <input type="checkbox"/> CONSTANT RATE <input type="checkbox"/> DRY <input checked="" type="checkbox"/> LOGGED <input type="checkbox"/> MANUAL <input checked="" type="checkbox"/> SPC <input type="checkbox"/> EC <input checked="" type="checkbox"/> C.F.T <input type="checkbox"/> YES <input type="checkbox"/> NO							
<i>Flow level moderate. Some submerged moss + grass. Stabilized stilling well after download logger. Put lid on logger sensor.</i>		Trial Time		SPC _B SPC _P	Mix Length	Mass of Salt	Mix Vol.	[Salt Slug]	
				EC _B (uS/cm) EC _P (uS/cm)	L _m (m)	M _s (kg)	Volume (L)	C _{ss} (kg/L)	
		1 (08:51)		<u>169.2 190.9</u>	<u>42 m</u>	<u>0.200 kg</u>	<u>10L</u>	<u>0.02</u>	
		2 (08:57)		<u>169.3 193.3</u>	<u>42 m</u>	<u>0.200 kg</u>	<u>10L</u>	<u>0.02</u>	
		3 (:)							
Channel Measurements		V ₁ for Sec. Mix (mL)		<u>50 mL</u>	Vol. Added (mL)		SPC (uS/cm)	Temp	
Staff Gauge Height (m): <u>0.709</u>		Csec (g/L):		<u>1 g/L</u>	1. <u>0 mL</u>		<u>169.5</u>	<u>0.9°C</u>	
Weir Head (m): <u>N/A</u>		Vol. Calib. Tank (L):		<u>1 L</u>	2. <u>2 mL</u>		<u>174.7</u>	<u>0.9°C</u>	
Water Temperature (°C): <u>0.6°C</u>		SPC ₀ Calib. Tank			3. <u>2 mL</u>		<u>177.7</u>	<u>0.9°C</u>	
Water Surface Slope (%):		C.F.T =			4. <u>4 mL</u>		<u>186.1</u>	<u>1.0°C</u>	
Average Width (m): <u>5.4</u>		Q _{salt} =			5. <u>4 mL</u>		<u>194.0</u>	<u>1.0°C</u>	
Average Depth (m): <u>0.192</u>		Notes: <u>50 mL S.S. into 1000 mL Ck.</u>			6.				
Measurement Summary		Primary	Secondary						
Meas. Type: <u>ADV</u>			<u>S.S.</u>						
Measurement ID (MID):									
Average Q (m³/s): <u>0.7015</u>		Volume (L) =			7.				
Q Meas. Accuracy +/- [%]: <u>5.4%</u>		Time (sec) [1]		[2]	[3]	[4]	[5]		
Average Velocity (m/s): <u>0.677</u>		Average Q (L/s) =			8.				
Cross-Sectional Area (m²): <u>1.036</u>		Avg. Q _{vol} (L/s) =			9.				
		Avg. Q _{vol} (m³/s) =							
Hydrometric Levels - Survey									
<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO REASON			Survey Time (HH:MM): (WATER) <u>9:18 / 9:25</u>	BM Shift: Yes No	Logger Shift: Yes No	Staff Gauge Shifted? Yes No			
Circuit #1	H I	Rod Read	Elevation (m)	± 0.003	Circuit #2	H I	Rod Read	Elevation (m)	Station Measurements
Station	A	B	C		Station	A	B	C	
BM1	<u>4.050</u>	<u>1.050</u>	<u>3.000</u>		BM1	<u>4.022</u>	<u>1.022</u>	<u>3.000</u>	Log'r Rod Length: <u>1.171 m</u>
BM2	<u>A+B-C</u>	<u>1.043</u>	<u>3.007</u>		BM2		<u>1.015</u>	<u>3.007</u>	Log'r Rod to Botm:
BM3	<u>A+B-C</u>	<u>1.372</u>	<u>2.678</u>		BM3		<u>1.343</u>	<u>2.679</u>	
TOS	<u>A+B-C</u>	<u>2.057</u>	<u>1.993</u>		TOS		<u>2.028</u>	<u>1.994</u>	
WATER	<u>A+B-C</u>	<u>2.355</u>	<u>1.695</u>		WATER		<u>2.327</u>	<u>1.695</u>	
LOG'R ROD:	<u>A+B-C</u>	<u>1.843</u>	<u>2.207</u>		LOG'R ROD:		<u>1.814</u>	<u>2.208</u>	
HWM/CON	<u>A-B-C</u>				HWM/CON				
BANKFULL	<u>A-B-C</u>				BANKFULL				
BM1	<u>A+B-C</u>	<u>1.050</u>	<u>3.000</u>		BS (BM1)				

Field Staff: MM, DH, DS

Data Entry By: _____ Date: _____
 Reviewed By: _____ Date: _____

Project #: 14-4-0352
 Project Name: Nansen



Weather: +5°C, overcast, windy

May

HID	H-VC-DBC		Date	21 MAY 2014		Discharge Measurement Instruments + Methods						
Station Name	Victoria Creek		Q Measurement Start Time:	10:25	(HH:MM) PDT PST	YSI SWOFFER PYGMY ADV MID-SECT. POINT						
	D/S of Back Creek		Q Measurement End Time:	10:50	(HH:MM) PDT PST	SALT TRACER WEIR VOLUMETRIC FLOAT ROD						
			Logger Download/Inst Time:	10:29	(HH:MM) PDT PST	Channel Conditions						
			Logger Reading (m)	-0.4145 M downloaded		NONE ICE BACKWATER > BANKFULL ZERO FLOW HIGH SUSP. SED						
Logger:	Serial #	1049137		HOBO (Solinst)	N/A		GPS Waypoint	ZONE		EASTING	NORTHING	
Photo #	[U/S]	8389		[D/S]	8390		[RDB]	8391		[LDB]	8393	
Site Comments				SLUG CONSTANT RATE DRY LOGGED MANUAL SPC EC CF.T YES NO								
Water level moderate. Clear water. No ice or snow at str.				Trial Time	SPC _B SPC _P		*Mix Length	Mass of Salt	Mix Vol.	[Salt Slug]		
					EC _B (uS/cm) EC _P (uS/cm)		L _m (m)	Ms _s (kg)	Volume (L)	C _{ss} (kg/L)		
				1 (:)								
				2 (:)								
Channel Measurements				V ₁ for Sec. Mix (mL)	= 1 / C _{ss}		CF.T	Vol. Added (mL)	SPC (uS/cm)	Temp		
Staff Gauge Height (m):	0.526		Csec (g/L):	1 g/L		1						
Weir Head (m):			Vol. Calib. Tank (L):	1 L		2						
Water Temperature (°C):	1.40		SPC ₀ Calib. Tank			3						
Water Surface Slope (%):			CF.T =			4						
Average Width (m):	4.8		Q _{salt} =			5						
Average Depth (m):	0.249		Notes:			6						
Measurement Summary	Primary	Secondary				7						
Meas. Type:	ADV							8				
Measurement ID (MID):							9					
Average Q (m ³ /s):	0.6273		Volume (L) =									
Q Meas. Accuracy +/- [%]:	1.9%		Time (sec) [1]			[2]	[3]	[4]	[5]			
Average Velocity (m/s):	0.525		Average Q (L/s) =									
Cross-Sectional Area (m ²):	1.195		Avg. Q _{vol} (L/s) =							Avg Q _{vol} (m ³ /s) =		
Hydrometric Levels - Survey												
YES NO REASON:			Survey Time (HH:MM):	(WATER)	10:37	BM Shift: Yes No	Logger Shift: Yes No	Staff Gauge Shifted?: Yes No				
Circuit #1	H I	Rod Read	Elevation (m)	± 0.003	Circuit #2	H I	Rod Read	Elevation (m)	Station Measurements			
Station	A	B	C		Station	A	B	C				
BM1	4.251	1.251	3.000		BM1			3.000	Log'r Rod Length:	1.167		
BM2	A-B+C	1.223	3.028		BM2			A-B =	Log'r Rod to Botm:			
BM3	A-B+D	1.333	2.918		BM3			A-B =				
TOS	A-B-C	1.896	2.355		TOS			A-B =				
WATER	A-B+G	2.373	1.878		WATER			A-B =				
LOG'R ROD:	A-B+C	1.683	2.568		LOG'R ROD:			A-B =				
HWM/CON	A-B+D		A-B =		HWM/CON			A-B =				
BANKFULL	A-B+C		A-B =		BANKFULL			A-B =				
BM 1	A-B+C	1.251	3.000		BS (BM1)			A-B =				

Field Staff: M.H., D.H., D.S.

Data Entry By: _____ Date: _____
 Reviewed By: _____ Date: _____



HID	H-DC-R		Date	20 MAY-2014		Discharge Measurement Instruments + Methods							
Station Name	Dome Creek at Road		Q Measurement Start Time:	1348	(HH:MM) PDT PST	YSP SWOFFER PYGMY ADV MID-SECT. POINT							
			Q Measurement End Time:		(HH:MM) PDT PST	SALT TRACER WEIR VOLUMETRIC FLOAT ROD							
			Logger Download/Inst Time:		(HH:MM) PDT PST	Channel Conditions							
	Logger Reading (m)				[] downloaded	NONE ICE BACKWATER > BANKFULL ZERO FLOW HIGH SUSP. SED.							
Logger: Serial #			HOBO Solinst <u>N/A</u>		GPS Waypoint		ZONE EASTING NORTHING						
Photo # [U/S]	8291		[D/S]	8290		[RDB]	8293		[LDB]	8292		[STAFF/WEIR] adjacent area	8294
Site Comments				SLUG CONSTANT RATE DRY LOGGED MANUAL SPC IEC CF.T YES NO Put salt in above culvert + measured below. Flow level high,									
Channel Measurements				Trial Time SPC _B SPC _P Mix Length Mass of Salt Mix Vol. [Salt Slug] EC ₂ (uS/cm) EC ₂₀ (uS/cm) L _m (m) M _s (kg) Volume (L) C _{ss} (kg/L)									
Staff Gauge Height (m):				1 (13:48) 710.1 773.7 18m 0.100kg 10L 0.01									
Weir Head (m):				2 (13:54) 709.9 772.2 18m 0.100kg 10L 0.01									
Water Temperature (°C):				3 ()									
Water Surface Slope (%):				V _i for Sec. Mix (mL) 100mL									
Average Width (m):				Csec (g/L): 1 g/L									
Average Depth (m):				Vol. Calib. Tank (L): 1 L									
Measurement Summary				SPC ₀ Calib. Tank CF.T = Qsalt = Notes: 50mL S.S. into 500mL ck.									
Meas. Type: Salt				Vol. Added (mL) SPC (uS/cm) Temp 1 0mL 710.9 0.40C 2 2mL 712.4 0.40C 3 10mL 734 0.40C 4 10mL 752.1 0.40C 5 10mL 769.7 0.50C 6 10mL 788.6 0.50C									
Measurment ID (MID):				CF.T 7. 8. 9.									
Average Q (m³/s):				Volume (L) = Time (sec) [1] [2] [3] [4] [5] Average Q (L/s) = Avg. Q _{vol} (L/s) = Avg Q _{vol} (m³/s) =									
Cross-Sectional Area (m²):				Hydrometric Levels - Survey YES NO REASON: <u>No longer in place</u> Survey Time (HH:MM): (WATER) BM Shift: Yes No Logger Shift: Yes No Staff Gauge Shifted?: Yes No									
Circuit #1	HI	Rod Read	Elevation (m)	± 0.003	Circuit #2	HI	Rod Read	Elevation (m)	Station Measurements				
Station	A	B	C		Station	A	B	C					
BM1	A-B=C		3.000		BM1			3.000	Log'r Rod Length:				
BM2	A-B=C		A-B=		BM2			A-B=	Log'r Rod to Botm:				
BM3	A-B=C		A-B=		BM3			A-B=					
TOS	A-B=L		A-B=		TOS			A-B=					
WATER	A-B=C		A-B=		WATER			A-B=					
LOG'R ROD:	A-B=C		A-B=		LOG'R ROD:			A-B=					
HWM/CON	A-B=C		A-B=		HWM/CON			A-B=					
BANKFULL	A-B=C		A-B=		BANKFULL			A-B=					
	A-B=C		A-B=		BS (BM1)			A-B=					

Project #: 14-Y-0352
 Project Name: Nas 300



Weather: -2°C, Spinning, windy
poor visibility

20-May-2014

HID	H-PC-U		Date	20-11-2014		Discharge Measurement Instruments + Methods					
Station Name	Upper Parry Creek		Q Measurement Start Time:	16:46	(H:MM) PDT PST	YSI SWOFFER PYGMY ADV MID-SECT POINT					
			Q Measurement End Time:		(H:MM) PDT PST	SALT TRACER WEIR VOLUMETRIC FLOAT ROD					
			Logger Download/Inst Time:		(H:MM) PDT PST	Channel Conditions					
	Logger Reading (m)			[] downloaded	NONE ICE BACKWATER > BANKFULL ZERO FLOW HIGH SUSP. SED						
Logger:	Serial #	HOBO Solinst		N/A	GPS Waypoint		ZONE	EASTING	NORTHING		
Photo #	[U/S] 816	[D/S] 814	[RDB] 815	[LDB] 817	[STAFF/WEIR]						
Site Comments			(SLUG) CONSTANT RATE DRY LOGGED MANUAL SPECIFIC C.F.T. YES/NO Trial Time SPC _B SPC _P Mix Length Mass of Salt Mix Vol. [Salt Slug] EC ₀ (uS/cm) EC _{pk} (uS/cm) L _m (m) M _s (kg) Volume (L) C _{ss} (kg/L)								
Water level high. Submerged grasses + willows, ~2cm fresh snow weir leaking around RD side. Most of flow (80%) coming down other channel.			Salt Tracer			V ₁ for Sec. Mix (mL) 1000 mL Csec (g/L): 1 g/L Vol. Calib. Tank (L): 1 L SPC ₀ Calib. Tank C.F.T = Q _{salt} = Notes: 500mL S.S. into 500mL ck.					
			Channel Measurements			C.F.T.					
			Staff Gauge Height (m):			Vol. Added (mL)			SPC (uS/cm)		Temp
			Weir Head (m):			1. 0 mL 134.0			0.7		
			Water Temperature (°C):	0.70C		2. 6 mL 140.2			0.8		
			Water Surface Slope (%):			3. 6 mL 146.3			0.7		
			Average Width (m):			4. 6 mL 153.0			0.8		
			Average Depth (m):								
			Measurement Summary	Primary	Secondary						
			Meas. Type:	S.S.							
Measurement ID (MID):											
Average Q (m³/s):			Volume (L) =								
Q Meas. Accuracy +/- [%]:			Time (sec) [1]			[2]		[3]	[4]	[5]	
Average Velocity (m/s):			Average Q (L/s) =								
Cross-Sectional Area (m²):			Avg. Q _{vol} (L/s) =								
Hydrometric Levels - Survey											
YES [NO] REASON: No logger			Survey Time (HH:MM): (WATER)		BM Shift: Yes No		Logger Shift: Yes No		Staff Gauge Shifted?: Yes No		
Circuit #1	HI	Rod Read	Elevation (m)	± 0.003	Circuit #2	HI	Rod Read	Elevation (m)	Station Measurements		
Station	A	B	C		Station	A	B	C			
BM1			3.000		BM1			3.000	Log'r Rod Length:		
BM2			A-B =		BM2			A-B =	Log'r Rod to Botm:		
BM3			A-B =		BM3			A-B =			
TOS			A-B =		TOS			A-B =			
WATER			A-B =		WATER			A-B =			
LOG'R ROD:			A-B =		LOG'R ROD:			A-B =			
HWM/CON			A-B =		HWM/CON			A-B =			
BANKFULL			A-B =		BANKFULL			A-B =			
			A-B =		BS (BM1)			A-B =			

Field Staff: MM, DH, DS.
 Data Entry By: _____ Date: _____
 Reviewed By: _____ Date: _____

Project #: 14-Y-0352
 Project Name: Nansen



Weather: +3°C, overcast + windy

HID		Date		Discharge Measurement Instruments + Methods									
Station Name	H-DC-DX+105	21 May 2014		Q Measurement Start Time: 15:08 (HH:MM) PDT PST (YS) SWOFFER PYGMY ADV MID-SECT POINT									
				Q Measurement End Time: (HH:MM) PDT PST (SALT TRACER) WEIR VOLUMETRIC FLOAT ROD									
				Logger Download/Inst Time: (HH:MM) PDT PST									
				Logger Reading (m) [] downloaded (NONE) ICE BACKWATER > BANKFULL ZERO FLOW HIGH SUSP. SED.									
Logger: Serial #		HOBO Solinst: N/A		GPS Waypoint		ZONE		EASTING		NORTHING			
Photo # [U/S] 0866		[D/S] 0867		[RDB] 0868		[LDB]		[STAFF/WEIR]					
Site Comments				(SLUG) CONSTANT RATE DRY (LOGGED) MANUAL (SPC) EC CF.T (YES) NO Trial Time SPC _B SPC _P Mix Length Mass of Salt Mix Vol. [Salt Slug] EC _B (uS/cm) EC _P (uS/cm) L _m (m) M _s (kg) Volume (L) C _{ss} (kg/L)									
Flaw level mod-high				Salt Tracer		1 (15:08) 373.6 392.8 22.5 0.01kg 10L 0.001		2 (15:23) 367.2 382.7 22.5 0.01kg 10L 0.001		3 (:)			
						V _i for Sec. Mix (mL) 1000mL		Vol. Added (mL)		SPC (uS/cm)		Temp	
						C _{sec} (g/L): 1 g/L		1. 0mL 361.6 +2.2		2. 2mL 367.0 2.1		3. 4mL 370.8 2.1	
Channel Measurements				Volum.		Vol. Calib. Tank (L): 1 L		4. 6mL 376.8 2.2		5. 10mL 386.4 2.3			
Staff Gauge Height (m):		SPC ₀ Calib. Tank				6. 10mL 396.0 2.3		7.		8.		9.	
Weir Head (m):		CF.T =				Notes: 500mL S.S. into 500mLCK.							
Water Temperature (°C): 1.7°C		Average Width (m):		Time (sec) [1] [2] [3] [4] [5]		Average Q (L/s) =		Avg Q _{vol} (m ³ /s) =					
Water Surface Slope (%):		Average Depth (m):		Average Q (L/s) =		Avg. Q _{vol} (L/s) =							
Measurement Summary		Primary Secondary		Avg. Q _{vol} (L/s) =									
Meas. Type: S.S.													
Measurement ID (MID):													
Average Q (m ³ /s):													
Q Meas. Accuracy +/- [%]:													
Average Velocity (m/s):													
Cross-Sectional Area (m ²):													
Hydrometric Levels - Survey													
YES (NO) REASON: N/A - no longer			Survey Time (HH:MM): (WATER)			BM Shift: Yes No		Logger Shift: Yes No		Staff Gauge Shifted?: Yes No			
Circuit #1	H I	Rod Read	Elevation (m)	± 0.003	Circuit #2	H I	Rod Read	Elevation (m)	Station Measurements				
Station	A	B	C		Station	A	B	C					
BM1	A=B+C		3.000		BM1			3.000	Log'r Rod Length:				
BM2	A=B+C		A-B=		BM2			A-B=	Log'r Rod to Botm:				
BM3	A=B+C		A-B=		BM3			A-B=					
TOS	A=B+C		A-B=		TOS			A-B=					
WATER	A=B+C		A-B=		WATER			A-B=					
LOG'R ROD:	A=B+C		A-B=		LOG'R ROD:			A-B=					
HWM/CON	A=B+C		A-B=		HWM/CON			A-B=					
BANKFULL	A=B+C		A-B=		BANKFULL			A-B=					
	A=B+C		A-B=		BS (BM1)			A-B=					

Field Staff: MM, DH, DS.

Data Entry By: _____ Date: _____
 Reviewed By: _____ Date: _____

Project #: 14-4-0352
 Project Name: Nansen



Weather: +3°C, overcast + windy

HID	NEW-MAY 0352		Date	21 MAY-2014		Discharge Measurement Instruments + Methods			
Station Name	Dit Water level		Q Measurement Start Time:	(HH:MM) PDT PST	YSI SWOFFER PYGMY ADV MID-SECT POINT				
			Q Measurement End Time:	(HH:MM) PDT PST	SALT TRACER WEIR VOLUMETRIC FLOAT ROD				
			Logger Download/Inst Time:	(HH:MM) PDT PST	Channel Conditions				
			Logger Reading (m)	[] downloaded	NONE ICE BACKWATER > BANKFULL ZERO FLOW HIGH SUSP. SED.				
Logger:	Serial #	HOBO Solinst <u>N/A</u>		GPS Waypoint		ZONE	EASTING	NORTHING	
Photo #	[U/S]	[D/S]	[RDB]	[LDB]	[STAFF/WEIR]				
Site Comments			SLUG CONSTANT RATE DRY LOGGED MANUAL SPC EC CF.T YES NO						
Pin # 1961 Underhill Surveys → Nail, ↳ took elevation relative to pin + back to a well.			Trial Time		SPC _B SPC _P	Mix Length	Mass of Salt	Mix Vol.	[Salt Slug]
					EC _a (uS/cm) EC _{pk} (uS/cm)	L _m (m)	Ms _a (kg)	Volume (L)	Css (kg/L)
			1 (:)		_____ _____				
			2 (:)		_____ _____				
Channel Measurements			V ₁ for Sec. Mix (mL) _____						
Staff Gauge Height (m):			Csec (g/L):		1 g/L	Vol. Added (mL)		SPC (uS/cm)	Temp
Weir Head (m):			Vol. Calib. Tank (L):		1 L	1.			
Water Temperature (°C):			SPC ₀ Calib. Tank			2.			
Water Surface Slope (%):			CF.T =			3.			
Average Width (m):			Qsalt =			4.			
Average Depth (m):			Notes:			5.			
Measurement Summary			Primary	Secondary					
Meas. Type:									
Measurement ID (MID):									
Average Q (m³/s):			Volume (L) =			6.			
Q Meas. Accuracy +/- [%]:			Time (sec) [1]		[2]	7.			
Average Velocity (m/s):			Average Q (L/s) =			8.			
Cross-Sectional Area (m²):			Avg. Q _{vol} (L/s) =			9.			
Hydrometric Levels - Survey									
YES NO REASON:			Survey Time (HH:MM): (WATER) 17:15	BM Shift: Yes No	Logger Shift: Yes No	Staff Gauge Shifted?: Yes No			
Circuit #1	HI	Rod Read	Elevation (m)	± 0.003	Circuit #2	HI	Rod Read	Elevation (m)	Station Measurements
Station	A	B	C		Station	A	B	C	
BM1 Pin	A-B = G	1.541	3.000		BM1			3.000	Log'r Rod Length:
BM2	A-B = G		A-B =		BM2			A-B =	Log'r Rod to Botm:
BM3	A-B = G		A-B =		BM3			A-B =	
TOS	A-B = L		A-B =		TOS			A-B =	
WATER	A-B = G	3.686	A-B =		WATER			A-B =	
LOG'R ROD:	A-B = C		A-B =		LOG'R ROD:			A-B =	
HWM/CON	A-B = G		A-B =		HWM/CON			A-B =	
BANKFULL	A-B = L		A-B =		BANKFULL			A-B =	
Top of Ditt	A-B = G	0.683	A-B =		BS (BM1)			A-B =	

Down hill side } w lid open. } see drawings on back
 CH 8-13-06 }
 60m }
 V Put + logger }

Field Staff: MM, DH, DS
 Data Entry By: _____ Date: _____
 Reviewed By: _____ Date: _____

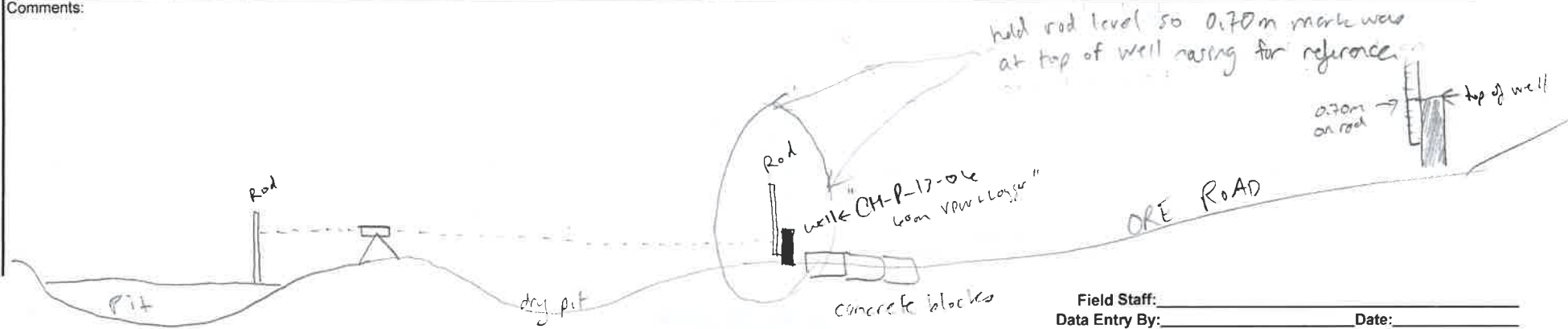
Project #: _____
 Project Name: _____



Weather: _____

HID												Date (dd.mm.yyyy)			
Velocity-Area Method		SWOFFER PYGMY ADV		Salt Tracer Trial 1 LOGGED MANUAL Time: _____				Salt Tracer Trial 2 LOGGED MANUAL Time: _____							
Station	Distance (m)	Depth (m)	Velocity (m/s)	Time (sec)	SPC (uS/cm)	Time (sec)	SPC (uS/cm)	Time (sec)	SPC (uS/cm)	Time (sec)	SPC (uS/cm)	Time (sec)	SPC (uS/cm)	Time (sec)	SPC (uS/cm)
1				$t_0 =$		260		520		$t_0 =$		260		520	
2				10		270		530		10		270		530	
3				20		280		540		20		280		540	
4				30		290		550		30		290		550	
5				40		300		560		40		300		560	
6				50		310		570		50		310		570	
7				60		320		580		60		320		580	
8				70		330		590		70		330		590	
9				80		340		600		80		340		600	
10				90		350		610		90		350		610	
11				100		360		620		100		360		620	
12				110		370		630		110		370		630	
13				120		380		640		120		380		640	
14				130		390		650		130		390		650	
15				140		400		660		140		400		660	
16				150		410		670		150		410		670	
17				160		420		680		160		420		680	
18				170		430		690		170		430		690	
19				180		440		700		180		440		700	
20				190		450		710		190		450		710	
21				200		460		720		200		460		720	
22				210		470		730		210		470		730	
23				220		480		740		220		480		740	
24				230		490		750		230		490		750	
25				240		500		760		240		500		760	
25				250		510		770		250		510		770	

Comments:



Field Staff: _____
 Data Entry By: _____ Date: _____
 Reviewed By: _____ Date: _____

Project #: 14-Y-0352
 Project Name: Nansen



Weather: -1°C, snowing, windy

May 2014

HID	H-DC-M		Date	20 NOV 2014		Discharge Measurement Instruments + Methods								
Station Name	Middle Dome Creek		Q Measurement Start Time:	1430 (HH:MM)		PDT PST	<input checked="" type="checkbox"/> YSI <input checked="" type="checkbox"/> SWOFFER <input checked="" type="checkbox"/> PYGMY <input checked="" type="checkbox"/> ADV <input checked="" type="checkbox"/> MID-SECT <input checked="" type="checkbox"/> POINT							
			Q Measurement End Time:			PDT PST	<input checked="" type="checkbox"/> SALT TRACER <input type="checkbox"/> WEIR <input type="checkbox"/> VOLUMETRIC <input type="checkbox"/> FLOAT <input type="checkbox"/> ROD							
			Logger Download/Inst Time:	1425 (HH:MM)		PDT PST	Channel Conditions							
Logger Reading (m)			<input checked="" type="checkbox"/> downloaded		<input checked="" type="checkbox"/> NONE <input type="checkbox"/> ICE <input type="checkbox"/> BACKWATER <input type="checkbox"/> > BANKFULL <input type="checkbox"/> ZERO FLOW <input type="checkbox"/> HIGH SUSP. SED.									
Logger: Serial #	1050618		HOBO		<input checked="" type="checkbox"/> Solinst <input type="checkbox"/> N/A	GPS Waypoint		ZONE	EASTING	NORTHING				
Photo # [U/S]	8295 8296		[D/S]	8297		[RDB]	8298		[LDB]	8300		[STAFF/WEIR]	8299	
Site Comments			<input checked="" type="checkbox"/> SLUG <input type="checkbox"/> CONSTANT RATE <input type="checkbox"/> DRY <input checked="" type="checkbox"/> LOGGED <input type="checkbox"/> MANUAL <input checked="" type="checkbox"/> SPC <input type="checkbox"/> EC <input type="checkbox"/> CF.T. <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO											
High water level, submergent grass + willow No ice. Moderate turbidity. Some sediment build up in well, stirred up + cleaned out. <i>noticed turbid + rocky</i>			Trial Time		SPC _B SPC _P		Mix Length		Mass of Salt		Mix Vol.		[Salt Slug]	
					EC _B (uS/cm) EC _P (uS/cm)		L _m (m)		M _S (kg)		Volume (L)		C _{SS} (kg/L)	
			1 (14:30)		706.3 779.8		33		0.100 kg		10L		0.01	
			2 (14:38)		702.1 775.4		33		0.100 kg		10L		0.01	
Channel Measurements			V _i for Sec. Mix (mL)		100 mL		Vol. Added (mL)		SPC (uS/cm)		Temp			
Staff Gauge Height (m):			0.194		Csec (g/L):		1 g/L		1. 0 mL		700.3		2.1°C	
Weir Head (m):			n/a		Vol. Calib. Tank (L):		1 L		2. 2 mL		706.8		2.2°C	
Water Temperature (°C):			n/a 2.0°C		SPC ₀ Calib. Tank				3. 10 mL		726.3		2.2°C	
Water Surface Slope (%):			n/a		CF.T =				4. 10 mL		744.3		2.2°C	
Average Width (m):					Q _{salt} =				5. 10 mL		762.6		2.2°C	
Average Depth (m):					Notes				6. 10 mL		780.1		2.3°C	
Measurement Summary			Primary		Secondary				7. 10 mL		798.4		2.3°C	
Meas. Type:			Salt		Volum.		Volume (L) =							
Measurement ID (MID):					Time (sec) [1]		[2]		[3]		[4]		[5]	
Average Q (m³/s):					Average Q (L/s) =									
Q Meas. Accuracy +/- [%]:					Avg. Q _{vol} (L/s) =									
Average Velocity (m/s):					Avg. Q _{vol} (m³/s) =									
Cross-Sectional Area (m²):					Hydrometric Levels - Survey									
<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO REASON:			Survey Time (HH:MM): (WATER)		14:34		BM Shift: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		Logger Shift: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No		Staff Gauge Shifted?: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No			
Circuit #1	H I		Rod Read	Elevation (m)		± 0.003		Circuit #2	H I		Rod Read	Elevation (m)		Station Measurements
Station	A		B	C				Station	A		B	C		
BM1	4.297		1.297	3.000				BM1				3.000		Log'r Rod Length:
BM2			1.982	2.315				BM2				2.5-		Log'r Rod to Botm:
BM3			1.585	2.712				BM3				2.9-		
TOS			1.819	2.470				TOS				2.9-		
WATER			2.630	1.667				WATER				2.8-		top line: 1.163m
LOG'R ROD:			1.588	2.709				LOG'R ROD:				2.5-		bottom line: 1.179m
HWM/CON				2.8-				HWM/CON				2.8-		
BANKFULL				2.8-				BANKFULL				2.8-		
BM1			1.297	3.000				BS (BM1)				2.8-		

Field Staff: MM, DH, DS
 Data Entry By: _____ Date: _____
 Reviewed By: _____ Date: _____



**General Site Tasks/
 Communications**

- 1) Download ALL data loggers present.
- 2) If a measurement is not feasible, fully document why and take photos.
- 3) Fill in ALL data boxes & Site Comment boxes on field sheets to document site conditions (even if site is unchanged).
- 4) During salt slugs, minimum SPC rise is only +10x resolution of conductivity meter.
- 5) Attempt to get paired SS and ADV measurements where ice cover is sufficiently thin to measure with the ADV.

WQ/H DCM
 WQ/H SEEP
 WQ/H TP
 WQ/H DCB
 ATM

WQ New Seeps (3)
 WQ/H DIB
 WQ MS 08
 WQ/H DX105
 WQ BX
 8 x 0.01 (10g)
 4 x 0.05 (50g)
 4 x 0.1 (100g)
 8 x 0.20 (200g)

More loggers taken vol. of water &
 water measured
 - Logger install

#	Complete	HID	Station Name	Station Type	Site Tasks	Survey Required	Logger Type Serial #	Q Method	Additional Materials Required	Date	Time	SG	Logger
						Yes/No				yy.mm.dd	HH:MM	(m)	(m)
1	[]	ATM-DC2	Atmospheric at Diversion Channel	Continuous Baro Logger	1) HOBO download; reprogram (data from last file corrupted)	NO	HOBO	None	None	2014-MAY-		n/a	
2	[]	ATM-DC4	Atmospheric at Diversion Channel (Back-up)	Continuous Baro Logger	1) Solinst download 2) Clear Solinst logger data	NO	Solinst Baro-logger	None	None	2014-MAY-		n/a	
3	[]	H-PC-U	Upper Pony Creek	Instantaneous	1) Q measurement (SS) 2) Complete Weir (concrete bags/sand bags, weir plate, cut notch)	YES	n/a	Salt (0.01 kg) CF.T	None	2014-MAY-			
4	[]	H-PC-DSP	Pony Creek Downstream of Pit	Instantaneous	1) Q measurement (SS) 2) Survey of WSL/stations if no ice/snow.	YES	n/a	Volumetric Salt (0.01 kg) CF.T	None	2014-MAY-			
5	[]	H-DC-DX+105	Dome Creek DX+105	Instantaneous	1) Q measurement	n/a	n/a	Salt (0.01 kg) CF.T	None	2014-MAY-		n/a	
6	[]	H-DC-D1b	Dome Creek D1b	Instantaneous	1) Q measurement if clear channel present	n/a	n/a	Salt (0.01 kg) CF.T	None	2014-MAY-		n/a	
7	[]	H-DC-B	Diversion Channel at Bridge	Continuous	1) Q measurement (if channel conditions permit) 2) install data logger/stilling well if possible.	NO	n/a	Salt (0.05 kg) CF.T	None	2014-MAY-			
8	[]	H-DC-M	Middle Dome Creek	Continuous	1) Q measurement 2) Logger download. 3) Complete weir (sandbags, weir plate, LB wing wall, change logger location?)	YES	Solinst 1050018	Salt (0.1 kg) CF.T	None	2014-MAY-			
9	[]	H-DC-R	Dome Creek at Road	Continuous	1) Q measurement if clear channel present.	NO	n/a	Volumetric Salt (0.1 kg) CF.T	None	2014-MAY-			
10	[]	H-VC-U	Upper Victoria Creek	Continuous	1) Q measurement (ADV + SS) 2) Logger download.	YES	Solinst 1049522	ADV SS (0.2 kg)	None	2014-MAY-			
11	[]	H-VC-DBC	Victoria Creek D/S of Back Creek	Continuous	1) Q measurement (ADV + SS) 2) Logger download.	YES	Solinst 1049137	ADV SS (0.2 kg)	None	2014-MAY-			
12	[]	H-BC	Back Creek	Continuous	1) Q measurement (ADV + SS) 2) Logger install (if possible) 3) Deploy solinst data logger & measure logger rod from data logger markings.	YES	n/a	Salt (0.05 kg) CF.T	None	2014-MAY-			
13	[]	H-VC-UMN	Victoria Creek U/S of Minnesota Creek	Continuous	1) Q measurement (ADV + SS) 2) Repair/support stilling well so it is properly anchored. 3) Place a cap on the solinst logger (or tape)	YES	n/a	ADV SS (0.2 kg)	None	2014-MAY-			
14	[]	H-VC-R	Victoria Creek at Road	Continuous	1) Q measurement (ADV + SS) 2) Logger download and/or direct read replacement.	YES	Solinst 1041103	ADV SS (0.2 kg) CF.T	None	2014-MAY-			
15	[]	H-SEEP	Seepage Pond Outlet	Instantaneous / Water Level	1) Q measurement at pipe outlet 2) Q measurement at flow meter in pumphouse 3) Staff Gauge Reading in Pond	NO	n/a	Volumetric	None	2014-MAY-			



3ure

HID	H PC U	Date	23 APRIL 2014	Discharge Measurement Instruments + Methods					
Station Name	Pony Creek upper	Q Measurement Start Time:	13:25 (HH:MM) PDT PST	SALT TRACER WEIR VOLUMETRIC FLOAT ROD					
		Q Measurement End Time:	(HH:MM) PDT PST	Channel Conditions					
		Logger Download/Inst Time:	(HH:MM) PDT PST	NONE ICE BACKWATER > BANKFULL ZERO FLOW HIGH SUSP. SED					
		Logger Reading (m)	[] downloaded	GPS Waypoint					
Logger: Serial #		HOBO Solinst <u>N/A</u>		ZONE		EASTING		NORTHING	
Photo #	[U/S] 0008	[D/S] 0009	[RDB] 0010	[LDB] 0011	[STAFF/WEIR]				
Site Comments			SLUG CONSTANT RATE DRY LOGGED MANUAL SPC IEC CF.T YES NO Constructed weir, notch plate and sandbagged. Photos 0005-0007 of weir construction. Water Water rising when we left - not @ notch.						
Channel Measurements			Trial Time SPC _B SPC _P Mix Length Mass of Salt Mix Vol. [Salt Slug] EC ₀ (uS/cm) EC _{pk} (uS/cm) L _m (m) Ms _s (kg) Volume (L) C _{ss} (kg/L)						
Staff Gauge Height (m):			V ₁ for Sec. Mix (mL) Vol. Added (mL) SPC (uS/cm) Temp Csec (g/L): 1 g/L 500 mL of SS in 500 mL of creek water Vol. Calib. Tank (L): 1 L SPC ₀ Calib. Tank: 229.1 CF.T = Q _{salt} = Notes: Trial 1 stopped @ 230.1 spc Trial 2 stopped @ 230.9 spc Constructed weir, notch plate and sandbagged. Water rising when we left.						
Average Width (m):			CF.T = Q _{salt} = Notes: Trial 1 stopped @ 230.1 spc Trial 2 stopped @ 230.9 spc Constructed weir, notch plate and sandbagged. Water rising when we left.						
Average Depth (m):			Notes: Trial 1 stopped @ 230.1 spc Trial 2 stopped @ 230.9 spc Constructed weir, notch plate and sandbagged. Water rising when we left.						
Measurement Summary			Volume (L) = [1] [2] [3] [4] [5] Time (sec) [1] [2] [3] [4] [5] Average Q (L/s) = Avg. Q _{vol} (L/s) = Avg Q _{vol} (m ³ /s) =						
Meas. Type:			Primary Secondary Meas. Type: SS Measurement ID (MID): Average Q (m ³ /s): Q Meas. Accuracy +/- [%]: Average Velocity (m/s): Cross-Sectional Area (m ²):						
Hydrometric Levels - Survey									
YES NO REASON: No Station			Survey Time (HH:MM): (WATER) BM Shift: Yes No Logger Shift: Yes No Staff Gauge Shifted?: Yes No Circuit #1 HI Rod Read Elevation (m) ± 0.003 Circuit #2 HI Rod Read Elevation (m) Station Measurements Station A B C Station A B C BM1 3.000 BM1 3.000 Log'r Rod Length: BM2 A-B = Log'r Rod to Botm: BM3 A-B = TOS A-B = WATER A-B = LOG'R ROD: A-B = HWM/CON A-B = BANKFULL A-B = BS (BM1) A-B =						

Field Staff: JM, DS, LH
 Data Entry By: _____ Date: _____
 Reviewed By: _____ Date: _____

Project #: 14Y 0352
 Project Name: NAUSEA



Weather: overcast 64-12.4
64-12.4

HID	HPC DSP		Date	24 MAY-2014		Discharge Measurement Instruments + Methods										
Station Name	Bay creek D/S of P.A.		Q Measurement Start Time:			YSI SWOFFER PYGMY ADV MID-SECT. POINT										
			Q Measurement End Time:			SALT TRACER WEIR VOLUMETRIC FLOAT ROD										
			Logger Download/Inst Time:	16:54		NONE ICE BACKWATER > BANKFULL ZERO FLOW HIGH SUSP. SED.										
Logger Reading (m)	0.5186		[] downloaded		Channel Conditions											
Logger: Serial #	0021045854		HOBO Solinst N/A		GPS Waypoint											
Photo # [U/S]	162		[D/S]	163		[RDB]	164		[LDB]	165						
Site Comments			SLUG CONSTANT RATE DRY			LOGGED MANUAL			SPC EC			CF.T YES NO				
Channel Measurements			Trial Time	SPC _B SPC _P		Mix Length		Mass of Salt		Mix Vol.		[Salt Slug]				
				EC ₀ (uS/cm) EC _{pk} (uS/cm)		L _m (m)		Ms _s (kg)		Volume (L)		Css (kg/L)				
Staff Gauge Height (m): 0.171 Weir Head (m): Water Temperature (°C): Water Surface Slope (%): Average Width (m): Average Depth (m):			Salt-Tracer			V ₁ for Sec. Mix (mL)		Vol. Added (mL)		SPC (uS/cm)		Temp				
			Csec (g/L): 1 g/L			Vol. Calib. Tank (L): 1 L		SPC ₀ Calib. Tank		CF.T =		Q _{salt} =		Notes		
Measurement Summary			Primary		Secondary		Volume (L) = 21		20		20		20			
Meas. Type: Vol.			Measurment ID (MID):		Average Q (m³/s): 0.0062		Time (sec) [1] 34.24		[2] 31.88		[3] 31.95		[4] 31.84		[5] 32.26	
Average Q (m³/s):			Q Meas. Accuracy +/- [%]:		Average Velocity (m/s):		Average Q (L/s) = 0.61		0.63		0.63		0.63		0.62	
Cross-Sectional Area (m²):			Avg. Q _{vol} (L/s) = 0.62		Avg Q _{vol} (m³/s) = 0.0062		Hydrometric Levels - Survey									
YES NO REASON			Survey Time (HH:MM): (WATER) 17:00		BM Shift: Yes No		Logger Shift: Yes No		Staff Gauge Shifted?: Yes No							
Circuit #1	H I		Rod Read	Elevation (m)		± 0.003		Circuit #2	H I		Rod Read	Elevation (m)		Station Measurements		
Station	A		B	C				Station	A		B	C				
BM1	4.295		1.295	3.000				BM1	4.269		1.269	3.000		Log'r Rod Length:		
BM2			1.052	3.243		1		BM2			1.027	3.242		Log'r Rod to Botm:		
BM3			0.672	3.623				BM3			0.647	3.622				
TOS			1.198	3.097				TOS			1.121	3.149				
WATER			1.972	2.323				WATER			1.944	2.325				
LOG'R ROD:			0.899	3.396				LOG'R ROD:			0.872	3.397				
HWM/CON				A-B:				HWM/CON				A-B:				
BANKFULL				A-B:				BANKFULL				A-B:				
BM1			1.294	3.001				BS (BM1)			1.269	3.000				

Circuit # 3
 BM1 | 4.301 | 1.301 | 3.00
 TOS | ↓ | 1.154 | 3.117 ✓
 BM1 | 1.301 | 3.00 ✓

Field Staff: JM LH DS
 Data Entry By: _____ Date: _____
 Reviewed By: _____ Date: _____

Project #: 0455
 Project Name: Nansen



Weather: light drizzle, overcast
12°C

HID <u>H-DC-DX-105</u>		Date <u>24 MAY-2014</u>		Discharge Measurement Instruments + Methods					
Station Name	Q Measurement Start Time: <u>15:15</u> (HH:MM) PDT PST		YSI SWOFFER PYGMY ADV MID-SECT. POINT						
	Q Measurement End Time: <u>15:42</u> (HH:MM) PDT PST		SALT TRACER WEIR VOLUMETRIC FLOAT ROD						
	Logger Download/Inst Time: (HH:MM) PDT PST		Channel Conditions						
Logger Reading (m) [] downloaded		NONE ICE BACKWATER > BANKFULL ZERO FLOW HIGH SUSP. SED							
Logger: Serial #	HOBO Solinst N/A		GPS Waypoint		ZONE	EASTING	NORTHING		
Photo # [U/S]	[D/S]	[RDB]	[LDB]	[STAFF/WEIR]					
Site Comments		SLUG CONSTANT RATE DRY LOGGED MANUAL SPC EC CF.T YES NO							
		Trial Time		SPC _B SPC _P	Mix Length	Mass of Salt	Mix Vol.	[Salt Slug]	
				EC _a (uS/cm) EC _{ph} (uS/cm)	L _m (m)	M _s (kg)	Volume (L)	Css (kg/L)	
		1 (15:15)		1186 1257	12	0.01	10	0.001	
		2 (15:30)		1190 1276	12.8	0.01	10	0.001	
		3 ()		— —					
Channel Measurements		V _i for Sec. Mix (mL)		= 1 / C _{sec}	500mL CSS	Vol. Added (mL)	SPC (uS/cm)	Temp	
Staff Gauge Height (m):		C _{sec} (g/L):	1 g/L		500mL Creek Water	1.	1221 1189	1.6	
Weir Head (m):		Vol. Calib. Tank (L):	1 L			2.	1198	1.7	
Water Temperature (°C):	1.5	SPC ₀ Calib. Tank				3.	1221	1.7	
Water Surface Slope (%):		CF.T =				4.	1253	1.9	
Average Width (m):		Q _{salt} =				5.	1286	2.0	
Average Depth (m):		Notes:				6.			
Measurement Summary	Primary	Secondary	Volum.		Volume (L) =				
Meas. Type:					Time (sec) [1]	[2]	[3]	[4]	
Measurement ID (MID):					Average Q (L/s) =			[5]	
Average Q (m³/s):					Avg. Q _{vol} (L/s) =				
Q Meas. Accuracy +/- [%]:									
Average Velocity (m/s):									
Cross-Sectional Area (m²):									
Hydrometric Levels - Survey									
YES NO REASON:			Survey Time (HH:MM) (WATER)	BM Shift: Yes No	Logger Shift: Yes No	Staff Gauge Shifted? Yes No			
Circuit #1	H I	Rod Read	Elevation (m)	± 0.003	Circuit #2	H I	Rod Read	Elevation (m)	Station Measurements
Station	A	B	C		Station	A	B	C	
BM1	A-B=C		3.000		BM1			3.000	Log'r Rod Length:
BM2	A-B=L		A-B=		BM2			A-B=	Log'r Rod to Botm:
BM3	A-B=L		A-B=		BM3			A-B=	
TOS	A-B=L		A-B=		TOS			A-B=	
WATER	A-B=L		A-B=		WATER			A-B=	
LOG'R ROD:	A-B=L		A-B=		LOG'R ROD:			A-B=	
HWM/CON	A-B=L		A-B=		HWM/CON			A-B=	
BANKFULL	A-B=L		A-B=		BANKFULL			A-B=	
	A-B=L		A-B=		BS (BM1)			A-B=	

Field Staff: LH, DS, JM
 Data Entry By: _____ Date: _____
 Reviewed By: _____ Date: _____



Weather: overcast Rain
 late-zero wind
 + 18°C

HID	H DC DIB		Date	24 APRIL 2014		Discharge Measurement Instruments + Methods							
Station Name	Dee Cree		Q Measurement Start Time:	13:35 (HH:MM) PDT PST		YS SWOFFER PYGMY ADV MID-SECT. POINT							
	Dee Cree Bee		Q Measurement End Time:	13:55 (HH:MM) PDT PST		SALT TRACER WEIR VOLUMETRIC FLOAT ROD							
			Logger Download/Inst Time:			Channel Conditions							
			Logger Reading (m)	[] downloaded		NONE ICE BACKWATER > BANKFULL ZERO FLOW HIGH SUSP. SED.							
Logger:	Serial #	HOBO Solinst <u>N/A</u>		GPS Waypoint		ZONE	EASTING		NORTHING				
Photo #	[U/S]	131	[D/S]	132	[RDB]	133	[LDB]	134	[STAFF/WEIR]				
Site Comments			Salt Tracer			SLUG CONSTANT RATE DRY LOGGED MANUAL SPC EC CF.T YES NO							
Creek goes underground sooner than previous year just ups stream from last years QA site.						Trial Time	SPC _B SPC _P	Mix Length	Mass of Salt	Mix Vol.	[Salt Slug]		
						EC _B (uS/cm) EC _P (uS/cm)		L _m (m)	M _s (kg)	Volume (L)	C _{ss} (kg/L)		
						1 (13 : 35)	1333 1375	11	0.01	10	0.001		
						2 (13 : 42)	1333 1393	11	0.01	10	0.001		
						3 (:)							
Channel Measurements						V ₁ for Sec. Mix (mL)	1000 mL	500mL into 500mL of creek water		Vol. Added (mL)	SPC (uS/cm)	Temp	
Staff Gauge Height (m):						Csec (g/L):	1 g/L				1. 0	1330	4.5
Weir Head (m):						Vol. Calib. Tank (L):	1 L				2. 5	1341	4.6
Water Temperature (°C):	3.9					SPC ₀ Calib. Tank					3. 5	1347	4.7
Water Surface Slope (%):			CF.T =					4. 10	1358	4.7			
Average Width (m):			Qsalt =					5. 10	1369	4.8			
Average Depth (m):			Notes:	Spring jumping around ~ 170 on second trial did not get sp the way to SPC				6. 10	1379	4.8			
Measurement Summary	Primary	Secondary	Volume (L) =					7. 10	1389	4.9			
Meas. Type:	SS		Time (sec) [1]			[2]	[3]	8. 10	1400	5.0			
Measurement ID (MID):			Average Q (L/s) =					9					
Average Q (m³/s):			Avg. Q _{vol} (L/s) =										
Q Meas. Accuracy +/- [%]:													
Average Velocity (m/s):													
Cross-Sectional Area (m²):													
Hydrometric Levels - Survey													
YES NO REASON No Station			Survey Time (HH:MM) (WATER)		BM Shift: Yes No		Logger Shift: Yes No		Staff Gauge Shifted?: Yes No				
Circuit #1	HI	Rod Read	Elevation (m)	± 0.003	Circuit #2	HI	Rod Read	Elevation (m)	Station Measurements				
Station	A	B	C		Station	A	B	C					
BM1			3.000		BM1			3.000	Log'r Rod Length:				
BM2					BM2				Log'r Rod to Botm:				
BM3					BM3								
TOS					TOS								
WATER					WATER								
LOG'R ROD:					LOG'R ROD:								
HWM/CON					HWM/CON								
BANKFULL					BANKFULL								
					BS (BM1)								

Field Staff: DS, Jn
 Data Entry By: _____ Date: _____
 Reviewed By: _____ Date: _____



HID	H-DC-B		Date	24 APRIL 2014		Discharge Measurement Instruments + Methods					
Station Name	Diversions channel at bridge		Q Measurement Start Time:	10:40	(HH:MM) PDT PST	YSI SWOFFER PYGMY ADV MID-SECT POINT					
			Q Measurement End Time:	10:51	(HH:MM) PDT PST	SALT TRACER WEIR VOLUMETRIC FLOAT ROD					
			Logger Download (Inst) Time:	10:40	(HH:MM) PDT PST	Channel Conditions					
Logger Reading (m)			[] downloaded	NONE ICE BACKWATER > BANKFULL ZERO FLOW HIGH SUSP. SED.							
Logger: Serial #	9908154		(HOB0) Solinst N/A	GPS Waypoint		NONE EASTING NORTHING					
Photo # [U/S]	111		[D/S]	112		[RDB]	113		[LDB]	114	
Site Comments			Atmo 4 downloaded Atmo 7 replaced Atmo 2 # 9896522 HOB0 installed 10:40 Atmo 4 # 0011041027 Atmo photos 117, 116, 115								
Channel Measurements			SLUG CONSTANT RATE DRY LOGGED MANUAL SPC EC CF.T YES NO Trial Time SPC _B SPC _P Mix Length Mass of Salt Mix Vol. [Salt Slug] EC _B (uS/cm) EC _P (uS/cm) L _m (m) M _{sa} (kg) Volume (L) C _{ss} (kg/L)								
Staff Gauge Height (m):			200			200ml CSS			Vol. Added (mL)		
Weir Head (m):			1 g/L			+ stream			SPC (uS/cm)		
Water Temperature (°C):			1 L			100ml CSS			Temp		
Water Surface Slope (%):			1360			500 mL stream			CF.T		
Average Width (m):			CF.T =								
Average Depth (m):			Qsalt =								
Measurement Summary			Notes								
Meas. Type:			Primary			Secondary					
Measurement ID (MID):			SS								
Average Q (m³/s):											
Q Meas. Accuracy +/- [%]:											
Average Velocity (m/s):											
Cross-Sectional Area (m²):											
V _i for Sec. Mix (mL)			200			200ml CSS			Temp		
Csec (g/L):			1 g/L			+ stream			1. 0 1360 8.3		
Vol. Calib. Tank (L):			1 L			100ml CSS			2. 5mL 1371 8.4		
SPC _B Calib. Tank			1360			500 mL stream			3. 10mL 1391 8.4		
CF.T =									4. 20 1426 8.4		
Qsalt =									5. 70 1461 8.5		
Notes									6. 70 1518 8.5		
									7. 70 1558 8.6		
									8.		
									9.		
Volume (L) =			Time (sec) [1]			[2]			[3] [4] [5]		
Average Q (L/s) =			Avg. Q _{vol} (L/s) =			Avg Q _{vol} (m³/s) =					
Hydrometric Levels - Survey											
YES NO REASON											
Circuit #1		HI		Rod Read		Elevation (m)		± 0.003		Survey Time (HH:MM) (WATER) 10:50	
Station		A		B		C				BM Shift: Yes No	
BM1		4.000		1.000		3.000				Logger Shift: Yes No	
BM2		0.648		0.648		3.352				Staff Gauge Shifted?: Yes No	
BM3		1.007		1.007		2.993				Station Measurements	
TOS										Log'r Rod Length:	
WATER		2.570		2.570		1.430				Log'r Rod to Botm:	
LOG'R ROD:		1.224		1.224		2.776					
HW/M/CON											
BANKFULL											
BM1		1.000		1.000		3.000					
Circuit #2		HI		Rod Read		Elevation (m)					
Station		A		B		C					
BM1		4.000		3.983		0.983		3.000			
BM2		0.633		0.633		3.350					
BM3		0.991		0.991		2.992					
TOS											
WATER		2.552		2.552		1.431					
LOG'R ROD:		1.208		1.208		2.775					
HW/M/CON											
BANKFULL											
BS (BM1)		0.983		0.983		3.000					

* Bm1 pin is slightly bent, possible movement over winter

Field Staff: LH, DS, JM
 Data Entry By: _____ Date: _____
 Reviewed By: _____ Date: _____



Weather: overcast 18°C
light wind

3ure

HID	H-DC-M		Date	23 APRIL 2014		Discharge Measurement Instruments + Methods						
Station Name	Middle Dome Creek		Q Measurement Start Time:	18:49	HH:MM	PDT PST	YSI SWOFFER PYGMY ADV MID-SECT POINT					
			Q Measurement End Time:	19:10	HH:MM	PDT PST	SALT TRACER WEIR VOLUMETRIC FLOAT ROD					
			Logger Download/Inst Time:	19:01	HH:MM	PDT PST	Channel Conditions					
Logger	Serial #	0021050018	HOBO	Solinst	N/A	GPS Waypoint		NONE ICE BACKWATER > BANKFULL ZERO FLOW HIGH SUSP. SED				
Photo #	[U/S]	0084	[D/S]	0085	[RDB]	0086	[LDB]	0087	[STAFF/WEIR]	0088		
Site Comments			* Staff gauge read from wetted water line as creek level drop due to weir construction. Weir photos 89-095 SLUG CONSTANT RATE DRY LOGGED MANUAL SPC EC CFT YES NO									
Channel Measurements			Trial Time SPC _B SPC _P Mix Length Mass of Salt Mix Vol. [Salt Slug] EC _B (uS/cm) EC _P (uS/cm) L _m (m) Ms _s (kg) Volume (L) C _{ss} (kg/L)									
Staff Gauge Height (m):			11.6 @ 08:55 243m V _i for Sec. Mix (mL): 100 Csec (g/L): 1 g/L Vol. Calib. Tank (L): 1 L SPC ₀ Calib. Tank: 1426 CF.T = Qsalt = Notes: Finish Trial 2 SPC = 1439 EC = 11.3									
Meas. Type:			Primary: SS Secondary: Weir Vol. Added (mL) SPC (uS/cm) Temp 1. 0 1426 11.4 2. 5 1428 11.5 3. 30 1488 11.5 4. 20 1524 11.5 5. 20 1560 11.5 6. 20 1595 11.5 7. 20 1626 11.4									
Average Q (m³/s):			Volume (L) = 23 22 23 23 24 Time (sec) [1] 2.41 [2] 2.49 [3] 2.63 [4] 2.37 [5] 2.6 Average Q (L/s) = 9.54 8.84 8.75 9.71 9.23 Avg. Q _{vol} (L/s) = 9.21 Avg Q _{vol} (m³/s) =									
Hydrometric Levels - Survey												
YES NO REASON												
Circuit #1	HI	Rod Read	Elevation (m)	± 0.003	Circuit #2	HI	Rod Read	Elevation (m)	Station Measurements	Staff Gauge Shifted? Yes No		
Station	A	B	C		Station	A	B	C	Log'r Rod Length:			
BM1	4362	1362	3.000		BM1	4333	1333	3.000	Log'r Rod to Botm:			
BM2		2039	2323		BM2		2010	2323				
BM3		1644	2718		BM3	16	1617	2716				
TOS		1892	2470		TOS		1863	2470				
WATER		2741	1621		WATER		2714	1619				
LOG'R ROD:		1659	2705		LOG'R ROD:		1631	2702				
HWM/CON					HWM/CON							
BANKFULL					BANKFULL							
BM		1363	0.001		BS (BM1)		1233	3000				

LH

*

* WATER -> surveyed to where water was before weir construction began

Field Staff: LH, DS, JM
 Data Entry By: _____ Date: _____
 Reviewed By: _____ Date: _____



June

HID	H-DKR		Date	23 24 JUNE 2014		Discharge Measurement Instruments + Methods						
Station Name	Done Creek Road		Q Measurement Start Time:	17:17	(HH:MM)	PDT PST	YSI SWOFFER PYGMY ADV MID-SECT POINT					
			Q Measurement End Time:	17:22	(HH:MM)	PDT PST	SALT TRACER WEIR VOLUMETRIC FLOAT ROD					
			Logger Download/Inst Time:	18:12	(HH:MM)	PDT PST	Channel Conditions					
Logger Reading (m)			[] downloaded			NONE ICE BACKWATER > BANKFULL ZERO FLOW HIGH SUSP. SED.						
Logger: Serial #	9908 152		HOBO Solinst N/A			GPS Waypoint		ZONE	EASTING	NORTHING		
Photo # [U/S]	84	[D/S]	85	[RDB]	86	[LDB]	87	[STAFF/WEIR]	88 (99-99)			
Site Comments			Logger rod to line on HOBO = 1.766 m Well, logger and Staff installed at site. water photos 069 095									
Channel Measurements			SLUG CONSTANT RATE DRY LOGGED MANUAL SPC EC CF.T YES NO Trial Time SPC _B SPC _P Mix Length Mass of Salt Mix Vol. [Salt Slug] EC _B (uS/cm) EC _P (uS/cm) L _m (m) Ms _s (kg) Volume (L) C _{ss} (kg/L)									
Staff Gauge Height (m):			0.301									
Weir Head (m):			0.121 m @ 08:55, 24 June									
Water Temperature (°C):			8.3									
Water Surface Slope (%):												
Average Width (m):												
Average Depth (m):												
Measurement Summary			Primary			Secondary						
Meas. Type:			SS			WMC						
Measurement ID (MID):												
Average Q (m³/s):												
Q Meas. Accuracy +/- [%]:												
Average Velocity (m/s):												
Cross-Sectional Area (m²):												
Salt Tracer			V ₁ for Sec. Mix (mL) 100 Csec (g/L): 1 g/L Vol. Calib. Tank (L): 1 L SPC ₀ Calib. Tank 1205 CF.T = Qsalt = Notes: Salt trial just downstream of culvert									
Volum.			Volume (L) = 23 Time (sec) [1] 2.4 [2] 2.49 [3] 2.63 [4] 2.37 [5] 2.6 Average Q (L/s) = 9.54 8.835 8.745 9.705 9.231 Avg. Q _{vol} (L/s) = 9.21 Avg Q _{vol} (m³/s) =									
Hydrometric Levels - Survey												
YES NO REASON												
Survey Time (HH:MM):			(WATER)			BM Shift: Yes No		Logger Shift: Yes No		Staff Gauge Shifted?: Yes No		
Circuit #1	H I	Rod Read	Elevation (m)	± 0.003	Circuit #2	H I	Rod Read	Elevation (m)	Station Measurements			
Station	A	B	C		Station	A	B	C				
BM1	3722	0722	3.000		BM1	3712 3352	0712 0752	3.000	Log'r Rod Length:			
BM2		0749	2973		BM2		0779	2933 2938	Log'r Rod to Botm:			
BM3		1409	2313		BM3		1440	2272 2302				
TOS		2590	1132		TOS		2620	1042 1132				
WATER		3299	423		WATER		3324	388 428				
LOG'R ROD:		1753	1969		LOG'R ROD:		1784	1428 1908				
HWM/CON					HWM/CON							
BANKFULL					BANKFULL							
DMI		0722	3.00		BS (BM1)		0752					

Field Staff: LH, DS, JM
 Data Entry By: _____ Date: _____
 Reviewed By: _____ Date: _____

Project #: _____
 Project Name: _____



Weather: clearing, sunny 15°C

HID	H-VC-U		Date	24 MAY-2014		Discharge Measurement Instruments + Methods								
Station Name	Victoria Creek Upper		Q Measurement Start Time:	20:05	PDT PST	YSI SWOFFER PYGMY ADV MID-SECT POINT								
			Q Measurement End Time:	20:30	PDT PST	SALT TRACER WEIR VOLUMETRIC FLOAT ROD								
			Logger Download/Inst Time:	20:31	PDT PST	Channel Conditions								
	Logger Reading (m)		downloaded			NONE ICE BACKWATER > BANKFULL ZERO FLOW HIGH SUSP. SED.								
Logger: Serial #	104952Z		HOBO	Solinst N/A		GPS Waypoint		ZONE EASTING NORTHING						
Photo # [U/S]	190		[D/S]	1A		[RDB]	192		[LDB]	194		[STAFF/WEIR]	143	
Site Comments			Salt Tracer			SLUG CONSTANT RATE DRY LOGGED MANUAL SPC IEC CF.T YES NO								
						Trial Time	SPC _B SPC _P		Mix Length	Mass of Salt	Mix Vol.	[Salt Slug]		
						EC _o (uS/cm) EC _{pk} (uS/cm)		L _m (m)	Ms _a (kg)	Volume (L)	C _{ss} (kg/L)			
						1 (:)								
						2 (:)								
						3 (:)								
Channel Measurements						V ₁ for Sec. Mix (mL)				Vol. Added (mL)	SPC (uS/cm)	Temp		
Staff Gauge Height (m):						0.138								
Weir Head (m):														
Water Temperature (°C):						6.6								
Water Surface Slope (%):														
Average Width (m):			3.9											
Average Depth (m):			0.243											
Measurement Summary			Primary		Secondary									
Meas. Type:			ADV											
Measurement ID (MID):														
Average Q (m³/s):			0.1724											
Q Meas. Accuracy +/- [%]:			3.5											
Average Velocity (m/s):			0.182											
Cross-Sectional Area (m²):			0.947											
			Volum.											
			Volume (L) =											
			Time (sec) [1]		[2]		[3]		[4]					
			Average Q (L/s) =						[5]					
			Avg. Q _{val} (L/s) =						Avg Q _{val} (m³/s) =					
Hydrometric Levels - Survey														
YES NO REASON			Survey Time (HH:MM): (WATER)		20:34		BM Shift: Yes No		Logger Shift: Yes No		Staff Gauge Shifted?: Yes No			
Circuit #1	H I		Rod Read	Elevation (m)	± 0.003	Circuit #2	H I		Rod Read	Elevation (m)	Station Measurements			
Station	A		B	C		Station	A		B	C				
BM1	4440		1440	3.000		BM1	4423		1423	3.000	Log'r Rod Length:			
BM2			1083	3.357		BM2			1068	3.355	Log'r Rod to Botm:			
BM3			1197	3.243		BM3			1178	3.245				
TOS			1530	2.910		TOS			1513	2.910				
WATER			2392	2.048		WATER			2374	2.049				
LOG'R ROD:			1284	3.156		LOG'R ROD:			1268	3.155				
HWM/CON				A-B		HWM/CON				A-B				
BANKFULL				A-B		BANKFULL				A-B				
BM4			1440	3.000		BS (BM1)			1424	2.999				

Field Staff: LH, DS, SM
 Data Entry By: _____ Date: _____
 Reviewed By: _____ Date: _____

Project #: _____
 Project Name: _____



Weather: Overcast 15°C

HID	H-VC-DBc		Date	24 MAY-2014	Discharge Measurement Instruments + Methods						
Station Name	Victoria Creek Downstream of Back creek		Q Measurement Start Time:	19:28 (HH:MM) PDT PST	YSI SWOFFER PYGMY ADV MID-SECT POINT						
			Q Measurement End Time:	19:55 (HH:MM) PDT PST	SALT TRACER WEIR VOLUMETRIC FLOAT ROD						
			Logger Download/Inst Time:	19:30 (HH:MM) PDT PST	Channel Conditions						
Logger:	Serial #	1049137	HOBO	Solinst N/A	GPS Waypoint						
Photo # [U/S]	180	[D/S]	181	[RDB]	182	[LDB]	184	[STAFF/WEIR]	183		
Site Comments			SLUG CONSTANT RATE DRY LOGGED MANUAL SPC IEC C.F.T. YES NO								
Channel Measurements			Trial Time		SPC _B SPC _P	Mix Length	Mass of Salt	Mix Vol.	[Salt Slug]		
					EC _O (uS/cm) EC _{Pk} (uS/cm)	L _m (m)	Ms _s (kg)	Volume (L)	Css (kg/L)		
			1 (:)		_____ _____						
			2 (:)		_____ _____						
			3 (:)		_____ _____						
			V ₁ for Sec. Mix (mL)		_____ _____						
			Csec (g/L):		1 g/L			Vol. Added (mL)	SPC (uS/cm)	Temp	
			Vol. Calib. Tank (L):		1 L			1.			
			SPC _O Calib. Tank					2.			
			C.F.T =					3.			
			Q _{salt} =					4.			
			Notes:					5.			
								6.			
								7.			
								8.			
								9.			
Measurement Summary			Primary	Secondary	Volum.		Volume (L) =				
Meas. Type:			ADV				Time (sec) [1]	[2]	[3]	[4]	[5]
Measurement ID (MID):							Average Q (L/s) =				
Average Q (m³/s):			0.1767				Avg. Q _{vol} (L/s) =				
Q Meas. Accuracy +/- [%]:			7.3								
Average Velocity (m/s):			0.308								
Cross-Sectional Area (m²):			0.574								
Hydrometric Levels - Survey											
YES NO REASON:			Survey Time (HH:MM):	(WATER)	19:33	BM Shift: Yes No	Logger Shift: Yes No	Staff Gauge Shifted?: Yes No			
Circuit #1	H I	Rod Read	Elevation (m)	± 0.003	Circuit #2	H I	Rod Read	Elevation (m)	Station Measurements		
Station	A	B	C		Station	A	B	C			
BM1	4500	1500	3.000		BM1	3480	1480	3.000	Log'r Rod Length:		
BM2		1474	3.026		BM2		1454	3.026	Log'r Rod to Botm:		
BM3		1590	2.910		BM3		1569	2.911			
TOS		2152	2.348		TOS		2132	2.348			
WATER		2152	2.348		WATER		2132	2.348			
LOG'R ROD:		1933	2.567	1751	LOG'R ROD:		1913	2.567			
HWM/CON			A-B =		HWM/CON			A-B =			
BANKFULL			A-B =		BANKFULL			A-B =			
Bm1		1500	3.000		BS (BM1)		1480	3.000			

Field Staff: LH, DS, JM
 Data Entry By: _____ Date: _____
 Reviewed By: _____ Date: _____

Project #: _____
 Project Name: _____



Weather: Rain Overcast 14°

3 re

HID	H-VC-UMN		Date	74 - MAY-2014		Discharge Measurement Instruments + Methods										
Station Name	Victoria Creek 1/5 Minnesota Creek		Q Measurement Start Time:	18:29 (HH:MM)	PDT PST	YSI SWOFFER PYGMY (ADV) MID-SECT POINT										
			Q Measurement End Time:	18:55 (HH:MM)	PDT PST	SALT TRACER WEIR VOLUMETRIC FLOAT ROD										
			Logger Download/Inst Time:	18:45 (HH:MM)	PDT PST	Channel Conditions										
	Logger Reading (m)		[] downloaded			NONE ICE BACKWATER > BANKFULL ZERO FLOW HIGH SUSP. SED.										
Logger: Serial #	021649534		HOBO Solinst		N/A	GPS Waypoint		ZONE	EASTING	NORTHING						
Photo # [U/S]	174		[D/S]	175		[RDB]	176		[LDB]	177		[STAFF/WEIR]	179			
Site Comments			SLUG CONSTANT RATE DRY									LOGGED	MANUAL	SPC JEC	CF.T	YES NO
logger rod needs new wingnut			Trial Time		SPC _B SPC _P		Mix Length		Mass of Salt		Mix Vol.		[Salt Slug]			
					EC _B (uS/cm) EC _P (uS/cm)		L _m (m)		Ms _s (kg)		Volume (L)		C _{ss} (kg/L)			
			1 (:)													
			2 (:)													
Channel Measurements			V ₁ for Sec. Mix (mL)		= 1/0.08		Vol. Added (mL)		SPC (uS/cm)		Temp					
Staff Gauge Height (m):	0.592		Csec (g/L):		1 g/L		1.									
Weir Head (m):			Vol. Calib. Tank (L):		1 L		2.									
Water Temperature (°C):	7.2		SPC _B Calib. Tank				3.									
Water Surface Slope (%):			CF.T =				4.									
Average Width (m):	5.600		Q _{salt} =				5.									
Average Depth (m):	0.169		Notes:				6.									
Measurement Summary	Primary	Secondary	Volum.		Volume (L) =		7.									
Meas. Type:	ADV				Time (sec) [1]		[2]		[3]		[4]		[5]			
Measurement ID (MID):					Average Q (L/s) =											
Average Q (m³/s):	0.1879				Avg. Q _{vol} (L/s) =											
Q Meas. Accuracy +/- [%]:	3.4															
Average Velocity (m/s):	0.199															
Cross-Sectional Area (m²):	0.944															
Hydrometric Levels - Survey																
YES NO REASON:			Survey Time (HH:MM):		(WATER)	18:27	BM Shift: Yes No		Logger Shift: Yes No		Staff Gauge Shifted?: Yes No					
Circuit #1	HI	Rod Read	Elevation (m)	± 0.003	Circuit #2	HI	Rod Read	Elevation (m)	Station Measurements							
Station	A	B	C		Station	A	B	C								
BM1	4163	1163	3.000		BM1	9140	1140	3.000	Log'r Rod Length:							
BM2		1157	3.009		BM2		1130	3.010	Log'r Rod to Botm:							
BM3		1486	2.677		BM3		1462	2.678								
TOS		2167	1.996		TOS		2144	1.996								
WATER		2576	1.587		WATER		2551	1.589								
LOG'R ROD:		1453	2.210		LOG'R ROD:		1430	2.210								
HWM/CON			A-B		HWM/CON			A-B								
BANKFULL			A-B		BANKFULL			A-B								
		1163	3.000		BS (BM1)		1140	3.000								

Field Staff: LH, PS, JM

Data Entry By: _____ Date: _____
 Reviewed By: _____ Date: _____



Over Cast
 Lite wind
 Weather: + 12°C

HID: <u>H-VC-R</u>		Date: <u>25 APRIL 2014</u>	Discharge Measurement Instruments + Methods			
Station Name: <u>Victoria csk Road</u>	Q Measurement Start Time: <u>16:03</u> (HH:MM) PDT PST		YSI SWOFFER PYGMY <u>ADV</u> <u>MID-SECT</u> POINT			
	Q Measurement End Time: <u>16:41</u> (HH:MM) PDT PST		SALT TRACER WEIR VOLUMETRIC <u>FLOAT</u> ROD			
	Logger Download/Inst Time: <u>15:48</u> (HH:MM) PDT PST		Channel Conditions			
Logger Reading (m): <u>0.0114</u>	<input checked="" type="checkbox"/> downloaded		<u>NONE</u> ICE BACKWATER > BANKFULL ZERO FLOW HIGH SUSP. SED.			
Logger: Serial # <u>1041103</u>	HOBO <u>Solinst</u> N/A		GPS Waypoint	ZONE	EASTING	NORTHING
CH. Photo # [U/S] <u>0075</u>	[D/S] <u>0076</u>	[RDB] <u>0078</u>	[LDB] <u>0077</u>	[STAFF/WEIR] <u>0079</u>		
Site Comments <u>Bed to T.O.C. inside is = 1.13m</u> <u>Bed to T.O.C. out = 1.175m</u> <u>Raising logger 19mm due to silting in well</u>		SLUG CONSTANT RATE <u>DRY</u> LOGGED <u>MANUAL</u> SPC [EC] CF.T YES NO				
Channel Measurements		Salt Tracer				
Staff Gauge Height (m): <u>0.487</u>		Trial Time	SPC _B SPC _P	Mix Length	Mass of Salt	Mix Vol.
Weir Head (m):			EC _B (uS/cm) EC _P (uS/cm)	L _m (m)	M _s (kg)	Volume (L)
Water Temperature (°C): <u>9.0</u>		1 (: :)				
Water Surface Slope (%):		2 (: :)				
Average Width (m): <u>3.850</u>		3 (: :)				
Average Depth (m): <u>0.229</u>		V ₁ for Sec. Mix (mL)	<u>= 1 / Guss</u>		Vol. Added (mL)	SPC (uS/cm)
Measurement Summary	Primary	Secondary	Csec (g/L):	<u>1 g/L</u>		Temp
Meas. Type: <u>ADV</u>			Vol. Calib. Tank (L):	<u>1 L</u>	1.	
Measurement ID (MID):			SPC _B Calib. Tank		2.	
Average Q (m³/s): <u>0.1791</u>			CF.T =		3.	
Q Meas. Accuracy +/- [%]: <u>2.3%</u>			Qsalt =		4.	
Average Velocity (m/s): <u>0.203</u>			Notes:		5.	
Cross-Sectional Area (m²): <u>0.881</u>					6.	
					7.	
					8.	
					9.	
			Volume (L) =			
			Time (sec) [1]	[2]	[3]	[4]
			Average Q (L/s) =			[5]
			Avg. Q _{vol} (L/s) =			Avg Q _{vol} (m³/s) =
Hydrometric Levels - Survey						
YES NO REASON						
Circuit #1	HI	Rod Read	Elevation (m)	± 0.003	Survey Time (HH:MM): (WATER) <u>16:22</u>	BM Shift: Yes (No) Logger Shift: Yes (No) Staff Gauge Shifted?: Yes (No)
Station	A	B	C		Circuit #2	HI
BM1	<u>4254</u>	<u>1254</u>	<u>3.000</u>		Station	A
BM2		<u>0836</u>	<u>3418</u>		BM1	<u>4231</u>
BM3		<u>1098</u>	<u>3166</u>		BM2	<u>1231</u>
TOS		<u>1879</u>	<u>2575</u>		BM3	<u>0815</u>
WATER		<u>2196</u>	<u>2058</u>		TOS	<u>1063</u>
LOG'R ROD:		<u>1363</u>	<u>2891</u>		WATER	<u>1655</u>
HWM/CON		<u>2345</u>	<u>1909</u>		LOG'R ROD:	<u>2170</u>
BANKFULL					HWM/CON	<u>1340</u>
BM1		<u>1254</u>	<u>3000</u>		BANKFULL	
					BS (BM1)	<u>1231</u>

1679 1911

Field Staff: LH DS JM
 Data Entry By: _____ Date: _____
 Reviewed By: _____ Date: _____



Weather: 16°C Overcast

HID	H-SEEP		Date	24 APRIL 2014		Discharge Measurement Instruments + Methods			
Station Name	SEEP	Q Measurement Start Time:	9:28	(HH:MM)	PDT PST	YSI SWOFFER PYGMY ADV MID-SECT POINT			
		Q Measurement End Time:	9:39	(HH:MM)	PDT PST	SALT TRACER WEIR VOLUMETRIC FLOAT ROD			
		Logger Download/Inst Time:		(HH:MM)	PDT PST	Channel Conditions			
Logger Reading (m)			[] downloaded	NONE ICE BACKWATER > BANKFULL ZERO FLOW HIGH SUSP. SED.					
Logger: Serial #			HOBO Solinst	(N/A)	GPS Waypoint		ZONE	TAXING	NORTHING
Photo # [U/S]	[D/S]	100	[RDB]	[LDB]	[STAFF/WEIR]		101		
Site Comments			SLUG CONSTANT RATE DRY LOGGED MANUAL SPC EC CF.T YES NO						
Flow meter photo 102, 105 Flow meter photo 104, 105 Flow change before volumetric			Trial Time	SPC _B SPC _P	Mix Length	Mass of Salt	Mix Vol.	[Salt Slug]	
				EC ₀ (uS/cm) EC _{pk} (uS/cm)	L _m (m)	M _s (kg)	Volume (L)	C _{ss} (kg/L)	
			1 (:)						
Channel Measurements			V ₁ for Sec. Mix (mL) = 1 / C _{cal}						
Staff Gauge Height (m):	0.208		Csec (g/L):	1 g/L		Vol. Added (mL)	SPC (uS/cm)	Temp	
Weir Head (m):			Vol. Calib. Tank (L):	1 L		1.			
Water Temperature (°C):			SPC ₀ Calib. Tank			2.			
Water Surface Slope (%):			CF.T =			3.			
Average Width (m):			Q _{salt} =			4.			
Average Depth (m):			Notes:			5.			
Measurement Summary	Primary	Secondary	Volumetric Volume (L) = 16 Time (sec) [1] 5.59 [2] 5.80 [3] 5.34 [4] 5.69 [5] 5.49 Average Q (L/s) = 2.86 2.93 2.99 2.99 2.91 Avg. Q _{vol} (L/s) = 2.94 Avg Q _{vol} (m³/s) = 0.0029						
Meas. Type:	Vol								
Measurement ID (MID):									
Average Q (m³/s):	0.0029								
Q Meas. Accuracy +/- [%]:									
Average Velocity (m/s):									
Cross-Sectional Area (m²):									
Hydrometric Levels - Survey									
YES (NO) REASON:	Survey Time (HH:MM): (WATER)			BM Shift: Yes No		Logger Shift: Yes No		Staff Gauge Shifted?: Yes No	
Circuit #1	H I	Rod Read	Elevation (m)	± 0.003	Circuit #2	H I	Rod Read	Elevation (m)	Station Measurements
Station	A	B	C		Station	A	B	C	
BM1			3.000		BM1			3.000	Log'r Rod Length:
BM2			A-B =		BM2			A-B =	Log'r Rod to Botm:
BM3			A-B =		BM3			A-B =	
TOS			A-B =		TOS			A-B =	
WATER			A-B =		WATER			A-B =	
LOG'R ROD:	A-B = C		A-B =		LOG'R ROD:			A-B =	
HWM/CON	A-B = C		A-B =		HWM/CON			A-B =	
BANKFULL	A-B = C		A-B =		BANKFULL			A-B =	
	A-B = C		A-B =		BS (BM1)			A-B =	

Field Staff: LH, DS, JM
 Data Entry By: _____ Date: _____
 Reviewed By: _____ Date: _____



HID: H-TP		Date: 24 APRIL-2014		Discharge Measurement Instruments + Methods					
Station Name: Tailings Pond	Q Measurement Start Time: 08:00		PDT PST		YSI SWOFFER PYGMY ADV MID-SECT POINT				
	Q Measurement End Time: 08:00		PDT PST		SALT TRACER WEIR VOLUMETRIC FLOAT ROD				
	Logger Download/Inst Time: 08:00		PDT PST		Channel Conditions				
	Logger Reading (m): [] downloaded		[]		NONE CE BACKWATER > BANKFULL ZERO FLOW HIGH SUSP. SED.				
Logger: Serial #	HOBO Solinst N/A		GPS Waypoint		ZONE	EASTING	NORTHING		
Photo # [U/S]	[D/S]	[RDB]	[LDB]	[STAFF/WEIR]	106				
Site Comments: Pond photos 107/108				SLUG CONSTANT RATE DRY LOGGED MANUAL SPC EC CF.T YES NO					
Channel Measurements				Trial Time	SPC _B SPC _P	Mix Length	Mass of Salt	Mix Vol.	[Salt Slug]
				EC ₀ (uS/cm) EC _{pk} (uS/cm)	L _m (m)	Ms _s (kg)	Volume (L)	Css (kg/L)	
Staff Gauge Height (m): 0.629				V ₁ for Sec. Mix (mL)	=1 / C_{cell}	Vol. Added (mL)	SPC (uS/cm)	Temp	
Weir Head (m): 17.8				Csec (g/L):	1 g/L	1.			
Water Temperature (°C): 17.8				Vol. Calib. Tank (L):	1 L	2.			
Water Surface Slope (%):				SPC ₀ Calib. Tank		3.			
Average Width (m):				CF.T =		4.			
Average Depth (m):				Q _{salt} =		5.			
Measurement Summary				Notes:		6.			
Primary		Secondary				7.			
Meas. Type:						8.			
Measurement ID (MID):						9.			
Average Q (m³/s):									
Q Meas. Accuracy +/- [%]:									
Average Velocity (m/s):									
Cross-Sectional Area (m²):									
Volum.				Volume (L) =					
				Time (sec) [1]	[2]	[3]	[4]	[5]	
				Average Q (L/s) =					
				Avg. Q _{vol} (L/s) =					
				Avg Q _{vol} (m³/s) =					
Hydrometric Levels - Survey									
YES NO REASON:			Survey Time (HH:MM): (WATER)		BM Shift: Yes No		Logger Shift: Yes No		Staff Gauge Shifted?: Yes No
Circuit #1	H I	Rod Read	Elevation (m)	± 0.003	Circuit #2	H I	Rod Read	Elevation (m)	Station Measurements
Station	A	B	C		Station	A	B	C	
BM1			3.000		BM1			3.000	Log'r Rod Length:
BM2			A-B =		BM2			A-B =	Log'r Rod to Botm:
BM3			A-B =		BM3			A-B =	
TOS			A-B =		TOS			A-B =	
WATER			A-B =		WATER			A-B =	
LOG'R ROD:			A-B =		LOG'R ROD:			A-B =	
HWM/CON			A-B =		HWM/CON			A-B =	
BANKFULL			A-B =		BANKFULL			A-B =	
			A-B =		BS (BM1)			A-B =	

Field Staff: **CH DS, JM**
 Data Entry By: _____ Date: _____
 Reviewed By: _____ Date: _____



Project #: 14-Y-U352

Project Name: Mount Nansen - Water Quality

Field Dates: April 14-15 2014

General Site Tasks/ Communications

The following sites have been removed from the program: MN, DC-U1, DC-U2, DRY, VC-REF. Check out some additional sites for flow (in case of melt).
Ask MM about HSS-03 and DX

#	Lab Sample Identifier	WQ ID	Station Name	Site Tasks	Date		Time HH:MM
					yy.mm.dd		
1	0352-1404 14 - 009	WQ-SEEP	Seepage		14.04.14		15:30
2	0352-1404 14 - 011	WQ-TP	Tailings Pond		14.04.14		16:00
3	0352-1404 / - / -	WQ-DC-DX+105	Dome Creek at DX+105	Dry/Frozen to bed. *Photo 40, collect frozen	14.04.14		17:15
4	0352-1404 14 - 008	WQ-DC-U	Upper Dome		14.04.14		14:22
5	0352-1404 14 - 012	WQ-DC-B	Dome Creek at Bridge (Diversion Channel)		14.04.14		16:40
6	0352-1404 / - / -	WQ-DX	Dome Creek at DX	Dry/Frozen to bed. Photos 4DB 44, RDB 43, US 41, DS 42, Overview 0045	14.04.14		17:42
7	0352-1404 / - / -	WQ-PC-D	Pony Creek Downstream	Dry/Frozen to bed. Some meltwater on surface of ice. Photos US 48, DS 49 Overview 50	14.04.14		19:05
8	0352-1404 / - / -	WQ-PC-U	Pony Creek Upstream	Dry/Frozen Photos US 56, DS 57 Overview 58	14.04.14		19:12
9	0352-1404 / - / -	WQ-BC	Back Creek	Dry/Frozen to bed.	14.04.15		11:50
10	0352-1404 15 - 004	WQ-VC-U	Upper Victoria Creek		14.04.15		10:50
11	0352-1404 14 - 007	WQ-VC-R+150	Victoria Creek at Road		14.04.14		12:40
12	0352-1404 15 - 003	WQ-VC-DBC	Victoria Creek D/S Back Creek		14.04.15		10:30
13	0352-1404 15 - 006	WQ-VC-UMN	Victoria Creek U/S Minnesota Creek		14.04.15		8:25
14	0352-1404 14 - 018	WQ-PIT-1	Pit Top	record DO (mg/L), ice thickness, water depth	14.04.14		18:18
15	0352-1404 14 - 017	WQ-PIT-2	Pit Middle	record DO (mg/L), ice thickness, water depth	14.04.14		18:24
16	0352-1404 14 - 016	WQ-PIT-3	Pit Bottom	record DO (mg/L), ice thickness, water depth	14.04.14		18:12



Project #: 14-Y-0352

Project Name: Mount Nansen - Water Quality

Field Dates: April 14-15 2014

#	Lab Sample Identifier	WQ ID	Station Name	Site Tasks	Date		Time HH:MM
					yy.mm.dd		
17	0352-140415-019	WQ-PW	Pumphouse Well	Drinking Water Package + Bact	14.04.15		12:00
18	0352-140414-010	Field Replicate 1	Seepage		14.04.14		15:40
19	0352-140415-002	Field Replicate 2	Upper Victoria Creek		14.04.15		11:00
20	0352-140314-Field Blank	Field Blank			14.04.14		21:20
21	TRAVEL BLANK	Travel Blank					



Project No.: 14-Y-0352
~~14-Y-0357~~

Weather: +1°C, overcast

Field Samplers: SM, DH, DS

Project Name: Mount Nansen Water Quality

Page 1 of 4

YSI Calibrated? Yes No

Date / Time: 14 April 2014 11:30

Site Information		Site Information	
Site Name:	<u>WQ-VL-R+150</u>	Site Name:	<u>WQ-DC-U</u>
Sample Identifier:	<u>0352-140414 - 007</u>	Sample Identifier:	<u>0352-140414 - 008</u>
Sample Date and Time:	<u>14 April 2014 12:40</u>	Sample Date and Time:	<u>April 14/2014 14:22</u>
Replicate ID (if applicable)	<u>/</u>	Replicate ID (if applicable)	<u>/</u>
Field Measured Parameters		Field Measured Parameters	
Temperature:	<u>0.0</u>	Temperature:	<u>1.2°C</u>
Specific Conductivity (SPC):	<u>298.0</u>	Specific Conductivity (SPC):	<u>1677</u>
pH:	<u>6.70</u>	pH:	<u>7.31</u>
Turbidity:	<u>1.65 ntu</u>	Turbidity:	<u>13.17</u>
Site Conditions		Site Conditions	
flow level:	<u>low</u>	flow level:	<u>low</u>
turbidity (clear, light, mod, high):	<u>(clear)</u>	turbidity (clear, light, mod, high):	<u>(light)</u>
ice thickness (if applicable)	<u>~30 layers.</u>	ice thickness (if applicable)	<u>21 cm</u>
Notes	Photo Numbers	Notes	Photo Numbers
(if pit incl. DO and ice thickness)	Upstream: <u>0001</u>	(if pit incl. DO and ice thickness)	Upstream: <u>0010</u>
	Downstream: <u>0002</u>		Downstream: <u>0011</u>
	Overview: <u>0016</u>		Overview: <u>0015</u>
	Datasheet:		Datasheet:

Site Information		Site Information	
Site Name:	<u>WQ-SEEP</u>	Site Name:	<u>WQ-TP</u>
Sample Identifier:	<u>0352-14-0414-009</u>	Sample Identifier:	<u>0352-140414 - 011</u>
Sample Date and Time:	<u>April 14/2014 15:30</u>	Sample Date and Time:	<u>April 14/2014 16:00</u>
Replicate ID (if applicable)	<u>010, 15:40</u>	Replicate ID (if applicable)	<u>/</u>
Field Measured Parameters		Field Measured Parameters	
Temperature:	<u>1.8°C</u>	Temperature:	<u>0.3°C</u>
Specific Conductivity (SPC):	<u>1799</u>	Specific Conductivity (SPC):	<u>2901</u>
pH:	<u>6.95</u>	pH:	<u>7.38</u>
Turbidity:	<u>13.37</u>	Turbidity:	<u>6.31</u>
Site Conditions		Site Conditions	
flow level:	<u>/</u>	flow level:	<u>/</u>
turbidity (clear, light, mod, high):	<u>(light)</u>	turbidity (clear, light, mod, high):	<u>light</u>
ice thickness (if applicable)		ice thickness (if applicable)	<u>91 cm</u>
Notes	Photo Numbers	Notes	Photo Numbers
(if pit incl. DO and ice thickness)	Upstream:	(if pit incl. DO and ice thickness)	Upstream: <u>0019</u>
	Downstream:		Downstream: <u>0020</u>
	Overview: <u>0016</u>		Overview: <u>0021</u>
	Datasheet:		Datasheet:

Field Blank ID _____
 Trip Blank ID _____



14-4-0352

Project No.: ~~14-4-0352~~
 Project Name: Mount Nansen Water Quality
 Page 2 of 4

Weather: +2 Calm Sun & clear

Field Samplers: DH/DS
 JH/

YSI Calibrated? Yes / No

Date / Time: 11:30 140414

Start 18:13 141.9% Stop 18:38 96.6%

Site Information		Site Information	
Site Name:	WQ - DC - B	Site Name:	WQ - MS - S - 03
Sample Identifier:	0352-140414 - 012	Sample Identifier:	0167-140414 - 013
Sample Date and Time:	140414 16:46	Sample Date and Time:	April 14/2014 17:24
Replicate ID (if applicable)	—	Replicate ID (if applicable)	—
Field Measured Parameters		Field Measured Parameters	
Temperature:	0.3°C	Temperature:	0.5°C
Specific Conductivity (SPC):	2863	Specific Conductivity (SPC):	140
pH:	6.79	pH:	6.90
Turbidity:	36.6	Turbidity:	117
Site Conditions		Site Conditions	
flow level:	Low	flow level:	low
turbidity (clear, light, mod, high):	Orange colour	turbidity (clear, light, mod, high):	117
ice thickness (if applicable)	> 60cm	ice thickness (if applicable)	N/A, snow covered (60cm)
Notes	Photo Numbers	Notes	Photo Numbers
(if pit incl. DO and ice thickness)	Upstream: 0025	(if pit incl. DO and ice thickness)	Upstream:
Sample ~ 5m W of Bridge due to Road run off from X RD & Bridge Pic 0028 - water flow through logs of ice due to excavation	Downstream: 0026	Downstream:	
	Overview: 0027	Overview:	
	Datasheet:	Datasheet:	

Site Information		Site Information	
Site Name:	WQ - PIT - 3 (Bottom)	Site Name:	WQ - PIT - 2 (Middle)
Sample Identifier:	0352-140414 - 016	Sample Identifier:	0352-140414 - 017
Sample Date and Time:	April 14/2014 18:12	Sample Date and Time:	April 14/2014 18:24
Replicate ID (if applicable)	—	Replicate ID (if applicable)	—
Field Measured Parameters		Field Measured Parameters	
Temperature:	3.8°C	Temperature:	1.8°C
Specific Conductivity (SPC):	2531	Specific Conductivity (SPC):	2127
pH:	6.92	pH:	7.24
Turbidity:	2.87	Turbidity:	0.82
Site Conditions		Site Conditions	
flow level:		flow level:	
turbidity (clear, light, mod, high):		turbidity (clear, light, mod, high):	
ice thickness (if applicable)	111cm	ice thickness (if applicable)	111cm
Notes	Photo Numbers	Notes	Photo Numbers
(if pit incl. DO and ice thickness)	Upstream:	(if pit incl. DO and ice thickness)	Upstream:
DO % 4.7	Downstream:	DO % 29.2	Downstream:
DO mg/L 0.160	Overview: 47+46	DO mg/L 4.04	Overview: 47+46
	Datasheet:		Datasheet:
Total Depth 6.7m		Total Depth 6.7m	
Sample depth 5.5m		Sample Depth 3.0m	

Field Blank ID _____
 Trip Blank ID _____



Project No.: 14-4-0352

Weather: +2°C, calm, sunny

Field Samplers: DA, JM, DS

Project Name: Mount Nansen Water Quality

Page 3 of 4

YSI Calibrated? Yes / No

Date / Time: April 15 / 2014 7:30

Site Information		Site Information	
Site Name:	<u>WQ-PIT-1 (Top)</u>	Site Name:	<u>WQ-VC-UMN</u>
Sample Identifier:	<u>0352-140414-018</u>	Sample Identifier:	<u>0352-140415-006</u>
Sample Date and Time:	<u>April 14 / 2014 18:18</u>	Sample Date and Time:	<u>April 15 / 2014 8:25</u>
Replicate ID (if applicable):	<u> </u>	Replicate ID (if applicable):	<u> </u>
Field Measured Parameters		Field Measured Parameters	
Temperature:	<u>0.3°C</u>	Temperature:	<u>0.0°C</u>
Specific Conductivity (SPC):	<u>2150</u>	Specific Conductivity (SPC):	<u>315.3</u>
pH:	<u>7.30</u>	pH:	<u>7.27</u>
Turbidity:	<u>1.19</u>	Turbidity:	<u>0.07</u>
Site Conditions		Site Conditions	
flow level:	<u> </u>	flow level:	<u>low</u>
turbidity (clear, light, mod, high):	<u> </u>	turbidity (clear, light, mod, high):	<u> </u>
ice thickness (if applicable)	<u>111cm</u>	ice thickness (if applicable)	<u>1-15cm, variable</u>
Notes	Photo Numbers	Notes	Photo Numbers
(if pit incl. DO and ice thickness)	Upstream:	(if pit incl. DO and ice thickness)	Upstream:
<u>DO% BM 30.3</u>	Downstream:	<u> </u>	Downstream:
<u>DO mg/L 4.33</u>	Overview:	<u> </u>	Overview:
<u>ice depth 6.7m</u>	Datasheet:	<u> </u>	Datasheet:
<u>sample depth 6.5m</u>			
<u>↳ just below ice</u>			

Site Information		Site Information	
Site Name:	<u>WQ-VC-DBC</u>	Site Name:	<u>WQ-VC-U</u>
Sample Identifier:	<u>0352-140415-003</u>	Sample Identifier:	<u>0352-140415-004</u>
Sample Date and Time:	<u>April 15 / 2014 10:30</u>	Sample Date and Time:	<u>April 15 / 2014 10:50</u>
Replicate ID (if applicable):	<u> </u>	Replicate ID (if applicable):	<u>0352-140414-002 11:00</u>
Field Measured Parameters		Field Measured Parameters	
Temperature:	<u>0.1°C</u>	Temperature:	<u>0.1°C</u>
Specific Conductivity (SPC):	<u>245.2</u>	Specific Conductivity (SPC):	<u>213.7</u>
pH:	<u>7.11</u>	pH:	<u>7.05</u>
Turbidity:	<u>0.01</u>	Turbidity:	<u>0.02</u>
Site Conditions		Site Conditions	
flow level:	<u>low</u>	flow level:	<u>low</u>
turbidity (clear, light, mod, high):	<u> </u>	turbidity (clear, light, mod, high):	<u> </u>
ice thickness (if applicable)	<u>30 cm</u>	ice thickness (if applicable)	<u>1-10 cm</u>
Notes	Photo Numbers	Notes	Photo Numbers
(if pit incl. DO and ice thickness)	Upstream:	(if pit incl. DO and ice thickness)	Upstream:
<u> </u>	Downstream:	<u> </u>	Downstream:
<u> </u>	Overview:	<u> </u>	Overview:
<u> </u>	Datasheet:	<u> </u>	Datasheet:

Field Blank ID 14 Apr-2014 21:20
 Trip Blank ID



14-Y-0352

Project No.: ~~14-0352~~

Weather: _____

Field Samplers: _____

Project Name: Mount Nansen Water Quality

Page 4 of 4

YSI Calibrated? Yes / No

Date / Time: _____

Site Information		Site Information	
Site Name:	WQ-PW	Site Name:	
Sample Identifier:	0352-140415 - 019	Sample Identifier:	0167-1403
Sample Date and Time:	April 15 2014 12:00	Sample Date and Time:	
Replicate ID (if applicable)		Replicate ID (if applicable)	
Field Measured Parameters		Field Measured Parameters	
Temperature:	1.3°C	Temperature:	
Specific Conductivity (SPC):	382.4	Specific Conductivity (SPC):	
pH:	7.58	pH:	
Turbidity:	0.07	Turbidity:	
Site Conditions		Site Conditions	
flow level:		flow level:	
turbidity (clear, light, mod, high):		turbidity (clear, light, mod, high):	
ice thickness (if applicable)		ice thickness (if applicable)	
Notes	Photo Numbers	Notes	Photo Numbers
(if pit incl. DO and ice thickness)	Upstream:	(if pit incl. DO and ice thickness)	Upstream:
	Downstream:		Downstream:
	Overview: 0394		Overview:
	Datasheet:		Datasheet:

Site Information		Site Information	
Site Name:		Site Name:	
Sample Identifier:	0167-1403	Sample Identifier:	0167-1403
Sample Date and Time:		Sample Date and Time:	
Replicate ID (if applicable)		Replicate ID (if applicable)	
Field Measured Parameters		Field Measured Parameters	
Temperature:		Temperature:	
Specific Conductivity (SPC):		Specific Conductivity (SPC):	
pH:		pH:	
Turbidity:		Turbidity:	
Site Conditions		Site Conditions	
flow level:		flow level:	
turbidity (clear, light, mod, high):		turbidity (clear, light, mod, high):	
ice thickness (if applicable)		ice thickness (if applicable)	
Notes	Photo Numbers	Notes	Photo Numbers
(if pit incl. DO and ice thickness)	Upstream:	(if pit incl. DO and ice thickness)	Upstream:
	Downstream:		Downstream:
	Overview:		Overview:
	Datasheet:		Datasheet:

Field Blank ID _____

Trip Blank ID _____



Project #: 14-Y-0352

Project Name: Mount Nansen - Water Quality

General Site Tasks/ Communications

Field Dates: May 8-9, 2014

#	Lab Sample Identifier	WQ ID	Station Name	Site Tasks	Date		Time HH:MM
					YY.mm.dd		
1	0352-140509-011	WQ-SEEP	Seepage		2014.05.09		12:50
2	0352-140509-013	WQ-TP	Tailings Pond		2014.05.09		13:05
3	0352-140509-021	WQ-DC-DX+105	Dome Creek at DX+105		2014.05.09		14:55
4	0352-140509-009	WQ-DC-U	Upper Dome		2014.05.09		12:30
5	0352-140509-010	WQ-DC-B	Dome Creek at Bridge (Diversion Channel)		2014.05.09		13:15
6	0352-140509-003	WX-DC-R	Dome Creek at Road		2014.05.09		9:20
7	0352-140509-018	WQ-DX	Dome Creek at DX		2014.05.09		15:10
8	0352-140509-099	WQ-PC-D	Pony Creek Downstream		2014.05.09		13:40
9	0352-140509-016	WQ-PC-U	Pony Creek Upstream		2014.05.09		13:50
10	0352-140509-008	WQ-BC	Back Creek		2014.05.09		11:10
11	0352-140509-007	WQ-VC-U	Upper Victoria Creek		2014.05.09		10:30
12	0352-140509-001	WQ-VC-R+150	Victoria Creek at Road		2014.05.09		8:00
13	0352-140509-005	WQ-VC-DBC	Victoria Creek D/S Back Creek		2014.05.09		10:20
14	0352-140509-002	WQ-VC-UMN	Victoria Creek U/S Minnesota Creek		2014.05.09		9:00
15	0352-1405 -	WQ-PIT-1	Pit Top	record DO (mg/L), ice thickness, water depth	2014.05. -		X
16	0352-1405 -	WQ-PIT-2	Pit Middle	record DO (mg/L), ice thickness, water depth	2014.05. -		X
17	0352-1405 -	WQ-PIT-3	Pit Bottom	record DO (mg/L), ice thickness, water depth	2014.05. -		X

LG, CL, DS



Project #: 14-Y-0352
 Project Name: Mount Nansen - Water Quality

Field Dates: May 8-9, 2014

#	Lab Sample Identifier	WQ ID	Station Name	Site Tasks	Date	Time
18	0352-140509-034	WQ-PW	Pumphouse Well	Drinking Water Package + Bact	2014.05.09	12:05
19	0352-140509-023	MS-S-08	Mill Seep 08		2014.05.09	15:10
20	0352-140509-022	MS-S-03	Mill Seep 03		2014.05.09	15:30
21	0352-140509-019	WQ-DC-D1b	Dome Creek at D1b		2014.05.09	14:25
22	0352-140509-014	DESS-01	East Dome Seep on Powerline	E388632, N6881131	2014.05.09	14:30
23	0352-1405	CH-P-13-01	Flow next to well site.	E0388640, N6881165 flow next to well.	2014.05.09	NO FLOW
24	0352-1405	DESS-02	Dome East Seep	E388699, N6881087	2014.05.09	NO FLOW
25	0352-140509-017	DESS-03	Dome East Seep	E388518, N6881143	2014.05.09	14:40
26	0352-1405	LW-Seep-01	West toe of W and SW piles	E388711, N6881371	2014.05.09	NO FLOW
27	0352-140509-024	NW-Seep-02	East toe of NW pile	E388837, N6881617	2014.05.09	16:00
28	0352-1405	Ore Ramp	Ore Ramp		2014.05.09	NO FLOW
29	0352-1405	WRD	West lower waste rock dump.		2014.05.09	NO FLOW
30	0352-140509-020	ET-1	Exploration trenches		2014.05.09	15:15
31	0352-1405	ET-2	Exploration trenches		2014.05.09	NO FLOW
32	0352-1405	Lysimeter (L2)	Lysimeter	E388742, N6881457	2014.05.09	NOT ENOUGH
33	0352-140509-012	Field Replicate 1	W0-SEEP-R		2014.05.09	12:50
34	0352-140509-004	Field Replicate 2	W0-DC-R-R		2014.05.09	9:20
35	0352-1405	Field Replicate 3			2014.05.09	
35	Field Blank	Field Blank		NO DI WATER PROVIDED	2014.05.09	NO DI H2O
36	Travel Blank	Travel Blank			2014.05.09	

LS, CL, DS



Project No.: 13-Y-0167

Weather: overcast

Field Samplers: LG

Project Name: Mount Nansen Water Quality

Page 1 of 6

DS

YSI Calibrated? (Yes) / No

Date / Time: 650am 09 MAY 2014

Site Information		Site Information	
Site Name:	<u>WR - VCR + 150</u>	Site Name:	<u>WR - VC UMN</u>
Sample Identifier:	<u>0167-1405 09 - 001</u>	Sample Identifier:	<u>0167-1405 09 - 002</u>
Sample Date and Time:	<u>09 MAY 2014 0800</u>	Sample Date and Time:	<u>09 MAY 2014 0900</u>
Replicate ID (if applicable)	<u>N/A</u>	Replicate ID (if applicable)	<u>N/A</u>
Field Measured Parameters		Field Measured Parameters	
Temperature:	<u>0.0</u> 0.1	Temperature:	<u>0.1</u> 0.2
Specific Conductivity (SPC):	<u>67.2</u>	Specific Conductivity (SPC):	<u>71.4</u>
pH:	<u>7.07</u>	pH:	<u>7.27</u>
Turbidity:	<u>15.53</u>	Turbidity:	<u>20.5</u>
Site Conditions		Site Conditions	
flow level:	<u>high</u>	flow level:	<u>high</u>
turbidity (clear, light, mod, high):	<u>high</u>	turbidity (clear, light, mod, high):	<u>high</u>
ice thickness (if applicable)	<u>-</u>	ice thickness (if applicable)	<u>n/a</u>
Notes	Photo Numbers	Notes	Photo Numbers
(if pit incl. DO and ice thickness)	Upstream: <u>0037</u>	(if pit incl. DO and ice thickness)	Upstream: <u>46</u>
<u>Took sample D/S of culvert</u>	Downstream: <u>0038</u>	<u>high flow + suspended sed.</u>	Downstream: <u>47</u>
<u>cond. @ culvert were unsafe.</u>	Overview: <u>0039</u>		Overview: <u>48</u>
<u>sample taken @ wintersite</u>	Datasheet: <u>0040</u>		Datasheet: <u>49</u>
<u>location.</u>			
<u>08 6392299 N 6879650</u>			

Site Information		Site Information	
Site Name:	<u>WQ - DC - R</u>	Site Name:	<u>WR - VC DCB</u>
Sample Identifier:	<u>0167-1405 09 - 003</u>	Sample Identifier:	<u>0167-1405 09 - 005</u>
Sample Date and Time:	<u>9 MAY 2014 9:20</u>	Sample Date and Time:	<u>09 MAY 2014 1020</u>
Replicate ID (if applicable)	<u>004 * merc dissol not filtered *</u>	Replicate ID (if applicable)	<u>N/A</u>
Field Measured Parameters		Field Measured Parameters	
Temperature:	<u>0.0</u> 0.1	Temperature:	<u>0.6</u> 0.7
Specific Conductivity (SPC):	<u>436.0</u> 436.0	Specific Conductivity (SPC):	<u>55.2</u> 55.2
pH:	<u>7.73</u> 7.73	pH:	<u>7.37</u> 7.37
Turbidity:	<u>11.54</u>	Turbidity:	<u>21.2</u>
Site Conditions		Site Conditions	
flow level:	<u>High</u>	flow level:	<u>HIGH</u>
turbidity (clear, light, mod, high):	<u>High</u>	turbidity (clear, light, mod, high):	<u>HIGH</u>
ice thickness (if applicable)	<u>some overflow ice still present in ch.</u>	ice thickness (if applicable)	<u>N/A</u>
Notes	Photo Numbers	Notes	Photo Numbers
(if pit incl. DO and ice thickness)	Upstream: <u>50</u>	(if pit incl. DO and ice thickness)	Upstream: <u>58</u>
<u>Replicate taken at site</u>	Downstream: <u>51</u>		Downstream: <u>59</u>
	Overview: <u>52</u>		Overview: <u>60</u>
	Datasheet:		Datasheet: <u>61</u>

Field Blank ID no. 21 water present & ∴ no sample collected

Trip Blank ID refused blank



Project No.: 13-Y-0167

Weather: clear

Field Samplers: LG
DS

Project Name: Mount Nansen Water Quality

Page 2 of 6

YSI Calibrated? Yes / No

Date / Time: 650 9 MAY / 14

Site Information		Site Information	
Site Name:	W0VCU	Site Name:	W0BC
Sample Identifier:	0167-1405 09 - 007	Sample Identifier:	0167-1405 09 - 008
Sample Date and Time:	9 MAY 2014 1030	Sample Date and Time:	09 MAY 2014 11:10
Replicate ID (if applicable)	-	Replicate ID (if applicable)	-
Field Measured Parameters		Field Measured Parameters	
Temperature:	0.6	Temperature:	1.9
Specific Conductivity (SPC):	51.4	Specific Conductivity (SPC):	73.9
pH:	7.34	pH:	7.42
Turbidity:	12.58	Turbidity:	498.0
Site Conditions		Site Conditions	
flow level:	high	flow level:	high
turbidity (clear, light, mod, high):	high	turbidity (clear, light, mod, high):	high
ice thickness (if applicable)	-	ice thickness (if applicable)	some ice on bank
Notes	Photo Numbers	Notes	Photo Numbers
(if pit incl. DO and ice thickness)	Upstream: 62	(if pit incl. DO and ice thickness)	Upstream: 71
DO = 100.50	Downstream: 63	DO = 101.3	Downstream: 72
temp = 11.37	Overview: 04	temp = 14.62	Overview: 73
	Datasheet: 65		Datasheet: 74

Site Information		Site Information	
Site Name:	W0-PW	Site Name:	W0BCU
Sample Identifier:	0167-1405 09 - 034 1233	Sample Identifier:	0167-1405 09 - 009 1230
Sample Date and Time:	09 MAY 2014 12:05	Sample Date and Time:	09 - MAY - 2014 12:30
Replicate ID (if applicable)	-	Replicate ID (if applicable)	-
Field Measured Parameters		Field Measured Parameters	
Temperature:	1.1	Temperature:	1.4°C
Specific Conductivity (SPC):	357.5	Specific Conductivity (SPC):	433.6
pH:	7.40	pH:	7.82
Turbidity:	6.32	Turbidity:	65.6 NTU
Site Conditions		Site Conditions	
flow level:	-	flow level:	high
turbidity (clear, light, mod, high):	clear	turbidity (clear, light, mod, high):	high
ice thickness (if applicable)	-	ice thickness (if applicable)	-
Notes	Photo Numbers	Notes	Photo Numbers
(if pit incl. DO and ice thickness)	Upstream: -	(if pit incl. DO and ice thickness)	Upstream: 77
DO = 30.3	Downstream: -	DO = 100.7412	Downstream: 80
temp = 4.45	Overview: 77		Overview: 81
	Datasheet: 78		Datasheet: 82

Field Blank ID _____
Trip Blank ID _____



Project No.: 13-Y-0167

Weather: Rain, overcast

Field Samplers: CL LG
125

Project Name: Mount Nansen Water Quality

Page 3 of 6

YSI Calibrated? Yes / No

Date / Time: 9 MAY 2014 7:30

Site Information		Site Information	
Site Name:	<u>WQ-KEEP</u>	Site Name:	<u>WQ-TP</u>
Sample Identifier:	<u>0167-140509-011</u>	Sample Identifier:	<u>0167-140509-013</u>
Sample Date and Time:	<u>09 MAY 2014 12:50</u>	Sample Date and Time:	<u>09 MAY 2014 13:05</u>
Replicate ID (if applicable)	<u>0167-140509-012</u>	Replicate ID (if applicable)	<u>—</u>
Field Measured Parameters		Field Measured Parameters	
Temperature:	<u>2.8</u>	Temperature:	<u>2.5</u>
Specific Conductivity (SPC):	<u>980</u>	Specific Conductivity (SPC):	<u>166.4</u>
pH:	<u>7.12</u>	pH:	<u>7.76</u>
Turbidity:	<u>11.41</u>	Turbidity:	<u>14.76</u>
Site Conditions		Site Conditions	
flow level:	<u>MODERATE</u>	flow level:	
turbidity (clear, light, mod, high):		turbidity (clear, light, mod, high):	
ice thickness (if applicable)		ice thickness (if applicable)	<u>~30cm chunks</u>
Notes	Photo Numbers	Notes	Photo Numbers
(if pit incl. DO and ice thickness)	Upstream:	(if pit incl. DO and ice thickness)	Upstream:
<u>Pump: 433818 m³</u> <u>Rate = 298.791</u>	Downstream:	<u>chunks of ice nearby</u>	Downstream:
	Overview: <u>83</u>	<u>@ sampler spot</u>	Overview: <u>85</u>
	Datasheet:	<u>level = 0860</u>	Datasheet:

Site Information		Site Information	
Site Name:	<u>WQ-DGB</u>	Site Name:	<u>WQ-PC-D</u>
Sample Identifier:	<u>0167-140509-010</u>	Sample Identifier:	<u>0167-140509-99</u>
Sample Date and Time:	<u>09 MAY 2014 13:15</u>	Sample Date and Time:	<u>9 MAY 2014 13:40</u>
Replicate ID (if applicable)	<u>—</u>	Replicate ID (if applicable)	<u>—</u>
Field Measured Parameters		Field Measured Parameters	
Temperature:	<u>0.2</u>	Temperature:	<u>0.7</u>
Specific Conductivity (SPC):	<u>393.0</u>	Specific Conductivity (SPC):	<u>76.0</u>
pH:	<u>7.56</u>	pH:	<u>7.37</u>
Turbidity:	<u>26.7</u>	Turbidity:	<u>12.66</u>
Site Conditions		Site Conditions	
flow level:	<u>moderate</u>	flow level:	<u>high</u>
turbidity (clear, light, mod, high):	<u>high</u>	turbidity (clear, light, mod, high):	<u>moderate</u>
ice thickness (if applicable)	<u>—</u>	ice thickness (if applicable)	<u>—</u>
Notes	Photo Numbers	Notes	Photo Numbers
(if pit incl. DO and ice thickness)	Upstream:	(if pit incl. DO and ice thickness)	Upstream:
<u>Some ice under bridge</u>	Downstream:		Downstream: <u>91</u>
<u>on margins</u>	Overview: <u>88</u>		Downstream: <u>92</u>
<u>2.57</u>	Datasheet: <u>89</u>		Overview: <u>90</u>
			Datasheet:

Field Blank ID _____

Trip Blank ID _____



Project No.: 13-Y-0167

Weather: rain overcast

Field Samplers: LG, DL, DS

Project Name: Mount Nansen Water Quality

Page 4 of 8

YSI Calibrated? Yes / No

Date / Time: 656 9 MAY 2014

Site Information		Site Information	
Site Name:	<u>WQ-PC-U</u>	Site Name:	<u>WQ-DAB</u>
Sample Identifier:	<u>0167-1403 09 - 016</u>	Sample Identifier:	<u>0167-1403 09 - 019</u>
Sample Date and Time:	<u>9 MAY 2014 1350</u>	Sample Date and Time:	<u>09 MAY 2014 1425</u>
Replicate ID (if applicable)		Replicate ID (if applicable)	
Field Measured Parameters		Field Measured Parameters	
Temperature:	<u>0.1°C</u>	Temperature:	<u>0.0</u>
Specific Conductivity (SPC):	<u>72.0</u>	Specific Conductivity (SPC):	<u>468.5</u>
pH:	<u>7.27</u>	pH:	<u>7.95</u>
Turbidity:	<u>8.23</u>	Turbidity:	<u>17.21</u>
Site Conditions		Site Conditions	
flow level:	<u>high</u>	flow level:	<u>moderate</u>
turbidity (clear, light, mod, high):	<u>mod</u>	turbidity (clear, light, mod, high):	<u>mod</u>
ice thickness (if applicable)	<u>-</u>	ice thickness (if applicable)	<u>-</u>
Notes	Photo Numbers	Notes	Photo Numbers
(if pit Incl. DO and Ice thickness)	Upstream: <u>94</u>	(if pit Incl. DO and Ice thickness)	Upstream: <u>96</u>
	Downstream: <u>95</u>	<u>surface water open but</u>	Downstream: <u>97</u>
	Overview: <u>93</u>	<u>flowing over ice</u>	Overview: <u>98</u>
	Datasheet:	94, 95, 96, 97, 98, 99	Datasheet: <u>99</u>

Site Information		Site Information	
Site Name:	<u>WQ-PC-DX+105</u>	Site Name:	<u>WQ-PC-DX</u>
Sample Identifier:	<u>0167-1403 09 - 021</u>	Sample Identifier:	<u>0167-1403 09 - 108</u>
Sample Date and Time:	<u>09 MAY 2014 1455</u>	Sample Date and Time:	<u>09 MAY 2014 1510</u>
Replicate ID (if applicable)		Replicate ID (if applicable)	
Field Measured Parameters		Field Measured Parameters	
Temperature:	<u>1.4</u>	Temperature:	<u>0.1</u>
Specific Conductivity (SPC):	<u>95.3</u>	Specific Conductivity (SPC):	<u>75.4</u>
pH:	<u>7.54</u>	pH:	<u>7.23</u>
Turbidity:	<u>11.33</u>	Turbidity:	<u>4.81</u>
Site Conditions		Site Conditions	
flow level:	<u>mod</u>	flow level:	<u>mod</u>
turbidity (clear, light, mod, high):	<u>mod</u>	turbidity (clear, light, mod, high):	<u>mod</u>
ice thickness (if applicable)	<u>-</u>	ice thickness (if applicable)	<u>some ice on margins, open</u>
Notes	Photo Numbers	Notes	Photo Numbers
(if pit Incl. DO and Ice thickness)	Upstream: <u>101</u>	(if pit Incl. DO and Ice thickness)	Upstream: <u>105</u>
0090 90:24	Downstream: <u>102</u>	0090 91:04	Downstream: <u>106</u>
0090 13:25	Overview: <u>100</u>	0090 14:04	Overview: <u>104</u>
	Datasheet: <u>102</u>		Datasheet: <u>107</u>

Field Blank ID _____
 Trip Blank ID _____



Project No.: 13-Y-0167

Weather: rain, overcast

Field Samplers: LG
DS CL

Project Name: Mount Nansen Water Quality

Page 5 of 6

YSI Calibrated? Yes / No

Date / Time: 9 MAY 2014 6:50 am

Site Information		Site Information	
Site Name:	<u>WR-MS-S-03</u>	Site Name:	<u>WR-NWSEGR2</u>
Sample Identifier:	<u>0167-1403 09 - 022</u>	Sample Identifier:	<u>0167-1403 09 - 024</u>
Sample Date and Time:	<u>09 MAY 2014 1530</u>	Sample Date and Time:	<u>09 MAY 2014 1600</u>
Replicate ID (if applicable)	<u>-</u>	Replicate ID (if applicable)	<u>-</u>
Field Measured Parameters		Field Measured Parameters	
Temperature:	<u>1.2</u>	Temperature:	<u>1.9</u>
Specific Conductivity (SPC):	<u>1041</u>	Specific Conductivity (SPC):	<u>591.3</u>
pH:	<u>7.02</u>	pH:	<u>7.55</u>
Turbidity:	<u>6.40</u>	Turbidity:	<u>7.63</u>
Site Conditions		Site Conditions	
flow level:	<u>low</u>	flow level:	<u>-</u>
turbidity (clear, light, mod, high):	<u>light</u>	turbidity (clear, light, mod, high):	<u>mod</u>
ice thickness (if applicable)	<u>na</u>	ice thickness (if applicable)	<u>some thin ice and deep</u>
Notes	Photo Numbers	Notes	Photo Numbers
(if pit incl. DO and ice thickness)	Upstream: <u>108</u>	(if pit incl. DO and ice thickness)	Upstream: <u>-</u>
<u>DO 7.0</u>	Downstream: <u>109</u>	<u>DO 7.0</u>	Downstream: <u>-</u>
<u>mg/L turbidity</u>	Overview: <u>110</u>	<u>mg/L turbidity</u>	Overview: <u>0112</u>
	Datasheet: <u>111</u>		Datasheet: <u>-</u>

Site Information		Site Information	
Site Name:	<u>EXP TRENCH-01 ET-1</u>	Site Name:	<u>DESS-01</u>
Sample Identifier:	<u>0167-1403 09 - 20</u>	Sample Identifier:	<u>0167-1403 09 - 014</u>
Sample Date and Time:	<u>9-MAY-2014 1515</u>	Sample Date and Time:	<u>9 MAY 2014 1430</u>
Replicate ID (if applicable)	<u>-</u>	Replicate ID (if applicable)	<u>-</u>
Field Measured Parameters		Field Measured Parameters	
Temperature:	<u>2.8</u>	Temperature:	<u>1.9</u>
Specific Conductivity (SPC):	<u>63.5</u>	Specific Conductivity (SPC):	<u>284.0</u>
pH:	<u>6.60</u>	pH:	<u>5.93</u>
Turbidity:	<u>- insufficient sample</u>	Turbidity:	<u>na insufficient sample</u>
Site Conditions		Site Conditions	
flow level:	<u>moderate - ~ 2-3 L/s</u>	flow level:	<u>low ~ 1 L/s or less</u>
turbidity (clear, light, mod, high):	<u>-</u>	turbidity (clear, light, mod, high):	<u>humic acid present w/ DOC from peat</u>
ice thickness (if applicable)	<u>none</u>	ice thickness (if applicable)	<u>-</u>
Notes	Photo Numbers	Notes	Photo Numbers
(if pit incl. DO and ice thickness)	Upstream: <u>-</u>	(if pit incl. DO and ice thickness)	Upstream: <u>-</u>
<u>runoff from exp. trench</u>	Downstream: <u>158</u>	<u>surface runoff from peat</u>	Downstream: <u>-</u>
<u>0387804 E</u>	Overview: <u>254</u>	<u>blanket peat that is</u>	Overview: <u>241</u>
<u>6881017 N</u>	Datasheet: <u>254</u>	<u>cut by hydraulic cut</u>	Datasheet: <u>239</u>

Field Blank ID _____
Trip Blank ID _____



Project No.: 13-Y-0167

Weather: rain, overcast

Field Samplers: OL
LG DS

Project Name: Mount Nansen Water Quality

Page 6 of 6

YSI Calibrated? / No

Date / Time: 9 MAY 2014 6:50 am

Site Information		Site Information	
Site Name:	<u>DCSS-03</u>	Site Name:	<u>Mill Runoff MS-5-08</u>
Sample Identifier:	<u>0167-1405 09-017</u>	Sample Identifier:	<u>0167-1405 09-023</u>
Sample Date and Time:	<u>9 MAY 2014 1440</u>	Sample Date and Time:	<u>9 MAY 2014 15:10</u>
Replicate ID (if applicable)	<u>-</u>	Replicate ID (if applicable)	<u>-</u>
Field Measured Parameters		Field Measured Parameters	
Temperature:	<u>1.9 °C</u>	Temperature:	<u>1.8</u>
Specific Conductivity (SPC):	<u>97.2</u>	Specific Conductivity (SPC):	<u>292.6</u>
pH:	<u>6.85</u>	pH:	<u>6.95</u>
Turbidity:	<u>- insufficient sample</u>	Turbidity:	<u>- insufficient sample</u>
Site Conditions		Site Conditions	
flow level:	<u>low <math>\leq 0.5 L/s</math>, u. small flow.</u>	flow level:	<u>high</u>
turbidity (clear, high , mod, high):		turbidity (clear, light, mod, high):	<u>light</u>
ice thickness (if applicable)		ice thickness (if applicable)	
Notes	Photo Numbers	Notes	Photo Numbers
(if pit incl. DO and ice thickness)	Upstream:	(if pit incl. DO and ice thickness)	Upstream:
<u>runoff from blanket pit on S.W. facing slope S. of pit. Water emerging as a result of slope cut into hill.</u>	Downstream:	<u>runoff from mill site blt MS-5-03 + MC-5-02</u>	Downstream:
	Overview: <u>238 239</u>		Overview: <u>253</u>
	Datasheet:		Datasheet:

Site Information		Site Information	
Site Name:		Site Name:	
Sample Identifier:	<u>0167-1403 -</u>	Sample Identifier:	<u>0167-1403 -</u>
Sample Date and Time:		Sample Date and Time:	
Replicate ID (if applicable)		Replicate ID (if applicable)	
Field Measured Parameters		Field Measured Parameters	
Temperature:		Temperature:	
Specific Conductivity (SPC):		Specific Conductivity (SPC):	
pH:		pH:	
Turbidity:		Turbidity:	
Site Conditions		Site Conditions	
flow level:		flow level:	
turbidity (clear, light, mod, high):		turbidity (clear, light, mod, high):	
ice thickness (if applicable)		ice thickness (if applicable)	
Notes	Photo Numbers	Notes	Photo Numbers
(if pit incl. DO and ice thickness)	Upstream:	(if pit incl. DO and ice thickness)	Upstream:
	Downstream:		Downstream:
	Overview:		Overview:
	Datasheet:		Datasheet:

Field Blank ID _____
Trip Blank ID _____



Project #: 14-Y-052

Project Name: Mount Nansen - Water Quality

Field Dates: May 20 - 21

General Site Tasks/ Communications

#	Lab Sample Identifier	WQ ID	Station Name	Site Tasks	Date		Time HH:MM
					yy.mm.dd		
1	0352-140521 - 015	WQ-SEEP	Seepage	LT50	2014.05.21		13:15
2	0352-140521 - 001	WQ-TP	Tailings Pond		2014.05.21		13:35
3	0352-140521 - 028	WQ-DC-DX+105	Dome Creek at DX+105		2014.05.21		14:55
4	0352-140521 - 014	WQ-DC-U	Upper Dome		2014.05.21		13:00
5	0352-140521 - 004	WQ-DC-B	Dome Creek at Bridge (Diversion Channel)		2014.05.21		13:55
6	0352-140521 - 009	WQ-DC-R	Dome Creek at Road		2014.05.21		10:00
7	0352-140521 - 030	WQ-DX	Dome Creek at DX		2014.05.21		16:00
8	0352-140521 - 010	WQ-PC-D	Pony Creek Downstream		2014.05.21		14:10
9	0352-140521 - 044	WQ-PC-U	Pony Creek Upstream		2014.05.21		14:22
10	0352-140521 - 012	WQ-BC	Back Creek		2014.05.21		12:00
11	0352-140521 - 013	WQ-VC-U	Upper Victoria Creek		2014.05.21		11:00
12	0352-140521 - 042	WQ-VC-R	Victoria Creek at Road		2014.05.21		08:00
13	0352-140521 - 011	WQ-VC-DBC	Victoria Creek D/S Back Creek		2014.05.21		10:45
14	0352-140521 - 040	WQ-VC-UMN	Victoria Creek U/S Minnesota Creek		2014.05.21		08:30
15	0352-1405 -	WQ-PIT-1	Pit Top	sample only if safe (record DO mg/L)	2014.05.21		X
16	0352-1405 -	WQ-PIT-2	Pit Middle	sample only if safe (record DO mg/L)	2014.05.21		X
17	0352-1405 -	WQ-PIT-3	Pit Bottom	sample only if safe (record DO mg/L)	2014.05.21		X



Project #: 14-Y-0352

Project Name: Mount Nansen - Water Quality

Field Dates: May 20 - 21

#	Lab Sample Identifier	WQ ID	Station Name	Site Tasks	Date		Time HH:MM
					yy.mm.dd		
18	0352-140521-009	WQ-PW	Pumphouse Well	Drinking Water Package + Bact ✓	2014.05.21		12:35
19	0352-140521-007	MS-S-08	Mill Seep 08		2014.05.21		14:45
20	0352-140521-032	MS-S-03	Mill Seep 03		2014.05.21		14:55
21	0352-140520-003	WQ-DC-D1b	Dome Creek at D1b		2014.05.20		18:00
22	0352-140520-006	DESS-01	East Dome Seep on Powerline	E388632, N6881131	2014.05.20		18:35
23	0352-140521-007	CH-P-13-01	Flow next to well site.	E0388640, N6881165 flow next to well.	2014.05.21		DRY
24	0352-140520-007	DESS-02	Dome East Seep	E388699, N6881087	2014.05.20		19:00
25	0352-140520-002	DESS-03	Dome East Seep	E388518, N6881143	2014.05.20		18:25
26	0352-140521-007	LW-Seep 01	West toe of W and SW piles	E388711, N6881371 DRY	2014.05.21		
27	0352-140521-007	NW-Seep-02	East toe of NW pile	E388837, N6881617 No flow	2014.05.21		
28	0352-140521-031	Ore Ramp	Ore Ramp	entrance to pit	2014.05.21		16:45
29	0352-140521-008	WRD	West lower waste rock dump.	flagged by AAM/DRY	2014.05.21		DRY
30	0352-140521-008	ET-1	Exploration trenches		2014.05.21		Dry
31	0352-140521-008	ET-2	Exploration trenches		2014.05.21		Dry
32	0352-140521-008	Lysimeter (L2)	Lysimeter	E388712, N6881457	2014.05.21		15:36
33	0352-140521-041	Field Replicate 1	Victoria Creek at Road		2014.05.21		08:00
34	0352-140521-008	Field Replicate 2	Back Creek		2014.05.21		12:00
35	0352-140521-008	Field Replicate 3	N/A		2014.05.21		
35	Field Blank	Field Blank			2014.05.21		
36	Travel Blank	Travel Blank			2014.05.21		



Project No.: 13-Y-0352

Weather: -1°C, over cast + windy

Field Samplers: MM, DA, OS

Project Name: Mount Nansen Water Quality

Page 1 of 6

YSI Calibrated? Yes No

Date / Time: 20 May 2014 12:00

Site Information		Site Information	
Site Name:	WQ-DC-D.1b	Site Name:	WQ-DESS-03
Sample Identifier:	0352-1405 20 - 003	Sample Identifier:	0352-1405 20 - 002
Sample Date and Time:	20 May 2014 18:00	Sample Date and Time:	20 May 2014 18:25
Replicate ID (if applicable)		Replicate ID (if applicable)	
Field Measured Parameters		Field Measured Parameters	
Temperature:	0.0°C	Temperature:	0.4°C
Specific Conductivity (SPC):	1166	Specific Conductivity (SPC):	74.3
pH:	8.01	pH:	7.88
Turbidity:	7.59	Turbidity:	2.13
Site Conditions		Site Conditions	
flow level:	Moderate	flow level:	low high
turbidity (clear, light, mod, high):		turbidity (clear, light, mod, high):	
ice thickness (if applicable)	> 50cm	ice thickness (if applicable)	N/A
Notes	Photo Numbers	Notes	Photo Numbers
(if pit incl. DO and ice thickness)	Upstream: 8359 + 8360	(if pit incl. DO and ice thickness)	Upstream: 8365-66
Still significant ice in channel, water flowing through.	Downstream: 8361 + 8362	Flow:	Downstream:
	Overview:	850 mL - 9.90 sec - 0.0 ⁸⁶	Overview:
	Datasheet:	1050 mL - 12.18 sec - 0.0 ⁸⁶	Datasheet:
	Tailings Pond 8363 + 64	1000 mL - 12.66 sec - 0.0 ⁷¹	
		AVG = 0.024	

Site Information		Site Information	
Site Name:	WQ-DESS-01	Site Name:	WQ-DESS-02
Sample Identifier:	0352-1405 20 - 006	Sample Identifier:	0352-1405 20 - 007
Sample Date and Time:	May 20/2014 18:35	Sample Date and Time:	20 May 2014 19:00
Replicate ID (if applicable)		Replicate ID (if applicable)	
Field Measured Parameters		Field Measured Parameters	
Temperature:	0.3°C	Temperature:	0.6°C
Specific Conductivity (SPC):	831.6	Specific Conductivity (SPC):	1374
pH:	5.71	pH:	7.26
Turbidity:	2.59	Turbidity:	86.5
Site Conditions		Site Conditions	
flow level:	high	flow level:	Moderate
turbidity (clear, light, mod, high):		turbidity (clear, light, mod, high):	
ice thickness (if applicable)	N/A	ice thickness (if applicable)	
Notes	Photo Numbers	Notes	Photo Numbers
(if pit incl. DO and ice thickness)	Upstream: 8367 / 68	(if pit incl. DO and ice thickness)	Upstream: 8370 + 8371
Flow:	Downstream: 8369	Flow:	Downstream:
900 mL - 1.13 sec = 0.79	Overview:	800 mL - 20.72 sec - 0.0 ⁴¹	Overview:
900 mL - 1.28 = 0.703	Datasheet:	1000 mL - 24.93 sec - 0.0 ⁴¹	Datasheet:
1050 mL - 1.22 = 0.861		1050 mL 26.07 sec - 0.0 ⁴¹	
= 0.787 L/l			

Field Blank ID _____

Trip Blank ID _____

$\approx 1/3 = \frac{0.91}{1.135}$

0.796
0.70
0.86
= 0.785



Project No.: 13-Y-0352

Weather: 0°C, overcast, light wind

Field Samplers: MM, DH, DS

Project Name: Mount Nansen Water Quality

Page 2 of 6

YSI Calibrated? Yes / No

Date / Time: 21 May 2014 7:15

Site Information		Site Information	
Site Name:	WQ-VC-R	Site Name:	WQ-VC-UMN
Sample Identifier:	0352-1405 21 - 042	Sample Identifier:	0352-1405 21 - 040
Sample Date and Time:	May 21/2014 8:00	Sample Date and Time:	21 May 2014 8:30
* Replicate ID (if applicable)	0352-140521-041	Replicate ID (if applicable)	
Field Measured Parameters		Field Measured Parameters	
Temperature:	0.4°C	Temperature:	0.5°C
Specific Conductivity (SPC):	151.5	Specific Conductivity (SPC):	167.9
pH:	7.41	pH:	7.64
Turbidity:	3.80	Turbidity:	2.78
Site Conditions		Site Conditions	
flow level:	moderate - high	flow level:	Moderate
turbidity (clear, light, mod, high):	light	turbidity (clear, light, mod, high):	light
ice thickness (if applicable)	N/A. Hanging ice on edges above water.	ice thickness (if applicable)	N/A
Notes	Photo Numbers	Notes	Photo Numbers
(if pit incl. DO and ice thickness)	Upstream: 8373	(if pit incl. DO and ice thickness)	Upstream: 8374
Shore ice on banks,	Downstream: 8372		Downstream: 8375
some submerged grass	Overview:		Overview:
willow on banks.	Datasheet:		Datasheet:

Site Information		Site Information	
Site Name:	WQ-DC-R	Site Name:	WQ-VC-DBC
Sample Identifier:	0352-1405 21 - 009	Sample Identifier:	0352-1405 21 - 011
Sample Date and Time:	May 21/2014 10:00	Sample Date and Time:	21 May 2014 10:45
Replicate ID (if applicable)		Replicate ID (if applicable)	
Field Measured Parameters		Field Measured Parameters	
Temperature:	0.3°C	Temperature:	1.7°C
Specific Conductivity (SPC):	552.0	Specific Conductivity (SPC):	125.0
pH:	7.56	pH:	7.68
Turbidity:	3.96	Turbidity:	3.68
Site Conditions		Site Conditions	
flow level:	High	flow level:	High
turbidity (clear, light, mod, high):	light	turbidity (clear, light, mod, high):	light
ice thickness (if applicable)	N/A - on edges.	ice thickness (if applicable)	NA
Notes	Photo Numbers	Notes	Photo Numbers
(if pit incl. DO and ice thickness)	Upstream: 8380	(if pit incl. DO and ice thickness)	Upstream: 826
	Downstream: 8381		Downstream: 827
	Overview: 8379		Overview: 828
	Datasheet:		Datasheet:

Field Blank ID Field Blank.
 Trip Blank ID Trip Blank



Project No.: 13-Y-0352

Weather: 0°C, overcast and windy

Field Samplers: MH, DH, DS

Project Name: Mount Nansen Water Quality

Page 3 of 6

YSI Calibrated? Yes / No

Date / Time: May 21/2014 7:15

Site Information		Site Information	
Site Name:	WQ - VC - U	Site Name:	WQ - BC
Sample Identifier:	0352-1405 21 - 013	Sample Identifier:	0352-1405 21 - 012
Sample Date and Time:	21 May 2014 11:00	Sample Date and Time:	21 May 2014 12:00
Replicate ID (if applicable)		Replicate ID (if applicable)	0352-140521-008
Field Measured Parameters		Field Measured Parameters	
Temperature:	1.5°C	Temperature:	4.1°C
Specific Conductivity (SPC):	116.1	Specific Conductivity (SPC):	185.0
pH:	7.68	pH:	7.86
Turbidity:	1.20 ntu	Turbidity:	26.8
Site Conditions		Site Conditions	
flow level:	High	flow level:	Moderate
turbidity (clear, light, mod, high):		turbidity (clear, light, mod, high):	
ice thickness (if applicable)	N/A	ice thickness (if applicable)	N/A
Notes	Photo Numbers	Notes	Photo Numbers
(if pit incl. DO and ice thickness)	Upstream: 829	(if pit incl. DO and ice thickness)	Upstream: 0386
	Downstream: 830		Downstream: 0387
	Overview: 831		Overview:
	Datasheet: 8		Datasheet:

Site Information		Site Information	
Site Name:	WQ - PW	Site Name:	WQ - DC - U
Sample Identifier:	0352-1405 21 - 019	Sample Identifier:	0352-1405 21 - 014
Sample Date and Time:	21 May 2014 12:35	Sample Date and Time:	21 May 2014 13:00
Replicate ID (if applicable)		Replicate ID (if applicable)	
Field Measured Parameters		Field Measured Parameters	
Temperature:	1.3	Temperature:	4.0
Specific Conductivity (SPC):	373.1	Specific Conductivity (SPC):	658.9
pH:	7.64	pH:	7.87
Turbidity:	0.06	Turbidity:	35.5
Site Conditions		Site Conditions	
flow level:		flow level:	moderate
turbidity (clear, light, mod, high):		turbidity (clear, light, mod, high):	moderate
ice thickness (if applicable)		ice thickness (if applicable)	n/a
Notes	Photo Numbers	Notes	Photo Numbers
(if pit incl. DO and ice thickness)	Upstream:	(if pit incl. DO and ice thickness)	Upstream: 0838
Back # 57512	Downstream: N/A	took sample off of well being constructed 5m dl of confluence w/ diversion channel.	Downstream: 0839
	Overview:		Overview:
	Datasheet:		Datasheet:

Field Blank ID Field Blank

Trip Blank ID Trip Blank



Project No.: 13-Y-0352

Weather: +2°C overcast, windy

Field Samplers: MY, DH, DS

Project Name: Mount Nansen Water Quality

Page 4 of 6

YSI Calibrated? Yes / No

Date / Time: 21 May 2014 7:15

Site Information		Site Information	
Site Name:	<u>WQ-Scap</u>	Site Name:	<u>WQ-TP</u>
Sample Identifier:	<u>0352-1405 21 - 015</u>	Sample Identifier:	<u>0352-1405 21 - 001</u>
Sample Date and Time:	<u>21 May 2014 13:15</u>	Sample Date and Time:	<u>21 May 2014 13:35</u>
Replicate ID (if applicable)	<u>/</u>	Replicate ID (if applicable)	<u>/</u>
Field Measured Parameters		Field Measured Parameters	
Temperature:	<u>3.6°C</u>	Temperature:	<u>8.2°C</u>
Specific Conductivity (SPC):	<u>1566</u>	Specific Conductivity (SPC):	<u>805</u>
pH:	<u>6.97</u>	pH:	<u>7.79</u>
Turbidity:	<u>041.0</u>	Turbidity:	<u>24.8</u>
Site Conditions		Site Conditions	
flow level:	<u>Seems less than usual.</u>	flow level:	<u>/</u>
turbidity (clear, light, mod, high):	<u>(mod)</u>	turbidity (clear, light, mod, high):	<u>(mod)</u>
ice thickness (if applicable)	<u>N/A</u>	ice thickness (if applicable)	<u>N/A</u>
Notes	Photo Numbers	Notes	Photo Numbers
(if pit incl. DO and ice thickness)	Upstream:	(if pit incl. DO and ice thickness)	Upstream:
	Downstream:		Downstream:
	Overview: <u>0844</u>	<u>Photos 0851 + 0852</u>	Overview: <u>849 + 850</u>
	Datasheet:	<u>↳ staff in TP</u>	Datasheet:

Site Information		Site Information	
Site Name:	<u>WQ-DC-B</u>	Site Name:	<u>WQ-PC-D</u>
Sample Identifier:	<u>0352-1405 21 - 004</u>	Sample Identifier:	<u>0352-1405 21 - 010</u>
Sample Date and Time:	<u>21 May 2014 13:55</u>	Sample Date and Time:	<u>21 May 2014 14:10</u>
Replicate ID (if applicable)	<u>/</u>	Replicate ID (if applicable)	<u>/</u>
Field Measured Parameters		Field Measured Parameters	
Temperature:	<u>3.6</u>	Temperature:	<u>2.2°C</u>
Specific Conductivity (SPC):	<u>580.6</u>	Specific Conductivity (SPC):	<u>181.8</u>
pH:	<u>7.54</u>	pH:	<u>7.66</u>
Turbidity:	<u>40.7</u>	Turbidity:	<u>1.08</u>
Site Conditions		Site Conditions	
flow level:	<u>High</u>	flow level:	<u>High</u>
turbidity (clear, light, mod, high):	<u>(mod)</u>	turbidity (clear, light, mod, high):	<u>(mod)</u>
ice thickness (if applicable)	<u>N/A</u>	ice thickness (if applicable)	<u>N/A</u>
Notes	Photo Numbers	Notes	Photo Numbers
(if pit incl. DO and ice thickness)	Upstream:	(if pit incl. DO and ice thickness)	Upstream:
	Downstream:		Downstream:
<u>lots of organic matter and silt flowing down</u>	Overview: <u>853</u>		Overview: <u>855</u>
	Datasheet:		Datasheet:

Field Blank ID _____

Trip Blank ID _____



Project No.: 13-Y-0352

Weather: +2°C, overcast, windy
light snow

Field Samplers: MM, DH, DS

Project Name: Mount Nansen Water Quality

Page 5 of 6

YSI Calibrated? Yes No

Date / Time: 21 May 2014 7:15

Site Information		Site Information	
Site Name:	WQ-PC-U	Site Name:	WQ-MS-5-08
Sample Identifier:	0352-1405 21 - 044	Sample Identifier:	0352-1405 21 - 027
Sample Date and Time:	21 May 2014 14:22	Sample Date and Time:	21-May 2014 14:45
Replicate ID (if applicable)		Replicate ID (if applicable)	
Field Measured Parameters		Field Measured Parameters	
Temperature:	1.5°C	Temperature:	6.5
Specific Conductivity (SPC):	179.2	Specific Conductivity (SPC):	1798.0
pH:	7.37	pH:	7.93
Turbidity:	0.22	Turbidity:	617.0
Site Conditions		Site Conditions	
flow level:	High	flow level:	High
turbidity (clear, light, mod, high):		turbidity (clear, light, mod, high):	turbid
ice thickness (if applicable)		ice thickness (if applicable)	n/a.
Notes	Photo Numbers	Notes	Photo Numbers
(if pit incl. DO and ice thickness)	Upstream: 0859	(if pit incl. DO and ice thickness)	Upstream: 860
	Downstream: 0858	running across road	Downstream: 861
	Overview:	from mill	Overview:
	Datasheet:		Datasheet:

Site Information		Site Information	
Site Name:	MS-5-03	Site Name:	WQ-DC-DX+105
Sample Identifier:	0352-1405 21 - 032	Sample Identifier:	0352-1405 21 - 028
Sample Date and Time:	21 May 2014 14:55	Sample Date and Time:	21 May 2014 14:55
Replicate ID (if applicable)		Replicate ID (if applicable)	
Field Measured Parameters		Field Measured Parameters	
Temperature:	1.2°C	Temperature:	1.1°C
Specific Conductivity (SPC):	1188	Specific Conductivity (SPC):	377.9
pH:	7.17	pH:	7.34
Turbidity:	6.31	Turbidity:	2.20 n/a
Site Conditions		Site Conditions	
flow level:	High	flow level:	High
turbidity (clear, light, mod, high):		turbidity (clear, light, mod, high):	
ice thickness (if applicable)	N/A	ice thickness (if applicable)	N/A
Notes	Photo Numbers	Notes	Photo Numbers
(if pit incl. DO and ice thickness)	Upstream: 0862	(if pit incl. DO and ice thickness)	Upstream: 0864
	Downstream: 0863		Downstream: 0865
	Overview:		Overview:
	Datasheet:		Datasheet:

Field Blank ID _____
Trip Blank ID _____



Project No.: 13-Y-0352

Weather: +3°C, overcast, windy
light snow

Field Samplers: MM, DH, DS

Project Name: Mount Nansen Water Quality

Page 6 of 6

YSI Calibrated? No

Date / Time: 21 May 2014 7:15

Site Information		Site Information	
Site Name:	<u>WQ - DQ - DK</u>	Site Name:	<u>L2 (upstream)</u>
Sample Identifier:	<u>0352-1405 21 - 030</u>	Sample Identifier:	<u>0352-1405 21 - 029</u>
Sample Date and Time:	<u>21 May 2014 16:00</u>	Sample Date and Time:	<u>21 May 2014 15:39</u>
Replicate ID (if applicable)	<u> </u>	Replicate ID (if applicable)	<u> </u>
Field Measured Parameters		Field Measured Parameters	
Temperature:	<u>0.3</u>	Temperature:	<u>2.0</u>
Specific Conductivity (SPC):	<u>202.9</u>	Specific Conductivity (SPC):	<u>548.5</u>
pH:	<u>7.54</u>	pH:	<u>7.62</u>
Turbidity:	<u>3.32</u>	Turbidity:	<u>3.37</u>
Site Conditions		Site Conditions	
flow level:	<u>High</u>	flow level:	<u>n/a</u>
turbidity (clear, light, mod, high):	<u>clear</u>	turbidity (clear, light, mod, high):	<u>clear</u>
ice thickness (if applicable)	<u>N/A</u>	ice thickness (if applicable)	<u>n/a</u>
Notes	Photo Numbers	Notes	Photo Numbers
(if pit incl. DO and ice thickness)	Upstream: <u>0871</u>	(if pit incl. DO and ice thickness)	Upstream: <u> </u>
<u>Snow on ground.</u>	Downstream: <u>0872</u>	<u>sufficient water in L2</u>	Downstream: <u>no photos</u>
<u>No ice.</u>	Overview: <u>0870</u>	<u>for sample. used</u>	Overview: <u> </u>
	Datasheet: <u> </u>	<u>peristaltic pump.</u>	Datasheet: <u> </u>

Site Information		Site Information	
Site Name:	<u>WQ - Ore Ramp</u>	Site Name:	<u> </u>
Sample Identifier:	<u>0352-1405 21 - 031</u>	Sample Identifier:	<u>0352-1405 -</u>
Sample Date and Time:	<u>21 May 2014 16:45</u>	Sample Date and Time:	<u> </u>
Replicate ID (if applicable)	<u> </u>	Replicate ID (if applicable)	<u> </u>
Field Measured Parameters		Field Measured Parameters	
Temperature:	<u>4.7 (taken after)</u>	Temperature:	<u> </u>
Specific Conductivity (SPC):	<u>817</u>	Specific Conductivity (SPC):	<u> </u>
pH:	<u>7.22</u>	pH:	<u> </u>
Turbidity:	<u>407</u>	Turbidity:	<u> </u>
Site Conditions		Site Conditions	
flow level:	<u>N/A</u>	flow level:	<u> </u>
turbidity (clear, light, mod, high):	<u> </u>	turbidity (clear, light, mod, high):	<u> </u>
ice thickness (if applicable)	<u>N/A</u>	ice thickness (if applicable)	<u> </u>
Notes	Photo Numbers	Notes	Photo Numbers
(if pit incl. DO and ice thickness)	Upstream: <u>0875</u>	(if pit incl. DO and ice thickness)	Upstream: <u> </u>
<u>Seep out of Road.</u>	Downstream: <u>0876</u>		Downstream: <u> </u>
	Overview: <u>0874</u>		Overview: <u> </u>
	Datasheet: <u> </u>		Datasheet: <u> </u>

Field Blank ID Field Blank - 18:00 sample
Trip Blank ID

Note LW-Seep-01 - Dry

NW-Seep-01 - no flow
WRD - Dry
out of pipe

Project #: 14-1-J455

Project Name: Mount Nansen - Water Quality



Field Dates: June 23 - June 25, 2014

General Site Tasks/ Communications

June 24 → 16:40 - Upstream activity on Dory Creek Photos: 153, 154, 155

#	Lab Sample Identifier	WQ ID	Station Name	Site Tasks	Date		Time
					yyyy.mm.dd	HH:MM	
1	0352-1406 - 24-17	WQ-SEEP	Seepage	no LT50	2014.06.24		09:20
2	0352-1406 - 24-18	WQ-TP	Tailings Pond		2014.06.24		09:40
3	0352-1406 24-009	WQ-DX	Dome Creek at DX		2014.06.24		14:45
4	0352-1406 24-012	WQ-DC-DX+105	Dome Creek at DX+105		2014.06.24		15:00
5	0352-1406 24-011	WQ-DC-D1b	Dome Creek at D1b		2014.06.24		13:15
6	0352-1406 24-14	WQ-DC-B	Dome Creek at Bridge (Diversion Channel)		2014.06.24		09:56
7	0352-1406 - 2415	WQ-DC-U	Upper Dome		2014.06.24		08:53
8	0352-1406 24-002	WX-DC-R	Dome Creek at Road		2014.06.24		16:23
9	0352-1406 24-004	WQ-PC-D	Pony Creek Downstream	Dory photos US, DS, CU 156, 157, 158	2014.06.24		16:45
10	0352-1406 24-004	WQ-PC-U	Pony Creek Upstream		2014.06.24		16:45
11	0352-1406 DRY	WQ-BC	Back Creek	Photos Taken JM	2014.06.24		20:35
12	0352-1406 24-006	WQ-VC-U	Upper Victoria Creek		2014.06.24		20:05 11:25
13	0352-1406 24-001	WQ-VC-R	Victoria Creek at Road		2014.06.24		16:05
14	0352-1406 24-003	WQ-VC-DBC	Victoria Creek D/S Back Creek		2014.06.24		19:50
15	0352-1406 24-005	WQ-VC-UMN	Victoria Creek U/S Minnesota Creek		2014.06.24		18:40
16	0352-1406 24-024	WQ-PIT-1	Pit Top	sample only if safe (record DO mg/L)	2014.06.25		9:25
17	0352-1406 24-025	WQ-PIT-2	Pit Middle	sample only if safe (record DO mg/L)	2014.06.25		9:08



Project #: 14-Y-0455
 Project Name: Mount Nansen - Water Quality

Field Dates:

#	Lab Sample Identifier	WQ ID	Station Name	Site Tasks	Date		Time HH:MM			
					YYYY-mm.dd					
18	0352-1406 25-026	WQ-PIT-3	Pit Bottom	sample only if safe (record DO mg/L)	2014.06.25		8:40			
19	0352-1406 25-027	WQ-PW	Pumphouse Well	Drinking Water Package + BacT	2014.06.25		11:15			
20	0352-1406 <i>DRY</i>	MS-S-08	Mill Seep 08	<i>Photos 135-137</i>	2014.06.25		14:18			
21	0352-1406 24-007	DESS-01	East Dome Seep on Powerline	E388632, N6881131 (flagged)	2014.06.24		12:10			
22	0352-1406 24-010	CH-P-13-01	Flow next to well site.	E0388640, N6881165 flow next to well.	2014.06.24		12:35			
23	0352-1406 24-008	DESS-02	Dome East Seep	E388699, N6881087 (flagged)	2014.06.24		11:46			
24	0352-1406 <i>DRY</i>	DESS-03	Dome East Seep	E388518, N6881143 (flagged)	2014.06.24		<i>DRY</i>			
25	0352-1406 - <i>DRY</i>	LW-Seep 01	West toe of W and SW piles	<i>photos 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000</i>				2014.06.25		<i>DRY</i>
26	0352-1406 24-16	Field Replicate 1	<i>DC-B</i>		2014.06.24		10:15			
27	0352-1406 25-029	Field Replicate 2	<i>Pit Top</i>		2014.06.25		9:30			
28	0352-1406 25-028 ✓	Field Replicate 3	<i>UG-11</i>		2014.06.25		11:25			
29	Field Blank 02	Field Blank			2014.06.24					
30	Travel Blank	Travel Blank			2014.06.24					



14-4-0852/045J
 Project No.: 13-1-0452
 Nansen

Project Name: Faro Surface Water Quality

Page 1 of 6

Weather: Partly Cloudy 16°C
 calm

Field Samplers: LH, DS
 JM

YSI Calibration Performed? Yes / No

Date / Time: June 24, 2014 08:53

Site Information		Site Information	
Site Name:	WQ-DC-19C	Site Name:	WQ-SEEP
UTM Coordinates:		UTM Coordinates:	
Sample Date and Time:	July 24 June 2014 08:53	Sample Date and Time:	24 June 09:20
Replicate ID (if applicable)		Replicate ID (if applicable)	
Field Measured Parameters		Field Measured Parameters	
Temperature:	6.6	Temperature:	7.5
Specific Conductivity (SPC):	1415	Specific Conductivity (SPC):	1815
pH:	7.69	pH:	6.75
Turbidity (NTU)	13.8	Turbidity (NTU)	13.1
Site Conditions		Site Conditions	
flow level:	Normal	flow level:	normal
ice thickness (if applicable)		ice thickness (if applicable)	
Notes		Notes	
Bottle set #15 Weir installed up stream previous day		Bottle set #17	
Photo Numbers July 23		Photo Numbers	
Sheet:	98, 99	Datasheet:	
Downstream:	85, 97	Downstream:	
Upstream:	87, 96	Upstream:	100
Overview:		Overview:	

Site Information		Site Information	
Site Name:	WQ-TP	Site Name:	WQ-DC-B
UTM Coordinates:		UTM Coordinates:	
Sample Date and Time:	0940 24 June 14	Sample Date and Time:	09:56 24 June 14
Replicate ID (if applicable)		Replicate ID (if applicable)	16 (10:15)
Field Measured Parameters		Field Measured Parameters	
Temperature:	12.8	Temperature:	7.6
Specific Conductivity (SPC):	1115	Specific Conductivity (SPC):	1339
pH:	8.3	pH:	7.81
Turbidity (NTU)	5.68	Turbidity (NTU)	12.3
Site Conditions		Site Conditions	
flow level:		flow level:	normal
ice thickness (if applicable)		ice thickness (if applicable)	
Notes		Notes	
		Bottle set 14	
Photo Numbers		Photo Numbers	
Datasheet:	109	Datasheet:	110
Downstream:	107/108	Downstream:	112
Upstream:		Upstream:	111
Overview:	107/108	Overview:	

Field Blank ID _____
 Trip Blank ID _____



14-40152/0455

Project No.: 13-Y-0452
 Project Name: Nansen
 Fero Surface Water Quality

Weather: Overcast 16°

Field Samplers: C4, OS

Page 2 of 6

YSI Calibration Performed? Yes / No

Date / Time: June 24 8:00

Site Information		Site Information	
Site Name:	WG-DESS-02	Site Name:	WG DESS-01
UTM Coordinates:	0352 1406 24 008	UTM Coordinates:	0352 140624 007
Sample Date and Time:	140624 11:40	Sample Date and Time:	140624 12:10
Replicate ID (if applicable)	—	Replicate ID (if applicable)	—
Field Measured Parameters		Field Measured Parameters	
Temperature:	8.7	Temperature:	2.9
Specific Conductivity (SPC):	1450	Specific Conductivity (SPC):	1570
pH:	7.98	pH:	7.09
Turbidity (NTU)	0.89	Turbidity (NTU)	0.33
Site Conditions		Site Conditions	
flow level:	low	flow level:	low
ice thickness (if applicable)	—	ice thickness (if applicable)	—
Notes		Notes	
Photo Numbers		Photo Numbers	
Datasheet:	Downstream: 120	Datasheet:	Downstream: 123
Upstream: 119	Overview: 121, 118	Upstream: 122	Overview: 124

Site Information		Site Information	
Site Name:	CH-P-13-01	Site Name:	WGDESS-03
UTM Coordinates:	0352-140624-010	UTM Coordinates:	—
Sample Date and Time:	140624 12:35	Sample Date and Time:	140624 12:51
Replicate ID (if applicable)	—	Replicate ID (if applicable)	—
Field Measured Parameters		Field Measured Parameters	
Temperature:	3.0	Temperature:	—
Specific Conductivity (SPC):	1818	Specific Conductivity (SPC):	—
pH:	6.23	pH:	—
Turbidity (NTU)	0.19	Turbidity (NTU)	—
Site Conditions		Site Conditions	
flow level:	Low	flow level:	—
ice thickness (if applicable)	—	ice thickness (if applicable)	—
Notes		Notes	
		Dry	
Photo Numbers		Photo Numbers	
Datasheet:	Downstream: 126	Datasheet:	Downstream: 130
Upstream: 125	Overview: 127	Upstream: 129	Overview: 128

Field Blank ID _____

Trip Blank ID _____



14-4-0352/0455
 Project No.: 13-Y-0452
 Project Name: Nansen
 Fare Surface Water Quality
 Page 3 of 6

Weather: overcast
rain +18

Field Samplers: DS JM

YSI Calibration Performed? Yes / No

Date / Time: 140624 07:00

Site Information		Site Information	
Site Name:	<u>WQ DC DIB</u>	Site Name:	<u>WQ DX</u>
UTM Coordinates:	<u>0352 140624 011</u>	UTM Coordinates:	<u>0352 - 140624 - 009</u>
Sample Date and Time:	<u>140624 13:15</u>	Sample Date and Time:	<u>140624 14:45</u>
Replicate ID (if applicable)	<u>—</u>	Replicate ID (if applicable)	<u>—</u>
Field Measured Parameters		Field Measured Parameters	
Temperature:	<u>3.8</u>	Temperature:	<u>2.4</u>
Specific Conductivity (SPC):	<u>1307</u>	Specific Conductivity (SPC):	<u>556.5</u>
pH:	<u>7.76</u>	pH:	<u>7.28</u>
Turbidity (NTU)	<u>3.99</u>	Turbidity (NTU)	<u>3.47</u>
Site Conditions		Site Conditions	
flow level:	<u>Normal</u>	flow level:	<u>low/normal</u>
ice thickness (if applicable)	<u>Some ice on shore 7 30 cm in some</u>	ice thickness (if applicable)	<u>—</u>
	<u>Slightly ice in up Pond area</u>		
Notes		Notes	
Photo Numbers		Photo Numbers	
Datasheet:	Downstream: <u>132</u>	Datasheet:	Downstream: <u>137</u>
Upstream: <u>131</u>	Overview: <u>134</u>	Upstream: <u>138</u>	Overview: <u>140 - 142</u>

Site Information		Site Information	
Site Name:	<u>WQ DX-105</u>	Site Name:	<u>WQ-VC-R</u>
UTM Coordinates:	<u>0352 140624 012</u>	UTM Coordinates:	<u>0352 140624 008 001</u>
Sample Date and Time:	<u>140624 15:00</u>	Sample Date and Time:	<u>24 June 2014 16:05</u>
Replicate ID (if applicable)	<u>—</u>	Replicate ID (if applicable)	<u>—</u>
Field Measured Parameters		Field Measured Parameters	
Temperature:	<u>1.1°C</u>	Temperature:	<u>7.9</u>
Specific Conductivity (SPC):	<u>1187</u>	Specific Conductivity (SPC):	<u>241.4</u>
pH:	<u>7.01</u>	pH:	<u>7.15</u>
Turbidity (NTU)	<u>2.66</u>	Turbidity (NTU)	<u>1.08</u>
Site Conditions		Site Conditions	
flow level:	<u>Normal</u>	flow level:	<u>normal</u>
ice thickness (if applicable)	<u>—</u>	ice thickness (if applicable)	<u>—</u>
Notes		Notes	
Photo Numbers		Photo Numbers	
Datasheet:	Downstream: <u>145</u>	Datasheet:	Downstream: <u>148</u>
Upstream: <u>143</u>	Overview: <u>146 - 147</u>	Upstream: <u>147</u>	Overview: <u>149</u>

Field Blank ID _____
 Trip Blank ID _____



Project No.: 14-4-0352/0455
 13-Y-0452

Project Name: Narson
 Bare Surface Water Quality

Page 4 of 6

Weather: Overcast, 13°C
light wind

Field Samplers: Jim OS
LF

YSI Calibration Performed? Yes / No Date / Time: _____

Site Information		Site Information	
Site Name:	WQ-DC-R	Site Name:	WQ-PC-10
UTM Coordinates:	0352-140624-002	UTM Coordinates:	0352-140624-004
Sample Date and Time:	June 24, 2014 16:23	Sample Date and Time:	June 24, 2014 16:45
Replicate ID (if applicable)		Replicate ID (if applicable)	
Field Measured Parameters		Field Measured Parameters	
Temperature:	7.7	Temperature:	5.0
Specific Conductivity (SPC):	1200	Specific Conductivity (SPC):	453.6
pH:	7.60	pH:	7.62
Turbidity (NTU)	26.6	Turbidity (NTU)	0.42
Site Conditions		Site Conditions	
flow level:		flow level:	low
ice thickness (if applicable)		ice thickness (if applicable)	/
Notes		Notes	
Photo Numbers		Photo Numbers	
Datasheet:	Downstream: 151	Datasheet:	Downstream: 160
Upstream: 150	Overview: 152	Upstream: 159	Overview: 161

Site Information		Site Information	
Site Name:	WQ-VC-UMN	Site Name:	WQ-VC-# ORC
UTM Coordinates:	352-140624-005	UTM Coordinates:	352-140624-003
Sample Date and Time:	140624 1840	Sample Date and Time:	140624 - 19:50
Replicate ID (if applicable)		Replicate ID (if applicable)	
Field Measured Parameters		Field Measured Parameters	
Temperature:	7.4	Temperature:	6.9
Specific Conductivity (SPC):	257.1	Specific Conductivity (SPC):	185.5
pH:	7.73	pH:	7.59
Turbidity (NTU)	1.44	Turbidity (NTU)	0.27
Site Conditions		Site Conditions	
flow level:		flow level:	
ice thickness (if applicable)		ice thickness (if applicable)	
Notes		Notes	
Photo Numbers		Photo Numbers	
Datasheet:	Downstream: 175	Datasheet:	Downstream: 186
Upstream: 174	Overview: 175	Upstream: 185	Overview: 186

Field Blank ID _____
 Trip Blank ID _____

Do cal start 8:41
 101% 886
 Docal King 90.3010



Project No.: 14-Y-0455
 13-Y-0452

Weather: Partly Cloudy
 90C

Field Samplers: CH, JSM

Project Name: Faro Surface Water Quality

Page 16 of 16

YSI Calibration Performed? Yes / No

Date / Time: June
 July 25 7:30

Site Information		Site Information	
Site Name:	WQ-PET-Bottom (5m) -3	Site Name:	WQ Pit-2 Middle (2.5m)
UTM Coordinates:	026	UTM Coordinates:	025
Sample Date and Time:	25 June 14 8:40	Sample Date and Time:	25 June 14 9:00
Replicate ID (if applicable)		Replicate ID (if applicable)	
Field Measured Parameters		Field Measured Parameters	
Temperature:	8.2	Temperature:	9.5
Specific Conductivity (SPC):	2346	Specific Conductivity (SPC):	1426
pH:	6.65	pH:	7.90
Turbidity (NTU)	2.88	Turbidity (NTU)	1.23
Site Conditions		Site Conditions	
flow level:		flow level:	
ice thickness (if applicable)		ice thickness (if applicable)	
Notes		Notes	
total depth 5.5m DO% = 62.2 DO mg/L = 7.25		DO % = 86.3 DO mg/L = 9.83	
Photo Numbers		Photo Numbers	
Sheet:	Downstream:	Datasheet:	Downstream:
Upstream: 195	Overview: 196	Upstream:	Overview:

Site Information		Site Information	
Site Name:	WQ-Pit-1 Top	Site Name:	WQ-PW
UTM Coordinates:	024	UTM Coordinates:	027
Sample Date and Time:	25 June 9:25	Sample Date and Time:	25 June 11:15
Replicate ID (if applicable)	029	Replicate ID (if applicable)	
Field Measured Parameters		Field Measured Parameters	
Temperature:	9.5	Temperature:	1.3
Specific Conductivity (SPC):	1426	Specific Conductivity (SPC):	404.9
pH:	7.96	pH:	6.72
Turbidity (NTU)	1.76	Turbidity (NTU)	0.10
Site Conditions		Site Conditions	
flow level:		flow level:	
ice thickness (if applicable)		ice thickness (if applicable)	
Notes		Notes	
% 85.3 mg/L 9.72		Sample # Bact = 57527	
Photo Numbers		Photo Numbers	
Datasheet:	Downstream:	Datasheet:	Downstream: 203
Sheet:	Overview:	Upstream:	Overview: 204

Field Blank ID _____
 Trip Blank ID _____



Project No.: 13-Y-0452
 14-Y-0455

Weather: Partly cloudy

Field Samplers: SM DS
LH

Project Name: Faro Surface Water Quality

Page 6 of 12

YSI Calibration Performed? Yes / No

Date / Time: June 25, 7:30

Site Information		Site Information	
Site Name:	WQ-VL-U	Site Name:	
UTM Coordinates:	R 30	UTM Coordinates:	
Sample Date and Time:	25 June 2014 11:25	Sample Date and Time:	
Replicate ID (if applicable):	28 H:30 11:25	Replicate ID (if applicable):	
Field Measured Parameters		Field Measured Parameters	
Temperature:	5.6	Temperature:	
Specific Conductivity (SPC):	183.7	Specific Conductivity (SPC):	
pH:	7.40	pH:	
Turbidity (NTU)	0.54	Turbidity (NTU)	
Site Conditions		Site Conditions	
flow level:		flow level:	
ice thickness (if applicable)		ice thickness (if applicable)	
Notes		Notes	
Photo Numbers		Photo Numbers	
Datasheet:	Downstream: 201	Datasheet:	Downstream:
Upstream: 200	Overview: 202	Upstream:	Overview:

Site Information		Site Information	
Site Name:		Site Name:	
UTM Coordinates:		UTM Coordinates:	
Sample Date and Time:		Sample Date and Time:	
Replicate ID (if applicable):		Replicate ID (if applicable):	
Field Measured Parameters		Field Measured Parameters	
Temperature:		Temperature:	
Specific Conductivity (SPC):		Specific Conductivity (SPC):	
pH:		pH:	
Turbidity (NTU)		Turbidity (NTU)	
Site Conditions		Site Conditions	
flow level:		flow level:	
ice thickness (if applicable)		ice thickness (if applicable)	
Notes		Notes	
Photo Numbers		Photo Numbers	
Datasheet:	Downstream: 201	Datasheet:	Downstream:
Upstream: 200	Overview: 202	Upstream:	Overview:

Field Blank ID _____
 Trip Blank ID _____



APPENDIX D Q1 SURFACE WATER HYDROLOGY DATA

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Table D-1. Hydrometric Instrument Accuracy.

Units	Instrument Accuracy
Acoustic Doppler Velocimeter (ADV)	± 1%
Swoffer Current Meter	± 1%
Staff Gauge	± 1 mm
Survey Rod	± 1 mm
Measuring Tape	± 1 mm
YSI ProPlus Multi-Meter - Temperature	± 0.2 °C
YSI ProPlus Multi-Meter - Specific Conductivity	0.5% of reading or 0.001 µs/cm, whichever is greater
Stop Watch	± 0.01 s
HOBO Pressure Transducer- Pressure	± .03 kPa ; ± 0.003 m
HOBO Pressure Transducer- Temperature	± 0.37 (at 20C) (-20 to -50C Op. Range)
Solinst Barologger	± 0.001 m
Solinst Pressure Transducer - Pressure	± 0.003 m
Solinst Pressure Transducer - Temperature	± 0.05 °C (-10 to +40 C Comp. Range)
Graduated Bucket	± .5 L
Lab Scale	± 0.00005 kg



Table D-2. Hydrometric station monitoring record from Q1 (April 1 through June 30, 2014).

HID	Monitoring Start	Q1		Q2		Q3		Q4		Logger Type	Rating Curve Status ¹	Method
		Measurements	Measurements	Measurements	Measurements	Measurements	Measurements					
		# Q	# Rating	# Q	# Rating	# Q	# Rating	# Q	# Rating			
ATM-DC-2	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	HOBO	N/A	N/A
ATM-DC-4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Solinst	N/A	N/A
H-PC-U	14-Apr-14	4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Solinst	N/A	SS,V
H-PC-DSP	14-Apr-14	5	3	N/A	N/A	N/A	N/A	N/A	N/A	HOBO	P	SS, V
H-DX+105	14-Apr-14	3	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	SS, V
H-DC-D1b	14-Apr-14	1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	SS
H-TP	14-Apr-14	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	SG
H-SEEP	14-Apr-14		N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	V, Flow Meter
H-DC-B	14-Apr-14	3	1	N/A	N/A	N/A	N/A	N/A	N/A	HOBO	P	SS
H-DC-M	14-Apr-14	5	4	N/A	N/A	N/A	N/A	N/A	N/A	Solinst+HOBO	P	SS
H-DC-R	14-Apr-14	3	1	N/A	N/A	N/A	N/A	N/A	N/A	HOBO	P	ADV, SS, V
H-BC	15-Apr-14	2	2	N/A	N/A	N/A	N/A	N/A	N/A	HOBO	P	ADV, SS
H-VC-U	15-Apr-14	4	3	N/A	N/A	N/A	N/A	N/A	N/A	Solinst	P	ADV, SS
H-VC-DBC	15-Apr-14	5	3	N/A	N/A	N/A	N/A	N/A	N/A	Solinst	P	ADV, SS
H-VC-UMN	15-Apr-14	6	2	N/A	N/A	N/A	N/A	N/A	N/A	Solinst	P	ADV, SS
H-VC-R	15-Apr-14	4	1	N/A	N/A	N/A	N/A	N/A	N/A	Solinst	P	ADV, SS

Q - Discharge
P – preliminary
SS – Salt Slug, V – volumetric, ADV – acoustic Doppler velocimeter, Flow Meter – Flow master totalizer.



Table D-3 Hydrometric data summary for station visits between April 1 and June 30, 2014.

Mid	HID	Measurement		Measurement	Staff Gauge	Discharge	Data Flag	Water Surface Elevation
		Date	Time					
		(DD/MM/YYYY)	(HH:MM)					
60	ATM-DC2	4/14/2014	16:49	N			UR	
68	ATM-DC2	5/8/2014		N				
84	ATM-DC2	5/20/2014	15:00	N				
	ATM-DC2	6/23/2014	9:00					
59	ATM-DC4	4/14/2014	16:38	N				
69	ATM-DC4	5/8/2014		N				
85	ATM-DC4	5/20/2014	15:24	N				
	ATM-DC4	6/24/2014	8:56					
66	H-BC	4/15/2014	11:50	N	0	0	X	
79	H-BC	5/9/2014	11:25	SS	0.42	0.3729		2.06
79	H-BC	5/9/2014	11:25	SS	0.42	0.3729		2.06
94	H-BC	5/21/2014	12:10	SS	0.201	0.047		1.847
116	H-BC	6/24/2014	20:38	N	0	0	X	
64	H-DC-B	4/14/2014	16:15	N			X	
74	H-DC-B	5/8/2014	14:37	SS		0.119		1.81
74	H-DC-B	5/8/2014	14:37	SS		0.119		1.808
91	H-DC-B	5/20/2014	15:17	SS		0.04		
112	H-DC-B	6/24/2014	10:40	SS		0.01		1.43
112	H-DC-B	6/24/2014	10:40	SS		0.01		1.431
63	H-DC-D1b	4/14/2014		N		0	X	
73	H-DC-D1b	5/8/2014	15:00	N			X	
90	H-DC-D1b	5/21/2014	18:07	N			X	
106	H-DC-D1b	6/24/2014	13:35	SS		0.005	E	
62	H-DC-DX+105	4/14/2014	17:18	N		0	X	
72	H-DC-DX+105	5/8/2014	17:11	SS		0.0193		



Mount Nansen Water Resources Investigations Quarterly Report (Q1): April – June 2014

Mid	HID	Measurement		Measurement	Staff Gauge	Discharge	Data Flag	Water Surface Elevation
		Date	Time					
		(DD/MM/YYYY)	(HH:MM)					
89	H-DC-DX+105	5/21/2014	15:08	SS		0.011	E	
105	H-DC-DX+105	6/24/2014	15:15	SS		0.001	E	
55	H-DC-M	4/14/2014	14:40	SS		0.002	B	1.617
75	H-DC-M	5/8/2014	13:59	SS	0.322	0.154		1.798
92	H-DC-M	5/20/2014	14:30	SS	0.194	0.045		1.667
121	H-DC-M	6/23/2014	18:49	V	0.15	0.009		1.621
113	H-DC-M	6/23/2014	18:49	SS	0.15	0.012		1.621
121	H-DC-M	6/23/2014	18:49	V	0.15	0.009		1.619
113	H-DC-M	6/23/2014	18:49	SS	0.15	0.012		1.619
114	H-DC-M WP	6/23/2014	18:49	V		0.009		
65	H-DC-R	4/14/2014	13:58	N			X	
76	H-DC-R	5/8/2014	13:24	SS		0.1521	B	
93	H-DC-R	5/20/2014	13:48	SS		0.056		
115	H-DC-R	6/23/2014	17:17	SS		0.014		0.428
115	H-DC-R	6/23/2014	17:17	SS		0.014		0.423
58	H-PC-DSP	4/14/2014	19:10	N		0	X	
71	H-PC-DSP	5/8/2014	15:29	SS	0.318	0.027		2.493
71	H-PC-DSP	5/8/2014	15:29	SS	0.318	0.027		2.491
87	H-PC-DSP	5/20/2014	15:56	SS	0.296	0.006		2.456
88	H-PC-DSP	5/20/2014	15:56	V	0.296	0.005		2.456
104	H-PC-DSP	6/24/2014	16:54	V	0.171	0.0006		2.323
104	H-PC-DSP	6/24/2014	16:54	V	0.171	0.0006		2.325
61	H-PC-U	4/14/2014		N		0	X	
70	H-PC-U	5/8/2014	16:12	SS		0.0237		
86	H-PC-U	5/20/2014	16:46	SS		0.006		
103	H-PC-U	6/23/2014	13:25	SS		0.001		



Mount Nansen Water Resources Investigations Quarterly Report (Q1): April – June 2014

Mid	HID	Measurement		Measurement	Staff Gauge	Discharge	Data Flag	Water Surface Elevation (m L.D., ± 5 mm)
		Date	Time					
		(DD/MM/YYYY)	(HH:MM)					
57	H-SEEP	4/14/2014	15:40	V		0.0025		
82	H-SEEP	5/9/2014	13:03				UR	
101	H-SEEP	5/21/2014	13:15	V		0.0009		
107	H-SEEP	6/24/2014	9:28	V	0.208	0.003		
67	H-TP	4/14/2014	15:16	N			X	
83	H-TP	5/9/2014	13:25		0.855		UR	
102	H-TP	5/21/2014	13:35	N	0.877			
108	H-TP	6/24/2014	9:45		0.629			
51	H-VC-DBC	4/15/2014	9:50	CM-MID	0.368	0.047	B	1.724
52	H-VC-DBC	4/15/2014	9:50	SS	0.368	0.044	B	1.724
78	H-VC-DBC	5/9/2014	11:40	ADV-MID	0.732	2.388		2.086
78	H-VC-DBC	5/9/2014	11:40	ADV-MID	0.732	2.388		2.083
97	H-VC-DBC	5/21/2014	10:25	ADV-MID	0.526	0.6273		1.878
118	H-VC-DBC	6/24/2014	19:28	ADV-MID	0.406	0.1767		1.748
118	H-VC-DBC	6/24/2014	19:28	ADV-MID	0.406	0.1767		1.751
81	H-VC-R	5/8/2014	11:54	ADV-MID	0.765	3.204		2.338
81	H-VC-R	5/8/2014	11:54	ADV-MID	0.765	3.204		2.345
81	H-VC-R	5/8/2014	11:54	ADV-MID	0.765	3.204		2.337
100	H-VC-R	5/20/2014	13:03	ADV-MID	0.594	0.758		2.167
120	H-VC-R	6/23/2014	16:03	ADV-MID	0.487	0.1791	SH-L	2.058
120	H-VC-R	6/23/2014	16:03	ADV-MID	0.487	0.1791	SH-L	2.061
77	H-VC-U	5/9/2014	11:37	ADV-MID	0.415	1.929		2.313
77	H-VC-U	5/9/2014	11:37	ADV-MID	0.415	1.929		2.315
96	H-VC-U	5/21/2014	11:21	SS	0.227	0.392		2.133
95	H-VC-U	5/21/2014	11:21	ADV-MID	0.227	0.556		2.133
117	H-VC-U	6/24/2014	20:05	ADV-MID	0.138	0.1724		2.048



Mount Nansen Water Resources Investigations Quarterly Report (Q1): April – June 2014

Mid	HID	Measurement		Measurement	Staff Gauge	Discharge	Data Flag	Water Surface Elevation
		Date	Time					
		(DD/MM/YYYY)	(HH:MM)					
117	H-VC-U	6/24/2014	20:05	ADV-MID	0.138	0.1724		2.049
54	H-VC-UMN	4/15/2014	8:40	SS	0.528	0.019	B	
53	H-VC-UMN	4/15/2014	8:40	CM-MID	0.528	0.022	B	
80	H-VC-UMN	5/9/2014	8:30	ADV-MID	0.9	2.605		1.918
80	H-VC-UMN	5/9/2014	8:30	ADV-MID	0.9	2.605		1.919
99	H-VC-UMN	5/21/2014	8:51	SS	0.709	0.741		1.695
98	H-VC-UMN	5/21/2014	8:51	ADV-MID	0.709	0.702	SH-SG	1.695
99	H-VC-UMN	5/21/2014	8:51	SS	0.709	0.741		1.695
98	H-VC-UMN	5/21/2014	8:51	ADV-MID	0.709	0.702	SH-SG	1.695
119	H-VC-UMN	6/24/2014	18:29	ADV-MID	0.592	0.1879		1.587
119	H-VC-UMN	6/24/2014	18:29	ADV-MID	0.592	0.1879		1.589
119	H-VC-UMN	6/24/2014	18:29	ADV-MID	0.592	0.1879		1.589

Notes:

MID = Measurement ID , unique measurement identifier in the hydrometric database.

HID = Hydrometric ID, unique hydrometric station identifier in hydrometric database.

L.D. = Local datum.

Measurement types: ADV – acoustic Doppler velocimeter; SS – salt dilution, slug injection; V – volumetric; CM – current meter; W – weir; N – no measurement obtained.

Data Flag = B – Ice Present, X – Poor channel conditions not appropriate for discharge measurement, E – Estimated Value



Table D-4. Hydrometric survey data summary from April 1 through June 30, 2014.

Station	MID	Date	Time	BM 1 (m L.D.)	BM 2 (m L.D.)	BM 3 (m L.D.)	LoggerRod* (m L.D.)	TOS (m L.D.)	Water Surface (m L.D.)
H-BC	86	5/9/2014	11:40	3	2.991	3.018	2.876	2.640	2.060
H-BC	100	5/21/2014	12:21	3	3.009	3.028	2.881	2.645	1.847
H-DC-B	81	5/8/2014		3	3.355	2.997	-	-	1.809
H-DC-B	118	6/24/2014	10:50	3	3.351	2.9925	2.775	-	1.4305
H-DC-M	61	4/14/2014	14:32	3	2.713	2.319	2.711	2.480	1.617
H-DC-M	82	5/8/2014	14:10	3	2.313	2.713	2.727	2.479	1.798
H-DC-M	98	5/20/2014	14:34	3	2.315	2.712	2.709	2.478	1.667
H-DC-M	119	6/23/2014	19:23	3	2.519	2.718	2.702	2.470	1.620
H-DC-R	121	6/23/2014		3	2.973	2.3125	1.968	1.132	0.425
H-PC-DSP	77	5/8/2014	15:56	3	3.658	3.248	3.424	3.1725	2.492
H-PC-DSP	94	5/20/2014	16:09	3	3.250	3.635	3.418	3.169	2.456
H-PC-DSP	110	6/24/2014	17:00	3	3.2425	3.6225	3.3965	3.148	2.324
H-VC-DBC	59	4/15/2014	10:40	3	3.029	2.919	2.571	2.354	1.724
H-VC-DBC	85	5/9/2014	9:50	3	3.024	2.917	2.565	2.341	2.084
H-VC-DBC	102	5/21/2014	10:37	3	3.028	2.918	2.568	2.355	1.878
H-VC-DBC	124	6/24/2014	19:33	3	3.026	2.910	2.567	2.348	1.749
H-VC-R	62	4/14/2014	13:20	3	3.431	3.170	2.812	2.573	-
H-VC-R	88	5/8/2014	12:20	3	3.4315	3.171	2.811	-	2.34
H-VC-R	104	5/20/2014	13:16	3	3.426	3.172	2.870	2.575	2.167
H-VC-R	126	6/23/2014	16:22	3	3.417	3.167	2.891	2.575	2.059
H-VC-U	58	4/15/2014		3	3.359	3.243	3.15	2.904	-
H-VC-U	84	5/9/2014	10:40	3	3.361	3.244	3.149	2.902	2.314
H-VC-U	101	5/21/2014	11:45	3	3.359	3.242	3.148	2.904	2.133
H-VC-U	123	6/24/2014	20:31	3	3.356	3.244	3.1555	2.910	2.048
H-VC-UMN	87	5/9/2014	9:00	3	3.008	2.678	2.191	1.984	1.918



Mount Nansen Water Resources Investigations Quarterly Report (Q1): April – June 2014

Station	MID	Date	Time	BM 1 (m L.D.)	BM 2 (m L.D.)	BM 3 (m L.D.)	LoggerRod* (m L.D.)	TOS (m L.D.)	Water Surface (m L.D.)
H-VC-UMN	103	5/21/2014	9:18	3	3.007	2.678	2.207	1.993	1.695
H-VC-UMN	125	6/24/2014	18:27	3	3.009	2.677	2.21	1.996	1.588
H-VC-R	62	4/14/2014	13:20	3	3.431	3.170	2.812	2.573	-
H-VC-R	88	5/8/2014	12:20	3	3.432	3.171	2.811	-	2.34
H-VC-R	104	5/20/2014	13:16	3	3.426	3.172	2.87	2.575	2.167
H-VC-R	126	6/23/2014	16:22	3	3.417	3.167	2.891	2.575	2.059

Notes:

L.D. = Local datum.

TOS = Top of Staff Gauge

LoggerRod = Top of fixed-length data logger installation rod.

**Zero flow elevation estimates obtained from the 2012/13 surface water and meteorological monitoring report.



Table D-5. Seepage Pond discharge volumetric measurements, April 1 to June 30, 2014.

HID	Measurement Date		Method	Discharge	
	Date	Time		m ³ /s	L/s
H-SEEP	4/14/2014	15:40	V	0.003	3
H-SEEP	5/9/2014	13:03	-	-	-
H-SEEP	5/21/2014	13:15	V	0.001	1
H-SEEP	6/24/2014	9:28	V	0.003	3

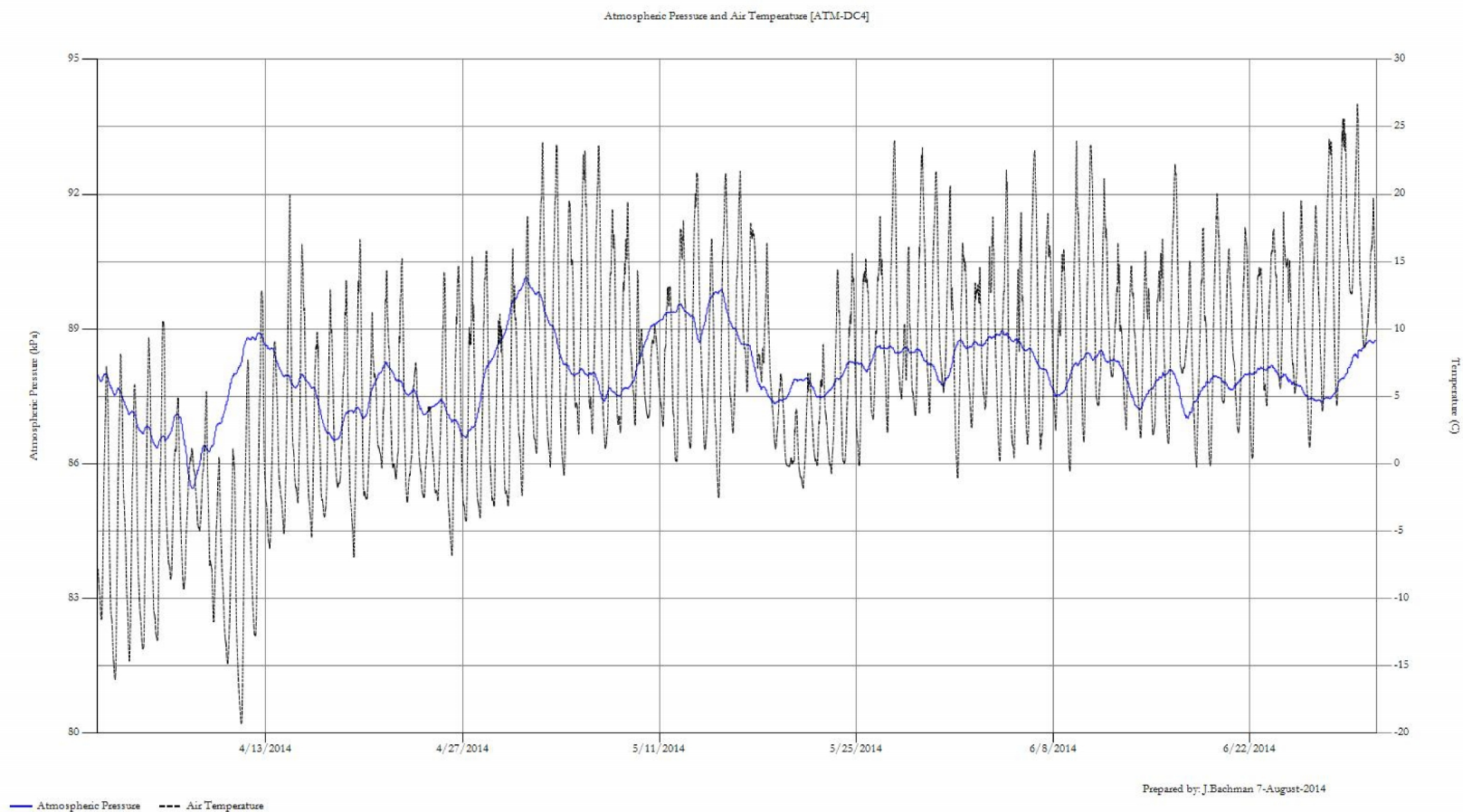


Figure D-1 ATM-DC4 atmospheric pressure and air temperature.

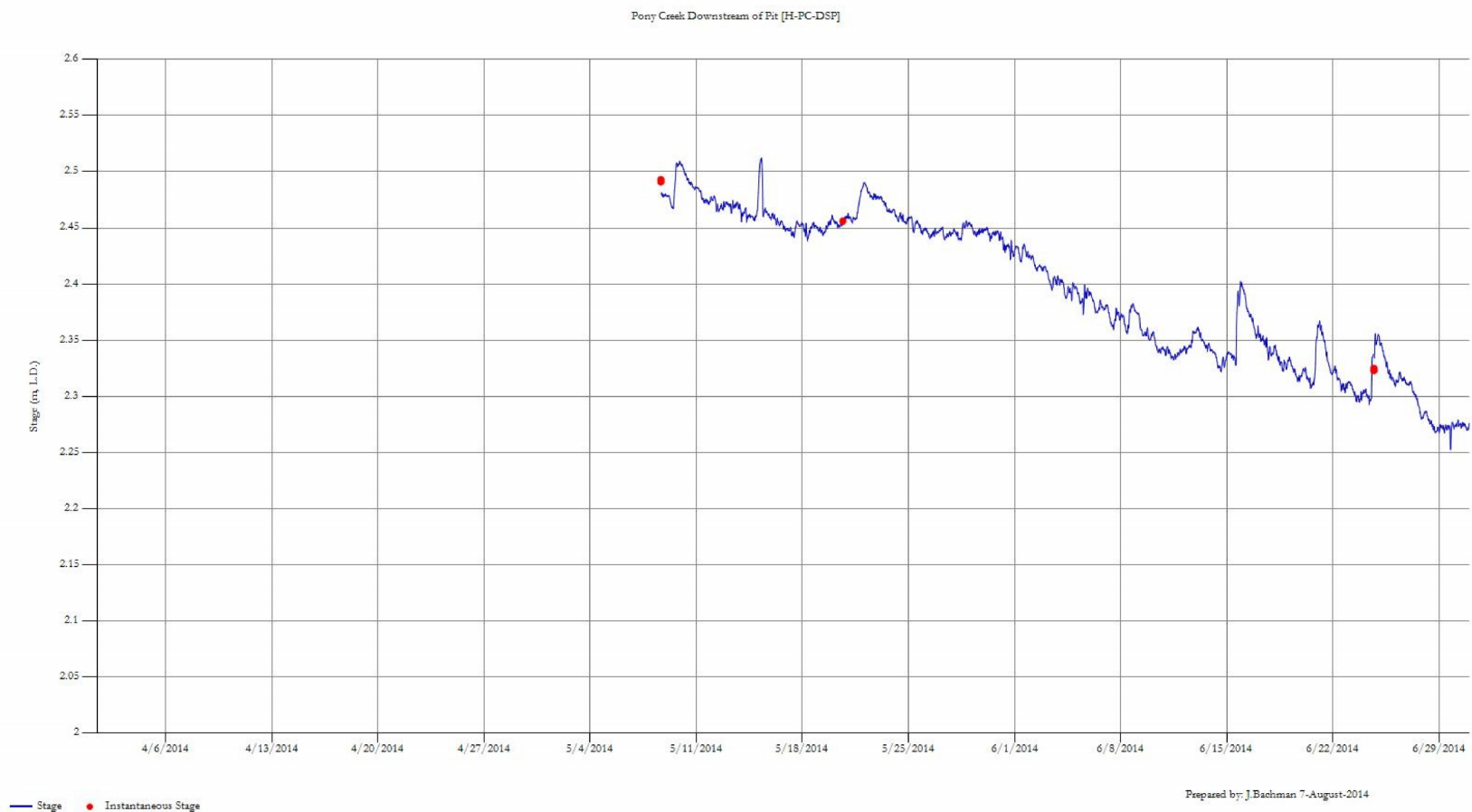


Figure D-2 H-PC-DSP Stage.

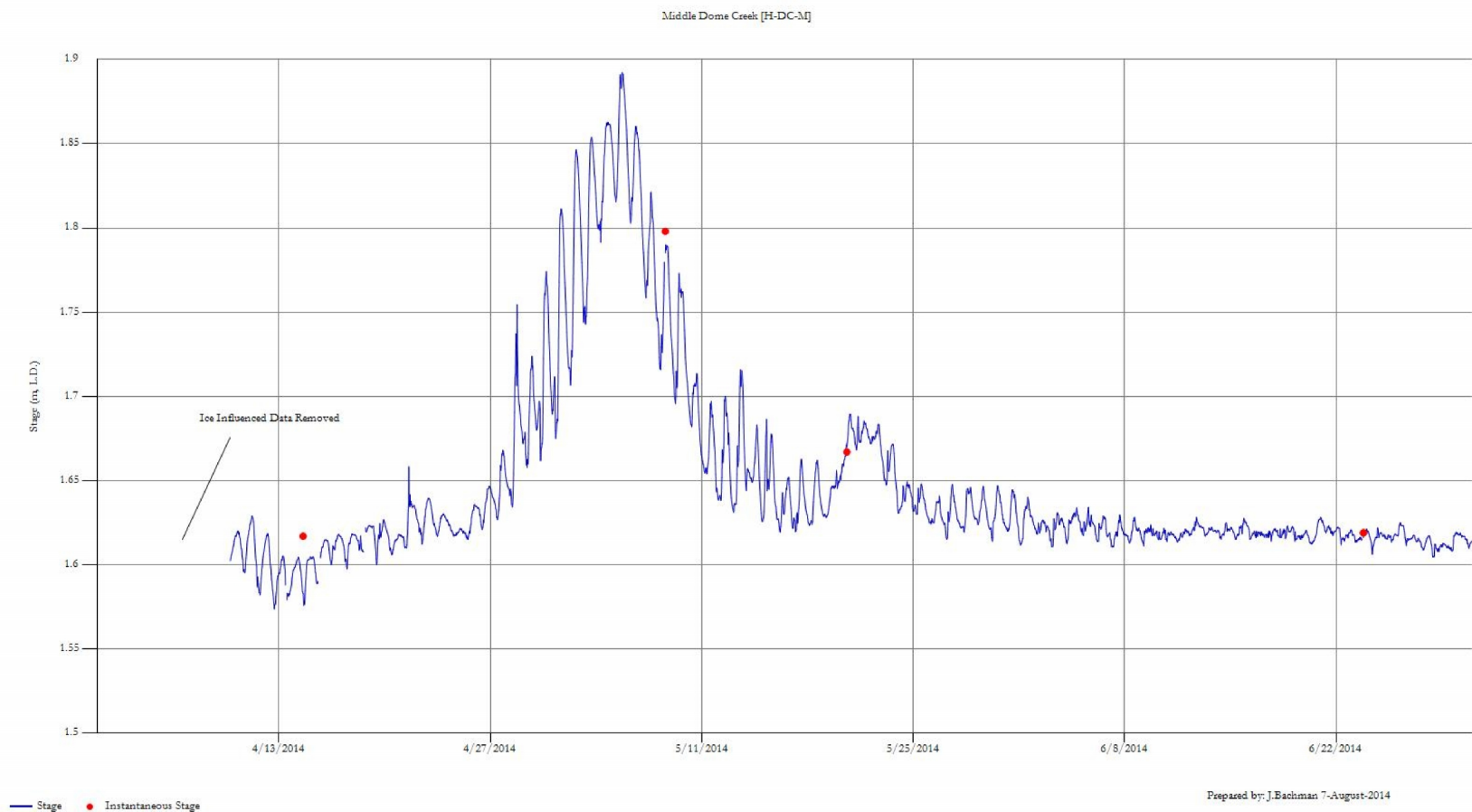


Figure D-3 H-DC-M Stage.

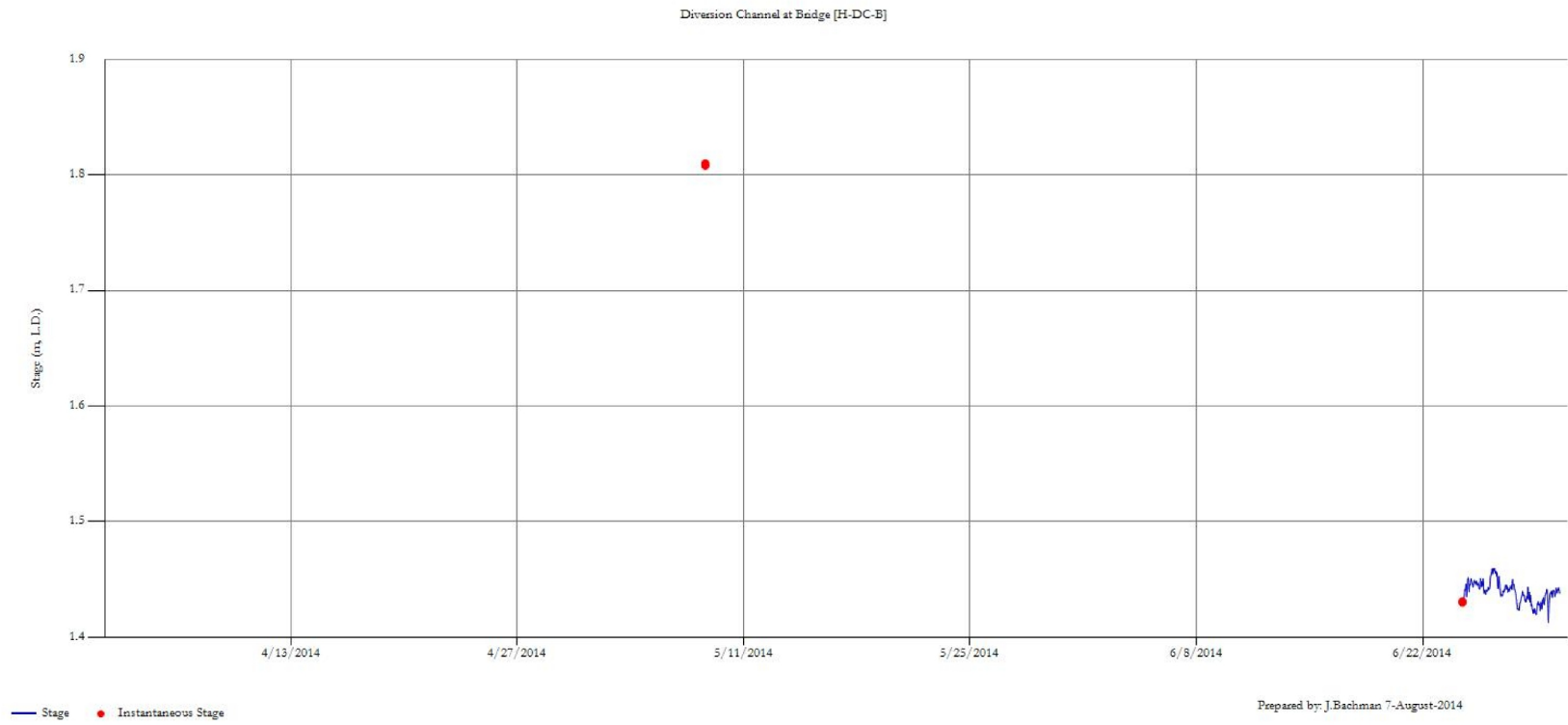


Figure D-4 H-DC-B Stage.

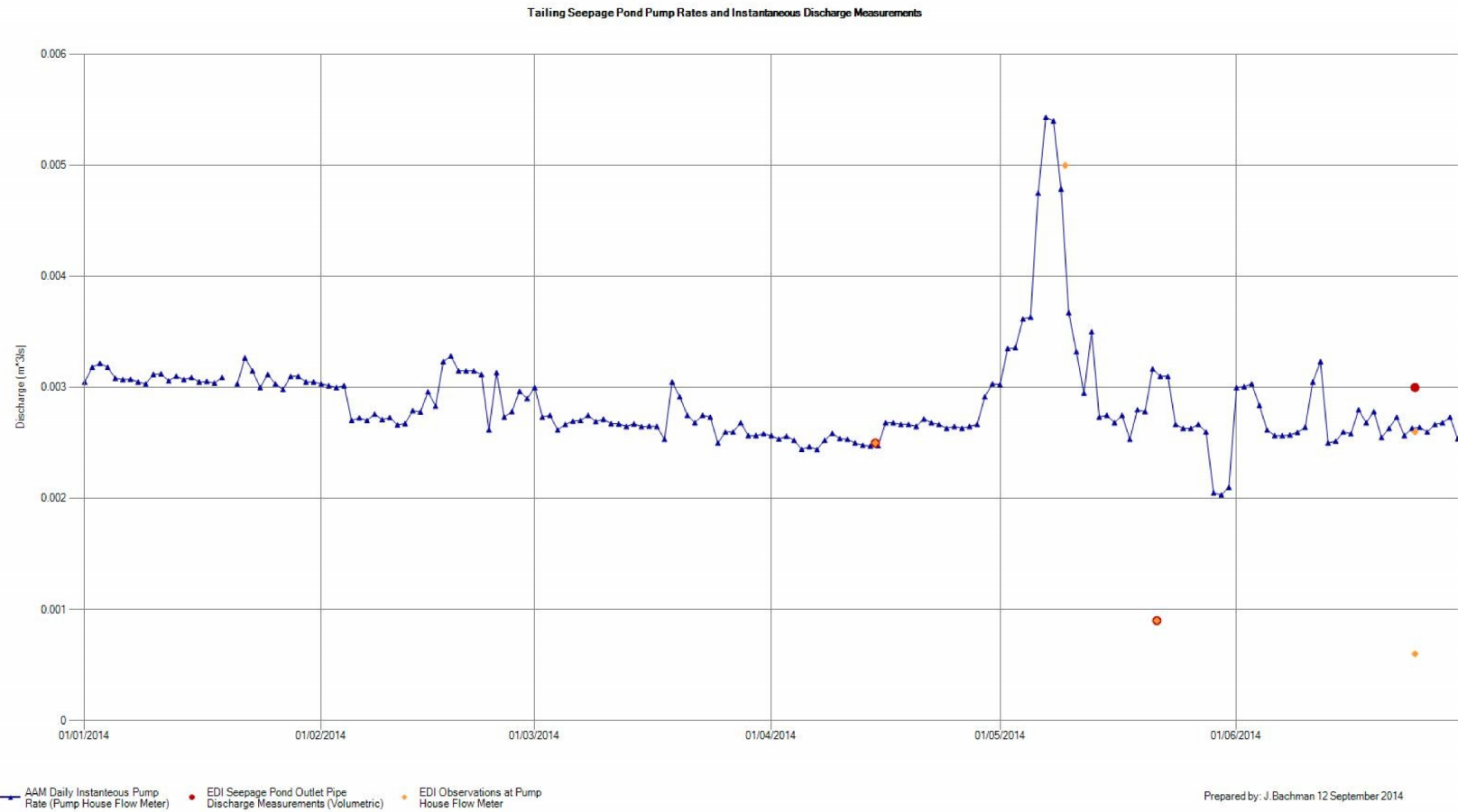


Figure D-5 H-SEEP Discharge and AAM Daily Flow Rates.

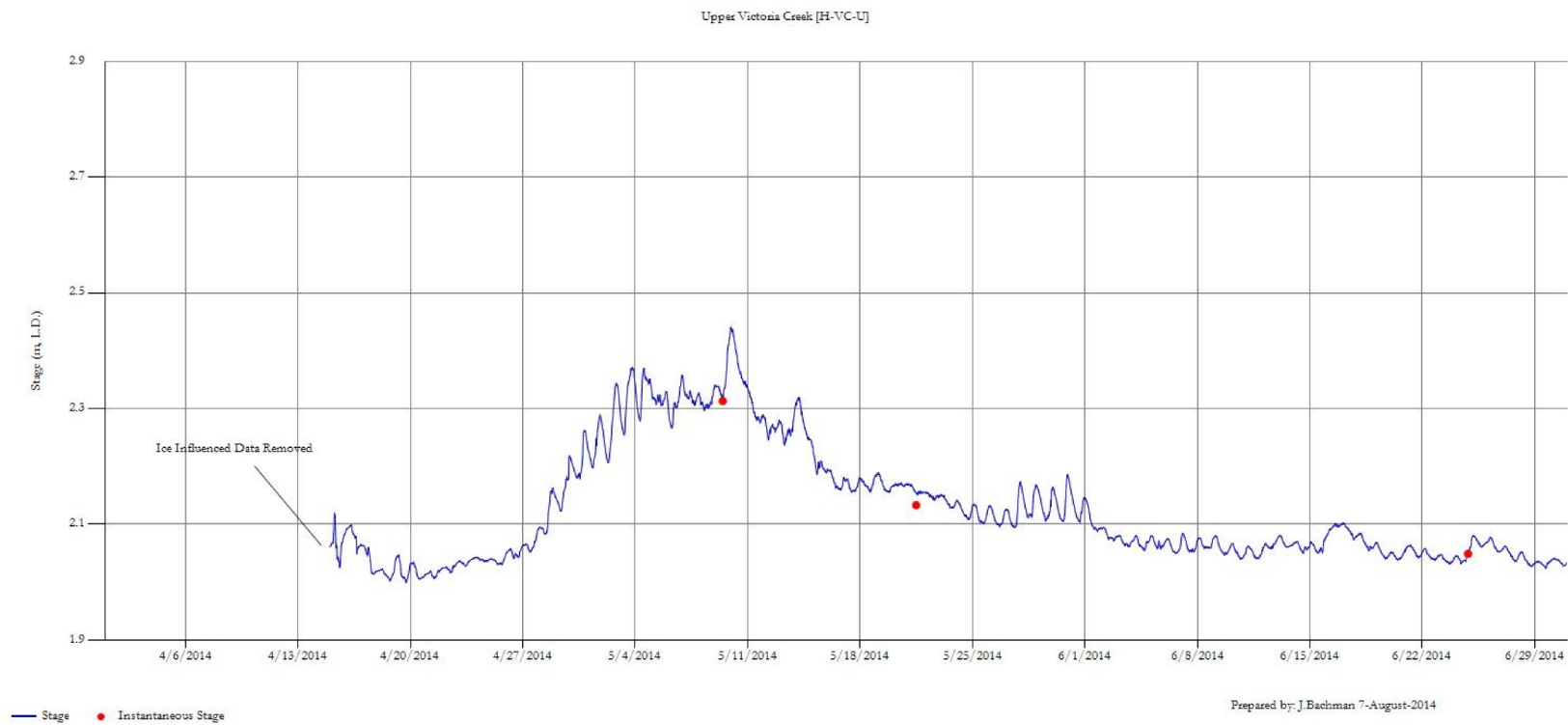


Figure D-6 H-VC-U Stage.

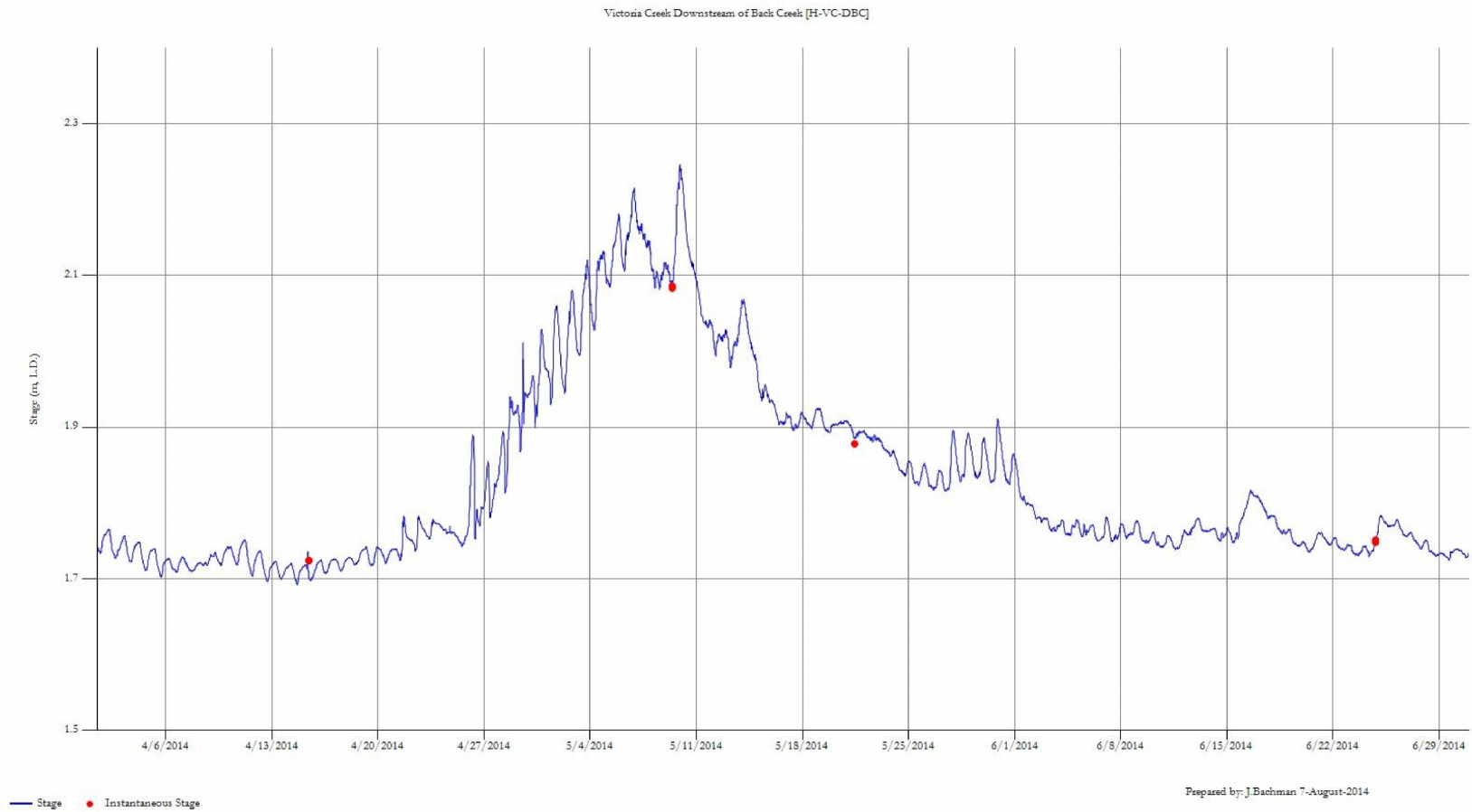


Figure D-7 H-VC-DBC Stage.

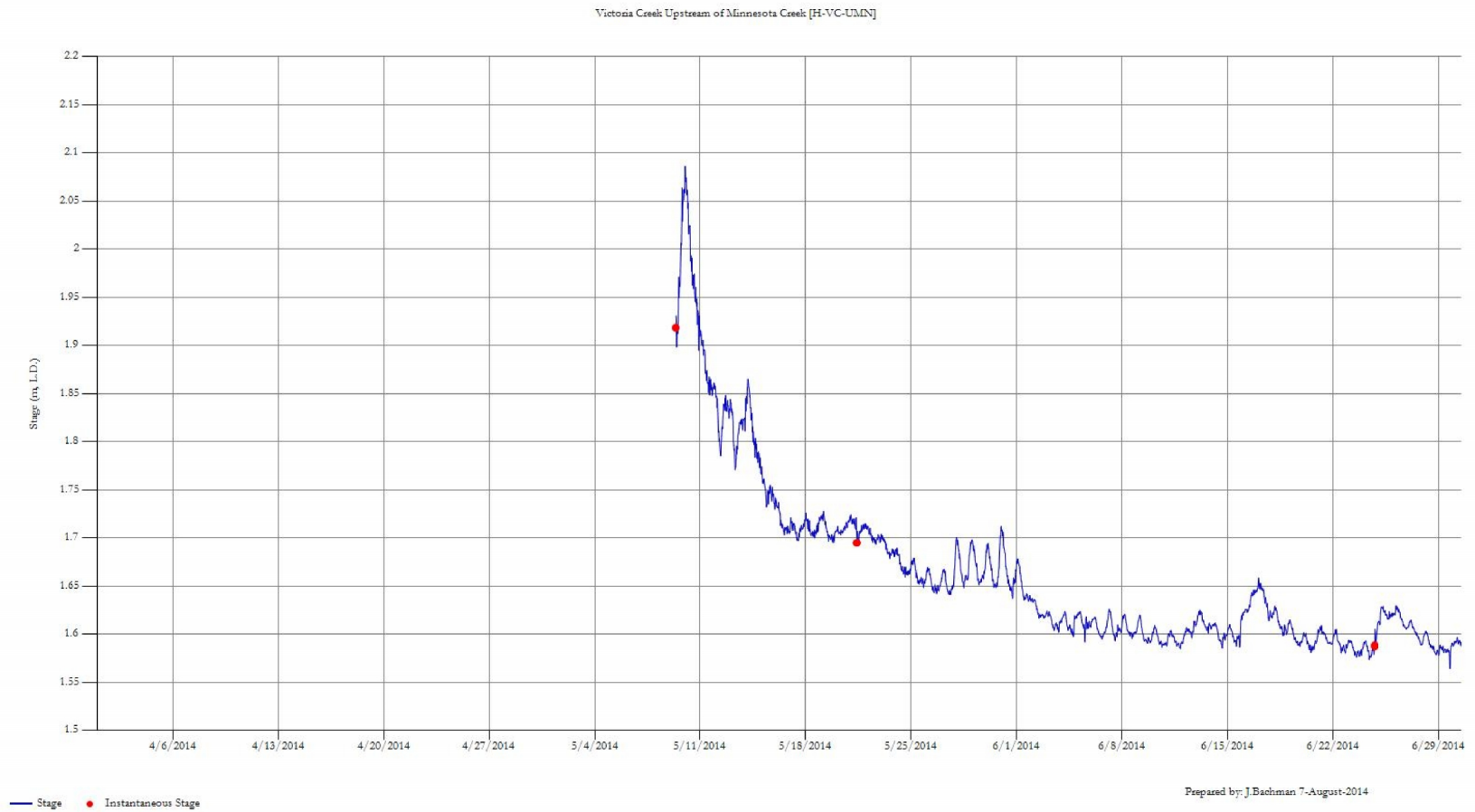


Figure D-8 H-VC-UMN Stage.

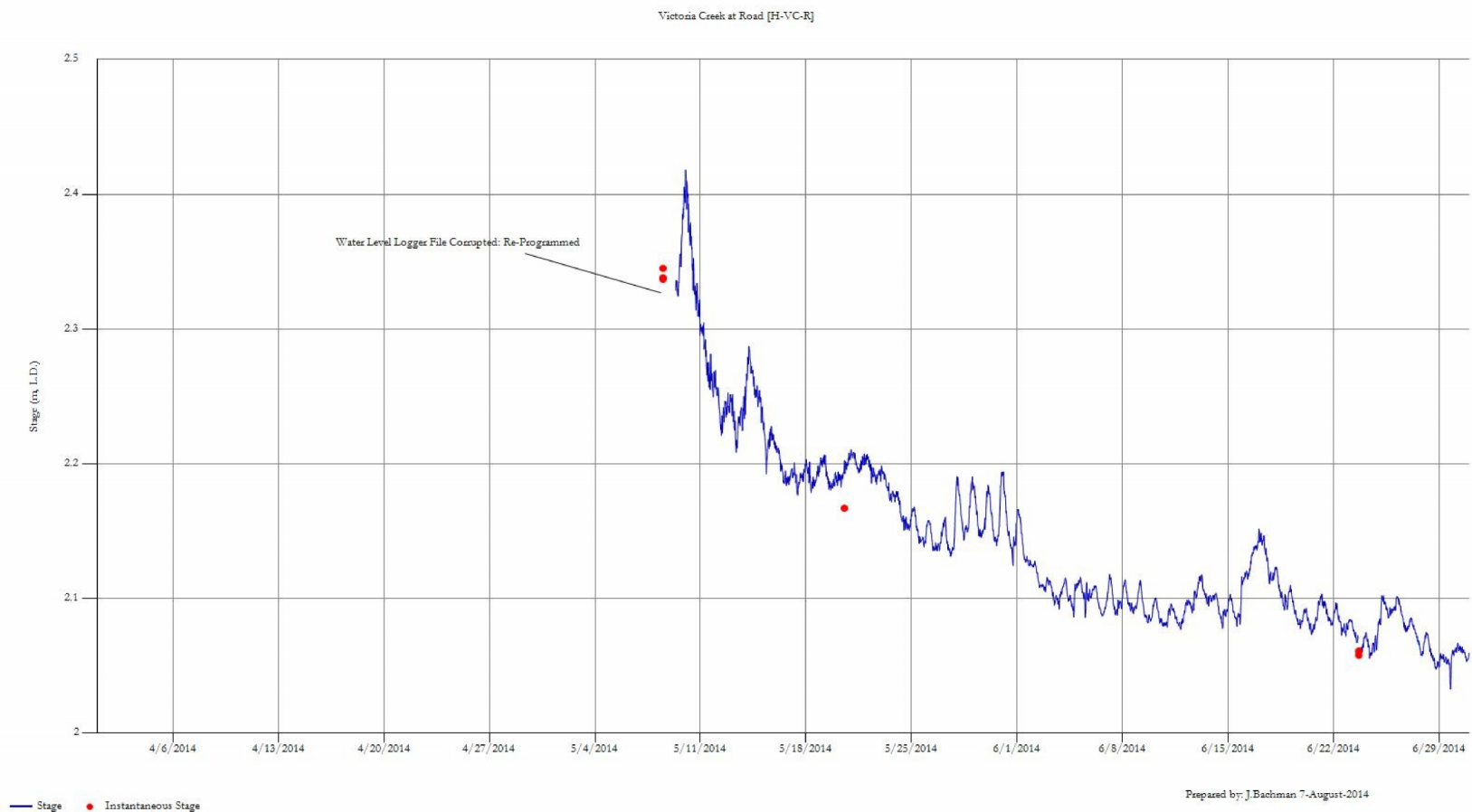


Figure D-9 H-VC-R Stage.



APPENDIX E Q1 SURFACE WATER QUALITY DATA

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Table E1. Water Quality Results for the April 14-15, 2014 Trip.

Analyte	Units	CCME-WATER-F-AL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0352-140414-016	0352-140414-017	0352-140414-018	0352-140414-019	0352-140414-009	0352-140414-010	QA/QC WQ-SEEP	0352-140414-011
					WQ-PIT-3 4/14/2014 Depth 5.5 m	WQ-PIT-2 4/14/2014 Depth 3.0 m	WQ-PIT-1 4/14/2014 Depth 0.30 m	WQ-PW 4/14/2014	WQ-SEEP 4/14/2014	WQ-SEEP-r 4/14/2014		WQ-TP 4/14/2014
Temperature (in-situ)	°C	-	-	-	3.8	1.8	0.3	1.3	1.8	-	-	0.3
Specific Conductivity (in-situ)	µS/cm	-	-	-	2531	2127	2150	382.4	1799	-	-	2901
pH (in-situ)	-	6.5 - 9.0	6.0 - 8.5	-	6.92	7.24	7.3	7.58	6.95	-	-	7.38
Turbidity (In-situ)	NTU	-	-	-	2.87	0.82	1.19	0.07	13.37	-	-	6.31
Dissolved Oxygen (in-situ)	mg/L	-	-	-	0.6	4.04	4.33	-	-	-	-	-
Colour, True	CU	15	-	5	-	-	-	<5.0	-	-	-	-
Conductivity	µS/cm	-	-	2	2290	2010	2080	370	1700	1680	1%	2750
Hardness (as CaCO3)	mg/L	-	-	0.5	1660	1390	1390	200	966	972	1%	1790
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1	7.43	7.72	7.7	7.99	7.39	7.4	0%	7.83
Total Suspended Solids	mg/L	-	50	3	14.7	4	<3.0	-	30.7	28	9%	7.3
Total Dissolved Solids	mg/L	-	-	1	2120	1810	1790	229	1340	1340	0%	2580
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1	207	218	211	-	223	235	5%	253
Alkalinity, Carbonate (as CaCO3)	mg/L	-	-	1	<1.0	<1.0	<1.0	-	<1.0	<1.0	-	<1.0
Alkalinity, Hydroxide (as CaCO3)	mg/L	-	-	1	<1.0	<1.0	<1.0	-	<1.0	<1.0	-	<1.0
Alkalinity, Total (as CaCO3)	mg/L	-	-	1	207	218	211	171	223	235	5%	253
Ammonia, Total (as N)	mg/L	0.75	-	0.005	0.226	0.0077	0.0088	-	4.41	4.84	10%	1.49
Chloride (Cl)	mg/L	120	-	0.5	<10	<5.0	<5.0	<0.50	<5.0	<5.0	-	<10
Fluoride (F)	mg/L	0.12	-	0.02	0.54	0.36	0.38	0.1	<0.20	0.22	16%	0.69
Nitrate (as N)	mg/L	13	-	0.005	0.2	0.07	0.07	0.128	0.74	0.836	13%	<0.10
Nitrite (as N)	mg/L	0.06	-	0.001	<0.020	<0.010	<0.010	<0.0010	0.028	0.026	7%	<0.020
Sulfate (SO4)	mg/L	-	-	0.5	1380	1170	1160	33.9	790	782	1%	1710
Cyanide, Weak Acid Diss	mg/L	-	0.1	0.005	-	-	-	-	0.019	0.0123	35%	<0.0050
Cyanide, Total	mg/L	-	0.3	0.005	-	-	-	-	0.107	0.0791	26%	<0.0050
Cyanate	mg/L	-	-	0.2	-	-	-	-	<0.20	3.57	1779%	<0.20
Thiocyanate (SCN)	mg/L	-	-	0.5	-	-	-	-	3.33	3.81	14%	<0.50
Aluminum (Al)-Total	mg/L	0.1	-	0.003	0.012	0.0124	0.0156	<0.010	0.0127	0.0123	3%	0.0137
Antimony (Sb)-Total	mg/L	-	0.15	0.0001	0.00142	0.00322	0.00335	<0.00050	0.00075	0.00077	3%	0.0187
Arsenic (As)-Total	mg/L	0.005	-	0.0001	0.27	0.0115	0.0157	0.00036	0.0591	0.0581	2%	0.387
Barium (Ba)-Total	mg/L	-	1	0.00005	0.0123	0.0125	0.013	0.086	0.0581	0.059	2%	0.0382
Beryllium (Be)-Total	mg/L	-	-	0.0001	<0.00020	<0.00020	<0.00020	-	<0.00010	<0.00010	-	<0.00020
Bismuth (Bi)-Total	mg/L	-	-	0.0005	<0.0010	<0.0010	<0.0010	-	<0.00050	<0.00050	-	<0.0010
Boron (B)-Total	mg/L	-	-	0.01	<0.020	<0.020	<0.020	<0.10	0.08	0.081	1%	0.154
Cadmium (Cd)-Total	mg/L	0.000033	0.02	0.00001	0.00738	0.00426	0.00434	<0.00020	0.000878	0.000886	1%	0.00811
Calcium (Ca)-Total	mg/L	-	-	0.05	447	382	380	45.7	281	293	4%	528
Chromium (Cr)-Total	mg/L	0.0089	0.04	0.0001	<0.00020	<0.00020	<0.00020	<0.0020	0.0005	0.00045	10%	0.00023
Cobalt (Co)-Total	mg/L	-	-	0.0001	0.00322	<0.00020	<0.00020	-	0.0075	0.00748	0%	0.0031
Copper (Cu)-Total	mg/L	0.002	0.2	0.0005	0.0022	0.0029	0.0032	<0.0010	0.00357	0.00366	3%	0.0407
Iron (Fe)-Total	mg/L	0.3	1	0.01	8.09	0.084	0.121	<0.030	14.4	15	4%	1.53
Lead (Pb)-Total	mg/L	0.003	0.1	0.00005	0.00095	0.00031	0.00047	0.00065	0.000064	0.000066	3%	0.00675
Lithium (Li)-Total	mg/L	-	-	0.0005	0.0089	0.0097	0.0089	-	<0.00050	0.00055	12%	0.0105
Magnesium (Mg)-Total	mg/L	-	-	0.1	119	108	106	20.9	62.9	65.2	4%	115
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	4.16	0.138	0.139	<0.0020	6.8	6.84	1%	11
Mercury (Hg)-Total	mg/L	0.000026	0.005	0.00001	<0.000010	<0.000010	<0.000010	<0.00020	<0.000010	<0.000010	-	<0.000010
Molybdenum (Mo)-Total	mg/L	0.0073	-	0.00005	0.00018	<0.00010	<0.00010	-	0.00101	0.00105	4%	0.00513
Nickel (Ni)-Total	mg/L	0.1	0.3	0.0005	0.0014	<0.0010	<0.0010	-	0.00275	0.00271	1%	0.0065
Phosphorus (P)-Total	mg/L	-	-	0.05	<0.050	<0.050	<0.050	-	<0.050	<0.050	-	<0.050
Potassium (K)-Total	mg/L	-	-	0.1	5.51	4.37	4.23	0.79	6.63	6.9	4%	30.8
Selenium (Se)-Total	mg/L	0.001	-	0.0001	<0.00020	<0.00020	<0.00020	<0.0010	0.00018	0.0002	11%	<0.00020
Silicon (Si)-Total	mg/L	-	-	0.05	4.27	3.99	3.96	-	7.48	7.8	4%	4.24
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	<0.000020	<0.000020	<0.000020	-	0.000038	0.000039	3%	0.000179
Sodium (Na)-Total	mg/L	-	-	0.05	13.7	15.1	15	4.9	38.2	38.2	0%	41.1
Strontium (Sr)-Total	mg/L	-	-	0.0002	1.24	1.22	1.2	-	0.818	0.835	2%	1.38
Sulfur (S)-Total	mg/L	-	-	0.5	471	391	386	-	278	282	1%	550
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	0.000091	0.000077	0.000074	-	<0.000010	<0.000010	-	0.000629
Tin (Sn)-Total	mg/L	-	-	0.0001	<0.00020	<0.00020	<0.00020	-	<0.00010	<0.00010	-	<0.00020
Titanium (Ti)-Total	mg/L	-	-	0.01	<0.020	<0.020	<0.020	-	<0.010	<0.010	-	<0.020



Table E1. Water Quality Results for the April 14-15, 2014 Trip.

Analyte	Units	CCME-WATER-F-AL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0352-140414-016 WQ-PIT-3 4/14/2014 Depth 5.5 m	0352-140414-017 WQ-PIT-2 4/14/2014 Depth 3.0 m	0352-140414-018 WQ-PIT-1 4/14/2014 Depth 0.30 m	0352-140414-019 WQ-PW 4/14/2014	0352-140414-009 WQ-SEEP 4/14/2014	0352-140414-010 WQ-SEEP-r 4/14/2014	QA/QC WQ-SEEP	0352-140414-011 WQ-TP 4/14/2014
Uranium (U)-Total	mg/L	0.015	-	0.00001	0.00403	0.00492	0.00493	0.00198	0.00225	0.00228	1%	0.00294
Vanadium (V)-Total	mg/L	-	-	0.001	<0.0020	<0.0020	<0.0020	-	0.0018	0.0019	6%	<0.0020
Zinc (Zn)-Total	mg/L	0.03	0.3	0.003	0.745	0.617	0.623	<0.050	0.0129	0.0135	5%	0.6
Dissolved Metals Filtration Location		-	-	n/a	FIELD	FIELD	FIELD	-	FIELD	FIELD	-	FIELD
Aluminum (Al)-Dissolved	mg/L	0.005	-	0.001	<0.0020	0.004	0.0027	-	0.0086	0.0096	12%	<0.0020
Antimony (Sb)-Dissolved	mg/L	-	-	0.0001	0.00124	0.00336	0.00338	-	0.00069	0.0007	1%	0.0123
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	0.249	0.00603	0.00582	-	0.0481	0.0487	1%	0.228
Barium (Ba)-Dissolved	mg/L	-	-	0.00005	0.0122	0.0129	0.0129	-	0.0554	0.0561	1%	0.0364
Beryllium (Be)-Dissolved	mg/L	-	-	0.0001	<0.00020	<0.00020	<0.00020	-	<0.00010	<0.00010	-	<0.00020
Bismuth (Bi)-Dissolved	mg/L	-	-	0.0005	<0.0010	<0.0010	<0.0010	-	<0.00050	<0.00050	-	<0.0010
Boron (B)-Dissolved	mg/L	-	-	0.01	<0.020	<0.020	<0.020	-	0.076	0.076	0%	0.157
Cadmium (Cd)-Dissolved	mg/L	0.000033	-	0.00001	0.0072	0.00429	0.00414	-	0.000319	0.000323	1%	0.00735
Calcium (Ca)-Dissolved	mg/L	-	-	0.05	455	380	374	-	282	281	0%	515
Chromium (Cr)-Dissolved	mg/L	0.0089	-	0.0001	<0.00020	<0.00020	<0.00020	-	0.0003	0.00037	23%	<0.00020
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	0.00324	<0.00020	<0.00020	-	0.00725	0.0074	2%	0.00299
Copper (Cu)-Dissolved	mg/L	0.002	-	0.0002	0.00115	0.00217	0.00212	-	0.00145	0.00148	2%	0.00659
Iron (Fe)-Dissolved	mg/L	0.3	-	0.01	7.85	<0.010	<0.010	-	12.9	13	1%	0.713
Lead (Pb)-Dissolved	mg/L	0.001	-	0.00005	<0.00010	<0.00010	<0.00010	-	<0.000050	<0.000050	-	0.00012
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	0.0073	0.0098	0.0093	-	0.00054	<0.00050	9%	0.0104
Magnesium (Mg)-Dissolved	mg/L	-	-	0.1	127	108	110	-	63.8	65.5	3%	122
Manganese (Mn)-Dissolved	mg/L	-	-	0.00005	4.14	0.103	0.103	-	6.56	6.77	3%	10.8
Mercury (Hg)-Dissolved	mg/L	0.000026	-	0.00001	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	-	<0.000010
Molybdenum (Mo)-Dissolved	mg/L	0.073	-	0.00005	0.00018	<0.00010	<0.00010	-	0.00101	0.00101	0%	0.0053
Nickel (Ni)-Dissolved	mg/L	0.1	-	0.0005	0.0013	<0.0010	<0.0010	-	0.00258	0.00269	4%	0.0065
Phosphorus (P)-Dissolved	mg/L	-	-	0.05	<0.050	<0.050	<0.050	-	<0.050	<0.050	-	<0.050
Potassium (K)-Dissolved	mg/L	-	-	0.1	5.55	4.31	4.27	-	6.62	6.62	0%	29.9
Selenium (Se)-Dissolved	mg/L	0.001	-	0.0001	<0.00020	<0.00020	<0.00020	-	0.00022	0.0002	9%	<0.00020
Silicon (Si)-Dissolved	mg/L	-	-	0.05	4.34	3.97	3.99	-	7.59	7.61	0%	4.1
Silver (Ag)-Dissolved	mg/L	0.0001	-	0.00001	<0.000020	<0.000020	<0.000020	-	0.000011	0.00001	9%	<0.000020
Sodium (Na)-Dissolved	mg/L	-	-	0.05	13.8	14.9	15	-	36.3	37	2%	39.6
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	1.21	1.26	1.26	-	0.822	0.834	1%	1.42
Sulfur (S)-Dissolved	mg/L	-	-	0.5	473	372	380	-	265	270	2%	550
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001	0.000084	0.000074	0.000076	-	<0.000010	<0.000010	-	0.000619
Tin (Sn)-Dissolved	mg/L	-	-	0.0001	<0.00020	<0.00020	<0.00020	-	<0.00010	<0.00010	-	<0.00020
Titanium (Ti)-Dissolved	mg/L	-	-	0.01	<0.020	<0.020	<0.020	-	<0.010	<0.010	-	<0.020
Uranium (U)-Dissolved	mg/L	0.015	-	0.00001	0.00393	0.00491	0.00503	-	0.00226	0.00221	2%	0.00312
Vanadium (V)-Dissolved	mg/L	-	-	0.001	<0.0020	<0.0020	<0.0020	-	0.0014	0.0014	0%	<0.0020
Zinc (Zn)-Dissolved	mg/L	0.03	-	0.001	0.75	0.625	0.621	-	0.0126	0.014	11%	0.564

Applied Guidelines: Federal CCME Canadian Environmental Quality Guidelines (JUL, 2012), CCME: Freshwater Aquatic Life

Color Key:

Mount Nansen Effluent Discharge Standards	
Exceeds CCME Guideline	
Exceeds MN Effluent Discharge Standards	
Exceeds both CCME and MN Standards	
Exceeds 10% difference threshold for QA/QC replicate samples	

Note: For those guidelines that are pH (Al) and hardness dependent (Cd, Cu, Pb, Ni), the most conservative guideline has been applied.



Table E1. Water Quality Results for the April 14-15, 2014 Trip.

Analyte	Units	CCME-WATER-F-AL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0352-140414-008 WQ-DC-U 4/14/2014	0352-140414-012 WQ-DC-B 4/14/2014	0352-140414-007 WQ-VC-R+150 4/14/2014	0352-140415-006 WQ-VC-UMN 4/15/2014	0352-140415-004 WQ-VC-U 4/15/2014	0352-140415-002 WQ-VC-U-r 4/15/2014	QA/QC WQ-VC-U	0352-140415-003 WQ-VC-DBC 4/15/2014
Temperature (in-situ)	°C	-	-	-	1.2	0.3	0	0	0.1	-	-	0.1
Specific Conductivity (in-situ)	µS/cm	-	-	-	1677	2863	298	315.3	213.7	-	-	245.2
pH (in-situ)	-	6.5 - 9.0	6.0 - 8.5	-	7.31	6.99	6.7	7.27	7.05	-	-	7.11
Turbidity (In-situ)	NTU	-	-	-	13.17	36.6	1.65	0.07	0.02	-	-	0.01
Dissolved Oxygen (in-situ)	mg/L	-	-	-	-	-	-	-	-	-	-	-
Colour, True	CU	15	-	5	-	-	-	-	-	-	-	-
Conductivity	µS/cm	-	-	2	1630	779	291	310	237	240	1%	238
Hardness (as CaCO3)	mg/L	-	-	0.5	940	802	150	157	121	123	2%	124
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1	7.8	7.79	7.74	7.74	7.63	7.66	0%	7.68
Total Suspended Solids	mg/L	-	50	3	19.3	81.3	<3.0	<3.0	<3.0	3.3	14%	<3.0
Total Dissolved Solids	mg/L	-	-	1	1270	670	163	175	130	129	1%	127
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1	230	83.7	104	109	107	103	4%	101
Alkalinity, Carbonate (as CaCO3)	mg/L	-	-	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	<1.0
Alkalinity, Hydroxide (as CaCO3)	mg/L	-	-	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	<1.0
Alkalinity, Total (as CaCO3)	mg/L	-	-	1	230	83.7	104	109	107	103	4%	101
Ammonia, Total (as N)	mg/L	0.75	-	0.005	3.55	0.0798	<0.0050	<0.0050	<0.0050	<0.0050	-	<0.0050
Chloride (Cl)	mg/L	120	-	0.5	<5.0	<0.50	<0.50	<0.50	<0.50	<0.50	-	<0.50
Fluoride (F)	mg/L	0.12	-	0.02	<0.20	0.045	0.056	0.051	0.046	0.046	0%	0.046
Nitrate (as N)	mg/L	13	-	0.005	0.57	0.0293	0.0787	0.032	0.0495	0.0497	0%	0.0503
Nitrite (as N)	mg/L	0.06	-	0.001	0.02	0.0016	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010
Sulfate (SO4)	mg/L	-	-	0.5	748	332	44	50.3	20.6	20.7	0%	20.1
Cyanide, Weak Acid Diss	mg/L	-	0.1	0.005	0.0124	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	-	<0.0050
Cyanide, Total	mg/L	-	0.3	0.005	0.0479	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	-	<0.0050
Cyanate	mg/L	-	-	0.2	4.62	<0.20	<0.20	<0.20	<0.20	<0.20	-	<0.20
Thiocyanate (SCN)	mg/L	-	-	0.5	1.77	<0.50	<0.50	<0.50	<0.50	<0.50	-	<0.50
Aluminum (Al)-Total	mg/L	0.1	-	0.003	0.0238	2.33	0.0151	0.0064	0.008	0.0395	394%	0.009
Antimony (Sb)-Total	mg/L	-	0.15	0.0001	0.00059	0.00154	0.00045	0.00033	0.00011	0.0001	9%	0.0001
Arsenic (As)-Total	mg/L	0.005	-	0.0001	0.0406	0.0243	0.00119	0.00136	0.00029	0.00032	10%	0.00028
Barium (Ba)-Total	mg/L	-	1	0.00005	0.0633	0.0667	0.0912	0.0878	0.0959	0.0863	10%	0.0894
Beryllium (Be)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010
Bismuth (Bi)-Total	mg/L	-	-	0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050
Boron (B)-Total	mg/L	-	-	0.01	0.07	<0.010	<0.010	<0.010	<0.010	<0.010	-	<0.010
Cadmium (Cd)-Total	mg/L	0.000033	0.02	0.00001	0.00045	0.000207	0.000038	0.000085	0.000033	0.000034	3%	0.000036
Calcium (Ca)-Total	mg/L	-	-	0.05	261	93.3	40.1	40.9	32.2	30.9	4%	32.4
Chromium (Cr)-Total	mg/L	0.0089	0.04	0.0001	0.00034	0.00408	0.0001	0.00011	0.00012	0.00014	17%	<0.00010
Cobalt (Co)-Total	mg/L	-	-	0.0001	0.00588	0.00134	<0.00010	0.00012	<0.00010	<0.00010	-	<0.00010
Copper (Cu)-Total	mg/L	0.002	0.2	0.0005	0.00222	0.00625	0.00126	0.00124	0.00107	0.00122	14%	0.00115
Iron (Fe)-Total	mg/L	0.3	1	0.01	7.55	6.2	0.021	0.012	0.01	0.057	470%	0.011
Lead (Pb)-Total	mg/L	0.003	0.1	0.00005	0.000053	0.0079	<0.000050	<0.000050	<0.000050	0.000073	49%	<0.000050
Lithium (Li)-Total	mg/L	-	-	0.0005	0.0008	0.00183	0.00079	<0.00050	<0.00050	<0.00050	-	<0.00050
Magnesium (Mg)-Total	mg/L	-	-	0.1	65.3	19.4	13.5	14.7	11.3	10.7	5%	11.4
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	5.86	0.345	0.01	0.0574	0.0757	0.0797	5%	0.0833
Mercury (Hg)-Total	mg/L	0.000026	0.005	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010
Molybdenum (Mo)-Total	mg/L	0.0073	-	0.00005	0.000943	0.000509	0.000357	0.000301	0.000309	0.000333	8%	0.000344
Nickel (Ni)-Total	mg/L	0.1	0.3	0.0005	0.00211	0.00378	<0.00050	<0.00050	<0.00050	0.00051	4%	<0.00050
Phosphorus (P)-Total	mg/L	-	-	0.05	<0.050	0.051	<0.050	<0.050	<0.050	<0.050	-	<0.050
Potassium (K)-Total	mg/L	-	-	0.1	5.82	1.5	1.1	1.21	0.86	0.82	5%	0.82
Selenium (Se)-Total	mg/L	0.001	-	0.0001	0.00016	0.00012	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010
Silicon (Si)-Total	mg/L	-	-	0.05	6.77	6.45	6.86	7.07	6.64	6.39	4%	6.62
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	0.000023	0.000284	<0.000010	<0.000010	<0.000010	0.000019	111%	<0.000010
Sodium (Na)-Total	mg/L	-	-	0.05	32.1	2.45	4.19	4.59	3.08	2.93	5%	3.04
Strontium (Sr)-Total	mg/L	-	-	0.0002	0.853	0.319	0.355	0.343	0.345	0.323	6%	0.338
Sulfur (S)-Total	mg/L	-	-	0.5	255	79.3	15.9	17.9	7.44	7.27	2%	7.4
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	<0.000010	0.000059	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010
Tin (Sn)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010
Titanium (Ti)-Total	mg/L	-	-	0.01	<0.010	0.117	<0.010	<0.010	<0.010	<0.010	-	<0.010



Table E1. Water Quality Results for the April 14-15, 2014 Trip.

Analyte	Units	CCME-WATER-F-AL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0352-140414-008 WQ-DC-U 4/14/2014	0352-140414-012 WQ-DC-B 4/14/2014	0352-140414-007 WQ-VC-R+150 4/14/2014	0352-140415-006 WQ-VC-UMN 4/15/2014	0352-140415-004 WQ-VC-U 4/15/2014	0352-140415-002 WQ-VC-U-r 4/15/2014	QA/QC WQ-VC-U	0352-140415-003 WQ-VC-DBC 4/15/2014
Uranium (U)-Total	mg/L	0.015	-	0.00001	0.00207	0.00104	0.000786	0.000669	0.000662	0.000655	1%	0.000706
Vanadium (V)-Total	mg/L	-	-	0.001	0.0011	0.0084	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010
Zinc (Zn)-Total	mg/L	0.03	0.3	0.003	0.0075	0.0331	0.0035	0.0064	<0.0030	<0.0030	-	<0.0030
Dissolved Metals Filtration Location		-	-	n/a	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	-	FIELD
Aluminum (Al)-Dissolved	mg/L	0.005	-	0.001	0.0054	0.0031	0.0045	0.0079	0.0061	0.0067	10%	0.0058
Antimony (Sb)-Dissolved	mg/L	-	-	0.0001	0.00051	0.00041	0.00042	0.00031	<0.00010	<0.00010	-	<0.00010
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	0.0256	0.00283	0.00112	0.00135	0.00026	0.00026	0%	0.00028
Barium (Ba)-Dissolved	mg/L	-	-	0.00005	0.0568	0.0431	0.0911	0.0864	0.0943	0.0886	6%	0.0896
Beryllium (Be)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010
Bismuth (Bi)-Dissolved	mg/L	-	-	0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050
Boron (B)-Dissolved	mg/L	-	-	0.01	0.062	<0.010	<0.010	<0.010	<0.010	<0.010	-	<0.010
Cadmium (Cd)-Dissolved	mg/L	0.000033	-	0.00001	0.000134	0.000033	0.000032	0.000088	0.000034	0.000035	3%	0.000035
Calcium (Ca)-Dissolved	mg/L	-	-	0.05	262	198	37.7	39.8	30.8	31.5	2%	31.5
Chromium (Cr)-Dissolved	mg/L	0.0089	-	0.0001	0.00023	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	0.0058	0.00073	<0.00010	0.00011	<0.00010	<0.00010	-	<0.00010
Copper (Cu)-Dissolved	mg/L	0.002	-	0.0002	0.00114	0.00043	0.00115	0.00117	0.00101	0.00117	16%	0.00106
Iron (Fe)-Dissolved	mg/L	0.3	-	0.01	3.97	2.45	<0.010	<0.010	<0.010	<0.010	-	<0.010
Lead (Pb)-Dissolved	mg/L	0.001	-	0.00005	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	<0.000050
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	0.00051	0.00166	0.00101	<0.00050	<0.00050	0.00058	18%	<0.00050
Magnesium (Mg)-Dissolved	mg/L	-	-	0.1	69.4	74.5	13.5	14	10.8	10.9	1%	11
Manganese (Mn)-Dissolved	mg/L	-	-	0.00005	5.84	1.06	0.00929	0.0556	0.0735	0.0752	2%	0.081
Mercury (Hg)-Dissolved	mg/L	0.000026	-	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010
Molybdenum (Mo)-Dissolved	mg/L	0.073	-	0.00005	0.000827	0.000289	0.000317	0.000298	0.000283	0.00031	10%	0.000322
Nickel (Ni)-Dissolved	mg/L	0.1	-	0.0005	0.00205	0.00065	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050
Phosphorus (P)-Dissolved	mg/L	-	-	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	-	<0.050
Potassium (K)-Dissolved	mg/L	-	-	0.1	6.05	2.08	1.1	1.16	0.81	0.82	1%	0.84
Selenium (Se)-Dissolved	mg/L	0.001	-	0.0001	0.00015	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010
Silicon (Si)-Dissolved	mg/L	-	-	0.05	6.82	3.74	6.94	6.95	6.54	6.55	0%	6.59
Silver (Ag)-Dissolved	mg/L	0.0001	-	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010
Sodium (Na)-Dissolved	mg/L	-	-	0.05	32.3	8.86	4.14	4.61	3.02	2.92	3%	2.94
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	0.793	0.685	0.327	0.346	0.329	0.327	1%	0.325
Sulfur (S)-Dissolved	mg/L	-	-	0.5	255	202	15.5	17.6	7.29	7.47	2%	7.34
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010
Tin (Sn)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010
Titanium (Ti)-Dissolved	mg/L	-	-	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-	<0.010
Uranium (U)-Dissolved	mg/L	0.015	-	0.00001	0.0021	0.00271	0.00073	0.000652	0.000629	0.000646	3%	0.000685
Vanadium (V)-Dissolved	mg/L	-	-	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010
Zinc (Zn)-Dissolved	mg/L	0.03	-	0.001	0.007	0.0053	0.0033	0.0076	0.002	0.0016	20%	0.0014



Table E1. Water Quality Results for the April 14-15, 2014 Trip.

Analyte	Units	CCME-WATER-F-AL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0352-140414-FIELD-BLANK Field Blank 4/14/2014	0352-140415-TRAVEL-BLANK Travel Blank 4/15/2014
Temperature (in-situ)	°C	-	-	-	-	-
Specific Conductivity (in-situ)	µS/cm	-	-	-	-	-
pH (in-situ)	-	6.5 - 9.0	6.0 - 8.5	-	-	-
Turbidity (In-situ)	NTU	-	-	-	-	-
Dissolved Oxygen (in-situ)	mg/L	-	-	-	-	-
Colour, True	CU	15	-	5	-	-
Conductivity	µS/cm	-	-	2	<2.0	<2.0
Hardness (as CaCO3)	mg/L	-	-	0.5	<0.50	-
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1	5.21	5.31
Total Suspended Solids	mg/L	-	50	3	<3.0	<3.0
Total Dissolved Solids	mg/L	-	-	1	<1.0	<1.0
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1	<1.0	<1.0
Alkalinity, Carbonate (as CaCO3)	mg/L	-	-	1	<1.0	<1.0
Alkalinity, Hydroxide (as CaCO3)	mg/L	-	-	1	<1.0	<1.0
Alkalinity, Total (as CaCO3)	mg/L	-	-	1	<1.0	<1.0
Ammonia, Total (as N)	mg/L	0.75	-	0.005	<0.0050	<0.0050
Chloride (Cl)	mg/L	120	-	0.5	<0.50	<0.50
Fluoride (F)	mg/L	0.12	-	0.02	<0.020	<0.020
Nitrate (as N)	mg/L	13	-	0.005	<0.0050	<0.0050
Nitrite (as N)	mg/L	0.06	-	0.001	<0.0010	<0.0010
Sulfate (SO4)	mg/L	-	-	0.5	<0.50	<0.50
Cyanide, Weak Acid Diss	mg/L	-	0.1	0.005	<0.0050	<0.0050
Cyanide, Total	mg/L	-	0.3	0.005	<0.0050	<0.0050
Cyanate	mg/L	-	-	0.2	<0.20	<0.20
Thiocyanate (SCN)	mg/L	-	-	0.5	<0.50	<0.50
Aluminum (Al)-Total	mg/L	0.1	-	0.003	<0.0030	<0.0030
Antimony (Sb)-Total	mg/L	-	0.15	0.0001	<0.00010	<0.00010
Arsenic (As)-Total	mg/L	0.005	-	0.0001	<0.00010	<0.00010
Barium (Ba)-Total	mg/L	-	1	0.00005	<0.000050	<0.000050
Beryllium (Be)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010
Bismuth (Bi)-Total	mg/L	-	-	0.0005	<0.00050	<0.00050
Boron (B)-Total	mg/L	-	-	0.01	<0.010	<0.010
Cadmium (Cd)-Total	mg/L	0.000033	0.02	0.00001	<0.000010	<0.000010
Calcium (Ca)-Total	mg/L	-	-	0.05	<0.050	<0.050
Chromium (Cr)-Total	mg/L	0.0089	0.04	0.0001	<0.00010	<0.00010
Cobalt (Co)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010
Copper (Cu)-Total	mg/L	0.002	0.2	0.0005	<0.00050	<0.00050
Iron (Fe)-Total	mg/L	0.3	1	0.01	<0.010	<0.010
Lead (Pb)-Total	mg/L	0.003	0.1	0.00005	<0.000050	<0.000050
Lithium (Li)-Total	mg/L	-	-	0.0005	<0.00050	<0.00050
Magnesium (Mg)-Total	mg/L	-	-	0.1	<0.10	<0.10
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	<0.000050	<0.000050
Mercury (Hg)-Total	mg/L	0.000026	0.005	0.00001	<0.000010	<0.000010
Molybdenum (Mo)-Total	mg/L	0.0073	-	0.00005	<0.000050	<0.000050
Nickel (Ni)-Total	mg/L	0.1	0.3	0.0005	<0.00050	<0.00050
Phosphorus (P)-Total	mg/L	-	-	0.05	<0.050	<0.050
Potassium (K)-Total	mg/L	-	-	0.1	<0.10	<0.10
Selenium (Se)-Total	mg/L	0.001	-	0.0001	<0.00010	<0.00010
Silicon (Si)-Total	mg/L	-	-	0.05	<0.050	<0.050
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	<0.000010	<0.000010
Sodium (Na)-Total	mg/L	-	-	0.05	<0.050	<0.050
Strontium (Sr)-Total	mg/L	-	-	0.0002	<0.00020	<0.00020
Sulfur (S)-Total	mg/L	-	-	0.5	<0.50	<0.50
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	<0.000010	<0.000010
Tin (Sn)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010
Titanium (Ti)-Total	mg/L	-	-	0.01	<0.010	<0.010



Table E1. Water Quality Results for the April 14-15, 2014 Trip.

Analyte	Units	CCME-WATER-F-AL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0352-140414-FIELD-BLANK Field Blank 4/14/2014	0352-140415-TRAVEL-BLANK Travel Blank 4/15/2014
Uranium (U)-Total	mg/L	0.015	-	0.00001	<0.000010	<0.000010
Vanadium (V)-Total	mg/L	-	-	0.001	<0.0010	<0.0010
Zinc (Zn)-Total	mg/L	0.03	0.3	0.003	<0.0030	<0.0030
Dissolved Metals Filtration Location		-	-	n/a	FIELD	-
Aluminum (Al)-Dissolved	mg/L	0.005	-	0.001	<0.0010	-
Antimony (Sb)-Dissolved	mg/L	-	-	0.0001	<0.00010	-
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	<0.00010	-
Barium (Ba)-Dissolved	mg/L	-	-	0.00005	<0.000050	-
Beryllium (Be)-Dissolved	mg/L	-	-	0.0001	<0.00010	-
Bismuth (Bi)-Dissolved	mg/L	-	-	0.0005	<0.00050	-
Boron (B)-Dissolved	mg/L	-	-	0.01	<0.010	-
Cadmium (Cd)-Dissolved	mg/L	0.000033	-	0.00001	<0.000010	-
Calcium (Ca)-Dissolved	mg/L	-	-	0.05	<0.050	-
Chromium (Cr)-Dissolved	mg/L	0.0089	-	0.0001	<0.00010	-
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	<0.00010	-
Copper (Cu)-Dissolved	mg/L	0.002	-	0.0002	<0.00020	-
Iron (Fe)-Dissolved	mg/L	0.3	-	0.01	<0.010	-
Lead (Pb)-Dissolved	mg/L	0.001	-	0.00005	<0.000050	-
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	<0.00050	-
Magnesium (Mg)-Dissolved	mg/L	-	-	0.1	<0.10	-
Manganese (Mn)-Dissolved	mg/L	-	-	0.00005	<0.000050	-
Mercury (Hg)-Dissolved	mg/L	0.000026	-	0.00001	<0.000010	-
Molybdenum (Mo)-Dissolved	mg/L	0.073	-	0.00005	<0.000050	-
Nickel (Ni)-Dissolved	mg/L	0.1	-	0.0005	<0.00050	-
Phosphorus (P)-Dissolved	mg/L	-	-	0.05	<0.050	-
Potassium (K)-Dissolved	mg/L	-	-	0.1	<0.10	-
Selenium (Se)-Dissolved	mg/L	0.001	-	0.0001	<0.00010	-
Silicon (Si)-Dissolved	mg/L	-	-	0.05	<0.050	-
Silver (Ag)-Dissolved	mg/L	0.0001	-	0.00001	<0.000010	-
Sodium (Na)-Dissolved	mg/L	-	-	0.05	<0.050	-
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	<0.00020	-
Sulfur (S)-Dissolved	mg/L	-	-	0.5	<0.50	-
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001	<0.000010	-
Tin (Sn)-Dissolved	mg/L	-	-	0.0001	<0.00010	-
Titanium (Ti)-Dissolved	mg/L	-	-	0.01	<0.010	-
Uranium (U)-Dissolved	mg/L	0.015	-	0.00001	<0.000010	-
Vanadium (V)-Dissolved	mg/L	-	-	0.001	<0.0010	-
Zinc (Zn)-Dissolved	mg/L	0.03	-	0.001	<0.0010	-



Table E2. Summary of Water Quality Results for the May 8-9, 2014 Trip.

Analyte	Units	CCME-WATER-F-AL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0352-140509-018 WQ-DC-DX 9-May-14	0352-140509-022 WQ-MS-S-03** 9-May-14	0352-140509-023 WQ-MS-S-08 9-May-14	0352-140509-024 WQ-NW-SEEP-02** 9-May-14	0352-140509-021 WQ-DC-DX+105 9-May-14	0352-140509-019 WQ-DC-D1b 9-May-14	0352-140509-017 WQ-DESS-03 9-May-14	0352-140509-008 WQ-BC 9-May-14	0352-140509-003 WQ-DC-R 9-May-14	0352-140509-004 WQ-DC-R-r 9-May-14	QA/QC WQ-DC-R
Temperature (in-situ)	°C	-	-	-	0.1	1.2	1.8	1.9	1.4	0	1.9	1.9	0	-	-
Specific Conductivity (in-situ)	µS/cm	-	-	-	75.4	1041	292.6	591.3	95.3	468.5	97.2	73.9	436	-	-
pH (in-situ)	pH	6.5 - 9.0	6.0 - 8.5	-	7.23	7.02	6.95	7.55	7.54	7.95	6.85	7.42	7.73	-	-
Turbidity (In-situ)	NTU	-	-	-	4.81	6.4	-	7.63	11.33	17.21	n/a**	498	11.54	-	-
Dissolved Oxygen (in-situ)	mg/L	-	-	-	-	-	0	-	-	-	-	-	-	-	-
Colour, True	CU	15	-	5	-	-	-	-	-	-	-	-	-	-	-
Conductivity	µS/cm	-	-	2	79.8	1060	1760	615	99.6	483	37.5	79.5	459	457	0%
Hardness (as CaCO3)	mg/L	-	-	0.5	38.6	655	1170	322	45.3	255	21.4	42	254	247	3%
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1	7.42	7.57	8.12	7.42	7.32	7.93	6.17	7.46	7.85	7.85	0%
Total Suspended Solids	mg/L	-	50	3	106	36.1	28.2	9.3	11.8	11.8	<3.0	598	10	16.3	63%
Total Dissolved Solids	mg/L	-	-	1	44.9	793	1470	429	55.5	317	18.2	45.1	306	300	2%
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1	22.2	242	314	45	17.4	78.6	5.2	24.9	64.8	64.7	0%
Alkalinity, Carbonate (as CaCO3)	mg/L	-	-	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Alkalinity, Hydroxide (as CaCO3)	mg/L	-	-	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Alkalinity, Total (as CaCO3)	mg/L	-	-	1	22.2	242	314	45	17.4	78.6	5.2	24.9	64.8	64.7	0%
Ammonia, Total (as N)	mg/L	0.75	-	0.005	0.0083	0.0852	0.033	0.0146	0.0054	0.0627	0.008	0.0175	0.343	0.34	1%
Bromide (Br)	mg/L	-	-	0.05	<0.050	<0.50	<1.0	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	-
Chloride (Cl)	mg/L	120	-	0.5	<0.50	<5.0	<10	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	-
Fluoride (F)	mg/L	0.12	-	0.02	0.037	<0.20	<0.40	0.186	0.043	0.084	0.027	0.041	0.05	0.05	0%
Nitrate (as N)	mg/L	13	-	0.005	<0.0050	<0.050	0.21	<0.0050	0.0054	0.0123	<0.0050	0.0287	0.0559	0.0551	1%
Nitrite (as N)	mg/L	0.06	-	0.001	<0.0010	<0.010	<0.020	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.003	0.0025	17%
Sulfate (SO4)	mg/L	-	-	0.5	14.7	409	891	281	25.7	177	4.9	12.5	170	167	2%
Cyanide, Weak Acid Diss	mg/L	-	0.1	0.005	<0.0050	<0.0050	0.0062	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	-
Cyanide, Total	mg/L	-	0.3	0.005	<0.0050	<0.0050	0.0077	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	-
Cyanate	mg/L	-	-	0.2	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	-
Thiocyanate (SCN)	mg/L	-	-	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	1.27	<0.50	0.54	<0.50	10%
Aluminum (Al)-Total	mg/L	0.1	-	0.003	1.03	0.272	0.349	0.144	0.473	0.235	0.274	9.59	0.217	0.199	8%
Antimony (Sb)-Total	mg/L	-	0.15	0.0001	0.00104	0.0147	0.0487	0.00272	0.00244	0.00789	<0.00010	0.00149	0.00161	0.00154	4%
Arsenic (As)-Total	mg/L	0.005	-	0.0001	0.0155	0.0984	0.111	0.0143	0.0153	0.047	0.00127	0.0514	0.0143	0.0134	6%
Barium (Ba)-Total	mg/L	1	-	0.00005	0.0319	0.0365	0.029	0.0184	0.0243	0.0182	0.0269	0.225	0.0335	0.0328	2%
Beryllium (Be)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00036	<0.00010	<0.00010	-
Bismuth (Bi)-Total	mg/L	-	-	0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00071	<0.00050	<0.00050	-
Boron (B)-Total	mg/L	-	-	0.01	<0.010	<0.010	0.026	<0.010	<0.010	<0.010	0.013	<0.010	0.014	0.012	14%
Cadmium (Cd)-Total	mg/L	0.000033	0.02	0.00001	0.000078	0.00443	0.0156	0.00159	0.00167	0.00183	0.000058	0.00117	0.000172	0.000168	2%
Calcium (Ca)-Total	mg/L	-	-	0.05	11.2	167	235	98.2	13.2	65.4	6.29	16	62.3	61.1	2%
Chromium (Cr)-Total	mg/L	0.0089	0.04	0.0001	0.00134	0.00029	0.00064	0.00018	0.00055	0.00034	0.00028	0.0126	0.00044	0.00038	14%
Cobalt (Co)-Total	mg/L	-	-	0.0001	0.00076	0.00107	0.00111	0.00028	0.00029	0.00036	<0.00010	0.0062	0.00097	0.00096	1%
Copper (Cu)-Total	mg/L	0.002	0.2	0.0005	0.00378	0.0131	0.0231	0.00569	0.00692	0.00502	0.00321	0.0223	0.00289	0.00278	4%
Iron (Fe)-Total	mg/L	0.3	1	0.01	1.91	4.11	1.06	0.4	0.834	1.69	0.1	15.7	1.71	1.61	6%
Lead (Pb)-Total	mg/L	0.003	0.1	0.00005	0.00221	0.00338	0.0518	0.00689	0.0134	0.0134	<0.000050	0.0443	0.00116	0.0011	5%
Lithium (Li)-Total	mg/L	-	-	0.0005	0.00141	0.00792	0.0106	<0.00050	<0.00050	0.00204	<0.00050	0.00593	0.00109	0.00108	1%
Magnesium (Mg)-Total	mg/L	-	-	0.1	3.14	54.9	131	16.8	3.18	21.6	1.26	6.01	20.4	20	2%
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	0.0734	1.64	0.301	0.255	0.047	0.466	0.00183	0.782	0.753	0.741	2%
Mercury (Hg)-Total	mg/L	0.000026	0.005	0.00001	0.000017	<0.000010	0.000015	0.000013	0.000014	<0.000010	0.000014	0.000038	<0.000010	<0.000010	-
Molybdenum (Mo)-Total	mg/L	0.0073	-	0.00005	0.000071	0.000303	0.000455	0.000094	0.000074	0.000167	<0.000050	0.000981	0.000213	0.000228	7%
Nickel (Ni)-Total	mg/L	0.1	0.3	0.0005	0.00114	0.00193	0.00314	<0.00050	0.00108	0.00103	0.00116	0.00872	0.00119	0.00112	6%
Phosphorus (P)-Total	mg/L	-	-	0.05	0.165	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.537	<0.050	<0.050	-
Potassium (K)-Total	mg/L	-	-	0.1	2.62	3.35	5.67	1.85	2.02	2.24	1.43	2.53	2.18	2.18	0%
Selenium (Se)-Total	mg/L	0.001	-	0.0001	<0.00010	<0.00010	0.00298	0.00015	<0.00010	0.00011	<0.00010	0.00012	0.0001	<0.00010	10%
Silicon (Si)-Total	mg/L	-	-	0.05	3.14	6.79	3.75	2.85	2.67	3.24	1.88	18	2.64	2.6	2%
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	0.000048	0.00013	0.00255	0.000167	0.000172	0.000235	<0.000010	0.00042	0.000043	0.000036	16%
Sodium (Na)-Total	mg/L	-	-	0.05	0.654	4.79	6.15	0.865	0.583	1.73	0.558	1.78	4.69	4.3	8%
Strontium (Sr)-Total	mg/L	-	-	0.0002	0.0392	0.387	0.604	0.214	0.0406	0.169	0.0311	0.115	0.173	0.175	1%
Sulfur (S)-Total	mg/L	-	-	0.5	4.86	129	266	89.8	57.2	57.2	1.83	4.45	56.5	55.4	2%
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	0.000036	0.00009	0.000368	0.000032	0.000031	0.000034	<0.000010	0.000155	<0.000010	<0.000010	-
Tin (Sn)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00018	<0.00010	<0.00010	-
Titanium (Ti)-Total	mg/L	-	-	0.01	0.048	0.016	0.016	<0.010	0.016	<0.010	<0.010	0.347	<0.010	<0.010	-
Uranium (U)-Total	mg/L	0.015	-	0.00001	0.000086	0.00326	0.00472	0.000212	0.000091	0.000743	<0.000010	0.00156	0.000557	0.000555	0%
Vanadium (V)-Total	mg/L	-	-	0.001	0.0042	0.0013	0.0016	<0.0010	0.0016	<0.0010	<0.0010	0.0284	0.0012	0.0012	0%
Zinc (Zn)-Total	mg/L	0.03	0.3	0.003	0.0107	0.824	1.48	0.068	0.218	0.344	0.0082	0.0975	0.0269	0.0276	3%
Dissolved Metals Filtration Location				n/a	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	LAB
Aluminum (Al)-Dissolved	mg/L	0.005	-	0.001	0.0558	0.0023	0.0067	0.0038	0.0883	0.0191	0.28	0.147	0.0821	0.0814	1%
Antimony (Sb)-Dissolved	mg/L	-	-	0.0001	0.00066	0.0153	0.0428	0.00187	0.00123	0.00539	<0.00010	0.00018	0.00143	0.00146	2%
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	0.00429	0.0367	0.0585	0.006	0.00516	0.0102	0.00132	0.0016	0.00893	0.00886	1%
Barium (Ba)-Dissolved	mg/L	-	-	0.00005	0.0158	0.0272	0.0227	0.0153	0.0188	0.0136	0.028	0.0301	0.0321	0.0318	1%
Beryllium (Be)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-
Bismuth (Bi)-Dissolved	mg/L	-	-	0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-
Boron (B)-Dissolved	mg/L	-	-	0.01	<0.010	<0.010	0.025	<0.010	<0.010	0.014	<0.010	<0.010	0.012	0.012	0%
Cadmium (Cd)-Dissolved	mg/L	0.000033	-	0.00001	0.00003	0.000369	0.0154	0.00142	0.00165	0.000924	0.000057	0.000103	0.000106	0.000102	4%
Calcium (Ca)-Dissolved	mg/L	-	-	0.05	10.7	169	241	101	13.1	66.4	6.43	12.1	65.9	64	3%
Chromium (Cr)-Dissolved	mg/L	0.0089	-	0.0001	0.00011	<0.00010	0.0001	<0.00010	0.0001	<0.00010	0.00019	0.00017	0.00014	<0.00010	36%



Table E2. Summary of Water Quality Results for the May 8-9, 2014 Trip.

Analyte	Units	CCME-WATER-F-AL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0352-140509-018 WQ-DC-DX 9-May-14	0352-140509-022 WQ-MS-S-03** 9-May-14	0352-140509-023 WQ-MS-S-08 9-May-14	0352-140509-024 WQ-NW-SEEP-02** 9-May-14	0352-140509-021 WQ-DC-DX+105 9-May-14	0352-140509-019 WQ-DC-D1b 9-May-14	0352-140509-017 WQ-DESS-03 9-May-14	0352-140509-008 WQ-BC 9-May-14	0352-140509-003 WQ-DC-R 9-May-14	0352-140509-004 WQ-DC-R-r 9-May-14	QA/QC WQ-DC-R
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	0.00011	0.00078	0.00091	0.00019	<0.00010	0.00022	<0.00010	0.00019	0.00091	0.00091	0%
Copper (Cu)-Dissolved	mg/L	0.002	-	0.0002	0.00176	0.00026	0.0148	0.00356	0.00561	0.00285	0.00323	0.00373	0.00206	0.00207	0%
Iron (Fe)-Dissolved	mg/L	0.3	-	0.01	0.082	2.92	0.012	0.013	0.1	0.214	0.1	0.211	1.02	0.991	3%
Lead (Pb)-Dissolved	mg/L	0.001	-	0.00005	0.000071	<0.000050	0.00252	0.000076	0.000351	0.000261	<0.000050	0.000612	0.000206	0.00021	2%
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	0.00065	0.00857	0.0105	<0.00050	<0.00050	0.00259	<0.00050	0.0005	0.0012	0.00131	9%
Magnesium (Mg)-Dissolved	mg/L	-	-	0.1	2.86	56.8	138	17.1	3.07	21.7	1.3	2.87	21.7	21.1	3%
Manganese (Mn)-Dissolved	mg/L	-	-	0.00005	0.0259	1.48	0.293	0.211	0.0293	0.412	0.0017	0.0805	0.757	0.76	0%
Mercury (Hg)-Dissolved	mg/L	0.000026	-	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000015	<0.000010	<0.000010	<0.000010	-
Molybdenum (Mo)-Dissolved	mg/L	0.073	-	0.00005	0.000052	0.000312	0.00042	0.000075	0.000052	0.000119	<0.000050	0.000277	0.000214	0.000207	3%
Nickel (Ni)-Dissolved	mg/L	0.1	-	0.0005	<0.00050	0.00161	0.00288	<0.00050	0.00098	0.0008	0.00127	0.00087	0.00104	0.00096	8%
Phosphorus (P)-Dissolved	mg/L	-	-	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	-
Potassium (K)-Dissolved	mg/L	-	-	0.1	2.54	3.34	5.77	1.8	1.93	2.24	1.46	0.99	2.29	2.3	0%
Selenium (Se)-Dissolved	mg/L	0.001	-	0.0001	<0.00010	<0.00010	0.00259	0.00013	<0.00010	0.00013	<0.00010	<0.00010	<0.00010	0.0001	11%
Silicon (Si)-Dissolved	mg/L	-	-	0.05	1.84	6.4	3.26	2.64	1.98	2.85	1.95	2.56	2.51	2.49	1%
Silver (Ag)-Dissolved	mg/L	0.0001	-	0.00001	0.000024	<0.000010	0.00102	0.000018	0.000026	0.000014	<0.000010	0.000013	<0.000010	<0.000010	-
Sodium (Na)-Dissolved	mg/L	-	-	0.05	0.602	4.37	6.24	0.852	0.635	1.69	0.57	1.03	4.62	4.61	0%
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	0.0364	0.412	0.613	0.213	0.0376	0.156	0.0312	0.0736	0.181	0.179	1%
Sulfur (S)-Dissolved	mg/L	-	-	0.5	5.01	128	267	89.7	8.39	57.4	1.99	4.53	59.2	58	2%
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001	0.000012	0.000079	0.000335	0.000012	<0.000010	0.000019	<0.000010	<0.000010	<0.000010	<0.000010	-
Tin (Sn)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-
Titanium (Ti)-Dissolved	mg/L	-	-	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-
Uranium (U)-Dissolved	mg/L	0.015	-	0.00001	0.00003	0.00358	0.00463	0.00021	0.000069	0.000695	<0.000010	0.000296	0.000558	0.000548	2%
Vanadium (V)-Dissolved	mg/L	-	-	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-
Zinc (Zn)-Dissolved	mg/L	0.03	-	0.001	0.0039	0.722	1.51	0.0551	0.242	0.283	0.0083	0.0026	0.0244	0.0236	3%

Applied Guidelines: Federal CCME Canadian Environmental Quality Guidelines (May 2014), CCME: Freshwater Aquatic Life
Mount Nansen Effluent Discharge Standards

Color Key:

Exceeds CCME Guideline
Exceeds MN Effluent Discharge Standards
Exceeds both CCME and MN Standards
Exceeds 10% difference threshold for QA/QC replicate samples

Notes:

- * Field turbidity was not collected due to insufficient sample
- ** Freshet visit samples only

Note: For those guidelines that are hardness dependent (Cd, Cu, Pb, Ni), the most conservative guideline has been applied.
Same for guidelines that are pH and temperature dependent (Ammonia and Aluminum), unless otherwise noted.



Table E2. Summary of Water Quality Results for the May 8-9, 2014 Trip.

Analyte	Units	CCME-WATER-F-AL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0352-140509-005 WQ-VC-DBC 9-May-14	0352-140509-007 WQ-VC-U 9-May-14	0352-140509-002 WQ-VC-UMN 9-May-14	0352-140509-001 WQ-VC-R+150 9-May-14	0352-140509-034 WQ-PW 9-May-14	0352-140509-014 WQ-DESS-01 9-May-14	0352-140509-010 WQ-DC-B 9-May-14	0352-140509-009 WQ-DC-U 9-May-14	0352-140509-016 WQ-PC-U 9-May-14	0352-140509-099 WQ-PC-D 9-May-14	0352-140509-013 WQ-TP 9-May-14
Temperature (in-situ)	°C	-	-	-	0.6	0.6	0.1	0	1.1	1.9	0.2	1.4	0.12	0.7	2.5
Specific Conductivity (in-situ)	µS/cm	-	-	-	55.2	51.4	71.4	67.2	354.5	284	393	433.6	72	76	166.4
pH (in-situ)	pH	6.5 - 9.0	6.0 - 8.5	-	7.37	7.34	7.27	7.07	7.4	5.93	7.56	7.82	7.27	7.37	7.76
Turbidity (In-situ)	NTU	-	-	-	21.2	12.58	20.5	15.53	6.32	n/a**	26.7	65.6	8.23	12.66	14.76
Dissolved Oxygen (in-situ)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Colour, True	CU	15	-	5	-	-	-	-	<5.0	-	-	-	-	-	-
Conductivity	µS/cm	-	-	2	57.1	54.1	74.8	69.8	361	581	429	462	75.6	80.8	173
Hardness (as CaCO3)	mg/L	-	-	0.5	32.3	30.5	39.5	36.7	199	286	222	236	36.8	39.4	74.1
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1	7.37	7.38	7.47	7.45	8.11	5.5	7.8	7.89	7.26	7.32	7.18
Total Suspended Solids	mg/L	-	50	3	81.4	51.8	67.2	62.9	-	26.2	901	739	3.7	11.1	16.1
Total Dissolved Solids	mg/L	-	-	1	32	29.8	42.1	39.3	217	395	274	300	40.9	44.3	102
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1	22.5	22.2	24.9	23.9	-	1.4	65.1	68.8	15.2	15.1	9.8
Alkalinity, Carbonate (as CaCO3)	mg/L	-	-	1	<1.0	<1.0	<1.0	<1.0	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Hydroxide (as CaCO3)	mg/L	-	-	1	<1.0	<1.0	<1.0	<1.0	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Total (as CaCO3)	mg/L	-	-	1	22.5	22.2	24.9	23.9	168	1.4	65.1	68.8	15.2	15.1	9.8
Ammonia, Total (as N)	mg/L	0.75	-	0.005	0.006	0.0058	0.0125	0.012	-	0.0146	0.0739	0.202	0.008	0.0054	0.0775
Bromide (Br)	mg/L	-	-	0.05	<0.050	<0.050	<0.050	<0.050	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Chloride (Cl)	mg/L	120	-	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	mg/L	0.12	-	0.02	0.03	0.031	0.032	0.032	0.112	0.032	0.051	0.055	0.029	0.032	0.051
Nitrate (as N)	mg/L	13	-	0.005	0.0311	0.0266	0.0293	0.029	0.132	0.0496	0.0156	0.0428	<0.0050	0.0051	0.0253
Nitrite (as N)	mg/L	0.06	-	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0022	<0.0010	<0.0010	<0.0010
Sulfate (SO4)	mg/L	-	-	0.5	4.82	3.54	10.8	9.56	34.8	289	154	171	16.1	18.7	65.2
Cyanide, Weak Acid Diss	mg/L	-	0.1	0.005	<0.0050	<0.0050	<0.0050	<0.0050	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Cyanide, Total	mg/L	-	0.3	0.005	<0.0050	<0.0050	<0.0050	<0.0050	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Cyanate	mg/L	-	-	0.2	<0.20	<0.20	<0.20	<0.20	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20
Thiocyanate (SCN)	mg/L	-	-	0.5	<0.50	<0.50	<0.50	<0.50	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Aluminum (Al)-Total	mg/L	0.1	-	0.003	1.33	0.761	1.05	0.865	<0.010	0.531	6.05	5.38	0.22	0.346	0.254
Antimony (Sb)-Total	mg/L	-	0.15	0.0001	0.00027	0.00012	0.00031	0.00027	<0.00050	0.00014	0.00252	0.00261	0.00041	0.00145	0.0143
Arsenic (As)-Total	mg/L	0.005	-	0.0001	0.00534	0.00159	0.00514	0.00436	0.00035	0.00266	0.0345	0.0456	0.00461	0.0121	0.0804
Barium (Ba)-Total	mg/L	-	1	0.00005	0.0544	0.0428	0.0505	0.0476	0.087	0.0302	0.121	0.123	0.0241	0.024	0.00939
Beryllium (Be)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	0.00019	0.00017	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total	mg/L	-	-	0.0005	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00073
Boron (B)-Total	mg/L	-	-	0.01	<0.010	<0.010	<0.010	<0.010	<0.10	<0.010	<0.010	0.013	<0.010	<0.010	<0.010
Cadmium (Cd)-Total	mg/L	0.000033	0.02	0.00001	0.000142	0.000076	0.000142	0.000132	<0.00020	0.00582	0.000485	0.000578	0.00006	0.000533	0.00239
Calcium (Ca)-Total	mg/L	-	-	0.05	9.05	8.12	11	9.73	45.7	71	68.2	68.4	10.3	11.1	24.2
Chromium (Cr)-Total	mg/L	0.0089	0.04	0.0001	0.00166	0.00101	0.00137	0.00123	<0.0020	0.00063	0.00849	0.00808	0.00026	0.00039	0.00029
Cobalt (Co)-Total	mg/L	-	-	0.0001	0.00091	0.00058	0.0008	0.00075	-	0.00061	0.004	0.00398	0.00017	0.00022	0.0004
Copper (Cu)-Total	mg/L	0.002	0.2	0.0005	0.00586	0.00486	0.00549	0.00511	<0.0010	0.00327	0.0109	0.0131	0.00235	0.0103	0.0388
Iron (Fe)-Total	mg/L	0.3	1	0.01	2.12	1.22	1.82	1.56	<0.030	0.731	11.7	13.5	0.439	0.658	1.08
Lead (Pb)-Total	mg/L	0.003	0.1	0.00005	0.00401	0.00122	0.00354	0.00299	0.00057	0.000513	0.00896	0.011	0.00124	0.00674	0.0596
Lithium (Li)-Total	mg/L	-	-	0.0005	0.00118	0.00063	0.00069	0.00069	-	0.00124	0.00481	0.0044	<0.00050	<0.00050	<0.00050
Magnesium (Mg)-Total	mg/L	-	-	0.1	2.76	2.51	3.42	2.98	20.6	25.3	23.3	22.4	2.3	2.52	2.75
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	0.0997	0.0533	0.117	0.11	<0.0020	0.581	0.674	0.88	0.0436	0.0385	0.548
Mercury (Hg)-Total	mg/L	0.000026	0.005	0.00001	0.000015	0.000013	0.000013	0.000013	<0.00020	0.00001	0.000014	0.000019	0.00001	0.000012	0.000018
Molybdenum (Mo)-Total	mg/L	0.0073	-	0.00005	0.000266	0.000204	0.000266	0.000256	-	<0.000050	0.000286	0.000338	<0.000050	0.000064	0.000328
Nickel (Ni)-Total	mg/L	0.1	0.3	0.0005	0.00168	0.00123	0.0016	0.00149	-	0.00386	0.00776	0.00736	0.00077	0.00083	0.00098
Phosphorus (P)-Total	mg/L	-	-	0.05	0.099	0.073	0.079	0.073	-	<0.050	0.622	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Total	mg/L	-	-	0.1	1.11	0.97	1.15	1.05	0.85	1.68	2.69	2.5	1	1.04	1.18
Selenium (Se)-Total	mg/L	0.001	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.0010	<0.00010	0.0002	0.00023	<0.00010	<0.00010	<0.00010
Silicon (Si)-Total	mg/L	-	-	0.05	4.12	3.07	3.81	3.26	-	2.84	11.3	10.2	2.46	2.72	0.922
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	0.000052	0.00002	0.000055	0.000044	-	0.000028	0.000149	0.000152	0.000029	0.000113	0.00122
Sodium (Na)-Total	mg/L	-	-	0.05	0.875	0.761	0.999	0.938	5	1.52	2.42	3.29	0.988	1	0.805
Strontium (Sr)-Total	mg/L	-	-	0.0002	0.0852	0.0827	0.0912	0.082	-	0.185	0.208	0.211	0.0682	0.0719	0.0562
Sulfur (S)-Total	mg/L	-	-	0.5	1.91	1.41	3.72	3.2	-	91.5	51.5	55.1	5.14	5.96	21.4
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	0.000021	0.00001	0.000017	0.000017	-	0.000014	0.000068	0.000078	<0.000010	0.000017	0.000065
Tin (Sn)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	0.00011	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total	mg/L	-	-	0.01	0.051	0.027	0.04	0.034	-	0.011	0.279	0.245	<0.010	<0.010	<0.010
Uranium (U)-Total	mg/L	0.015	-	0.00001	0.000392	0.00032	0.000384	0.000335	0.00183	0.000037	0.000925	0.00102	0.0001	0.00009	0.000074
Vanadium (V)-Total	mg/L	-	-	0.001	0.004	0.0022	0.0031	0.0028	-	0.0015	0.0182	0.0186	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Total	mg/L	0.03	0.3	0.003	0.0138	0.0073	0.0125	0.0109	<0.050	1.86	0.0933	0.0988	0.0065	0.0502	0.257
Dissolved Metals Filtration Location				n/a	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD
Aluminum (Al)-Dissolved	mg/L	0.005	-	0.001	0.145	0.138	0.124	0.131	-	0.169	0.0474	0.047	0.141	0.127	0.0452
Antimony (Sb)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00010	0.00013	0.00012	-	<0.00010	0.0017	0.00156	0.00031	0.00058	0.00633
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	0.0006	0.00037	0.00084	0.00084	-	0.00527	0.00474	0.00527	0.00186	0.00271	0.0156
Barium (Ba)-Dissolved	mg/L	-	-	0.00005	0.0312	0.0318	0.0313	0.0309	-	0.0255	0.0226	0.0249	0.0236	0.0208	0.00453
Beryllium (Be)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Dissolved	mg/L	-	-	0.0005	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Dissolved	mg/L	-	-	0.01	<0.010	<0.010	<0.010	<0.010	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved	mg/L	0.000033	-	0.00001	0.000044	0.000034	0.000047	0.000048	-	0.00613	0.000105	0.000104	0.000038	0.000411	0.00178
Calcium (Ca)-Dissolved	mg/L	-	-	0.05	8.81	8.21	10.7	9.92	-	72.7	55.7	60.3	10.8	11.5	25
Chromium (Cr)-Dissolved	mg/L	0.0089	-	0.0001	0.0001	0.00016	0.00013	0.00012	-	<0.00010	<0.00010	<0.00010	0.00017	0.00012	<0.00010



Table E2. Summary of Water Quality Results for the May 8-9, 2014 Trip.

Analyte	Units	CCME-WATER-F-AL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0352-140509-005 WQ-VC-DBC 9-May-14	0352-140509-007 WQ-VC-U 9-May-14	0352-140509-002 WQ-VC-UMN 9-May-14	0352-140509-001 WQ-VC-R+150 9-May-14	0352-140509-034 WQ-PW 9-May-14	0352-140509-014 WQ-DESS-01 9-May-14	0352-140509-010 WQ-DC-B 9-May-14	0352-140509-009 WQ-DC-U 9-May-14	0352-140509-016 WQ-PC-U 9-May-14	0352-140509-099 WQ-PC-D 9-May-14	0352-140509-013 WQ-TP 9-May-14
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	0.00017	0.00016	0.00018	0.0002	-	0.00051	0.00036	0.00055	0.00011	<0.00010	0.00031
Copper (Cu)-Dissolved	mg/L	0.002	-	0.0002	0.00338	0.00327	0.00321	0.00321	-	0.00191	0.00134	0.00161	0.00219	0.00887	0.0241
Iron (Fe)-Dissolved	mg/L	0.3	-	0.01	0.234	0.234	0.265	0.286	-	0.228	0.58	0.661	0.189	0.179	0.121
Lead (Pb)-Dissolved	mg/L	0.001	-	0.00005	0.00007	<0.000050	0.0001	0.000091	-	0.000075	0.000176	0.00016	0.000097	0.000546	0.00233
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	0.00056	<0.00050	<0.00050	<0.00050	-	0.00134	0.00156	0.00145	<0.00050	<0.00050	0.00053
Magnesium (Mg)-Dissolved	mg/L	-	-	0.1	2.5	2.42	3.13	2.89	-	25.3	20.2	20.7	2.39	2.58	2.82
Manganese (Mn)-Dissolved	mg/L	-	-	0.00005	0.0323	0.0218	0.0432	0.0469	-	0.615	0.442	0.574	0.0364	0.0174	0.497
Mercury (Hg)-Dissolved	mg/L	0.000026	-	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	mg/L	0.073	-	0.00005	0.000128	0.000128	0.000165	0.000139	-	<0.000050	0.000134	0.000167	<0.000050	<0.000050	0.000326
Nickel (Ni)-Dissolved	mg/L	0.1	-	0.0005	0.0007	0.00069	0.00068	0.00078	-	0.0036	0.00064	0.00073	0.00073	0.0007	0.00084
Phosphorus (P)-Dissolved	mg/L	-	-	0.05	<0.050	<0.050	<0.050	<0.050	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Dissolved	mg/L	-	-	0.1	0.97	0.93	1.05	0.95	-	1.59	1.79	1.81	1.02	1.05	1.03
Selenium (Se)-Dissolved	mg/L	0.001	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Silicon (Si)-Dissolved	mg/L	-	-	0.05	2.32	2.27	2.32	2.27	-	2.4	2.11	2.23	2.4	2.48	0.516
Silver (Ag)-Dissolved	mg/L	0.0001	-	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	0.000014	0.000018	0.000103
Sodium (Na)-Dissolved	mg/L	-	-	0.05	0.856	0.762	0.946	0.935	-	1.57	1.88	1.76	1.04	1.03	0.831
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	0.0691	0.0808	0.0869	0.0736	-	0.2	0.158	0.178	0.071	0.0692	0.0592
Sulfur (S)-Dissolved	mg/L	-	-	0.5	1.93	1.49	3.85	3.43	-	97.8	52.4	57.4	5.44	6.16	22.2
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000033
Tin (Sn)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved	mg/L	-	-	0.01	<0.010	<0.010	<0.010	<0.010	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Dissolved	mg/L	0.015	-	0.00001	0.000178	0.000184	0.000218	0.000187	-	<0.000010	0.000572	0.000637	0.000096	0.000078	0.000057
Vanadium (V)-Dissolved	mg/L	-	-	0.001	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	mg/L	0.03	-	0.001	0.0038	0.0026	0.003	0.003	-	1.98	0.0283	0.0212	0.0056	0.0403	0.221



Table E2. Summary of Water Quality Results for the May 8-9, 2014 Trip.

Analyte	Units	CCME-WATER-F-AL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0352-140509-011 WQ-SEEP 9-May-14	0352-140509-012 WQ-SEEP-r 9-May-14	QA/QC WQ-SEEP	0352-140509-020 WQ-ET-01** 9-May-14	0352-140509-TRAVEL-BLANK TRAVEL BLANK 9-May-14
Temperature (in-situ)	°C	-	-	-	2.8	-	-	0.8	-
Specific Conductivity (in-situ)	µS/cm	-	-	-	980	-	-	63.5	-
pH (in-situ)	pH	6.5 - 9.0	6.0 - 8.5	-	7.12	-	-	6.6	-
Turbidity (In-situ)	NTU	-	-	-	11.41	-	-	n/a**	-
Dissolved Oxygen (in-situ)	mg/L	-	-	-	-	-	-	-	-
Colour, True	CU	15	-	5	-	-	-	-	-
Conductivity	µS/cm	-	-	2	1010	1000	1%	67.7	<2.0
Hardness (as CaCO3)	mg/L	-	-	0.5	502	513	2%	32.4	-
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1	7.54	7.52	0%	7.68	5.64
Total Suspended Solids	mg/L	-	50	3	20.6	21.9	6%	85.4	<3.0
Total Dissolved Solids	mg/L	-	-	1	722	786	9%	36.2	<1.0
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1	131	131	0%	30.2	<1.0
Alkalinity, Carbonate (as CaCO3)	mg/L	-	-	1	<1.0	<1.0	-	<1.0	<1.0
Alkalinity, Hydroxide (as CaCO3)	mg/L	-	-	1	<1.0	<1.0	-	<1.0	<1.0
Alkalinity, Total (as CaCO3)	mg/L	-	-	1	131	131	0%	30.2	<1.0
Ammonia, Total (as N)	mg/L	0.75	-	0.005	2.9	3.02	4%	0.0116	0.0241
Bromide (Br)	mg/L	-	-	0.05	<0.050	<0.50	-	<0.050	<0.050
Chloride (Cl)	mg/L	120	-	0.5	0.87	<5.0	360%	<0.50	<0.50
Fluoride (F)	mg/L	0.12	-	0.02	0.085	<0.20	124%	0.054	<0.020
Nitrate (as N)	mg/L	13	-	0.005	0.372	0.442	19%	0.0186	<0.0050
Nitrite (as N)	mg/L	0.06	-	0.001	0.0146	0.024	64%	0.0011	<0.0010
Sulfate (SO4)	mg/L	-	-	0.5	419	479	14%	4.45	<0.50
Cyanide, Weak Acid Diss	mg/L	-	0.1	0.005	<0.0050	<0.0050	-	<0.0050	<0.0050
Cyanide, Total	mg/L	-	0.3	0.005	0.0435	0.0604	39%	<0.0050	<0.0050
Cyanate	mg/L	-	-	0.2	<0.20	0.39	105%	0.3	<0.20
Thiocyanate (SCN)	mg/L	-	-	0.5	1.98	1.94	2%	<0.50	<0.50
Aluminum (Al)-Total	mg/L	0.1	-	0.003	0.151	0.142	6%	2.24	<0.0030
Antimony (Sb)-Total	mg/L	-	0.15	0.0001	0.00077	0.00073	5%	0.00176	<0.00010
Arsenic (As)-Total	mg/L	0.005	-	0.0001	0.0391	0.0379	3%	0.0306	<0.00010
Barium (Ba)-Total	mg/L	-	1	0.00005	0.0493	0.048	3%	0.044	<0.000050
Beryllium (Be)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	-	<0.00010	<0.00010
Bismuth (Bi)-Total	mg/L	-	-	0.0005	<0.00050	<0.00050	-	<0.00050	<0.00050
Boron (B)-Total	mg/L	-	-	0.01	0.04	0.04	0%	<0.010	<0.010
Cadmium (Cd)-Total	mg/L	0.000033	0.02	0.00001	0.000618	0.000628	2%	0.000072	<0.000010
Calcium (Ca)-Total	mg/L	-	-	0.05	152	154	1%	9.41	<0.050
Chromium (Cr)-Total	mg/L	0.0089	0.04	0.0001	0.00046	0.00046	0%	0.00249	<0.00010
Cobalt (Co)-Total	mg/L	-	-	0.0001	0.00479	0.00481	0%	0.00134	<0.00010
Copper (Cu)-Total	mg/L	0.002	0.2	0.0005	0.00989	0.0096	3%	0.00639	<0.00050
Iron (Fe)-Total	mg/L	0.3	1	0.01	9.45	9.47	0%	4.17	<0.010
Lead (Pb)-Total	mg/L	0.003	0.1	0.00005	0.00151	0.00133	12%	0.0041	<0.000050
Lithium (Li)-Total	mg/L	-	-	0.0005	0.00056	0.00052	7%	0.00121	<0.00050
Magnesium (Mg)-Total	mg/L	-	-	0.1	28.9	30.1	4%	3.34	<0.10
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	3.6	3.58	1%	0.129	<0.000050
Mercury (Hg)-Total	mg/L	0.000026	0.005	0.00001	<0.000010	<0.000010	-	0.000022	<0.000010
Molybdenum (Mo)-Total	mg/L	0.0073	-	0.00005	0.000831	0.000782	6%	0.000146	<0.000050
Nickel (Ni)-Total	mg/L	0.1	0.3	0.0005	0.00225	0.00217	4%	0.00167	<0.00050
Phosphorus (P)-Total	mg/L	-	-	0.05	<0.050	<0.050	-	0.109	<0.050
Potassium (K)-Total	mg/L	-	-	0.1	4.12	4.12	0%	1.71	<0.10
Selenium (Se)-Total	mg/L	0.001	-	0.0001	0.00017	0.00014	18%	<0.00010	<0.00010
Silicon (Si)-Total	mg/L	-	-	0.05	4.53	4.54	0%	5.42	<0.050
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	0.000122	0.000083	32%	0.000108	<0.000010
Sodium (Na)-Total	mg/L	-	-	0.05	20.8	20.7	0%	0.911	<0.050
Strontium (Sr)-Total	mg/L	-	-	0.0002	0.448	0.445	1%	0.0352	<0.00020
Sulfur (S)-Total	mg/L	-	-	0.5	138	142	3%	1.71	<0.50
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	0.000015	0.000016	7%	0.000118	<0.000010
Tin (Sn)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	-	<0.00010	<0.00010
Titanium (Ti)-Total	mg/L	-	-	0.01	<0.010	<0.010	-	0.093	<0.010
Uranium (U)-Total	mg/L	0.015	-	0.00001	0.00117	0.00118	1%	0.000129	<0.000010
Vanadium (V)-Total	mg/L	-	-	0.001	0.0015	0.0015	0%	0.0085	<0.0010
Zinc (Zn)-Total	mg/L	0.03	0.3	0.003	0.018	0.0169	6%	0.0131	<0.0030
Dissolved Metals Filtration Location		-	-	n/a	FIELD	FIELD	-	FIELD	-
Aluminum (Al)-Dissolved	mg/L	0.005	-	0.001	0.0671	0.0558	17%	0.056	-
Antimony (Sb)-Dissolved	mg/L	-	-	0.0001	0.00058	0.00058	0%	0.00048	-
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	0.03	0.0296	1%	0.00311	-
Barium (Ba)-Dissolved	mg/L	-	-	0.00005	0.0477	0.0461	3%	0.0129	-
Beryllium (Be)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00010	-	<0.00010	-
Bismuth (Bi)-Dissolved	mg/L	-	-	0.0005	<0.00050	<0.00050	-	<0.00050	-
Boron (B)-Dissolved	mg/L	-	-	0.01	0.039	0.039	0%	<0.010	-
Cadmium (Cd)-Dissolved	mg/L	0.000033	-	0.00001	0.000547	0.000532	3%	0.000021	-
Calcium (Ca)-Dissolved	mg/L	-	-	0.05	152	156	3%	8.73	-
Chromium (Cr)-Dissolved	mg/L	0.0089	-	0.0001	0.00027	0.00019	30%	0.00023	-



Table E2. Summary of Water Quality Results for the May 8-9, 2014 Trip.

Analyte	Units	CCME-WATER-F-AL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0352-140509-011 WQ-SEEP 9-May-14	0352-140509-012 WQ-SEEP-r 9-May-14	QA/QC WQ-SEEP	0352-140509-020 WQ-ET-01** 9-May-14	0352-140509-TRAVEL-BLANK TRAVEL BLANK 9-May-14
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	0.00479	0.00469	2%	0.00013	-
Copper (Cu)-Dissolved	mg/L	0.002	-	0.0002	0.00593	0.0061	3%	0.00185	-
Iron (Fe)-Dissolved	mg/L	0.3	-	0.01	8.17	8.33	2%	0.109	-
Lead (Pb)-Dissolved	mg/L	0.001	-	0.00005	0.000215	0.000206	4%	0.000502	-
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	<0.00050	<0.00050	-	<0.00050	-
Magnesium (Mg)-Dissolved	mg/L	-	-	0.1	29.5	30.1	2%	2.59	-
Manganese (Mn)-Dissolved	mg/L	-	-	0.00005	3.59	3.52	2%	0.0398	-
Mercury (Hg)-Dissolved	mg/L	0.000026	-	0.00001	<0.000010	<0.000010	-	<0.000010	-
Molybdenum (Mo)-Dissolved	mg/L	0.073	-	0.00005	0.000728	0.000721	1%	0.000081	-
Nickel (Ni)-Dissolved	mg/L	0.1	-	0.0005	0.00206	0.00197	4%	<0.00050	-
Phosphorus (P)-Dissolved	mg/L	-	-	0.05	<0.050	<0.050	-	<0.050	-
Potassium (K)-Dissolved	mg/L	-	-	0.1	4.24	4.2	1%	1.1	-
Selenium (Se)-Dissolved	mg/L	0.001	-	0.0001	0.00014	0.00015	7%	<0.00010	-
Silicon (Si)-Dissolved	mg/L	-	-	0.05	4.38	4.42	1%	1.56	-
Silver (Ag)-Dissolved	mg/L	0.0001	-	0.00001	0.000018	0.000029	61%	0.000012	-
Sodium (Na)-Dissolved	mg/L	-	-	0.05	20.3	20.2	0%	0.841	-
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	0.447	0.435	3%	0.031	-
Sulfur (S)-Dissolved	mg/L	-	-	0.5	139	140	1%	1.68	-
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001	<0.000010	0.000013	44%	0.000012	-
Tin (Sn)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00010	-	<0.00010	-
Titanium (Ti)-Dissolved	mg/L	-	-	0.01	<0.010	<0.010	-	<0.010	-
Uranium (U)-Dissolved	mg/L	0.015	-	0.00001	0.00114	0.00114	0%	0.000058	-
Vanadium (V)-Dissolved	mg/L	-	-	0.001	0.0011	0.001	9%	<0.0010	-
Zinc (Zn)-Dissolved	mg/L	0.03	-	0.001	0.0184	0.0156	15%	0.0043	-



Table E3. Summary of Water Quality Results for the May 20-21, 2014 Trip.

Analyte	Units	CCME-WATER-F-AL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0352-140521-028 WQ-DC-DX+105 21-May-14	0352-140521-015 WQ-SEEP 21-May-14	0352-140521-030 WQ-DX 21-May-14	0352-140521-032 WQ-MS-S-03 * 21-May-14	0352-140521-029 L2 (lysimeter) * 21-May-14	0352-140521-031 Ore Ramp * 21-May-14	0352-140521-027 WQ-MS-S-08 21-May-14	0352-140521-001 WQ-TP 21-May-14	0352-140521-004 WQ-DC-B 21-May-14	0352-140521-011 WQ-VC-DBC 21-May-14	0352-140521-013 WQ-VC-U 21-May-14	0352-140521-040 WQ-VC-UMN 21-May-14
Temperature (in-situ)	*C	-	-	-	1.1	3.6	0.3	1.2	2	4.7	6.5	8.2	3.6	1.7	1.5	0.5
Specific Conductivity (in-situ)	µS/cm	-	-	-	377.9	1566	202.9	1188	548.5	817	1798	805	580.6	125	116.1	167.9
pH (in-situ)	pH	6.5 - 9.0	6.0 - 8.5	-	7.34	6.97	7.54	7.17	7.62	7.22	7.93	7.79	7.54	7.68	7.68	7.64
Turbidity (In-situ)	NTU	-	-	-	2.2	64	3.32	6.31	3.37	407	617	24.8	40.7	3.68	1.2	2.78
Dissolved Oxygen (in-situ)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Colour, True	CU	15	-	5	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity	µS/cm	-	-	2	358	1480	205	1110	583	785	1710	817	585	129	116	171
Hardness (as CaCO3)	mg/L	-	-	0.5	189	847	91.9	694	348	446	1160	435	320	62.1	58	82.1
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1	7.38	6.98	7.4	7.54	7.81	7.23	8.06	7.69	7.51	7.59	7.57	7.61
Total Suspended Solids	mg/L	-	50	3	<3.0	35.3	8.7	6	<3.0	130	349	14	168	9.3	7.3	12.7
Total Dissolved Solids	mg/L	-	-	1	226	1210	114	834	400	571	1440	605	393	65.5	61.3	92.6
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1	73.6	205	41.7	255	70.1	47.7	315	51.5	78.9	49.8	50.2	54.6
Alkalinity, Carbonate (as CaCO3)	mg/L	-	-	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Hydroxide (as CaCO3)	mg/L	-	-	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity, Total (as CaCO3)	mg/L	-	-	1	73.6	205	41.7	255	70.1	47.7	315	51.5	78.9	49.8	50.2	54.6
Ammonia, Total (as N)	mg/L	0.75	-	0.005	0.007	4.04	<0.0050	0.0468	<0.0050	<0.0050	0.0858	0.343	0.0581	<0.0050	<0.0050	0.0153
Chloride (Cl)	mg/L	120	-	0.5	<0.50	<0.50	<0.50	<0.50	0.82	<0.50	<0.50	<2.5	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	mg/L	0.12	-	0.02	0.07	<0.20	0.055	0.23	0.525	0.38	<0.20	0.16	0.056	0.036	0.035	0.048
Nitrate (as N)	mg/L	13	-	0.005	<0.0050	0.414	<0.0050	<0.050	0.128	1.07	0.152	0.087	0.0419	0.0803	0.0741	0.078
Nitrite (as N)	mg/L	0.06	-	0.001	<0.0010	0.017	<0.0010	<0.010	0.0048	<0.0010	<0.010	0.0058	0.0014	<0.0010	<0.0010	<0.0010
Sulfate (SO4)	mg/L	-	-	0.5	111	721	52	429	234	373	848	400	232	11.4	8.68	28.1
Cyanide, Weak Acid Diss	mg/L	-	0.1	0.005	<0.0050	0.0093	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Cyanide, Total	mg/L	-	0.3	0.005	<0.0050	0.0533	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Cyanate	mg/L	-	-	0.2	<0.20	6.57	<0.20	<0.20	<0.20	<0.20	<0.20	0.54	<0.20	<0.20	<0.20	<0.20
Thiocyanate (SCN)	mg/L	-	-	0.5	<0.50	3.26	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Aluminum (Al)-Total	mg/L	0.1	-	0.003	0.0428	0.0187	0.24	0.0312	0.0243	3.22	4.16	0.128	2.56	0.198	0.138	0.119
Antimony (Sb)-Total	mg/L	-	0.15	0.001	0.0032	0.0047	0.00113	0.0179	0.00098	0.0515	0.123	0.0296	0.00171	0.00014	0.00011	0.00023
Arsenic (As)-Total	mg/L	0.005	-	0.0001	0.00861	0.0563	0.00544	0.0636	0.00585	2.68	0.687	0.112	0.0162	0.00121	0.00054	0.00131
Barium (Ba)-Total	mg/L	-	1	0.00005	0.0225	0.0592	0.0269	0.0182	0.00399	0.0782	0.105	0.0111	0.0756	0.0456	0.0448	0.0437
Beryllium (Be)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00019	0.0002	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Total	mg/L	-	-	0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00714	0.00234	0.00051	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Total	mg/L	-	-	0.01	<0.010	0.065	<0.010	<0.010	<0.010	<0.010	0.035	0.043	0.011	<0.010	<0.010	<0.010
Cadmium (Cd)-Total	mg/L	0.000033	0.02	0.00001	0.00107	0.00046	0.000023	0.00382	0.000612	0.000879	0.03	0.00325	0.000162	0.000036	0.000026	0.000027
Calcium (Ca)-Total	mg/L	-	-	0.05	48.9	245	25.5	185	81.9	126	244	119	76.8	16.6	14.9	21.3
Chromium (Cr)-Total	mg/L	0.0089	0.04	0.0001	0.00015	0.00046	0.00038	<0.00010	<0.00010	0.00153	0.00687	0.00021	0.00419	0.0004	0.00035	0.00029
Cobalt (Co)-Total	mg/L	-	-	0.0001	0.00014	0.00722	0.0002	0.00098	<0.00010	0.00141	0.00488	0.001	0.00175	0.00015	0.00011	0.00014
Copper (Cu)-Total	mg/L	0.002	0.2	0.0005	0.00336	0.00304	0.00217	0.00133	0.00109	0.0604	0.102	0.0367	0.00684	0.00235	0.00216	0.00215
Iron (Fe)-Total	mg/L	0.3	1	0.01	0.155	12	0.438	1.98	0.033	17.5	12.7	0.926	5.48	0.363	0.292	0.286
Lead (Pb)-Total	mg/L	0.003	0.003	0.00005	0.000513	0.000121	0.000406	0.0012	0.000875	0.661	0.57	0.0424	0.00262	0.000523	0.00047	0.000318
Lithium (Li)-Total	mg/L	-	-	0.0005	0.00171	0.00102	<0.00050	0.00959	0.00255	0.00623	0.0123	0.00414	0.0032	<0.00050	<0.00050	<0.00050
Magnesium (Mg)-Total	mg/L	-	-	0.1	14.6	51.5	7.01	59.1	27.7	26.5	119	30.1	5.3	5.03	6.99	6.99
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	0.197	6.38	0.0144	1.28	0.00595	0.613	2.13	1.5	0.332	0.0394	0.0211	0.0332
Mercury (Hg)-Total	mg/L	0.000026	0.005	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000085	0.000073	0.00002	0.000013	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Total	mg/L	0.0073	-	0.00005	0.000114	0.000944	0.000099	0.000358	0.000065	0.000321	0.000989	0.000984	0.000005	0.00032	0.000321	0.000321
Nickel (Ni)-Total	mg/L	0.1	0.3	0.0005	0.00079	0.00246	0.00061	0.00202	<0.00050	0.00117	0.00845	0.00216	0.0036	0.00065	0.0006	0.00057
Phosphorus (P)-Total	mg/L	-	-	0.05	<0.050	<0.050	<0.050	<0.050	0.18	0.185	<0.050	0.142	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Total	mg/L	-	-	0.1	2.68	5.96	3.4	3.45	2.17	4.77	6.65	6.47	2.02	0.6	0.55	0.7
Selenium (Se)-Total	mg/L	0.001	-	0.0001	<0.00010	0.00017	<0.00010	<0.00010	<0.00010	0.00026	0.00109	<0.00010	0.00018	<0.00010	<0.00010	<0.00010
Silicon (Si)-Total	mg/L	-	-	0.05	4.09	6.72	3.73	6.46	1.2	12	12.6	1.36	6.96	4.36	4.08	4.24
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	0.00002	0.000032	0.000011	0.000034	0.000019	0.00698	0.0142	0.000899	0.000054	<0.000010	0.000026	0.00001
Sodium (Na)-Total	mg/L	-	-	0.05	2	35.5	1.61	4.93	0.436	1.79	7.96	8.54	3.42	1.6	1.54	2.04
Strontium (Sr)-Total	mg/L	-	-	0.0002	0.137	0.817	0.0863	0.476	0.267	0.105	0.619	0.333	0.265	0.185	0.179	0.192
Sulfur (S)-Total	mg/L	-	-	0.5	36.3	238	17.4	149	74.1	122	265	124	74.4	4.05	3.11	9.5
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	0.000021	<0.000010	0.000012	0.000107	0.00001	0.000534	0.000498	0.00017	0.000035	<0.000010	<0.000010	<0.000010
Tin (Sn)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	0.00015	0.00057	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total	mg/L	-	-	0.01	<0.010	<0.010	0.013	<0.010	<0.010	0.018	0.157	<0.010	0.132	<0.010	<0.010	<0.010
Uranium (U)-Total	mg/L	0.015	-	0.00001	0.000746	0.00174	0.000047	0.000397	0.000051	0.000276	0.000503	0.000523	0.00121	0.000356	0.000305	0.000375
Vanadium (V)-Total	mg/L	-	-	0.001	<0.0010	0.0018	0.0013	<0.0010	<0.0010	0.0076	0.017	<0.0010	0.0102	0.001	<0.0010	<0.0010
Zinc (Zn)-Total	mg/L	0.03	0.3	0.003	0.185	0.0082	0.0034	0.943	0.023	0.663	2.21	0.302	0.0292	0.0033	<0.0030	<0.0030
Dissolved Metals Filtration Location				n/a	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD
Aluminum (Al)-Dissolved	mg/L	0.005	-	0.001	0.0285	0.0095	0.0184	0.0018	0.0013	0.007	0.0122	0.0165	0.112	0.045	0.0452	0.0412
Antimony (Sb)-Dissolved	mg/L	-	-	0.0001	0.00321	0.00045	0.00098	0.0172	0.00089	0.00928	0.048	0.0248	0.00126	0.00011	<0.00010	0.00021
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	0.0046	0.0427	0.00294	0.0326	0.00533	0.366	0.0888	0.0467	0.00367	0.00047	0.00035	0.00098
Barium (Ba)-Dissolved	mg/L	-	-	0.00005	0.023	0.0581	0.024	0.0179	0.00239	0.02	0.00975	0.0359	0.0425	0.0425	0.0425	0.0428
Beryllium (Be)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Bismuth (Bi)-Dissolved	mg/L	-	-	0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Boron (B)-Dissolved	mg/L	-	-	0.01	<0.010	0.063	<0.010	<0.010	<0.010	<0.010	<0.010	0.044	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved	mg/L	0.000033	-	0.00001	0.00076	0.00032	0.000013	0.00111	0.000624	0.00293	0.0181					



Table E3. Summary of Water Quality Results for the May 20-21, 2014 Trip.

Analyte	Units	CCME-WATER-F-AL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0352140521-028 WQ-DC-DX+105 21-May-14	0352-140521-015 WQ-SEEP 21-May-14	0352-140521-030 WQ-DX 21-May-14	0352-140521-032 WQ-MS-S-03 * 21-May-14	0352-140521-029 L2 (lysimeter) * 21-May-14	0352-140521-031 Ore Ramp * 21-May-14	0352-140521-027 WQ-MS-S-08 21-May-14	0352-140521-001 WQ-TP 21-May-14	0352-140521-004 WQ-DC-B 21-May-14	0352-140521-011 WQ-VC-DBC 21-May-14	0352-140521-013 WQ-VC-U 21-May-14	0352-140521-040 WQ-VC-UMN 21-May-14
Molybdenum (Mo)-Dissolved	mg/L	0.073	-	0.00005	0.000116	0.000917	<0.000050	0.000332	0.000054	<0.000050	0.000452	0.000987	0.000175	0.000276	0.000247	0.000292
Nickel (Ni)-Dissolved	mg/L	0.1	-	0.0005	0.00075	0.0023	<0.00050	0.00214	<0.00050	<0.00050	0.0035	0.00226	0.00092	0.00059	<0.00050	0.00053
Phosphorus (P)-Dissolved	mg/L	-	-	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Dissolved	mg/L	-	-	0.1	2.73	6.09	3.35	3.45	2.35	2.18	5.65	6.74	1.82	0.55	0.53	0.69
Selenium (Se)-Dissolved	mg/L	0.001	-	0.0001	<0.00010	0.00015	<0.00010	<0.00010	<0.00010	0.00015	0.00108	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Silicon (Si)-Dissolved	mg/L	-	-	0.05	4.2	6.64	3.39	6.25	1.29	6.12	4.85	1.21	3.34	4.1	3.99	4.19
Silver (Ag)-Dissolved	mg/L	0.0001	-	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000015	0.000085	0.000081	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	mg/L	-	-	0.05	2.04	35.9	1.6	4.69	0.466	1.87	7.89	9.31	3.34	1.59	1.49	2.07
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	0.139	0.811	0.0831	0.447	0.284	0.0834	0.612	0.342	0.255	0.177	0.179	0.186
Sulfur (S)-Dissolved	mg/L	-	-	0.5	36.9	232	17.4	141	80.5	125	269	128	77.2	3.99	3.09	9.23
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001	0.00002	<0.000010	<0.000010	0.000089	<0.000010	<0.000010	0.000212	0.000159	<0.000010	<0.000010	<0.000010	<0.000010
Tin (Sn)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Dissolved	mg/L	-	-	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Dissolved	mg/L	0.015	-	0.00001	0.000761	0.00174	0.000034	0.00369	0.000551	0.000068	0.00496	0.000508	0.000956	0.000321	0.000284	0.000348
Vanadium (V)-Dissolved	mg/L	-	-	0.001	<0.0010	0.0012	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	mg/L	0.03	-	0.001	0.196	0.007	<0.0010	0.895	0.0241	0.29	1.34	0.284	0.0058	0.0012	<0.0010	0.0013

Applied Guidelines: *Federal CCME Canadian Environmental Quality Guidelines (May 2014), CCME: Freshwater Aquatic Life
 *Mount Nansen Effluent Discharge Standards

Colour Key:

Exceeds CCME Guideline
Exceeds MN Effluent Discharge Standards
Exceeds both CCME and MN Standards
Exceeds 10% difference threshold for QA/QC replicate samples

Notes:
 * Freshet visit samples only

For those guidelines that are hardness dependent (Cd, Cu, Pb, Ni), the most conservative guideline has been applied. Same for guidelines that are pH and temperature dependent (Ammonia and Aluminum), unless otherwise noted.



Table E3. Summary of Water Quality Results for the May 20-21, 2014 Trip.

Analyte	Units	CCME-WATER-F-AL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0352-140521-012 WQ-BC 21-May-14	0352-140521-008 WQ-BC-r 21-May-14	QA/QC WQ-BC	0352-140521-009 WQ-DC-R 21-May-14	0352-140521-014 WQ-DC-U 21-May-14	0352-140521-010 WQ-PC-D 21-May-14	0352-140521-044 WQ-PC-U 21-May-14	0352-140520-003 WQ-DC-D1b 20-May-14	0352-140520-006 WQ-DESS-01 20-May-14	0352-140520-007 WQ-DESS-02 20-May-14	0352-140520-002 WQ-DESS-03 20-May-14	0352-140521-019 WQ-PW 21-May-14
Temperature (in-situ)	°C	-	-	-	4.1	-	-	0.3	4	2.2	1.5	0	0.3	0.6	0.4	1.3
Specific Conductivity (in-situ)	µS/cm	-	-	-	185	-	-	552	658.9	181.8	179.2	1166	831.6	1374	74.3	373.1
pH (in-situ)	pH	6.5 - 9.0	6.0 - 8.5	-	7.86	-	-	7.56	7.87	7.66	7.37	8.01	5.71	7.26	7.88	7.64
Turbidity (In-situ)	NTU	-	-	-	26.8	-	-	3.96	35.5	1.08	0.22	7.59	2.59	86.5	2.13	0.06
Dissolved Oxygen (in-situ)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Colour, True	CU	15	-	5	-	-	-	-	-	-	-	-	-	-	-	<5.0
Conductivity	µS/cm	-	-	2	187	189	1%	532	607	184	181	1100	809	1340	60.2	372
Hardness (as CaCO3)	mg/L	-	-	0.5	90.1	90.3	0%	278	338	84.5	83.6	682	445	810	27.2	197
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1	7.56	7.65	1%	7.49	7.53	7.38	7.43	7.98	5.78	7.75	6.08	7.89
Total Suspended Solids	mg/L	-	50	3	28	24	14%	4.7	101	<3.0	<3.0	4	7.3	315	14	-
Total Dissolved Solids	mg/L	-	-	1	102	101	1%	350	414	106	103	844	580	1090	27.7	210
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1	55.1	53.3	3%	69	80.8	29.6	27.7	178	2.2	86.8	4	-
Alkalinity, Carbonate (as CaCO3)	mg/L	-	-	1	<1.0	<1.0	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Alkalinity, Hydroxide (as CaCO3)	mg/L	-	-	1	<1.0	<1.0	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-
Alkalinity, Total (as CaCO3)	mg/L	-	-	1	55.1	53.3	3%	69	80.8	29.6	27.7	178	2.2	86.8	4	172
Ammonia, Total (as N)	mg/L	0.75	-	0.005	<0.0050	<0.0050	-	0.246	0.235	<0.0050	<0.0050	0.191	0.016	0.0115	0.006	-
Chloride (Cl)	mg/L	120	-	0.5	<0.50	<0.50	-	<0.50	<0.50	<0.50	<0.50	<5.0	<0.50	<5.0	<0.50	<0.50
Fluoride (F)	mg/L	0.12	-	0.02	0.052	0.051	2%	0.062	0.06	0.039	0.04	<0.20	0.035	<0.20	0.023	0.092
Nitrate (as N)	mg/L	13	-	0.005	0.0529	0.0529	0%	0.0734	0.0601	0.0073	0.0050	0.053	0.133	4.82	0.0061	0.133
Nitrite (as N)	mg/L	0.06	-	0.001	<0.0010	<0.0010	-	0.0044	0.0022	<0.0010	<0.0010	<0.010	<0.0010	<0.010	<0.0010	<0.0010
Sulfate (SO4)	mg/L	-	-	0.5	33.8	33.7	0%	203	242	54.4	52.7	498	420	706	12.9	34.2
Cyanide, Weak Acid Diss	mg/L	-	0.1	0.005	<0.0050	<0.0050	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	-
Cyanide, Total	mg/L	-	0.3	0.005	<0.0050	<0.0050	-	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	-
Cyanate	mg/L	-	-	0.2	<0.20	<0.20	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	-
Thiocyanate (SCN)	mg/L	-	-	0.5	<0.50	<0.50	-	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	0.72	-
Aluminum (Al)-Total	mg/L	0.1	-	0.003	0.745	0.689	8%	0.12	1.66	0.0538	0.0298	0.0515	0.299	7.84	0.602	<0.010
Antimony (Sb)-Total	mg/L	-	0.15	0.001	0.00039	0.00046	18%	0.00151	0.00146	0.00137	0.0004	0.00749	0.00013	0.0026	0.00021	<0.00050
Arsenic (As)-Total	mg/L	0.005	-	0.0001	0.00578	0.00569	2%	0.0119	0.0144	0.00455	0.00137	0.0205	0.00161	0.129	0.002	0.0004
Barium (Ba)-Total	mg/L	-	1	0.00005	0.0529	0.0516	2%	0.0367	0.0645	0.0236	0.0288	0.0206	0.0318	0.108	0.0381	0.085
Beryllium (Be)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00032	<0.00010	-
Bismuth (Bi)-Total	mg/L	-	-	0.0005	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-
Boron (B)-Total	mg/L	-	-	0.01	<0.010	<0.010	-	0.013	0.012	<0.010	<0.010	0.029	<0.010	<0.010	<0.010	<0.10
Cadmium (Cd)-Total	mg/L	0.000033	0.02	0.00001	0.000161	0.00017	6%	0.00085	0.000158	0.000215	0.000015	0.00084	0.00684	0.00122	0.00069	<0.00020
Calcium (Ca)-Total	mg/L	-	-	0.05	24.5	24.9	2%	72.8	79.9	24.2	24.1	158	103	245	7.76	45.4
Chromium (Cr)-Total	mg/L	0.0089	0.04	0.0001	0.00109	0.00104	5%	0.00029	0.00289	0.00019	0.00015	0.00018	0.00031	0.00932	0.00059	<0.00020
Cobalt (Co)-Total	mg/L	-	-	0.0001	0.00048	0.00046	4%	0.0009	0.0016	<0.00010	<0.00010	0.00026	0.0003	0.0038	0.00028	-
Copper (Cu)-Total	mg/L	0.002	0.2	0.0005	0.0042	0.00415	6%	0.00234	0.00612	0.00626	0.00138	0.00215	0.00229	0.0193	0.00355	<0.0010
Iron (Fe)-Total	mg/L	0.3	1	0.01	1.16	1.09	6%	1.35	4.37	0.066	0.053	0.9	0.351	11.2	0.518	<0.030
Lead (Pb)-Total	mg/L	0.003	0.1	0.00005	0.00255	0.00273	7%	0.00098	0.00188	0.000698	<0.00050	0.00427	0.000156	0.0365	0.00016	0.00061
Lithium (Li)-Total	mg/L	-	-	0.0005	0.00066	0.00064	3%	0.00081	0.00236	<0.00050	<0.00050	0.00598	0.00144	0.00498	<0.00050	-
Magnesium (Mg)-Total	mg/L	-	-	0.1	6.24	6.3	1%	25	30.1	5.55	5.51	65.6	40.1	43	1.7	20.4
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	0.182	0.181	1%	0.561	0.541	0.00298	0.00236	0.671	0.398	0.612	0.0339	<0.0020
Mercury (Hg)-Total	mg/L	0.000026	0.005	0.00001	<0.000010	<0.000010	-	<0.000010	0.000013	<0.000010	<0.000010	<0.000010	<0.000010	0.000098	0.000012	<0.00020
Molybdenum (Mo)-Total	mg/L	0.0073	-	0.00005	0.000574	0.000646	13%	0.000295	0.000305	0.000069	0.00006	0.000184	<0.000050	0.000318	<0.000050	-
Nickel (Ni)-Total	mg/L	0.1	0.3	0.0005	0.00124	0.00131	6%	0.00114	0.00289	<0.00050	<0.00050	0.00081	0.00552	0.00702	0.00146	-
Phosphorus (P)-Total	mg/L	-	-	0.05	<0.050	<0.050	-	<0.050	0.091	<0.050	<0.050	<0.050	<0.050	0.741	<0.050	-
Potassium (K)-Total	mg/L	-	-	0.1	0.88	0.88	0%	1.96	2.07	0.68	0.65	3.68	1.26	3.56	1.11	0.89
Selenium (Se)-Total	mg/L	0.001	-	0.0001	<0.00010	<0.00010	-	<0.00010	0.00016	<0.00010	<0.00010	0.00013	<0.00010	0.00029	<0.00010	<0.0010
Silicon (Si)-Total	mg/L	-	-	0.05	5.68	5.69	0%	3.3	5.52	4.5	4.79	4.85	3.81	18	3.57	-
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	0.000038	0.000042	11%	0.000022	0.000068	0.00002	<0.000010	0.000073	0.000011	0.000706	0.000029	-
Sodium (Na)-Total	mg/L	-	-	0.05	2.19	2.2	0%	5.69	4.59	2.54	2.56	5	2.63	7.28	0.987	5
Strontium (Sr)-Total	mg/L	-	-	0.0002	0.158	0.174	10%	0.249	0.276	0.171	0.174	0.433	0.284	0.564	0.0393	-
Sulfur (S)-Total	mg/L	-	-	0.5	10.9	11	1%	70.4	78.8	17.4	17.3	159	135	221	4.16	-
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	0.000016	0.000014	13%	<0.000010	0.000024	<0.000010	<0.000010	0.000035	<0.000010	0.000197	0.000012	-
Tin (Sn)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-
Titanium (Ti)-Total	mg/L	-	-	0.01	0.029	0.026	10%	<0.010	0.086	<0.010	<0.010	<0.010	<0.010	0.247	0.011	-
Uranium (U)-Total	mg/L	0.015	-	0.00001	0.000594	0.000649	9%	0.000753	0.00113	0.000055	0.000078	0.000206	0.000021	0.00083	0.00004	0.00193
Vanadium (V)-Total	mg/L	-	-	0.001	0.0023	0.0023	0%	0.0011	0.0072	<0.0010	<0.0010	<0.0010	<0.0010	0.0221	0.0012	-
Zinc (Zn)-Total	mg/L	0.03	0.3	0.003	0.009	0.0088	2%	0.0124	0.0239	0.0191	<0.0030	0.258	2.54	0.113	0.0094	<0.050
Dissolved Metals Filtration Location				n/a	FIELD	FIELD		FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	
Aluminum (Al)-Dissolved	mg/L	0.005	-	0.001	0.0452	0.0479	6%	0.074	0.118	0.0253	0.0274	0.0041	0.18	0.008	0.273	-
Antimony (Sb)-Dissolved	mg/L	-	-	0.0001	0.0003	0.0003	0%	0.00139	0.00116	0.00136	0.00043	0.00673	0.0001	0.00013	0.00014	-
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	0.00183	0.00192	5%	0.00858	0.00472	0.00394	0.00137	0.00987	0.00089	0.00311	0.00118	-
Barium (Ba)-Dissolved	mg/L	-	-	0.00005	0.0408	0.0414	1%	0.0344	0.0364	0.0237	0.0294	0.0195	0.0245	0.0335	0.0335	-
Beryllium (Be)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-
Bismuth (Bi)-Dissolved	mg/L	-	-	0.0005	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-
Boron (B)-Dissolved	mg/L	-	-	0.01	<0.010	<0.010	-	0.012	0.011	<0.010	<0.010	0.028	<0.010	<0.010	<0.010	-
Cadmium (Cd)-Dissolved	mg/L	0.000033	-	0.00001	0.000079	0.000085	8%	0.000055	0.000024	0.000214	0.000011	0.000331	0.00707	0.000014	0.000048	-
Calcium (Ca)-Dissolved	mg/L	-	-	0.05	25.6	25.7	0%	71.6	83.4	24.6	24.3	160	109	253	8	-
Chromium (Cr)-Dissolved	mg/L	0.0089	-	0.0001	0.00015	0.00014	7%	0.00018	0.00015	0.00011	0.00012	<0.00010	0.00012	<0.00010	0.00021	-
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	0.00015	0.00014	7%	0.00084	0.00068	<0.00010	<0.00010	0.00024				



Table E3. Summary of Water Quality Results for the May 20-21, 2014 Trip.

Analyte	Units	CCME-WATER-F-AL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0352-140521-012 WQ-BC 21-May-14	0352-140521-008 WQ-BC-r 21-May-14	QA/QC WQ-BC	0352-140521-009 WQ-DC-R 21-May-14	0352-140521-014 WQ-DC-U 21-May-14	0352-140521-010 WQ-PC-D 21-May-14	0352-140521-044 WQ-PC-U 21-May-14	0352-140520-003 WQ-DC-D1b 20-May-14	0352-140520-006 WQ-DESS-01 20-May-14	0352-140521-007 WQ-DESS-02 20-May-14	0352-140520-002 WQ-DESS-03 20-May-14	0352-140521-019 WQ-PW 21-May-14
Molybdenum (Mo)-Dissolved	mg/L	0.073	-	0.00005	0.000551	0.000567	3%	0.000237	0.0002	<0.000050	<0.000050	0.00017	<0.000050	0.000069	<0.000050	-
Nickel (Ni)-Dissolved	mg/L	0.1	-	0.0005	0.00064	0.00063	2%	0.00105	0.00104	<0.00050	<0.00050	0.0007	0.00552	<0.00050	0.00116	-
Phosphorus (P)-Dissolved	mg/L	-	-	0.05	<0.050	<0.050	-	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	-
Potassium (K)-Dissolved	mg/L	-	-	0.1	0.76	0.76	0%	1.84	1.99	0.7	0.62	3.85	1.3	2.77	1.16	-
Selenium (Se)-Dissolved	mg/L	0.001	-	0.0001	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	0.00015	<0.00010	<0.00010	<0.00010	-
Silicon (Si)-Dissolved	mg/L	-	-	0.05	4.79	4.81	0%	3.15	3.44	4.54	4.79	4.8	3.81	7.3	3.38	-
Silver (Ag)-Dissolved	mg/L	0.0001	-	0.00001	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-
Sodium (Na)-Dissolved	mg/L	-	-	0.05	2.21	2.21	0%	5.47	4.49	2.53	2.6	5.08	2.69	7.1	1.01	-
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	0.171	0.174	2%	0.236	0.272	0.166	0.168	0.421	0.286	0.516	0.0379	-
Sulfur (S)-Dissolved	mg/L	-	-	0.5	11.2	11.2	0%	67	80.7	17.8	17.4	158	138	226	4.29	-
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	0.00003	<0.000010	<0.000010	<0.000010	-
Tin (Sn)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-
Titanium (Ti)-Dissolved	mg/L	-	-	0.01	<0.010	<0.010	-	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-
Uranium (U)-Dissolved	mg/L	0.015	-	0.00001	0.00057	0.000586	3%	0.000708	0.000974	0.000048	0.000073	0.00201	<0.000010	0.000428	0.000011	-
Vanadium (V)-Dissolved	mg/L	-	-	0.001	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-
Zinc (Zn)-Dissolved	mg/L	0.03	-	0.001	0.0015	0.0015	0%	0.0096	0.0048	0.0196	0.0014	0.235	2.71	0.0028	0.0081	-

Applied Guidelines: Federal CCME Canadian Environmental Quality Guidelines (May 2014), CCME: Freshwater Aquatic Life

Mount Nansen Effluent Discharge Standards

Colour Key:

Exceeds CCME Guideline
Exceeds MN Effluent Discharge Standards
Exceeds both CCME and MN Standards
Exceeds 10% difference threshold for QA/QC replicate samples

For those guidelines that are hardness dependent (Cd, Cu, Pb, Ni), the most conservative guideline has been applied. Same for guidelines that are pH and temperature dependent (Ammonia and Aluminum), unless otherwise noted.



Table E3. Summary of Water Quality Results for the May 20-21, 2014 Trip.

Analyte	Units	CCME-WATER-F-AL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0352-140521-042 WQ-VC-R 21-May-14	0352-140521-041 WQ-VC-R-r 21-May-14	QA/QC WQ-VC-R	0352-140522-TRAVEL-BLANK TRAVEL BLANK 22-May-14	0352-140521-FIELD-BLANK FIELD BLANK 21-May-14
Temperature (in-situ)	°C	-	-	-	0.4	-	-	-	-
Specific Conductivity (in-situ)	µS/cm	-	-	-	151.5	-	-	-	-
pH (in-situ)	pH	6.5 - 9.0	6.0 - 8.5	-	7.41	-	-	-	-
Turbidity (In-situ)	NTU	-	-	-	3.8	-	-	-	-
Dissolved Oxygen (in-situ)	mg/L	-	-	-	-	-	-	-	-
Colour, True	CU	15	-	5	-	-	-	-	-
Conductivity	µS/cm	-	-	2	150	154	3%	<2.0	<2.0
Hardness (as CaCO3)	mg/L	-	-	0.5	73.3	73.4	0%	-	<0.50
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1	7.42	7.57	2%	5.67	5.7
Total Suspended Solids	mg/L	-	50	3	3.3	3.3	0%	<3.0	<3.0
Total Dissolved Solids	mg/L	-	-	1	82.3	81.6	1%	<1.0	<1.0
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1	49.3	47.9	3%	<1.0	<1.0
Alkalinity, Carbonate (as CaCO3)	mg/L	-	-	1	<1.0	<1.0	-	<1.0	<1.0
Alkalinity, Hydroxide (as CaCO3)	mg/L	-	-	1	<1.0	<1.0	-	<1.0	<1.0
Alkalinity, Total (as CaCO3)	mg/L	-	-	1	49.3	47.9	3%	<1.0	<1.0
Ammonia, Total (as N)	mg/L	0.75	-	0.005	0.0111	0.0096	14%	<0.0050	<0.0050
Chloride (Cl)	mg/L	120	-	0.5	<0.50	<0.50	-	<0.50	<0.50
Fluoride (F)	mg/L	0.12	-	0.02	0.042	0.043	2%	<0.020	<0.020
Nitrate (as N)	mg/L	13	-	0.005	0.0688	0.0696	1%	<0.0050	<0.0050
Nitrite (as N)	mg/L	0.06	-	0.001	<0.0010	<0.0010	-	<0.0010	<0.0010
Sulfate (SO4)	mg/L	-	-	0.5	24.1	24.1	0%	<0.50	<0.50
Cyanide, Weak Acid Diss	mg/L	-	0.1	0.005	<0.0050	<0.0050	-	<0.0050	<0.0050
Cyanide, Total	mg/L	-	0.3	0.005	<0.0050	<0.0050	-	<0.0050	<0.0050
Cyanate	mg/L	-	-	0.2	<0.20	<0.20	-	<0.20	<0.20
Thiocyanate (SCN)	mg/L	-	-	0.5	<0.50	<0.50	-	<0.50	<0.50
Aluminum (Al)-Total	mg/L	0.1	-	0.003	0.13	0.156	20%	<0.0030	<0.0030
Antimony (Sb)-Total	mg/L	-	0.15	0.0001	0.00022	0.00023	5%	<0.00010	<0.00010
Arsenic (As)-Total	mg/L	0.005	-	0.0001	0.00142	0.00151	6%	<0.00010	<0.00010
Barium (Ba)-Total	mg/L	-	1	0.00005	0.0428	0.045	5%	<0.000050	<0.000050
Beryllium (Be)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	-	<0.00010	<0.00010
Bismuth (Bi)-Total	mg/L	-	-	0.0005	<0.00050	<0.00050	-	<0.00050	<0.00050
Boron (B)-Total	mg/L	-	-	0.01	<0.010	<0.010	-	<0.010	<0.010
Cadmium (Cd)-Total	mg/L	0.000033	0.02	0.00001	0.000026	0.000033	27%	<0.000010	<0.000010
Calcium (Ca)-Total	mg/L	-	-	0.05	19.3	19.7	2%	<0.050	<0.050
Chromium (Cr)-Total	mg/L	0.0089	0.04	0.0001	0.00034	0.00034	0%	<0.00010	<0.00010
Cobalt (Co)-Total	mg/L	-	-	0.0001	0.00017	0.00018	6%	<0.00010	<0.00010
Copper (Cu)-Total	mg/L	0.002	0.2	0.0005	0.00236	0.0024	2%	<0.00050	<0.00050
Iron (Fe)-Total	mg/L	0.3	1	0.01	0.543	0.578	6%	<0.010	<0.010
Lead (Pb)-Total	mg/L	0.003	0.1	0.00005	0.000292	0.000309	6%	<0.000050	<0.000050
Lithium (Li)-Total	mg/L	-	-	0.0005	<0.00050	<0.00050	-	<0.00050	<0.00050
Magnesium (Mg)-Total	mg/L	-	-	0.1	6.22	6.41	3%	<0.10	<0.10
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	0.0403	0.0423	5%	<0.000050	<0.000050
Mercury (Hg)-Total	mg/L	0.000026	0.005	0.00001	<0.000010	<0.000010	-	<0.000010	<0.000010
Molybdenum (Mo)-Total	mg/L	0.0073	-	0.00005	0.000286	0.000293	2%	<0.000050	<0.000050
Nickel (Ni)-Total	mg/L	0.1	0.3	0.0005	0.00082	0.00088	7%	<0.00050	<0.00050
Phosphorus (P)-Total	mg/L	-	-	0.05	<0.050	<0.050	-	<0.050	<0.050
Potassium (K)-Total	mg/L	-	-	0.1	0.73	0.73	0%	<0.10	<0.10
Selenium (Se)-Total	mg/L	0.001	-	0.0001	<0.00010	<0.00010	-	<0.00010	<0.00010
Silicon (Si)-Total	mg/L	-	-	0.05	4.22	4.37	4%	<0.050	<0.050
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	<0.000010	<0.000010	-	<0.000010	<0.000010
Sodium (Na)-Total	mg/L	-	-	0.05	1.93	1.99	3%	<0.050	<0.050
Strontium (Sr)-Total	mg/L	-	-	0.0002	0.17	0.177	4%	<0.00020	<0.00020
Sulfur (S)-Total	mg/L	-	-	0.5	8.07	8.29	3%	<0.50	<0.50
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	<0.000010	<0.000010	-	<0.000010	<0.000010
Tin (Sn)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	-	<0.00010	<0.00010
Titanium (Ti)-Total	mg/L	-	-	0.01	<0.010	<0.010	-	<0.010	<0.010
Uranium (U)-Total	mg/L	0.015	-	0.00001	0.000334	0.000353	6%	<0.000010	<0.000010
Vanadium (V)-Total	mg/L	-	-	0.001	<0.0010	0.001	11%	<0.0010	<0.0010
Zinc (Zn)-Total	mg/L	0.03	0.3	0.003	0.0035	<0.0030	17%	<0.0030	<0.0030
Dissolved Metals Filtration Location				n/a	FIELD	FIELD	-	-	FIELD
Aluminum (Al)-Dissolved	mg/L	0.005	-	0.001	0.0531	0.0547	3%	-	<0.0010
Antimony (Sb)-Dissolved	mg/L	-	-	0.0001	0.00024	0.00019	21%	-	<0.00010
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	0.00105	0.00097	8%	-	<0.00010
Barium (Ba)-Dissolved	mg/L	-	-	0.00005	0.0412	0.0424	3%	-	<0.000050
Beryllium (Be)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00010	-	-	<0.00010
Bismuth (Bi)-Dissolved	mg/L	-	-	0.0005	<0.00050	<0.00050	-	-	<0.00050
Boron (B)-Dissolved	mg/L	-	-	0.01	<0.010	<0.010	-	-	<0.010
Cadmium (Cd)-Dissolved	mg/L	0.000033	-	0.00001	0.000037	0.000026	30%	-	<0.000010
Calcium (Ca)-Dissolved	mg/L	-	-	0.05	19.1	19.2	1%	-	<0.050
Chromium (Cr)-Dissolved	mg/L	0.0089	-	0.0001	0.00017	0.0002	18%	-	<0.00010
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	0.00012	0.00013	8%	-	<0.00010
Copper (Cu)-Dissolved	mg/L	0.002	-	0.0002	0.00208	0.00205	1%	-	<0.00020
Iron (Fe)-Dissolved	mg/L	0.3	-	0.01	0.339	0.332	2%	-	<0.010
Lead (Pb)-Dissolved	mg/L	0.001	-	0.00005	<0.000050	<0.000050	-	-	<0.000050
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	<0.00050	<0.00050	-	-	<0.00050
Magnesium (Mg)-Dissolved	mg/L	-	-	0.1	6.2	6.17	0%	-	<0.10
Manganese (Mn)-Dissolved	mg/L	-	-	0.00005	0.0308	0.0297	4%	-	<0.000050
Mercury (Hg)-Dissolved	mg/L	0.000026	-	0.00001	<0.000010	<0.000010	-	-	<0.000010



Table E3. Summary of Water Quality Results for the May 20-21, 2014 Trip.

Analyte	Units	CCME-WATER-F-AL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0352-140521-042 WQ-VC-R 21-May-14	0352-140521-041 WQ-VC-R-r 21-May-14	QA/QC WQ-VC-R	0352-140522-TRAVEL-BLANK TRAVEL BLANK 22-May-14	0352-140521-FIELD-BLANK FIELD BLANK 21-May-14
Molybdenum (Mo)-Dissolved	mg/L	0.073	-	0.00005	0.000267	0.000252	6%	-	<0.000050
Nickel (Ni)-Dissolved	mg/L	0.1	-	0.0005	0.00072	0.00073	1%	-	<0.00050
Phosphorus (P)-Dissolved	mg/L	-	-	0.05	<0.050	<0.050	-	-	<0.050
Potassium (K)-Dissolved	mg/L	-	-	0.1	0.7	0.69	1%	-	<0.10
Selenium (Se)-Dissolved	mg/L	0.001	-	0.0001	<0.00010	<0.00010	-	-	<0.00010
Silicon (Si)-Dissolved	mg/L	-	-	0.05	4.12	4.16	1%	-	<0.050
Silver (Ag)-Dissolved	mg/L	0.0001	-	0.00001	<0.000010	<0.000010	-	-	<0.000010
Sodium (Na)-Dissolved	mg/L	-	-	0.05	1.87	1.93	3%	-	<0.050
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	0.161	0.168	4%	-	<0.00020
Sulfur (S)-Dissolved	mg/L	-	-	0.5	7.93	8.03	1%	-	<0.50
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001	<0.000010	<0.000010	-	-	<0.000010
Tin (Sn)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00010	-	-	<0.00010
Titanium (Ti)-Dissolved	mg/L	-	-	0.01	<0.010	<0.010	-	-	<0.010
Uranium (U)-Dissolved	mg/L	0.015	-	0.00001	0.000315	0.000304	3%	-	<0.000010
Vanadium (V)-Dissolved	mg/L	-	-	0.001	<0.0010	<0.0010	-	-	<0.0010
Zinc (Zn)-Dissolved	mg/L	0.03	-	0.001	0.0041	0.0019	54%	-	<0.0010

Applied Guidelines: *Federal CCME Canadian Environmental Quality Guidelines (May 2014), CCME: Freshwater Aquatic Life

*Mount Nansen Effluent Discharge Standards

Colour Key:

Exceeds CCME Guideline
Exceeds MN Effluent Discharge Standards
Exceeds both CCME and MN Standards
Exceeds 10% difference threshold for QA/QC replicate samples

For those guidelines that are hardness dependent (Cd, Cu, Pb, Ni), the most conservative guideline has been applied. Same for guidelines that are pH and temperature dependent (Ammonia and Aluminum), unless otherwise noted.



Table E4. Summary of Water Quality Results for the June 24-25, 2014 Trip.

Analyte	Units	CCME-WATER-F-AL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0352-140624-004 WQ-PC-U 24-Jun-14	0352-140624-002 WQ-DC-R 24-Jun-14	0352-140624-007 WQ-DESS-01 24-Jun-14	0352-140624-008 WQ-DESS-02 24-Jun-14	0352-140624-001 WQ-VC-R 24-Jun-14	0352-140624-011 WQ-DC-D1b 24-Jun-14	0352-140624-017 WQ-SEEP 24-Jun-14	0352-140624-014 WQ-DC-B 24-Jun-14	0352-140624-016 WQ-DC-B-r 24-Jun-14	QA/QC WQ-DC-B	0352-140624-010 CH-P-13-01 24-Jun-14	0352-140624-009 WQ-DX 24-Jun-14
Temperature (in-situ)	°C	-	-	-	5.0	7.7	2.9	8.7	7.9	3.8	7.5	7.6	-	-	3	2.4
Specific Conductivity (in-situ)	µS/cm	-	-	-	453.6	1200	1570	1450	241.4	1307	1815	1339	-	-	1818	556.5
pH (in-situ)	pH	6.5 - 9.0	6.0 - 8.5	-	7.62	7.6	7.09	7.98	7.95	7.76	6.75	7.81	-	-	6.23	7.28
Turbidity (In-situ)	NTU	-	-	-	0.42	26.6	0.33	0.89	1.08	3.99	13.1	12.3	-	-	0.19	3.47
Dissolved Oxygen (in-situ)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Colour, True	CU	15	-	5	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity	µS/cm	-	-	2	432	1140	1480	1380	238	1250	1750	1290	1310	2%	1620	514
Hardness (as CaCO3)	mg/L	-	-	0.5	237	704	984	891	125	833	1010	860	853	1%	1140	290
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1	7.68	7.78	5.67	7.89	7.86	8.05	7.18	8.06	8.05	0%	5.76	7.47
Total Suspended Solids	mg/L	-	50	3	<3.0	147	7.3	82.7	4	6.7	38.7	68	64	6%	19.3	22.7
Total Dissolved Solids	mg/L	-	-	1	295	916	1300	1180	142	1020	1460	1070	1070	0%	1480	368
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1	81	173	1.6	110	85.3	238	242	211	212	0%	2.5	89.5
Alkalinity, Carbonate (as CaCO3)	mg/L	-	-	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	<1.0	<1.0
Alkalinity, Hydroxide (as CaCO3)	mg/L	-	-	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	<1.0	<1.0
Alkalinity, Total (as CaCO3)	mg/L	-	-	1	81	173	1.6	110	85.3	238	242	211	212	0%	2.5	89.5
Ammonia, Total (as N)	mg/L	0.75	-	0.005	<0.0050	0.671	0.007	0.0058	0.0126	0.239	5.29	0.106	0.12	13%	<0.0050	<0.0050
Chloride (Cl)	mg/L	120	-	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	-	<0.50	<0.50
Fluoride (F)	mg/L	0.12	-	0.02	0.041	<0.20	<0.20	<0.20	0.052	<0.20	<0.20	<0.20	<0.20	-	<0.20	0.052
Nitrate (as N)	mg/L	13	-	0.005	<0.0050	0.517	0.132	1.33	0.0853	0.162	0.337	0.169	0.166	2%	0.307	<0.0050
Nitrite (as N)	mg/L	0.06	-	0.001	<0.0010	0.019	<0.010	<0.010	<0.010	<0.010	0.013	<0.010	<0.010	-	<0.010	<0.0010
Sulfate (SO4)	mg/L	-	-	0.5	156	546	956	773	43	586	867	646	643	0%	1080	202
Cyanide, Weak Acid Diss	mg/L	-	0.1	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0104	<0.0050	<0.0050	-	<0.0050	<0.0050
Cyanide, Total	mg/L	-	0.3	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0573	<0.0050	<0.0050	-	<0.0050	<0.0050
Cyanate	mg/L	-	-	0.2	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	-	<0.20	<0.20
Thiocyanate (SCN)	mg/L	-	-	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	5.28	<0.50	<0.50	-	<0.50	<0.50
Aluminum (Al)-Total	mg/L	0.1	-	0.003	0.0165	0.246	0.156	0.02	0.024	0.0486	0.0152	0.75	0.809	8%	0.265	0.236
Antimony (Sb)-Total	mg/L	-	0.15	0.0001	0.00047	0.00219	0.00014	0.00024	0.00032	0.00863	0.00051	0.00205	0.00195	5%	0.00018	0.00101
Arsenic (As)-Total	mg/L	0.005	-	0.0001	0.0015	0.0289	0.00052	0.00287	0.00168	0.038	0.0853	0.0109	0.0107	2%	0.00108	0.0121
Barium (Ba)-Total	mg/L	-	1	0.00005	0.0778	0.0693	0.0363	0.0231	0.0637	0.0251	0.0652	0.0716	0.0705	2%	0.0167	0.0473
Beryllium (Be)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010
Bismuth (Bi)-Total	mg/L	-	-	0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050
Boron (B)-Total	mg/L	-	-	0.01	<0.010	0.027	<0.010	<0.010	<0.010	0.04	0.075	0.022	0.022	0%	<0.010	<0.010
Cadmium (Cd)-Total	mg/L	0.000033	0.02	0.00001	0.000035	0.00012	0.012	0.00002	0.000017	0.000513	0.000327	0.000123	0.000142	15%	0.015	0.000041
Calcium (Ca)-Total	mg/L	-	-	0.05	69.1	170	233	273	30.4	187	299	186	182	2%	250	80.1
Chromium (Cr)-Total	mg/L	0.0089	0.04	0.0001	0.00024	0.00075	0.00021	<0.00010	0.00031	0.00017	0.0006	0.0016	0.00167	4%	0.00033	0.00043
Cobalt (Co)-Total	mg/L	-	-	0.0001	<0.00010	0.00219	<0.00010	<0.00010	0.00012	0.00028	0.0089	0.0008	0.00078	3%	0.00046	0.00046
Copper (Cu)-Total	mg/L	0.002	0.2	0.0005	0.00081	0.00204	0.00142	<0.00050	0.00123	0.00134	0.00219	0.00335	0.00324	3%	0.00166	0.00151
Iron (Fe)-Total	mg/L	0.3	1	0.01	0.052	4.22	0.055	0.014	0.22	0.775	13.6	2.55	2.55	0%	0.209	1.71
Lead (Pb)-Total	mg/L	0.003	0.1	0.00005	<0.000050	0.0032	<0.000050	0.000063	0.000058	0.00535	0.000066	0.000997	0.000992	1%	0.00015	0.00139
Lithium (Li)-Total	mg/L	-	-	0.0005	0.00084	0.00207	0.00221	<0.00050	0.0007	0.00566	0.00141	0.00394	0.00442	12%	0.00187	<0.00050
Magnesium (Mg)-Total	mg/L	-	-	0.1	16.1	58.6	91.3	10	85	58.4	85.5	81.2	81.2	5%	92.3	20.5
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	0.0144	1.69	0.347	0.00192	0.0423	0.845	7.16	0.888	0.85	4%	0.872	0.381
Mercury (Hg)-Total	mg/L	0.000026	0.005	0.00001	<0.000010	0.000013	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010
Molybdenum (Mo)-Total	mg/L	0.0073	-	0.00005	0.000059	0.00051	<0.000050	0.000164	0.000393	0.00025	0.00105	0.000554	0.000499	10%	0.00066	0.00087
Nickel (Ni)-Total	mg/L	0.1	0.3	0.0005	<0.00050	0.00141	0.0113	<0.00050	<0.00050	0.0007	0.00253	0.00175	0.00177	1%	0.01	0.00061
Phosphorus (P)-Total	mg/L	-	-	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	-	<0.050	<0.050
Potassium (K)-Total	mg/L	-	-	0.1	0.47	3.47	0.8	0.61	0.81	4.02	7.68	3.29	3.06	7%	0.96	4.54
Selenium (Se)-Total	mg/L	0.001	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00017	0.00012	0.00012	0%	<0.00010	<0.00010
Silicon (Si)-Total	mg/L	-	-	0.05	5.51	5.37	6.85	6.09	5.27	5.08	7.58	6.34	6.22	2%	6.04	4.55
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	<0.000010	0.000048	<0.000010	<0.000010	<0.000010	0.000048	0.000033	0.000023	0.000047	104%	0.000012	0.000024
Sodium (Na)-Total	mg/L	-	-	0.05	5.34	15.2	5.81	7.8	3.26	6.31	42.4	9.21	8.59	7%	6.09	4.18
Strontium (Sr)-Total	mg/L	-	-	0.0002	0.482	0.575	0.575	0.562	0.253	0.464	0.868	0.741	0.66	11%	0.671	0.252
Sulfur (S)-Total	mg/L	-	-	0.5	53.6	172	313	250	13.7	192	288	205	198	3%	355	67.9
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000025	<0.000010	0.000015	0.000022	47%	<0.000010	0.000013
Tin (Sn)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010
Titanium (Ti)-Total	mg/L	-	-	0.01	<0.010	0.012	<0.010	<0.010	<0.010	<0.010	<0.010	0.033	0.037	12%	<0.010	0.011
Uranium (U)-Total	mg/L	0.015	-	0.00001	0.000407	0.00207	<0.000010	0.000793	0.000511	0.00268	0.00173	0.00376	0.0034	10%	0.00024	0.000181
Vanadium (V)-Total	mg/L	-	-	0.001	<0.0010	0.0022	<0.0010	<0.0010	<0.0010	<0.0010	0.0023	0.0048	0.0055	15%	<0.0010	0.0015
Zinc (Zn)-Total	mg/L	0.03	0.3	0.003	0.004	0.0106	4.45	0.0039	<0.0030	0.15	0.0064	0.0113	0.012	6%	4.89	0.009
Dissolved Metals Filtration Location		-	-	n/a	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	-	FIELD	FIELD
Aluminum (Al)-Dissolved	mg/L	0.005	-	0.001	0.0087	0.0106	0.137	0.012	0.0133	0.0025	0.0122	0.0092	0.0088	4%	0.268	0.004
Antimony (Sb)-Dissolved	mg/L	-	-	0.0001	0.00042	0.00185	0.00015	0.00024	0.00033	0.00795	0.00048	0.00191	0.00182	5%	0.00017	0.00073
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	0.00119	0.00918	0.00046	0.00257	0.0015	0.0221	0.0685	0.00431	0.00443	3%	0.00057	0.00405
Barium (Ba)-Dissolved	mg/L	-	-	0.00005	0.0665	0.0631	0.0374	0.0223	0.0686	0.0231	0.0608	0.0489	0.0486	1%	0.0178	0.0418
Beryllium (Be)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010
Bismuth (Bi)-Dissolved	mg/L	-	-	0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050
Boron (B)-Dissolved	mg/L	-	-	0.01	<0.010	0.025	<0.010	<0.010	<0.010	0.037	0.072	0.018	0.018	0%	<0.010	<0.010
Cadmium (Cd)-Dissolved	mg/L	0.000033	-	0.00001	0.000026	0.000041	0.0117	0.000026	0.000015	0.000263	0.000229	0.000017	0.000021	24%	0.0223	0.000012
Calcium (Ca)-Dissolved	mg/L	-	-	0.05	69	179	240	279	32.4	191	307	195	197	1%	268	82
Chromium (Cr)-Dissolved	mg/L	0.0089	-	0.0001	<0.00010	0.00012	0.00012	<0.00010</								



Table E4. Summary of Water Quality Results for the June 24-25, 2014 Trip.

Analyte	Units	CCME-WATER-F-AL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0352-140624-004 WQ-PC-U 24-Jun-14	0352-140624-002 WQ-DC-R 24-Jun-14	0352-140624-007 WQ-DESS-01 24-Jun-14	0352-140624-008 WQ-DESS-02 24-Jun-14	0352-140624-001 WQ-VC-R 24-Jun-14	0352-140624-011 WQ-DC-D1b 24-Jun-14	0352-140624-017 WQ-SEEP 24-Jun-14	0352-140624-014 WQ-DC-B 24-Jun-14	0352-140624-016 WQ-DC-B-r 24-Jun-14	QA/QC WQ-DC-B	0352-140624-010 CH-P-13-01 24-Jun-14	0352-140624-009 WQ-DX 24-Jun-14
Manganese (Mn)-Dissolved	mg/L	-	-	0.00005	0.008	1.62	0.306	0.00163	0.0389	0.834	7.19	0.837	0.88	5%	1.54	0.377
Mercury (Hg)-Dissolved	mg/L	0.000026	-	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	mg/L	0.073	-	0.00005	0.000057	0.000524	<0.000050	0.000159	0.0004	0.000234	0.001	0.000472	0.000409	13%	<0.000050	0.000054
Nickel (Ni)-Dissolved	mg/L	0.1	-	0.0005	<0.00050	0.00115	0.0108	<0.00050	<0.00050	0.00059	0.00259	0.00087	0.00091	5%	0.0139	<0.00050
Phosphorus (P)-Dissolved	mg/L	-	-	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	-	<0.050	<0.050
Potassium (K)-Dissolved	mg/L	-	-	0.1	0.48	3.44	0.81	0.61	0.85	4.07	8.05	3.37	3.26	3%	0.9	4.57
Selenium (Se)-Dissolved	mg/L	0.001	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00017	<0.00010	<0.00010	-	<0.00010	<0.00010
Silicon (Si)-Dissolved	mg/L	-	-	0.05	5.47	4.98	7	6.14	5.61	5.03	7.59	5.38	5.35	1%	6.09	4.25
Silver (Ag)-Dissolved	mg/L	0.0001	-	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010
Sodium (Na)-Dissolved	mg/L	-	-	0.05	4.78	15.4	5.78	7.52	3.44	6.22	42.6	8.76	9.19	5%	6.07	4.17
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	0.468	0.606	0.607	0.577	0.259	0.475	0.864	0.743	0.665	10%	0.719	0.235
Sulfur (S)-Dissolved	mg/L	-	-	0.5	51.4	175	311	247	14.2	187	283	207	205	1%	388	67.4
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000023	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010
Tin (Sn)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010
Titanium (Ti)-Dissolved	mg/L	-	-	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-	<0.010	<0.010
Uranium (U)-Dissolved	mg/L	0.015	-	0.00001	0.00038	0.00225	<0.000010	0.000887	0.000556	0.00256	0.00172	0.00363	0.0034	6%	<0.000010	0.000162
Vanadium (V)-Dissolved	mg/L	-	-	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010
Zinc (Zn)-Dissolved	mg/L	0.03	-	0.001	0.0024	0.0037	4.5	0.0051	<0.0010	0.137	0.0066	0.0027	0.0027	0%	7.12	0.0015

Applied Guidelines: Federal CCME Canadian Environmental Quality Guidelines (May 2014), CCME: Freshwater Aquatic Life
 Mount Nansen Effluent Discharge Standards

Colour Key:

Exceeds CCME Guideline
Exceeds MN Effluent Discharge Standards
Exceeds both CCME and MN Standards
Exceeds 10% difference threshold for QA/QC replicate samples

For those guidelines that are hardness dependent (Cd, Cu, Pb, Ni), the most conservative guideline has been applied. Same for guidelines that are pH and temperature dependent (Ammonia and Aluminum), unless otherwise noted.



Table E4. Summary of Water Quality Results for the June 24-25, 2014 Trip.

Analyte	Units	CCME-WATER-F-AL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0352-140624-018 WQ-TP 24-Jun-14	0352-140624-005 WQ-VC-UMN 24-Jun-14	0352-140624-003 WQ-VC-DBC 24-Jun-14	0352-140624-015 WQ-DC-U 24-Jun-14	0352-140624-012 WQ-DC-DX+105 24-Jun-14	0352-140625-030 WQ-VC-U 25-Jun-14	0352-140625-028 WQ-VC-U-r 25-Jun-14	QA/QC WQ-VC-U	0352-140625-024 WQ-PIT-1 25-Jun-14	0352-140625-029 WQ-PIT-1-r 25-Jun-14	QA/QC WQ-PIT-1	0352-140625-025 WQ-PIT-2 25-Jun-14
Temperature (in-situ)	°C	-	-	-	12.8	7.4	6.9	6.6	1.1	5.6	-	-	9.5	-	-	9.5
Specific Conductivity (in-situ)	µS/cm	-	-	-	1115	257.1	185.5	1415	1187	183.7	-	-	1426	-	-	1426
pH (in-situ)	pH	6.5 - 9.0	6.0 - 8.5	-	8.3	7.73	7.59	7.69	7.01	7.4	-	-	7.96	-	-	7.9
Turbidity (In-situ)	NTU	-	-	-	5.68	1.44	0.27	13.8	2.66	0.54	-	-	1.76	-	-	1.23
Dissolved Oxygen (in-situ)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Colour, True	CU	15	-	5	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity	µS/cm	-	-	2	1060	252	180	1340	1110	187	179	4%	1370	1360	1%	1390
Hardness (as CaCO3)	mg/L	-	-	0.5	621	131	93.9	873	730	92.6	92.8	0%	851	872	2%	845
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1	7.83	7.87	7.93	8.05	7.48	7.93	7.82	1%	8.04	8.04	0%	8
Total Suspended Solids	mg/L	-	50	3	6	<3.0	<3.0	22	<3.0	19.3	10	48%	<3.0	<3.0	-	3.3
Total Dissolved Solids	mg/L	-	-	1	866	151	102	1120	873	101	101	0%	1140	1160	2%	1140
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1	71	89.2	85	213	276	82	81.9	0%	139	139	0%	139
Alkalinity, Carbonate (as CaCO3)	mg/L	-	-	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	<1.0	<1.0	-	<1.0
Alkalinity, Hydroxide (as CaCO3)	mg/L	-	-	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	-	<1.0	<1.0	-	<1.0
Alkalinity, Total (as CaCO3)	mg/L	-	-	1	71	89.2	85	213	276	82	81.9	0%	139	139	0%	139
Ammonia, Total (as N)	mg/L	0.75	-	0.005	0.0106	0.0103	<0.0050	1.14	0.0147	<0.0050	<0.0050	-	<0.0050	<0.0050	-	<0.0050
Chloride (Cl)	mg/L	120	-	0.5	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	<5.0	-	<5.0	<5.0	-	<5.0
Fluoride (F)	mg/L	0.12	-	0.02	<0.20	0.049	0.047	<0.20	<0.20	0.048	0.045	6%	<0.20	<0.20	-	0.24
Nitrate (as N)	mg/L	13	-	0.005	0.065	0.0892	0.0691	0.32	<0.050	0.0884	0.0881	0%	<0.050	<0.050	-	<0.050
Nitrite (as N)	mg/L	0.06	-	0.001	<0.010	0.0013	<0.0010	<0.010	<0.010	<0.0010	<0.0010	-	<0.010	<0.010	-	<0.010
Sulfate (SO4)	mg/L	-	-	0.5	577	47.2	15.6	667	446	15.9	16	1%	746	752	1%	746
Cyanide, Weak Acid Diss	mg/L	-	0.1	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	-	-	-	-	-
Cyanide, Total	mg/L	-	0.3	0.005	<0.0050	<0.0050	<0.0050	<0.0088	<0.0050	<0.0050	<0.0050	-	-	-	-	-
Cyanate	mg/L	-	-	0.2	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	-	-	-	-	-
Thiocyanate (SCN)	mg/L	-	-	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	-	-	-	-	-
Aluminum (Al)-Total	mg/L	0.1	-	0.003	0.0234	0.0139	0.0182	0.207	0.0295	0.0496	0.0211	57%	0.0136	0.013	4%	0.0142
Antimony (Sb)-Total	mg/L	-	0.15	0.0001	0.0362	0.00039	0.00013	0.00125	0.0124	0.00012	0.00011	8%	0.00313	0.00299	4%	0.00314
Arsenic (As)-Total	mg/L	0.005	-	0.0001	0.0867	0.00172	0.00038	0.0231	0.0336	0.00041	0.00039	5%	0.00572	0.00528	8%	0.00573
Barium (Ba)-Total	mg/L	-	1	0.00005	0.00674	0.0646	0.0657	0.0662	0.013	0.0603	0.0613	2%	0.0271	0.0252	7%	0.0259
Beryllium (Be)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	-	<0.00010
Bismuth (Bi)-Total	mg/L	-	-	0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	-	<0.00050
Boron (B)-Total	mg/L	-	-	0.01	0.071	<0.010	<0.010	0.034	<0.010	<0.010	<0.010	-	<0.010	<0.010	-	<0.010
Cadmium (Cd)-Total	mg/L	0.000033	0.02	0.00001	0.00059	0.000015	0.000013	0.00012	0.00348	0.000017	0.000013	24%	0.00308	0.00282	8%	0.00289
Calcium (Ca)-Total	mg/L	-	-	0.05	171	33.8	23.6	225	184	22.9	23.4	2%	249	239	4%	243
Chromium (Cr)-Total	mg/L	0.0089	0.04	0.0001	0.00013	0.00013	0.00015	0.00061	0.00015	0.00047	0.00019	60%	<0.00010	<0.00010	-	<0.00010
Cobalt (Co)-Total	mg/L	-	-	0.0001	0.00049	0.0001	<0.00010	0.00234	0.00047	<0.00010	<0.00010	-	<0.00010	<0.00010	-	<0.00010
Copper (Cu)-Total	mg/L	0.002	0.2	0.0005	0.0182	0.00116	0.0011	0.00188	0.00071	0.00124	0.00112	10%	0.00337	0.00306	9%	0.00366
Iron (Fe)-Total	mg/L	0.3	1	0.01	0.266	0.079	0.046	3	0.464	0.106	0.068	36%	0.023	0.023	15%	0.039
Lead (Pb)-Total	mg/L	0.003	0.1	0.00005	0.00675	0.000051	<0.000050	0.000378	0.000482	0.000089	<0.000050	45%	0.000334	0.000293	12%	0.000455
Lithium (Li)-Total	mg/L	-	-	0.0005	0.00591	0.00058	<0.00050	0.00235	0.00089	<0.00050	0.00053	0%	0.00698	0.00653	6%	0.00672
Magnesium (Mg)-Total	mg/L	-	-	0.1	39.5	11	7.99	80.1	61.8	7.72	7.66	1%	64.1	62.9	2%	61.6
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	0.084	0.0433	0.0258	2.19	1.03	0.025	0.0227	9%	0.0235	0.0214	9%	0.0234
Mercury (Hg)-Total	mg/L	0.000026	0.005	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	-	<0.000010
Molybdenum (Mo)-Total	mg/L	0.0073	-	0.00005	0.00137	0.00042	0.000428	0.000536	0.000375	0.000458	0.000452	1%	0.000146	0.000135	8%	0.000135
Nickel (Ni)-Total	mg/L	0.1	0.3	0.0005	0.00072	<0.00050	<0.00050	0.00151	0.00153	<0.00050	<0.00050	-	0.00057	0.00053	7%	0.00073
Phosphorus (P)-Total	mg/L	-	-	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	-	<0.050	<0.050	-	<0.050
Potassium (K)-Total	mg/L	-	-	0.1	10	0.83	0.67	4.28	3.61	0.64	0.63	2%	2.85	2.9	2%	2.83
Selenium (Se)-Total	mg/L	0.001	-	0.0001	<0.00010	<0.00010	<0.00010	0.00013	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	-	<0.00010
Silicon (Si)-Total	mg/L	-	-	0.05	0.345	5.39	5.38	6.14	6.44	5.28	5.33	1%	2.59	2.44	6%	2.52
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	0.00014	<0.000010	<0.000010	0.000011	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	-	<0.000010
Sodium (Na)-Total	mg/L	-	-	0.05	14.3	3.59	2.48	18.5	5.14	2.41	2.43	1%	9.34	8.55	8%	8.9
Strontium (Sr)-Total	mg/L	-	-	0.0002	0.473	0.31	0.28	0.713	0.44	0.286	0.29	1%	0.832	0.788	5%	0.803
Sulfur (S)-Total	mg/L	-	-	0.5	184	15.7	5.65	227	144	5.78	5.84	1%	245	242	1%	236
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	0.000182	<0.000010	<0.000010	<0.000010	0.000094	<0.000010	<0.000010	-	0.000054	0.000053	2%	0.000056
Tin (Sn)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	-	<0.00010
Titanium (Ti)-Total	mg/L	-	-	0.01	<0.010	<0.010	<0.010	0.011	<0.010	<0.010	<0.010	-	<0.010	<0.010	-	<0.010
Uranium (U)-Total	mg/L	0.015	-	0.00001	0.000834	0.000589	0.000517	0.00255	0.00465	0.000553	0.000558	1%	0.00316	0.00295	7%	0.00311
Vanadium (V)-Total	mg/L	-	-	0.001	<0.0010	<0.0010	<0.0010	0.002	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	-	<0.0010
Zinc (Zn)-Total	mg/L	0.03	0.3	0.003	0.0411	<0.0030	<0.0030	0.008	0.631	0.0036	<0.0030	19%	0.347	0.316	9%	0.337
Dissolved Metals Filtration Location		-	-	n/a	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	-	FIELD	FIELD	-	FIELD
Aluminum (Al)-Dissolved	mg/L	0.005	-	0.001	0.0057	0.0078	0.0097	0.0115	<0.0010	0.0115	0.0111	3%	0.0016	0.0026	63%	0.0018
Antimony (Sb)-Dissolved	mg/L	-	-	0.0001	0.0357	0.00035	<0.00010	0.00124	0.0019	0.0001	0.0001	0%	0.00297	0.00296	0%	0.00296
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	0.0574	0.00137	0.00033	0.0127	0.00643	0.00032	0.00034	6%	0.00494	0.00494	0%	0.00504
Barium (Ba)-Dissolved	mg/L	-	-	0.00005	0.00666	0.0651	0.0669	0.056	0.0121	0.0612	0.0613	0%	0.0253	0.0255	1%	0.0254
Beryllium (Be)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	-	<0.00010
Bismuth (Bi)-Dissolved	mg/L	-	-	0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	-	<0.00050
Boron (B)-Dissolved	mg/L	-	-	0.01	0.07	<0.010	<0.010	0.032	<0.010	<0.010	<0.010	-	<0.010	<0.010	-	<0.010
Cadmium (Cd)-Dissolved	mg/L	0.000033	-	0.00001	0.000346	0.000012	0.000012	0.00005	0.00141	0.000012	0.000011	8%	0.00295	0.00292	1%	0.00282
Calcium (Ca)-Dissolved	mg/L	-	-	0.05	180	34.1	24.2	219	188	24.1	24.1	0%	241	243	1%	239
Chromium (Cr)-Dissolved	mg/L	0.0089	-	0.0001	<0.00010	0.00011	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	-	<0.00010
Cobalt (Co)-Dissolved	mg/L	-	-	0.00005	<0.000050	<0.000050	<0.000050	0.00204	0.00043	<0.000050	<0.000050	-	<0.000050	<0.000050	-	<0.000050
Copper (Cu)-Dissolved	mg/L	0.002	-	0.0002	0.0131	0.00107	0.00101	0								



Table E4. Summary of Water Quality Results for the June 24-25, 2014 Trip.

Analyte	Units	CCME-WATER-F-AL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0352-140624-018 WQ-TP 24-Jun-14	0352-140624-005 WQ-VC-UMN 24-Jun-14	0352-140624-003 WQ-VC-DBC 24-Jun-14	0352-140624-015 WQ-DC-U 24-Jun-14	0352-140624-012 WQ-DC-DX+105 24-Jun-14	0352-140625-030 WQ-VC-U 25-Jun-14	0352-140625-028 WQ-VC-U-r 25-Jun-14	QA/QC WQ-VC-U	0352-140625-024 WQ-PIT-1 25-Jun-14	0352-140625-029 WQ-PIT-1-r 25-Jun-14	QA/QC WQ-PIT-1	0352-140625-025 WQ-PIT-2 25-Jun-14
Manganese (Mn)-Dissolved	mg/L	-	-	0.00005	0.0562	0.0398	0.0233	1.99	1.04	0.0191	0.0199	4%	0.0212	0.0207	2%	0.0215
Mercury (Hg)-Dissolved	mg/L	0.000026	-	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	-	<0.000010
Molybdenum (Mo)-Dissolved	mg/L	0.073	-	0.00005	0.0014	0.000391	0.000374	0.00053	0.000336	0.00043	0.000434	1%	0.000135	0.000125	7%	0.000129
Nickel (Ni)-Dissolved	mg/L	0.1	-	0.0005	0.00069	<0.00050	<0.00050	0.00105	0.00142	<0.00050	<0.00050	-	0.00053	<0.00050	8%	0.00053
Phosphorus (P)-Dissolved	mg/L	-	-	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	-	<0.050	<0.050	-	<0.050
Potassium (K)-Dissolved	mg/L	-	-	0.1	10.3	0.83	0.67	4.22	3.67	0.64	0.64	0%	2.77	2.81	1%	2.67
Selenium (Se)-Dissolved	mg/L	0.001	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	-	<0.00010
Silicon (Si)-Dissolved	mg/L	-	-	0.05	0.319	5.46	5.43	5.54	6.43	5.4	5.37	1%	2.48	2.51	1%	2.46
Silver (Ag)-Dissolved	mg/L	0.0001	-	0.00001	0.000027	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	-	<0.000010
Sodium (Na)-Dissolved	mg/L	-	-	0.05	14.8	3.49	2.53	17	5.14	2.35	2.43	3%	8.78	8.9	1%	8.64
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	0.494	0.292	0.264	0.743	0.431	0.275	0.272	1%	0.787	0.793	1%	0.797
Sulfur (S)-Dissolved	mg/L	-	-	0.5	186	15.5	5.56	213	140	5.8	5.81	0%	233	244	5%	231
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001	0.000183	<0.000010	<0.000010	<0.000010	0.000082	<0.000010	<0.000010	-	0.000055	0.000052	5%	0.000052
Tin (Sn)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	-	<0.00010
Titanium (Ti)-Dissolved	mg/L	-	-	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	-	<0.010	<0.010	-	<0.010
Uranium (U)-Dissolved	mg/L	0.015	-	0.00001	0.000811	0.000567	0.000494	0.00264	0.00415	0.000537	0.000536	0%	0.00299	0.00297	1%	0.00298
Vanadium (V)-Dissolved	mg/L	-	-	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	-	<0.0010
Zinc (Zn)-Dissolved	mg/L	0.03	-	0.001	0.0191	<0.0010	<0.0010	0.002	0.587	<0.0010	<0.0010	-	0.331	0.324	2%	0.334

Applied Guidelines: Federal CCME Canadian Environmental Quality Guidelines (May 2014), CCME: Freshwater Aquatic Life
 Mount Nansen Effluent Discharge Standards

Colour Key:

Exceeds CCME Guideline
Exceeds MN Effluent Discharge Standards
Exceeds both CCME and MN Standards
Exceeds 10% difference threshold for QA/QC replicate samples

For those guidelines that are hardness dependent (Cd, Cu, Pb, Ni), the most conservative guideline has been applied. Same for guidelines that are pH and temperature dependent (Ammonia and Aluminum), unless otherwise noted.



Table E4. Summary of Water Quality Results for the June 24-25, 2014 Trip.

Analyte	Units	CCME-WATER-F-AL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0352-140625-027 WQ-PW 25-Jun-14	0352-140625-026 WQ-PIT-3 25-Jun-14	0352-140624-FIELD-BLANK FIELD BLANK 24-Jun-14	0352-140624-TRAVEL-BLANK TRAVEL BLANK 24-Jun-14
Temperature (in-situ)	°C	-	-	-	1.3	8.2	-	-
Specific Conductivity (in-situ)	µS/cm	-	-	-	404.9	2346	-	-
pH (in-situ)	pH	6.5 - 9.0	6.0 - 8.5	-	6.72	6.65	-	-
Turbidity (In-situ)	NTU	-	-	-	0.1	2.88	-	-
Dissolved Oxygen (in-situ)	mg/L	-	-	-	-	-	-	-
Colour, True	CU	15	-	5	<5.0	-	-	-
Conductivity	µS/cm	-	-	2	366	2200	<2.0	<2.0
Hardness (as CaCO3)	mg/L	-	-	0.5	190	1530	<0.50	<0.50
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1	7.63	7.46	5.52	5.56
Total Suspended Solids	mg/L	-	50	3	-	10.7	<3.0	<3.0
Total Dissolved Solids	mg/L	-	-	1	206	2090	<1.0	<1.0
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1	-	214	<1.0	<1.0
Alkalinity, Carbonate (as CaCO3)	mg/L	-	-	1	-	<1.0	<1.0	<1.0
Alkalinity, Hydroxide (as CaCO3)	mg/L	-	-	1	-	<1.0	<1.0	<1.0
Alkalinity, Total (as CaCO3)	mg/L	-	-	1	172	214	<1.0	<1.0
Ammonia, Total (as N)	mg/L	0.75	-	0.005	-	<0.0050	<0.0050	<0.0050
Chloride (Cl)	mg/L	120	-	0.5	<0.50	<10	<0.50	<0.50
Fluoride (F)	mg/L	0.12	-	0.02	0.095	<0.40	<0.020	<0.020
Nitrate (as N)	mg/L	13	-	0.005	0.136	<0.10	<0.0050	<0.0050
Nitrite (as N)	mg/L	0.06	-	0.001	<0.0010	<0.020	<0.0010	<0.0010
Sulfate (SO4)	mg/L	-	-	0.5	33.1	1400	<0.50	<0.50
Cyanide, Weak Acid Diss	mg/L	-	0.1	0.005	-	-	<0.0050	<0.0050
Cyanide, Total	mg/L	-	0.3	0.005	-	-	<0.0050	<0.0050
Cyanate	mg/L	-	-	0.2	-	-	<0.20	<0.20
Thiocyanate (SCN)	mg/L	-	-	0.5	-	-	<0.50	<0.50
Aluminum (Al)-Total	mg/L	0.1	-	0.003	<0.010	0.0182	<0.0030	<0.0030
Antimony (Sb)-Total	mg/L	-	0.15	0.0001	<0.00050	0.00105	<0.00010	<0.00010
Arsenic (As)-Total	mg/L	0.005	-	0.0001	0.00039	0.0271	<0.00010	<0.00010
Barium (Ba)-Total	mg/L	-	1	0.00005	0.082	0.0118	<0.000050	<0.000050
Beryllium (Be)-Total	mg/L	-	-	0.0001	-	<0.00020	<0.00010	<0.00010
Bismuth (Bi)-Total	mg/L	-	-	0.0005	-	<0.0010	<0.00050	<0.00050
Boron (B)-Total	mg/L	-	-	0.01	<0.10	<0.020	<0.010	<0.010
Cadmium (Cd)-Total	mg/L	0.000033	0.02	0.00001	<0.00020	0.00503	<0.000010	<0.000010
Calcium (Ca)-Total	mg/L	-	-	0.05	43.7	429	<0.050	<0.050
Chromium (Cr)-Total	mg/L	0.0089	0.04	0.0001	<0.0020	<0.00020	<0.00010	<0.00010
Cobalt (Co)-Total	mg/L	-	-	0.0001	-	0.00032	<0.00010	<0.00010
Copper (Cu)-Total	mg/L	0.002	0.2	0.0005	<0.0010	0.0039	<0.00050	<0.00050
Iron (Fe)-Total	mg/L	0.3	1	0.01	<0.030	0.198	<0.010	<0.010
Lead (Pb)-Total	mg/L	0.003	0.1	0.00005	0.00056	0.00096	<0.000050	<0.000050
Lithium (Li)-Total	mg/L	-	-	0.0005	-	0.0101	<0.00050	<0.00050
Magnesium (Mg)-Total	mg/L	-	-	0.1	19.7	110	<0.10	<0.10
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	<0.0020	0.552	<0.000050	<0.000050
Mercury (Hg)-Total	mg/L	0.000026	0.005	0.00001	<0.00020	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Total	mg/L	0.0073	-	0.00005	-	<0.00010	<0.000050	<0.000050
Nickel (Ni)-Total	mg/L	0.1	0.3	0.0005	-	0.0014	<0.00050	<0.00050
Phosphorus (P)-Total	mg/L	-	-	0.05	-	<0.050	<0.050	<0.050
Potassium (K)-Total	mg/L	-	-	0.1	0.82	4.65	<0.10	<0.10
Selenium (Se)-Total	mg/L	0.001	-	0.0001	<0.0010	<0.00020	<0.00010	<0.00010
Silicon (Si)-Total	mg/L	-	-	0.05	-	3.2	<0.050	<0.050
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	-	<0.000020	<0.000010	<0.000010
Sodium (Na)-Total	mg/L	-	-	0.05	4.7	14.5	<0.050	<0.050
Strontium (Sr)-Total	mg/L	-	-	0.0002	-	1.27	<0.00020	<0.00020
Sulfur (S)-Total	mg/L	-	-	0.5	-	447	<0.50	<0.50
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	-	0.000091	<0.000010	<0.000010
Tin (Sn)-Total	mg/L	-	-	0.0001	-	<0.00020	<0.00010	<0.00010
Titanium (Ti)-Total	mg/L	-	-	0.01	-	<0.020	<0.010	<0.010
Uranium (U)-Total	mg/L	0.015	-	0.00001	0.00177	0.00436	<0.000010	<0.000010
Vanadium (V)-Total	mg/L	-	-	0.001	-	<0.0020	<0.0010	<0.0010
Zinc (Zn)-Total	mg/L	0.03	0.3	0.003	<0.050	0.576	<0.0030	<0.0030
Dissolved Metals Filtration Location		-	-	n/a	-	FIELD	FIELD	-
Aluminum (Al)-Dissolved	mg/L	0.005	-	0.001	-	<0.0020	<0.0010	-
Antimony (Sb)-Dissolved	mg/L	-	-	0.0001	-	0.001	<0.00010	-
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	-	0.0133	<0.00010	-
Barium (Ba)-Dissolved	mg/L	-	-	0.00005	-	0.0114	<0.000050	-
Beryllium (Be)-Dissolved	mg/L	-	-	0.0001	-	<0.00020	<0.00010	-
Bismuth (Bi)-Dissolved	mg/L	-	-	0.0005	-	<0.0010	<0.00050	-
Boron (B)-Dissolved	mg/L	-	-	0.01	-	<0.020	<0.010	-
Cadmium (Cd)-Dissolved	mg/L	0.000033	-	0.00001	-	0.00485	<0.000010	-
Calcium (Ca)-Dissolved	mg/L	-	-	0.05	-	429	<0.050	-
Chromium (Cr)-Dissolved	mg/L	0.0089	-	0.0001	-	<0.00020	<0.00010	-
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	-	0.00029	<0.00010	-
Copper (Cu)-Dissolved	mg/L	0.002	-	0.0002	-	0.00235	<0.00020	-
Iron (Fe)-Dissolved	mg/L	0.3	-	0.01	-	<0.010	<0.010	-
Lead (Pb)-Dissolved	mg/L	0.001	-	0.00005	-	<0.00010	<0.000050	-
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	-	0.01	<0.00050	-
Magnesium (Mg)-Dissolved	mg/L	-	-	0.1	-	110	<0.10	-



Table E4. Summary of Water Quality Results for the June 24-25, 2014 Trip.

Analyte	Units	CCME-WATER-F-AL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0352-140625-027 WQ-PW 25-Jun-14	0352-140625-026 WQ-PIT-3 25-Jun-14	0352-140624-FIELD-BLANK FIELD BLANK 24-Jun-14	0352-140624-TRAVEL-BLANK TRAVEL BLANK 24-Jun-14
Manganese (Mn)-Dissolved	mg/L	-	-	0.00005	-	0.513	<0.000050	-
Mercury (Hg)-Dissolved	mg/L	0.000026	-	0.00001	-	<0.000010	<0.000010	-
Molybdenum (Mo)-Dissolved	mg/L	0.073	-	0.00005	-	<0.00010	<0.000050	-
Nickel (Ni)-Dissolved	mg/L	0.1	-	0.0005	-	<0.0010	<0.00050	-
Phosphorus (P)-Dissolved	mg/L	-	-	0.05	-	<0.050	<0.050	-
Potassium (K)-Dissolved	mg/L	-	-	0.1	-	4.78	<0.10	-
Selenium (Se)-Dissolved	mg/L	0.001	-	0.0001	-	<0.00020	<0.00010	-
Silicon (Si)-Dissolved	mg/L	-	-	0.05	-	3.22	<0.050	-
Silver (Ag)-Dissolved	mg/L	0.0001	-	0.00001	-	<0.000020	<0.000010	-
Sodium (Na)-Dissolved	mg/L	-	-	0.05	-	14.4	<0.050	-
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	-	1.29	<0.00020	-
Sulfur (S)-Dissolved	mg/L	-	-	0.5	-	439	<0.50	-
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001	-	0.000091	<0.000010	-
Tin (Sn)-Dissolved	mg/L	-	-	0.0001	-	<0.00020	<0.00010	-
Titanium (Ti)-Dissolved	mg/L	-	-	0.01	-	<0.020	<0.010	-
Uranium (U)-Dissolved	mg/L	0.015	-	0.00001	-	0.0044	<0.000010	-
Vanadium (V)-Dissolved	mg/L	-	-	0.001	-	<0.0020	<0.0010	-
Zinc (Zn)-Dissolved	mg/L	0.03	-	0.001	-	0.581	<0.0010	-

Applied Guidelines: Federal CCME Canadian Environmental Quality Guidelines (May 2014), CCME: Freshwater Aquatic Life
 Mount Nansen Effluent Discharge Standards

Colour Key:

Exceeds CCME Guideline
Exceeds MN Effluent Discharge Standards
Exceeds both CCME and MN Standards
Exceeds 10% difference threshold for QA/QC replicate samples

For those guidelines that are hardness dependent (Cd, Cu, Pb, Ni), the most conservative guideline has been applied. Same for guidelines that are pH and temperature dependent (Ammonia and Aluminum), unless otherwise noted.



APPENDIX F Q1 METEOROLOGICAL DATA

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Table F-1. Mount Nansen Daily Meteorological Data (April 11 to June 30, 2014).

Date/Time	Air Temperature		Relative Humidity		Snow Depth (cm)
	Max (°C)	Min (°C)	Max (%)	Min (%)	
11/04/2014 0:00	-7.10	-12.6	57.68	41.04	61.730
12/04/2014 0:00	0.73	-14.6	66.41	15.87	61.49
13/04/2014 0:00	4.30	-7.4	39.52	21.36	61.450
14/04/2014 0:00	3.76	-4.2	54.96	28.20	61.12
15/04/2014 0:00	6.05	-3.2	68.01	34.49	60.360
16/04/2014 0:00	5.97	-0.2	70.33	33.46	57.71
17/04/2014 0:00	3.82	-3.2	93.60	53.51	57.660
18/04/2014 0:00	3.77	-2.9	94.70	44.56	58.43
19/04/2014 0:00	6.03	-2.1	99.40	39.49	54.970
20/04/2014 0:00	4.42	-4.6	70.44	30.07	53.55
21/04/2014 0:00	5.84	-1.0	63.18	38.29	50.680
22/04/2014 0:00	6.74	-0.2	85.80	43.19	48.32
23/04/2014 0:00	3.45	-1.6	95.80	56.60	46.060
24/04/2014 0:00	2.12	-1.8	96.20	69.01	45.79
25/04/2014 0:00	1.63	-3.8	96.70	61.51	45.090
26/04/2014 0:00	4.84	-3.9	92.70	27.02	44.69
27/04/2014 0:00	6.05	-3.3	63.63	29.42	42.170
28/04/2014 0:00	7.25	-1.1	59.41	33.90	40.03
29/04/2014 0:00	7.88	-1.6	67.83	31.66	35.660
30/04/2014 0:00	6.83	-1.1	81.90	38.39	33.03
01/05/2014 0:00	8.50	-2.8	95.30	38.82	27.810
02/05/2014 0:00	9.34	0.1	66.29	43.73	23.1
03/05/2014 0:00	9.52	1.4	66.93	36.17	15.380
04/05/2014 0:00	11.06	2.9	61.38	32.36	7.837
05/05/2014 0:00	13.46	2.7	51.20	33.07	-0.063
06/05/2014 0:00	15.48	5.9	57.33	25.64	-0.277
07/05/2014 0:00	14.33	3.1	59.68	26.93	-0.127
08/05/2014 0:00	13.03	1.8	60.65	33.14	-0.242
09/05/2014 0:00	11.93	5.1	68.20	36.34	-0.239
10/05/2014 0:00	10.00	3.8	90.30	48.70	-0.051
11/05/2014 0:00	7.77	2.2	86.80	47.47	-0.054
12/05/2014 0:00	8.55	3.2	63.94	30.41	-0.143
13/05/2014 0:00	12.52	3.4	72.07	31.75	-0.504
14/05/2014 0:00	15.36	6.1	74.33	32.11	-0.204
15/05/2014 0:00	8.22	0.0	96.60	25.02	-0.466
16/05/2014 0:00	14.37	2.1	42.30	14.06	0.023
17/05/2014 0:00	14.81	6.6	45.37	19.41	-0.149
18/05/2014 0:00	13.22	4.4	58.38	28.97	-0.392
19/05/2014 0:00	9.99	3.4	95.70	40.56	-0.100
20/05/2014 0:00	4.04	-0.3	99.50	73.80	0.626
21/05/2014 0:00	0.26	-2.1	99.30	84.60	0.261
22/05/2014 0:00	3.48	-3.2	97.20	62.96	0.112
23/05/2014 0:00	6.57	-0.9	96.40	45.81	0.125
24/05/2014 0:00	7.52	-1.7	97.20	33.16	-0.268
25/05/2014 0:00	11.04	1.7	68.89	31.25	-0.328
26/05/2014 0:00	11.12	1.7	69.56	27.25	0.027
27/05/2014 0:00	12.45	4.0	71.89	40.40	0.133
28/05/2014 0:00	15.15	5.2	60.27	21.47	0.117
29/05/2014 0:00	11.02	3.3	95.90	54.09	0.250
30/05/2014 0:00	16.27	5.2	81.70	26.32	0.108
31/05/2014 0:00	15.36	4.5	68.28	35.60	0.264
01/06/2014 0:00	13.96	3.8	76.79	25.97	0.117
02/06/2014 0:00	11.03	1.5	50.55	24.60	0.359
03/06/2014 0:00	8.91	2.8	50.35	29.93	0.115



Mount Nansen Water Resources Investigations Quarterly Report (Q1): April – June 2014

Date/Time	Air Temperature		Relative Humidity		Snow Depth (cm)
	Max (°C)	Min (°C)	Max (%)	Min (%)	
04/06/2014 0:00	11.60	3.0	61.60	28.37	0.235
05/06/2014 0:00	13.46	2.9	85.50	24.91	0.092
06/06/2014 0:00	13.18	3.9	89.60	36.76	-0.049
07/06/2014 0:00	16.13	4.1	77.18	14.02	-0.177
08/06/2014 0:00	13.68	3.9	64.84	29.98	0.053
09/06/2014 0:00	11.41	4.6	88.10	33.52	0.018
10/06/2014 0:00	14.45	1.4	74.79	24.53	0.009
11/06/2014 0:00	16.56	3.4	61.82	17.03	0.08
12/06/2014 0:00	14.26	5.2	68.22	34.05	0.280
13/06/2014 0:00	11.02	5.2	88.60	61.12	0.24
14/06/2014 0:00	11.62	3.9	93.10	43.32	0.237
15/06/2014 0:00	11.72	1.7	85.90	38.66	0.247
16/06/2014 0:00	12.70	3.8	89.20	39.72	0.386
17/06/2014 0:00	16.59	5.1	82.40	15.95	-0.269
18/06/2014 0:00	11.47	3.1	73.96	39.76	0.165
19/06/2014 0:00	12.44	0.2	79.80	26.74	0.262
20/06/2014 0:00	13.38	1.3	68.22	20.90	-0.091
21/06/2014 0:00	13.33	3.6	97.20	31.29	-0.078
22/06/2014 0:00	12.35	0.6	96.50	26.29	-0.371
23/06/2014 0:00	12.15	3.7	80.30	50.03	-0.16
24/06/2014 0:00	15.22	4.3	86.50	44.63	-0.330
25/06/2014 0:00	12.76	7.9	92.60	64.33	0.561
26/06/2014 0:00	12.99	4.5	81.20	35.01	-0.100
27/06/2014 0:00	14.05	0.0	98.70	29.34	-0.109
28/06/2014 0:00	17.57	5.2	75.17	16.42	-0.562
29/06/2014 0:00	20.03	8.2	62.12	24.69	-0.159
30/06/2014 0:00	21.26	9.9	87.40	26.82	0.094

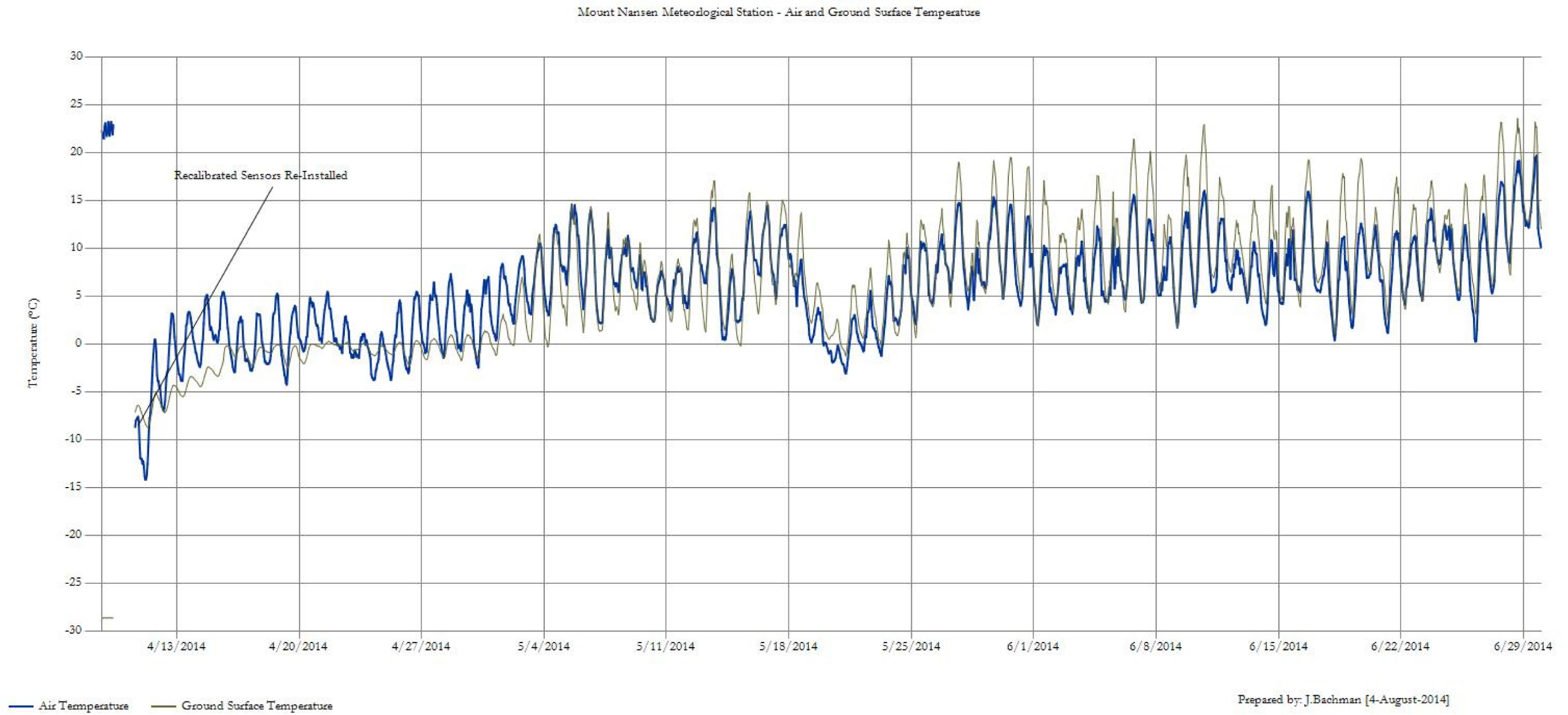


Figure F-1 Mount Nansen mean hourly air and ground temperature, April 10 to June 30, 2014.

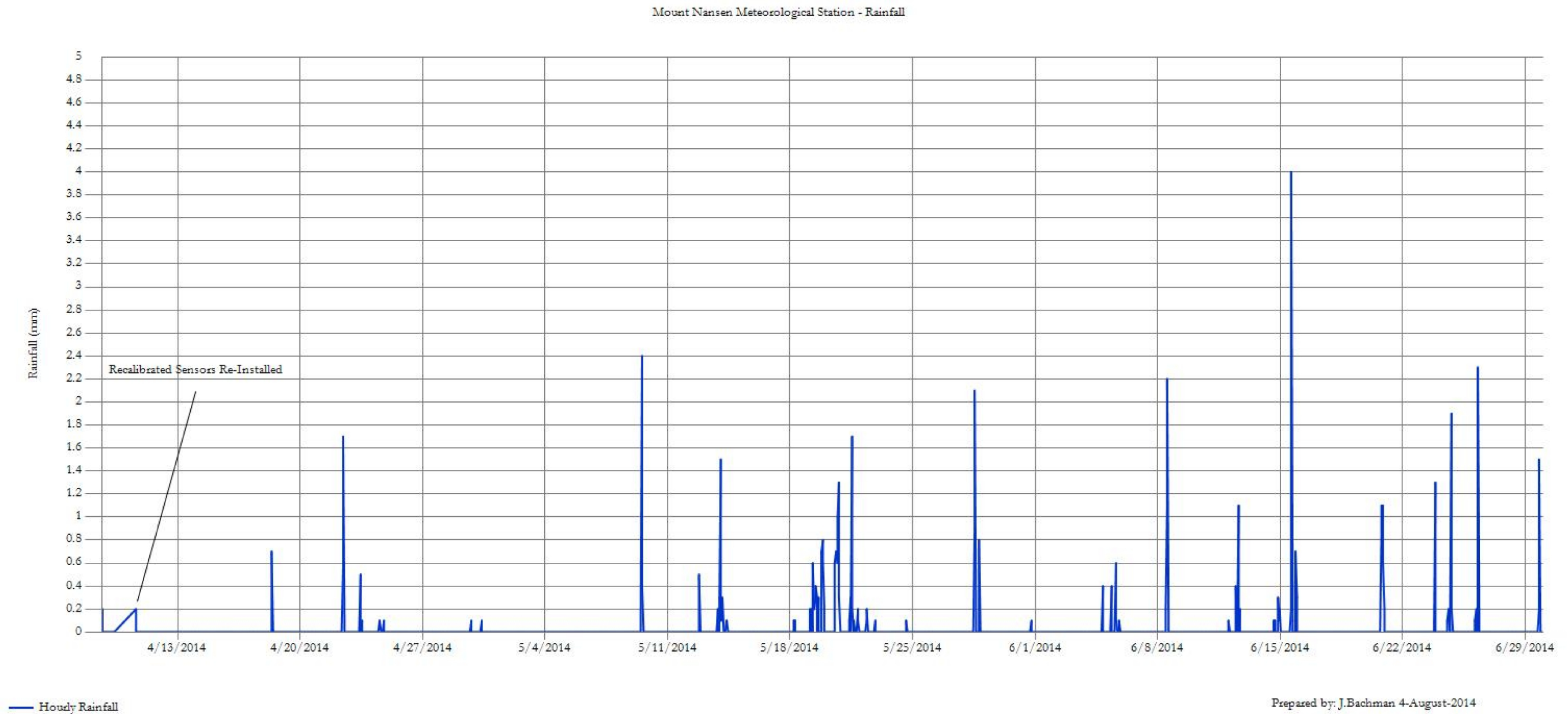


Figure F-2 Mount Nansen cumulative hourly precipitation as rainfall, April 10 to June 30, 2014.



Mount Nansen Site Meteorological Station - Snow Depth

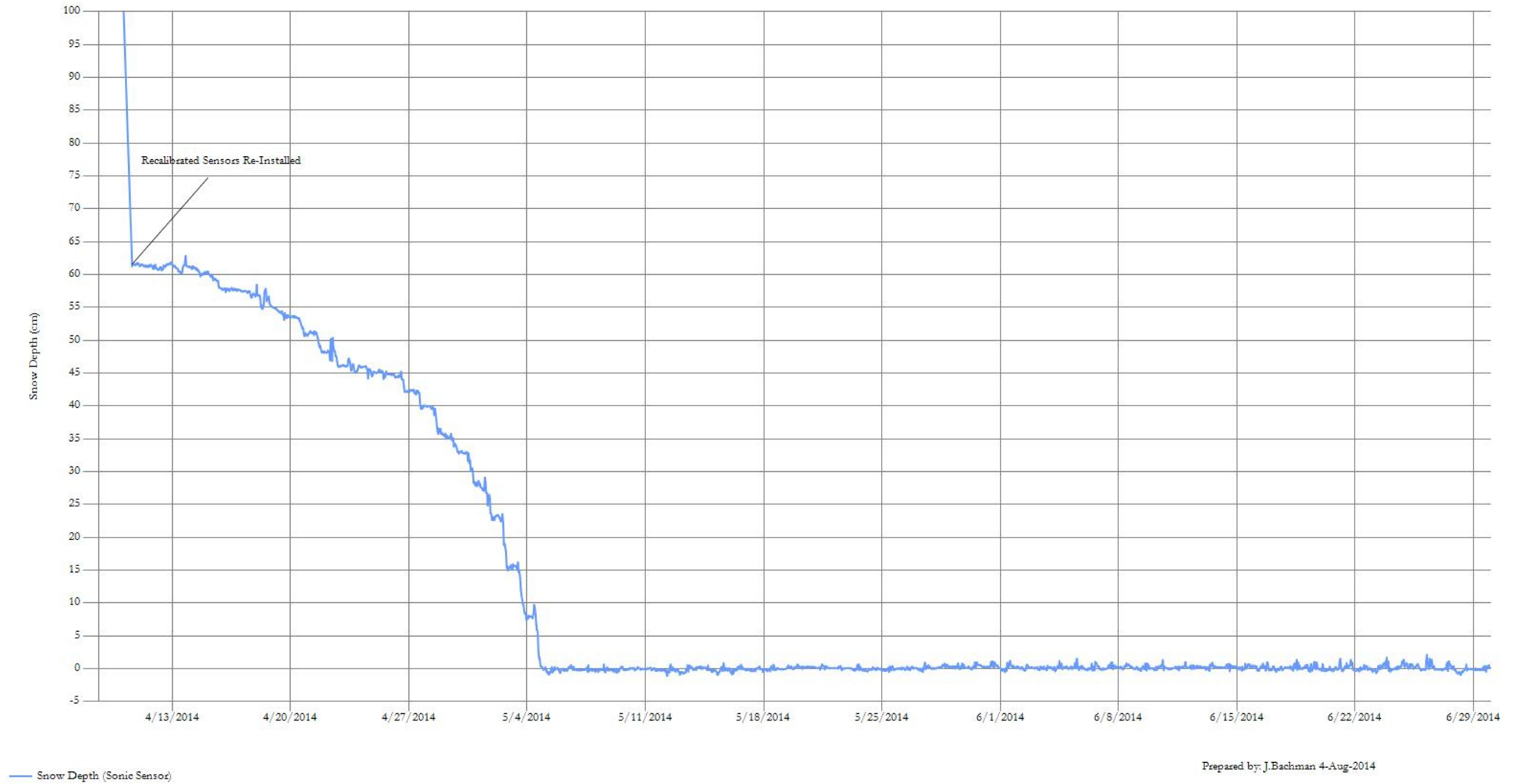


Figure F-3 Mount Nansen cumulative daily snow depth, April 10 to June 30, 2014.



Mount Nansen Meteorological Station - Wind Speed

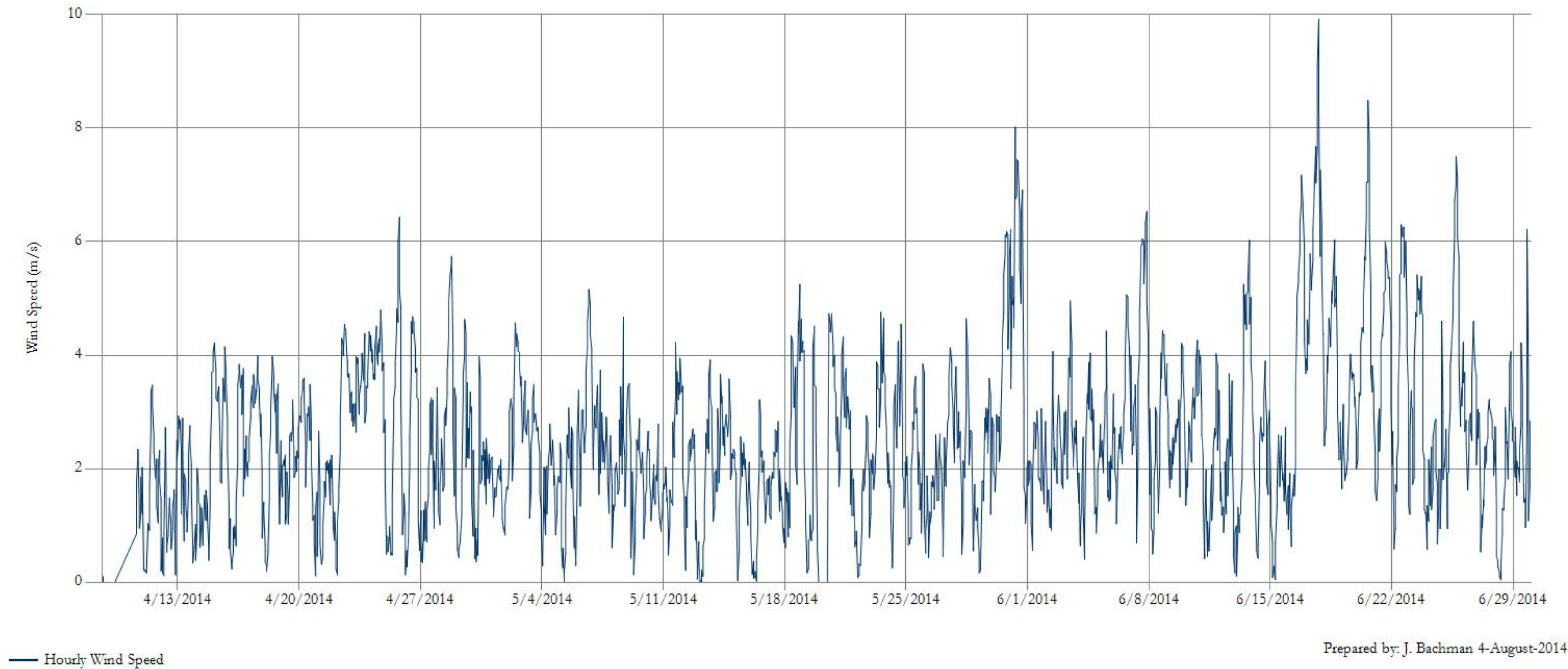


Figure F-4 Mount Nansen mean hourly wind speed, April 10 to June 30, 2014.

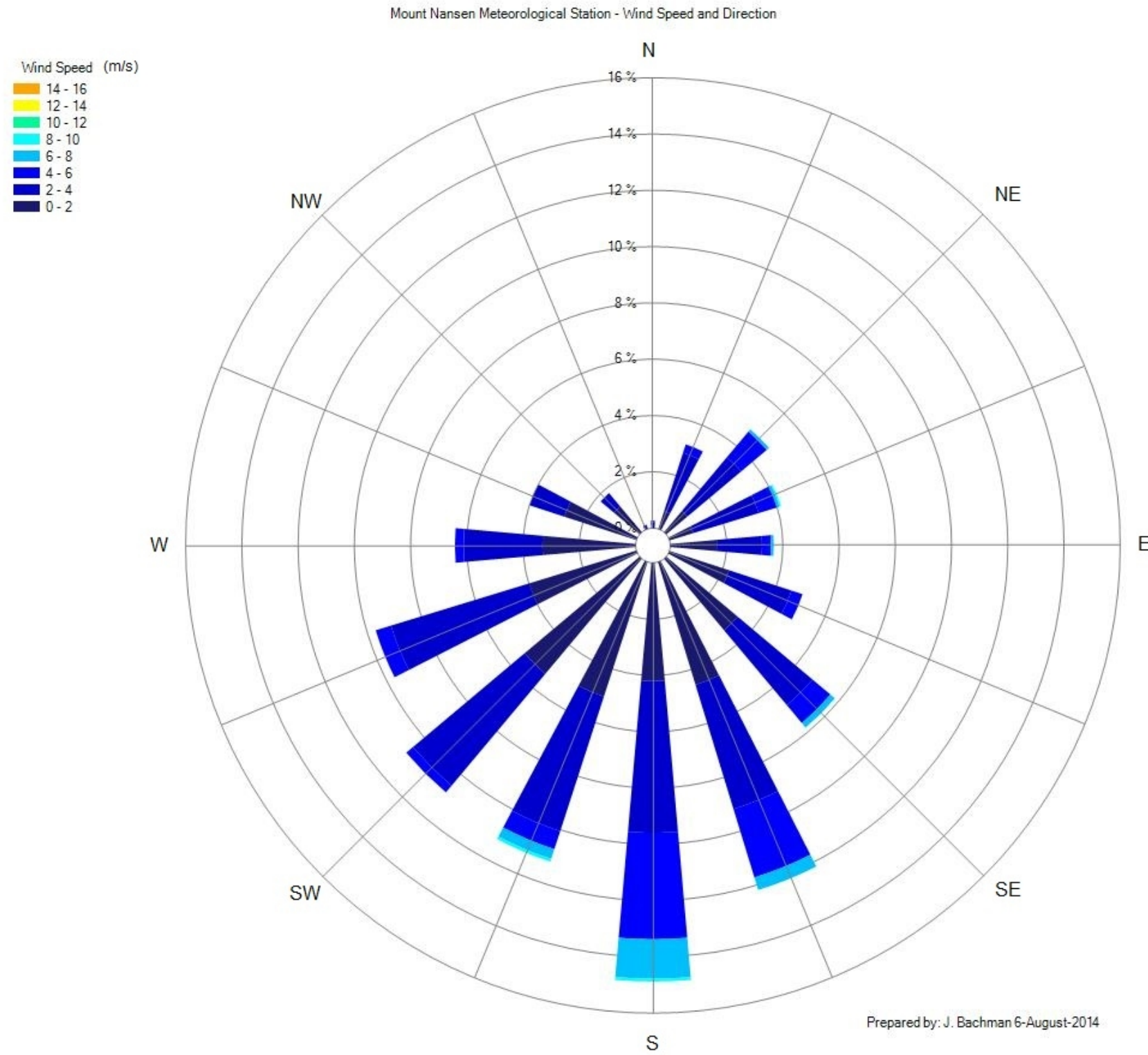


Figure F-5 Mount Nansen mean hourly wind speed (m/s) and direction (wind rose diagram), April 10 to June 30, 2014.



Mount Nansen Meteorological Station - Radiative Fluxes

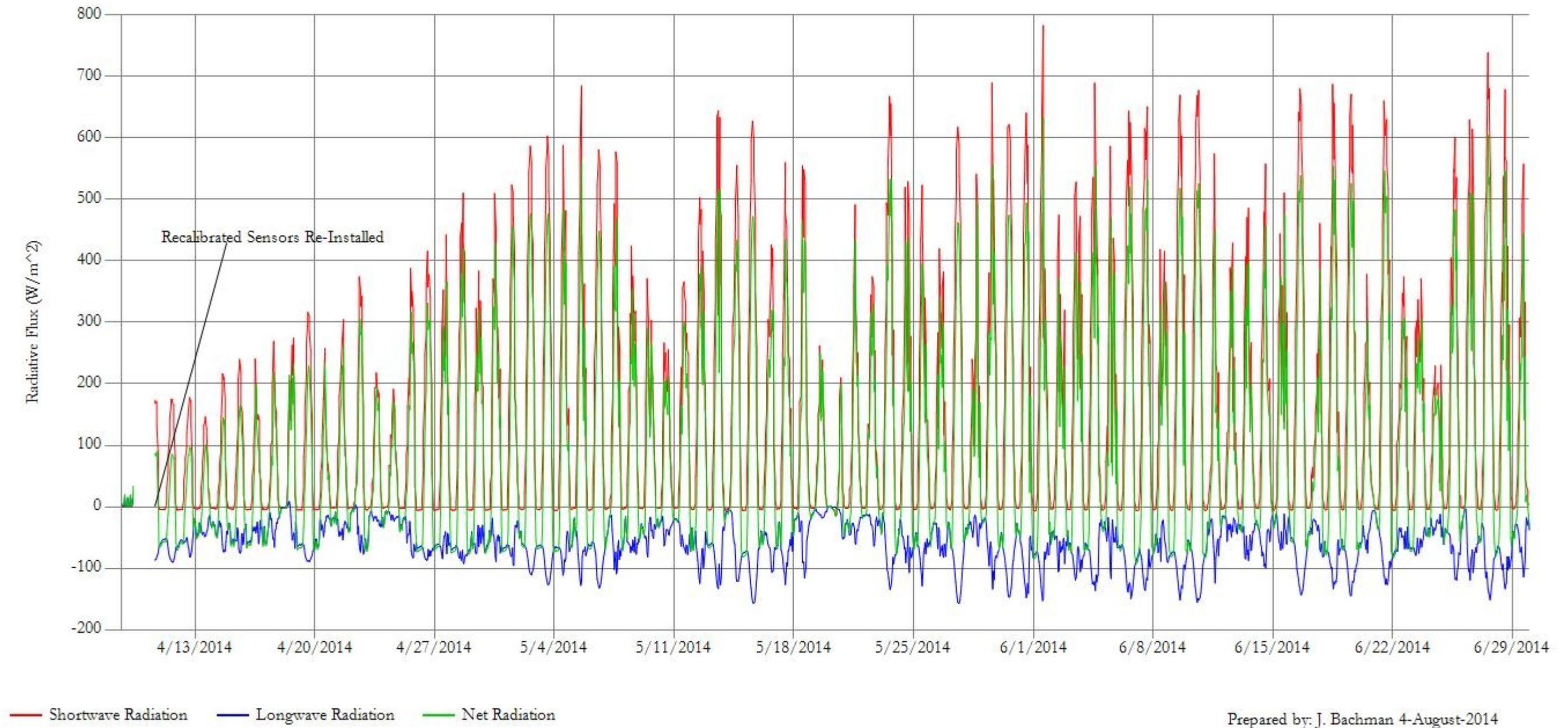


Figure F-6. Mount Nansen mean hourly net shortwave, long wave and total radiation, April 10 to June 30, 2014.



Mount Nansen Site Meteorological Station - Relative Humidity



Figure F-7 Mount Nansen mean hourly relative humidity, April 10 to June 30, 2014.

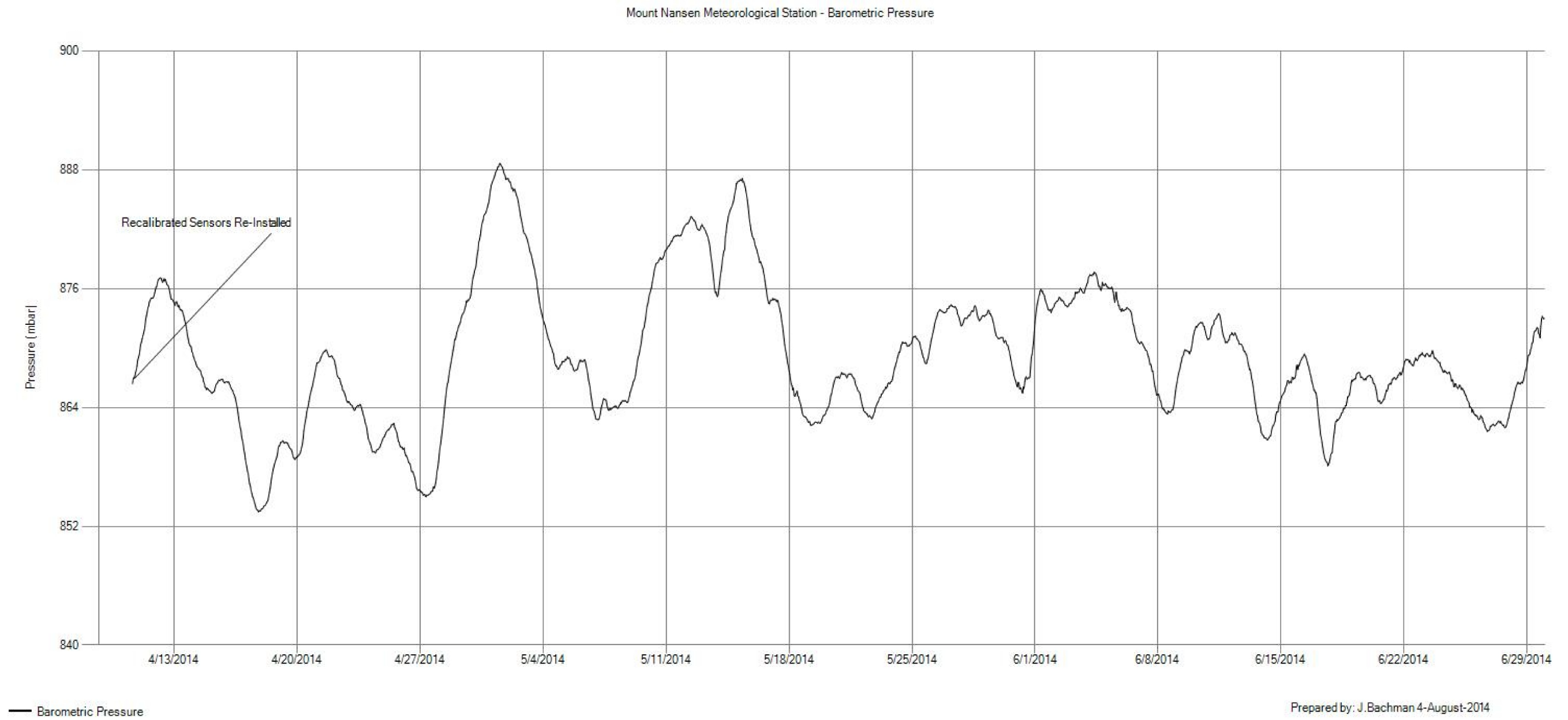


Figure F-8 Mount Nansen mean hourly barometric pressure, April 10 to June 30, 2014.