Mount Nansen
Water Resource Investigations
Quarterly Report
April -June 2013

Prepared for:

Yukon

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2012 ENVIRONMENTAL EMPLOYER OF THE YEAR

EDI ENVIRONMENTAL DYNAMICS INC.

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EXECUTIVE SUMMARY

EDI Environmental Dynamics Inc. (EDI) was retained by Yukon Government, Assessment and Abandoned Mines (AAM) in 2013 to conduct the Water Resource Investigations 2013/14 program at the Mount Nansen Site. This program involves surface water hydrometric and water quality monitoring, and meteorology for the five watersheds at the Mount Nansen Site. The data presented in this report comprises the first quarter of the program (Q1), from April 1, 2013 to June 30, 2013.

Over the course of the first quarter, seven monitoring events took place:

- April 15-17, 2013
- May 6-8, 2013
- May 15-17, 2013
- May 21-23, 2013
- May 27-29, 2013
- June 10-12-2013
- June 24-26, 2013

The monitoring objectives during this period were to collect surface water data leading up to the spring freshet, during the freshet, and following the freshet. Hydrometric monitoring was completed at 19 hydrometric stations. Monitoring at each station included discharge measurements, water level surveys, and installation and maintenance of continuous water level data loggers. Twelve of the nineteen stations have continuous water level loggers installed, while the remaining stations serve as instantaneous discharge measurement locations. Stream gauging methods included the velocity-area method (mid-section method), salt dilution gauging, volumetric, and a v-notch weir.

Water quality sampling was completed at 25 water quality sites. Water samples were collected at each site along with *in situ* water quality parameters such as 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.

This report summarizes the site conditions between April 1 and June 30, 2013 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 first-quarter hydrographs. Water quality results include a summary of parameters that exceed the CCME guidelines and/or the Mount Nansen Effluent Quality Standards, *in situ* water quality parameters. A brief description of the daily and hourly meteorological data for the first quarter 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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1 INTRODUCTION

Yukon Government Assessment and Abandoned Mines Branch (AAM) retained the services of EDI Environmental Dynamics Inc. (EDI) in 2013 to conduct the Water Resource Investigations 2013/14 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, 2013 to June 30, 2013.

During Q1 of the program, a total of seven monitoring events took place, with one trip in April, four trips in May, and two in June. The purpose of such a high concentration of trips during this period was to collect surface water data leading up to the spring freshet, during the freshet, and following the freshet. The dates of each visit are listed below:

- April 17-19, 2013
- May 6-8, 2013
- May 15-17, 2013
- May 21-23, 2013
- May 27-29, 2013
- June 10-12-2013
- June 24-26, 2013

This report outlines the methodology for all components, followed by results and recommendations. The data included in this report for each component is summarized in Table 1-1, below.

Table 1-1. Summary of meteorology, hydrology and water quality data included in the first quarter report, April 1 to June 30, 2013.

Monitoring Component	Data Included	Section
Hydrology	• Rating curve data summary tables • Database tables • Field Datasheets	• 3.2 • Appendix C • Appendix D
Water Quality	• Summary of Guideline Exceedances Tables • *In situ* Water Quality Data Summary Tables • Field Datasheets	• 3.3 • Appendix B • Appendix E
Meteorology	• Summary of meteorological data by day • Hourly meteorological plots	• 3.1 • Appendix F

1.1 SITE CONDITIONS

Site conditions during the Q1 program represented the period surrounding the spring freshet when many creeks on site reach peak flows for the year.

- **April 17-19, 2013** – Air temperatures remained at or below zero degrees, with many hydrometric stations and water quality sites still frozen to substrate, including Pony Creek, Dome Creek, Back Creek and Minnesota Creek. Victoria Creek remained mostly ice covered with some areas of open water. The tailings pond and pit lake remained ice covered.
- **May 6-9, 2013** – This trip represented the transition period from winter conditions to spring conditions, as temperatures remained above zero through the day and stream flow at many sites and stations had increased from previous trips, as ice and snow began to melt. Ice conditions on Victoria Creek were variable with some sites/stations completely ice free, while others were mostly ice covered or had multiple layers of ice with flow above and below the surface. Dome Creek still had significant ice over the valley bottom, with water starting to flow above and below the ice surface in multiple, braided channels at some locations. Pony Creek, Back Creek, and Minnesota Creek had water seeping through layers of ice and snow.
- **May 15-17, 2013** – This trip took place during high flows on Victoria Creek. High flows actually washed the road out at the Victoria Creek crossing, requiring access to the site by helicopter after a failed attempt driving up the road on May 13, 2013. Stream flows had increased due to warm ambient temperatures, enhanced solar insolation, snow and ice melt. All ice had melted off Victoria Creek, with the exception of the area just above the culvert. Thick ice remained over Dome Creek at lower and mid-elevations, while Pony Creek only had ice remaining on the margins. Back Creek was open and very turbid and Minnesota Creek had water flowing over the channel.
- **May 21-23, 2013** – During this trip the stream flows at higher elevations had increased from the previous week, while flows at lower elevation had declined slightly (Victoria Creek, Pony Creek, Minnesota Cree, and Back Creek). Overflow ice remained on Dome Creek at the lower and mid-elevation locations. Some overflow ice remained at Minnesota Creek. Thick ice also remained over Victoria Creek upstream of the culvert. The Brown-McDade pit lake was still partly frozen and not suitable for sampling due to safety concerns. The tailings pond had open water along the margins.
- **May 27-29, 2013** – Warmer spring/summer air temperatures (17°C) caused higher flows at higher elevation locations. The warming trend also resulted in elevated stream flow responses at lower elevation sites/stations as melting continued in the headwaters (Victoria Creek). Despite warm temperatures, overflow ice still remained over Dome Creek at two sites/stations. Ice cover also still persisted on the pit lake and tailings pond.

- **June 10-12, 2013** – Air temperatures remained warm during this trip, up to 18°C, with periods of light rain. Vegetation across the site had begun to green up. Small portions of ice still remain in the upper Dome Creek Valley; however, the pit and tailings pond were ice free.
- **June 24-25, 2013** – Air temperature continued to rise, reaching maximums of 28°C. Water levels at many sites and stations had diminished to summer low flow levels. The warm temperatures caused the remaining ice to melt within the Dome Creek Valley.

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)
- Unpaved Road/Access
- Drainage Areas (Local)

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).

Project data displayed is site specific. Data collected by EDI Environmental Dynamics Inc. (2011) was obtained using Garmin GPS technology.

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

0 200 400 600 800 1,000

metres

Map Scale = 1:22,000 (printed on 11 x 17)
Map Projection: North American Datum 1983 UTM Zone 8N

Drawn:	Checked:	FIGURE 1	Date: 28/10/2013
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Mount Nansen Map Area

Carmacks

Yukon

EDI

Path: J:\Yukon\Projects\2013\13_Y_0167_AAM_Mount Nansen_Surface_Water\Mapping\Fig1_Hydro_Sites_30July2013.mxd

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 methods used. This report for Q1 consists of data collected between April 1, 2013 and June 30, 2013.

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 water courses drain into Victoria Creek within the mine site area, including Dome Creek and Pony Creek. Dome Creek originates upstream of the mill and 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 is also flows into Victoria Creek downstream of the Dome Creek confluence. See Figure 1 for an overview of the watersheds present within the study area.

There are a total of 19 hydrometric stations and 25 surface water quality sites positioned throughout the five watersheds on-site and within Dry Creek, a reference watershed south of the site. There are also several 'seeps' that are sampled on a regular basis. The list and location of hydrometric stations is summarized in Table 2-1, below and identified in Figure 1.

Table 2-1. List of hydrometric stations and water quality sites at the Mount Nansen Site as of April 1, 2013.

Station/Site Name	Hydrology	Water Quality	Station/Site ID
Upper Pony Creek	X	X	H-PC-U/WQ-PC-U
Pony Creek Downstream of Pit	X	X	H-PC-DSP/WQ-PC-D
Dome Creek at DX	X	X	H-DC-DX/WQ-DC-DX
Dome Creek at DX+105	X	X	H-DC-DX+105/WQ-DC-DX+105
Dome Creek at D1[1]	X	X	H-DC-D1/WQ-DC-D1
Dome Creek at D1b	X	X	H-DC-D1b/WQ-DC-D1b
Upper Dome Creek 1	X	X	H-DC-U1/WQ-DC-U1
Upper Dome Creek 2	X	X	H-DC-U2/WQ-DC-U2
Diversion Channel at Bridge	X		H-DC-B
Middle Dome Creek	X	X	H-DC-M/WQ-DC-U
Dome Creek at Road	X	X	H-DC-R/WQ-DC-R
Seepage Pond Outflow	X	X	H-SEEP/WQ-SEEP
Tailings Pond	X	X	H-TP/WQ-TP
Brown-McDade Pit Lake		X	WQ-PIT-1,2,3
Mill Site Seep 03		X	WQ-MS-S-03
Mill Site Seep 08		X	WQ-MS-S-08
Adit Seep		X	WQ-ADIT-SEEP

Station/Site Name	Hydrology	Water Quality	Station/Site ID
Back Creek	X	X	H-BC/WQ-BC
Minnesota Creek	X	X	H-MN/WQ-MN
Victoria Creek Reference Site[2]	X	X	H-VC-REF/WQ-VC-REF
Upper Victoria Creek	X	X	H-VC-U/WQ-VC-U
Victoria Creek Downstream of Back Creek	X	X	H-VC-DBC/WQ-VC-DBC
Victoria Creek Upstream of Minnesota Creek	X	X	H-VC-UMN/WQ-VC-UMN
Victoria Creek at Road	X	X	H-VC-R/WQ-VC-R
Pump House Well		X	WQ-PW
Dry Creek Reference		X	WQ-DRY

[1] The H/WQ-DC-D1 location was removed from the Scope of Work for the June 2013 to March 2014 season.

[2] This site was originally intended to function as a reference site for surface water quality, not surface water hydrology.

2.2 METEOROLOGY

A Campbell Scientific meteorological station (ATM-ROAD AAM) was established at the Mount Nansen Site on October 2011. The station is located adjacent to the Mount Nansen Road, east of the camp (Figure 1). This new station replaced the HOBO Onset weather station that was located near the camp kitchen (ATM-CAMP AAM), which operated from 2009 to 2011. The ATM-ROAD AAM station is administered by Northern Avcom and data is accessible via an internet download. EDI is responsible for downloading and compiling these raw data. 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.

The ATM-ROAD AAM station records battery voltage, air temperature, ground temperature, humidity, rainfall, snow depth, net shortwave and long-wave radiation, total radiation, wind speed, and wind direction (Table 2-2). Barometric pressure (mbar) data collection at the station began on August 30, 2012.

Table 2-2. Summary of weather data parameters collected at Mount Nansen Meteorological Station (ATM-ROAD AAM)

Meteorological Parameter	Units	Notes
Daily Collection		
Battery Voltage	Volts	Measured every 5 minutes. Daily minimum value is reported
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.
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.

Meteorological Parameter	Units	Notes
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 sampling began August 30, 2012 at 15:00

2.3 HYDROLOGY

The methods used for the 2013 hydrometric monitoring program closely follow that outlined by EDI (2013) in the *'Mount Nansen Site Hydrologic Monitoring: 2012-2013'* report including data management and data processing methodology. Hydrometric data presented in this report spans the monitoring period April 1, 2013 to June 30, 2013. Discharge and/or stage were measured at 19 different hydrometric stations either continuously with water level loggers or instantaneously during each site visit. There were 14 combined continuous/instantaneous hydrometric stations and five instantaneous hydrometric stations (Figure 1, Table 2-2). Four stations were used to record water levels during the winter period with instantaneous discharge measurements collected during each visit.

The manual water level monitoring station (staff gauge) installed by AAM in the tailings pond (H-TP) required replacement once ice was off the tailings pond. A detailed description of each hydrometric station is found in Appendix E. Table 2-3 summarizes the station information for the Mount Nansen site.

Methods employed for discharge measurement in 2013 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).

The velocity-area mid-section method is standardized by RISC (2009), however many of the channels at the site are inappropriate for using this method (i.e., too shallow or narrow). In such cases, alternative methods including salt-dilution gauging and volumetric measurements were used. When salt dilution or volumetric measurements were made, field crews collected replicate measurements and mean resultant discharge estimates used. Elevation surveys were completed during each hydrometric station visit. These surveys were used to monitor shifts in benchmarks, station, and staff gauge elevations. Due to the periglacial environment, shifting mediums are common and require post-collection data adjustments.

Given the small channels sizes and relatively low discharge at many stations, the minimum reportable discharge is set to 0.001 m^3/s or 1 L/s; this resolution is lower than typical hydrometric reporting (e.g., Water Survey of Canada uses +/-0.01 m^3/s for open water conditions). Field methods used can

accommodate this resolution of discharge under ideal conditions, however measurement uncertainty for each method should be considered when interpreting results. Discharges calculated for several stations were less than 0.001 m^3/s and reported as 0.000 m^3/s, below reportable confidence limits.

Table 2-3. Mount Nansen hydrometric station information, April 1 to June 30, 2013.

HID[1]	Hydrometric Station Name	Type[2]	Location [3] Easting	Northing	Drainage Area (km^2)	Elevation [4] (m)
ATM-DC2	Barometric at Diversion Channel	ATM	389476	6880792	-	1099
ATM-DC3	Barometric at Diversion Channel	ATM	389476	6880792	-	1099
ATM-DC4	Barometric at Diversion Channel	ATM	389476	6880792	-	1100
H-PC-U	Upper Pony Creek	C	388709	6881930	0.8	1227
H-PC-DSP	Pony Creek Downstream of Pit	C	388986	6881734	1.0	1191
H-DC-DX	Dome Creek at DX	I	387674	6881127	0.2	1215
H-DC-DX+105	Dome Creek at DX+105	I	387820	6881150	0.9	1204
H-DC-D1	Dome Creek at D1	I	388167	6881059	0.9	1171
H-DC-D1b	Dome Creek at D1b	I	388262	6881000	1.4	1156
H-DC-U1	Upper Dome Creek 1	I	388919	6880772	2.1	1115
H-DC-U2	Upper Dome Creek 2	I	388937	6880819	2.1	1102
H-DC-B	Diversion Channel at Bridge	C / I	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-MN	Minnesota Creek	C	392540	6879249	12.7	989
H-VC-REF	Victoria Creek Reference Site	C	391650	6881113	64.0	1036
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.

All velocity-area measurements of stream discharge used the Sontek Acoustic Doppler Velocimeter (ADV). The ADV was 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.

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),

$$Q = v \cdot A = bdv \qquad [1]$$

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:

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

$$Q = q_1 + q_2 + q_3 + q_4 + q_5 + \cdots q_n \qquad [3]$$

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 was 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 both 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 1999). Typically the statistical discharge uncertainty calculated by the FlowTracker at Mount Nansen was less than ±5%; typically, ±10% is an acceptable uncertainty for the velocity-area mid-section method. The statistical uncertainty was applied for all velocity-area discharge measurements obtained with the ADV; discharge uncertainty was estimated to be ±10% for measurements collected with the Swoffer current meter.

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 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) must be 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 2004; Laberge Environmental Services1999).

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 (2004, 2005) are significantly more robust and adaptable to site-specific stream conditions.

The gram conductivity of salt, the conductivity of 1 g NaCl in 1 m^3 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 (2004; 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 at during extreme cold temperatures but was employed on during all trips in the first quarter of 2013.

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 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 recorded 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 or YSI 556 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 conductance[1] (SPC) was measured (logged) because the values are compensated for water temperature. A known mass of salt (NaCl) was dissolved into a graduated bucket of stream water at the injection site. Once fully dissolved, the salt slug was injected at the upstream site and the electrical conductivity of the salt wave was 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 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 was:

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

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.T value is the calibration factor that accounts for the non-linearity of electrical conductance and salt concentration in stream water. The CF.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 25% and 50% of SPC_0 was achieved, above the required increase of 2 to 5 µS/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 ± 20%. However, salt dilution gauging accuracy will vary between each station due to differences in individual channel conditions and stream water velocities.

[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.

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 was used at four stations at Mount Nansen where a culvert, pipe or free falling nape at a weir was available (H-PC-U; H-PC-DSP; H-SEEP). During extreme low flows it was also possible to obtain volumetric estimates at H-DX and H-DX+105. Discharges were less than 26 L/s (0.026 m^3/s), but more typically less than 7 L/s (0.007 m^3/s). A graduated 20 L bucket was filled and timed over five volumetric trials. The estimated measurement accuracy is ± 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 were provided by AAM; concurrent flow meter readings were collected when EDI was on site collecting volumetric measurements at the pipe outlet.

2.3.4 V- Notch Weir

Rated structures such as v-notch weirs are typically installed in streams where standard measurement methods cannot be employed. These structures are designed with a specific rating equation where discharge is directly related to the head distance above the v-notch. The 90° v-notch design is ideal for low flows such that large changes in head correspond with relatively small changes in discharge.

One hydrometric station at the Mount Nansen Site has a 90° thin plate v-notch weir which was installed in the upper Pony Creek watershed approximately 15 m upstream of the H-PC-U gauging station at an existing channel constriction. The station required this approach for discharge measurement because of poor metering sites along this small, shallow, vegetated channel. Design and installation guidelines followed those described in RISC (2009).

The head over the weir crest was measured during each site visit, however it was determined that the measurement location was not sufficiently far upstream of the weir plate where the water surface is unaffected by draw-down. In an effort to compensate for this, 10% was added to each head measurement. Volumetric discharge measurements were used to validate the weir measurements. Discharge from the weir was initially calculated using a standardized rating structure equation for a fully contracted v-notch weir using:

$$Q = 1.370\, h^{2.5} \qquad [5]$$

Where Q is discharge in m^3/s and h is the height of water above the v-notch (head) (RISC 2009).

2.3.5 Ice-cover Hydrometrics

Hydrologic measurements completed during periods of channel ice-cover 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 must be carefully analyzed. 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 were 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 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.

2.3.6 Hydrometric Leveling Surveys

Hydrometric leveling surveys were conducted during each visit at stations where continuous data loggers were installed. The purpose of the survey was 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 were installed at each continuous station as per RISC (2009) Data Grade A guidelines. Each survey included surveys 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). Benchmark 1 at every station was used to define a local elevation of 3.000 m above datum. The datum was always located below the elevation of zero flow. The benchmarks and the top of the staff gauge were regularly checked for shifting as a result of periglacial processes and survey error. While there was some apparent movement in the benchmark elevations and 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; suspect data was excluded. All stage data is presented in metres referenced to the local datum (L.D.) unless otherwise noted.

2.3.7 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 did not meet

standardized criteria and alternative methods (e.g., salt dilution) were used. In some cases, concurrent velocity-area and salt dilution or volumetric and weir measurements allowed for the validation and calibration alternate methods. In addition, these concurrent measurements facilitated uncertainty estimates.

Quality control and quality assurance (QA/QC) checks began during the field visits. The FlowTracker 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, preliminary checks and reviews were made to the raw data and discharge calculations prior to the production of trip and monthly reports. A third round of QA/QC was conducted when data was entered into the hydrometric database and final QA/QC was conducted during the development of rating curves and hydrographs

2.3.8 Rating Curve Development

Rating curves are based on open channel hydraulic relationships between stage (water level) and discharge. 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 a smoothly varying channel with increasing stage (or a constant control point at all stages) (Maidment 1992). The rating curve equation [6] has the form:

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

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, 1992). 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 and as such, multiple rating curves are often required to accurately represent the full range of flows in the stream.

By taking the log of both sides of the rating curve equation [7],

$$\log Q = logC + N\ log(h + a) \qquad [7]$$

the rating curve equation [6] takes the linear form $y=mx+b$ and can be fit to the discharge calibration 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, and the small range of change in stage, and channel instabilities, the rating curves were developed by fitting by eye in the Aquarius Time-Series Software environment (Aquarius Informatics Inc., 2012).

Rating curves were developed for stations with continuous water level loggers using surveyed water levels (stage) and instantaneous discharge measurements. The rating curves were considered preliminary if there were less than 10 rating measurements (RISC 1998), if the rating measurements did not capture an acceptable range of flows (i.e., 10 %-200 % of mean discharge (MD), or if there was high rating curve error.

Rating curves were developed with rating measurements obtained when the channel was ice free; measurements obtained during ice conditions are reported simply as instantaneous measurements. For stations where there were no shifts to hydraulic controls or datum (due to benchmark repairs) between 2011 and 2013, previous years rating measurements were included in the revised 2013 rating curves.

The highest flows recorded for the Mount Nansen hydrometric program were measured in the spring of 2013. Successive monitoring events throughout the spring freshet period allow the capture of higher spring flows than previous monitoring years. 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. Formerly developed rating curves have been revised and extended in the 2013 in this report only to approximate the high-flows captured during field measurements.

2.3.9 Continuous Stage and Discharge

Continuous data loggers were established or re-established at 12 hydrometric stations, in five watersheds at the Mount Nansen Site in the spring of 2013. All stations were located at the same locations as the loggers installed in 2012/13 program. A combination of HOBO (Model: U20-001-04, Onset Corporation) and Solinst (Model Gold 3001, Solinst) pressure transducers were installed on site. Two barometric and 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; measurement accuracy details are located in Appendix E

The hydrostatic pressure data was compensated for atmospheric pressure using data from the barometric pressure logger located at ATM-DC2; data from the redundant barometric loggers was not required (Appendix B, Figure B1).

The water depth was calculated manually for the HOBO loggers submerged in the streams, using the following relationship from the Euler equation [8] where:

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

Hydraulic head (H) or water depth, hydrostatic pressure (P) in Pa, the specific weight of water $\gamma = pg$ where p 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 1992):

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

Where t = temperature (°C). The Solinst logger records at stream sites did not require water depth conversions; depth is an automatic output from the record.

Continuous stage records were collected at 15 minute intervals and re-sampled to 30 minute intervals. Continuous discharge was calculated using the stage-discharge rating curve for each station; the continuous stage record (rather than discharge record) is presented for stations where developing reliable rating curves was challenging.

2.3.10 Hydrometric Data Management

Hydrometric data was compiled into a MS Access database after each visit to the Mount Nansen Site (EDI 13-Y-0167 Hydrology Database 2013.accdb). The hydrometric database was designed to hold raw field data including hydrometric station metadata, station history, field measurements, survey data and data logger files. The hydrometric database also contains tracking information such that each stage of QA/QC can be checked for completion.

2.4 WATER QUALITY METHODS

Water samples were collected at each of the 25 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 2-4. Note that the Dome Creek site at D1 (WQ-DC-D1) was removed from the program on May 29, 2013.

During the Q1 period, sampling occurred on a monthly basis in April 2013, on a weekly basis in May 2013 and on a bi-weekly basis in June 2013. Details on the field methodology, laboratory analysis, QA/QC program and data analysis are provided in the sub-sections to follow.

Table 2-4 Mount Nansen water quality site and sampling information.

Water Quality Site Name	Site ID	Site Location [1] Easting	Northing	Sampling Frequency	Parameters Included in Lab Analysis [2]
Pony Creek upstream	WQ-PC-U	388955	6881745	Variable[3]	Standard Site Package
Pony Creek downstream	WQ-PC-D	389131	6881719	Variable[3]	Standard Site 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	Variable[3]	Standard Site Package
Dome Creek at DX+105	WQ-DC-DX+105	387820	6881150	Variable[3]	Standard Site Package
Dome Creek at D1[4]	WQ-DC-D1	388167	6881059	Variable[3]	Standard Site Package
Dome Creek at D1b	WQ-DC-D1b	388264	6880989	Variable[3]	Standard Site Package
Upper Dome 1	WQ-DC-U1	388919	6880772	Variable[3]	Standard Site Package
Upper Dome 2	WQ-DC-U2	388938	6880812	Variable[3]	Standard Site Package

Water Quality Site Name	Site ID	Site Location [1] Easting	Northing	Sampling Frequency	Parameters Included in Lab Analysis [2]
Upper Dome Creek	WQ-DC-U	389788	6880565	Variable[3]	Standard Site Package
Dome Creek at Road	WQ-DC-R	391111	6880449	Variable[3]	Standard Site Package
Tailings Pond	WQ-TP	389427	6880625	Variable[3]	Standard Site Package
Seepage Pond Outlet Pipe	WQ-SEEP	389604	6880598	Variable[3]	Standard Site Package, LT50
Mill Site Seep 03	WQ-MS-S-03	387884	6881121	Variable[3]	Standard Site Package
Mill Site Seep 08	WQ-MS-S-08	387954	6881073	Variable[3]	Standard Site Package
Adit Seep	WQ-ADIT-SEEP	389081	6881709	Variable[3]	Standard Site Package
Back Creek	WQ-BC	391626	6880901	Variable[3]	Standard Site Package
Minnesota Creek	WQ-MN	392540	6879249	Variable[3]	Standard Site Package
Victoria Creek Reference Site	WQ-VC-REF	391650	6881113	Variable[3]	Standard Site Package
Upper Victoria Creek	WQ-VC-U	391626	6880872	Variable[3]	Standard Site Package
Victoria Creek downstream Back Creek	WQ-VC-DBC	391633	6880740	Variable[3]	Standard Site Package
Victoria upstream of Minnesota	WQ-VC-UMN	392413	6879244	Variable[3]	Standard Site Package
Victoria Creek at Road	WQ-VC-R	392431	6878802	Variable[3]	Standard Site Package
Pump House Well	WQ-PW	391558	6880856	Variable[3]	Drinking Water Package Bacteriological Analysis
Dry Creek	WQ-DRY	387621	6880579	Seasonally	Standard Site Package

[1] NAD 83, UTM Zone 8.

[2] Parameters included in various sampling packages are explained in greater detail in Section 2.4.1, below.

[3] Sampling frequency for these sites was variable over the course of the Q1 period, with sampling monthly in April, weekly in May, and bi-weekly in June. Note sampling frequency for these sites will be on a monthly basis from July 1, 2013 to March 31, 2014.

[4] WQ-DC-D1 site was dropped from the Mount Nansen program beginning May 28, 2013.

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 (µS/cm), and in some cases

dissolved oxygen (mg/L, for the pit lake). Field crews calibrated the meter on a daily basis prior to each field day. Field data was recorded on standard field datasheets including station name, sample identifier, sample date and time, water temperature, specific conductivity, pH, photo numbers and a record of site conditions including flow stage (low, moderate, high), turbidity (clear, low, moderate, high), and any other observations.

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 each lab (ALS or YG Environmental Health Services (EHS)). Samples from the pit lake are taken from the same general location on the lake at three different depths, from the surface, at mid depth and just off the bottom. The boat anchor or Van Dorn sampler is used to measure the depth, in order to determine mid- and bottom-depth of the samples.

Samples were kept in coolers with ice packs during the field work and transport, and were stored in a refrigerator if overnight storage was required. For chemical analysis, Chain of Custody forms 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. For bacteriological analysis, the sample from each trip was submitted to YG EHS.

2.4.2 Laboratory Analysis

All surface water quality laboratory analysis was conducted by ALS in Whitehorse, YT, except for the bacteriological sample collected from the pump house well which was analyzed by YG EHS. Several lab analysis packages have been organized for the Mount Nansen Site, including a standard site package (all other sites), a pit lake package (WQ-PIT), a drinking water package (WQ-PW), and an LT50 package (WQ-SEEP). The parameters included in each package are outlined in Table 2-5.

The only change to these packages during the course of the Q1 period was that plant pigment analysis (chlorophyll a and pheopigments) were dropped from the Mount Nansen program beginning in June 2013.

Table 2-5 Laboratory analysis parameters included in various 'packages' created for surface water quality sampling at Mount Nansen.

Analysis Package	Parameters Included
Standard Site Package	**Cyanides:** Cyanate, Total Cyanide (as Strong Acid Dissociable), Weak Acid Dissociable, Thiocyanate
	Physical Tests: Conductivity, Hardness, pH, Total Dissolved Solids, Total Suspended Solids
	Anions and Nutrients: Bicarbonate, Carbonate, Hydroxide, Total Alkalinity, Total Ammonia, Chloride, Fluoride, Nitrate, Nitrite, Sulphate
	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.
	Dissolved Metals: Aluminum, Antimony, Arsenic, Barium, Beryllium, Bismuth, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Lithium,

Analysis Package	Parameters Included
	Magnesium, Manganese, Mercury, Molybdenum, Nickel, Phosphorus, Potassium, Selenium, Silicon, Silver, Sodium, Strontium, Sulfur, Thallium, Tin, Titanium, Uranium, Vanadium, Zinc.
Pit Lake Package	**Physical Tests:** Conductivity, Hardness, pH, Total Dissolved Solids, Total Suspended Solids **Anions and Nutrients:** Bicarbonate, Carbonate, Hydroxide, Total Alkalinity, Total Ammonia, Chloride, Fluoride, Nitrate, Nitrite, Sulphate **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. **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. **Plant Pigments[1]:** Chlorophyll a, Pheopigments
Drinking Water Package	**Physical Tests:** True Colour, Conductivity, Hardness, pH, Total Dissolved Solids, Turbidity **Anions and Nutrients:** Alkalinity, Total, Chloride, Fluoride, Nitrate, Nitrite, 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.

[1] Plant pigment analysis was removed from the Mount Nansen program beginning in June 2013.

2.4.3 QA/QC Program

A QA/QC sampling was conducted as part of the monitoring program, including two 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 sites, randomly selected on the June 2013 trip. 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 from the sampler or 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 stations 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 2013; Table 2-6), and with the Effluent Quality Standards outlined in Yukon Water Board Water license No. QZ94-004, issued to BYG Natural Resources Inc. on February 13, 1996 (Table 2-7).

Table 2-6. CCME AL Guidelines applicable to Mount Nansen surface water quality sampling program.

Water Quality Parameter	CCME AL Guideline	Units	Comments
Aluminum (Al)	0.1 mg/L	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	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	-

Water Quality Parameter	CCME AL Guideline	Units	Comments
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 2-7 Mount Nansen Effluent Quality Standards outlined in Yukon Water License #QZ94-004.

Water Quality Parameter	Effluent Quality 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

3 RESULTS

Results are separated into the three program components, hydrometric, water quality and meteorological results. Select field photographs for the first quarter 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 first quarter period is available in Appendix B. All field datasheets for hydrology and water quality are provided in Appendix C. All hydrometric data is provided in Appendix D and water quality data in Appendix E. Meteorological data is provided in Appendix F.

3.1 METEOROLOGICAL RESULTS

Meteorological data from the ATM-ROAD AAM station is summarized below for the Q1 period (April 1 to June 30, 2013). All data is plotted in Appendix F, with selected summary statistics tabulated for air and ground temperature, rainfall, snow depth, wind direction and wind speed in Appendix F. A brief description of the meteorological conditions is presented in the following sections.

3.1.1 Air and Ground Temperature

Minimum air temperatures were observed throughout April, with a minimum mean daily air temperature of -15°C on April 5, 2013. Maximum mean daily temperature of 20.44°C occurred on June 28, 2013. Mean daily air temperatures were generally warming from April 1 through to June 30, 2013 with mean air temperatures above zero degrees beyond May 3, 2013.

Mean ground temperatures remained below zero degrees until May 10, 2013 when temperatures began to rise gradually. Maximum ground temperatures occurred on May 28, 2013 with a mean daily temperature of 23.2°C.

3.1.2 Precipitation

Precipitation measured as rainfall occurred sporadically between April 1 and June 30, 2013. The highest rainfall rate occurred on June 6, 2013 at a rate of 4.3 mm/hour. Maximum daily rainfall also occurred on June 6, 2013 with a total daily rainfall of 12.8 mm. Precipitation events as rainfall are dominated by short, low-intensity rainfall events most often associated with convective systems moving over the region.

3.1.3 Wind

Wind speeds are generally low, with maximum daily wind speeds occurring on April 10, 2013 with a velocity of 6.68 m/s (24 km/h). Dominant wind directions at the Mount Nansen site are south, southwest and southeast. The highest wind speed recorded between April 1 and June 30, 2013 was 12.69 m/s (45.7 km/h) which also occurred on April 10, 2013. Generally, wind speeds were highest in the early spring (April through early May) period.

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 disappearance of snow) and solar insolation angles increase through the spring, net solar radiation increases from ~0 W/m^2 to over 500 W/m^2 in early June, 2013. Net radiation exhibits a diurnal cycle associated with increases and decreases in received solar insolation.

3.1.5 Relative Humidity

Relative humidity at Mount Nansen generally remains above 30%, and fluctuates up to 100%. Relative humidity remains persistently variable between April 1 and June 30, 2013, and generally declines into the late May and early June months. The slight seasonal decline in relative humidity is likely associated with a disappearance of snow cover and reduction in near ground surface air saturation.

3.2 HYDROMETRIC RESULTS

Discharge measurements began at most hydrometric station beginning in April, 2013. Discharge measurements were not completed at some stations until late May, 2013. A total of seven discharge measurement events were performed between April 1 and June 30, 2013 and are included in this quarterly report. A summary of each hydrometric measurement event is presented in Appendix D, in addition to the measured discharge, river stage elevations and hydrographs for each station.

Some data collected from stations visited early in the Q1 monitoring period (i.e. throughout April and early May) have increased uncertainty due to the backwater effects associated with ice cover. Throughout the monitoring program, professional judgement is used to ascertain the results associated with ice-covered discharge.

A full summary of hydrometric monitoring records for the first quarterly monitoring period is recorded in Appendix D, Table C-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 (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 a "Grade B". Uncertainties associated with the instruments used for hydrometric monitoring is presented in table C-1 in Appendix D. The following sections describe the results from each gauging station.

3.2.1 Dome Creek Watershed

3.2.1.1 H-DC-DX

The highest elevation hydrometric station in the Dome Creek watershed is H-DC-DX, with a very small contributing basin. The drainage area of H-DC-DX is 0.21 km^2. The station was originally established for water quality sampling (station WQ-DC-DX) as an upstream control site and not as a hydrometric station. The channel at H-DC-DX is a poorly defined, braided channel through willow shrub, moss and grass vegetation. Average wetted width of the station is 0.10 m and an average depth of 0.07 m. The station is unsuitable for standard discharge measurement methods and is only used as an instantaneous discharge measurement location.

A total of five discharge measurements were collected at H-DC-DX between April 1 and June 30, 2013. Ice and snow remained within the channel until late May, 2013. Salt dilution gauging was when flows were great enough within the channel. Volumetric measurements were used for the June 12, 2013 and June 25, 2013 monitoring trips when flows were too low for salt dilution gauging. Discharge measurements at H-DC-DX ranged from below reportable confidence levels (<0.000 m^3/s) to 0.003 m^3/s. The hydrograph of instantaneous measurements and associated discharge is shown in Appendix E.

3.2.1.2 H-DC-DX+105

Station H-DC-DX+105 is located 105 m downstream of H-DC-DX and represents a drainage area of 0.52 km^2. The station is typically ice-free slightly sooner than upstream H-DC-DX, since the station receives slightly more groundwater contributions associated with the road and mill cut immediately upstream. 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 standard discharge methods. A total of five discharge measurements were completed at this station between April 1 and June 30, 2013. Ice and residual snow remained within the channel to late May 2013 and was gone by June 2013 sampling events. Low discharges encountered within the channel increase uncertainty with discharge estimates. Maximum discharge occurred on May 29, 2013 at 0.025 m^3/s. Minimum measured discharge occurred in late June and is near reportable confidence limits.

3.2.1.3 H-DC-D1

Originally established as a water quality monitoring location, H-DC-D1 is used as an instantaneous hydrometric monitoring station downstream of the mill. The channel is very poorly defined braided network of small stream channels through dense will shrub, moss and grasses. It appears as though there is no single, well defined channel at this location due to soil and highly organic channel substrate conditions. A single hydrometric measurement was taken from this station on May 29, 2013 when ice and snow was no longer present at the stations location. Measured discharge was 0.012 m^3/s. This station was removed from the monitoring network for the June 2013 to March 2014 contract, as this station was replaced by H-DC-D1b, which captures the majority of the flow within the upper Dome Creek watershed.

3.2.1.4 H-DC-D1b

H-DC-D1b was established in June of 2012 following discoveries that additional channels of Dome Creek were present in the vicinity of H-DC-D1. The channel at H-DC-D1b is approximately 0.35 m wide and 0.13 m deep, and is unsuitable for standard discharge measurements. Similar to other stations within the Dome Creek watershed, thick layers of ice (commonly referred to as creek 'glaciation') develop through the winter period as a surface expression of winter-time flows. Complex, braided channels develop within the ice cover during the spring melt period, making hydrometric gauging nearly impossible. No gauging could be completed effectively at this station during the April trip nor the first three trips in May when ice is present. Only three discharge measurements were collected from H-DC-D1b, one on May 29, 2013 (0.10 m3/s), June 10, 2013 (0.003 m3/s) and June 25, 2013 (0.007 m3/s).

3.2.1.5 H-DC-U1 and H-DC-U2

Station H-DC-U1 and H-DC-U2 remained ice and snow covered throughout the first quarter monitoring period. Due to significant accumulations of overflow ice as a result of stream 'glaciation', the stations remained beneath several metres of ice cover. Complex flow pathways though, beneath and on the surface of the ice cover prevented the reliable measurement of stream flows over the Q1 period.

3.2.1.6 H-DC-B

The H-DC-B station is a continuous gauging station established at the downstream end of the Dome Creek diversion channel at the channel 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.

The well at this station was removed for the 2012/2013 winter due to ongoing channel maintenance work to reduce icing issues at the bridge location. During the Q1 period, Denison Environmental Services excavated the channel on April 12-16, April 28, and May 5-7, 2013. Instantaneous measurements were collected at the station when conditions allowed. The continuous gauging station was re-established on May 27, 2013 when the channel was ice-free. Discharge conditions were generally unsuitable for measurements using the ADV. Due to uncertainty associated with rating measurement points and limited number of data points, no rating curve was developed for this station.

Station discharge measurements are presented in Appendix D. The greatest discharge was measured on June 24, 2013 at 0.427 m^3/s. Generally, discharge ranged from 0.022 m^3/s to 0.427 m^3/s during the first quarter of 2013. Differences in discharge measurements between H-DC-B and those of upper Dome Creek highlight different hydrological responses associated with different channel morphologies and conditions. Upper Dome Creek is a heavily vegetated and braided channel, while H-DC-B is channelized, has minimal riparian vegetation, and a significant quantity of mining infrastructure in the immediate vicinity.

3.2.1.7 H-DC-M

A continuous monitoring station was operating within middle 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). Continuous stage measurements were collected over the 2012-2013 winter period and continued into the first quarter of 2013.

The channel is moderately well defined within fine grained substrate. Some cobble to boulder sized material persists upstream of the diversion channel confluence 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 unsuitable for the ADV.

Continuous water stage elevations and discharge measurements are presented in Appendix E from April 1 to June 30, 2013. The channel became ice-free in late May, similar to other stations in the Dome Creek watershed. A total of seven discharge measurements were collected between April 1 and June 30, 2013. Discharge measurements ranged from below reportable confidence limits (<0.000 m^3/s) to 0.456 m^3/s on May 21, 2013. H-DC-M stage time-series and hydrographs are presented in Appendix D.

A rating curve for H-DC-M was established for the station following the 2012-2013 monitoring year. This rating curve was subsequently updated with additional measurements collected during high flows in the spring of 2013. Table 3-1 summarizes the rating curve expressions presented for the 2012-2013 report and revised rating curve for the 2013 Q1 report.

Table 3-1 Middle Dome Creek (H-DC-M) rating curve equations.

Stage (m)	Discharge (m^3/s)	Offset (m)	Slope	Equation
Former Rating Curve, April, 2012 to March, 2013				
1.556	0.005	1.5	-----	-----
1.701	0.060	1.5	1.986	$Q = 1.44074\ (Y-1.5)^{1.98631}$
2.003	0.356	1.5	1.950	$Q = 1.35912\ (Y-1.5)^{1.94996}$
Revised Rating Curve, April, 2013 to June, 2013				
1.550	0.00124	1.52	-	-
1.891	0.771	1.52	2.558	$Q=9.74\ (h-1.52)^{2.56}$

3.2.1.8 H-DC-R

The station at H-DC-R was re-established once the channel was ice-free and suitable for stilling well installation on June 10, 2013. This section of Dome Creek accumulates significant quantities of ice due to the broad, flat nature of the valley bottom. Throughout the winter period, ice removal and maintenance occurs along the Dome Creek road crossing as a result of the ice accumulation. Therefore the stations remain covered by ice well into the spring period.

Salt dilution gauging was used for three discharge measurements at H-DC-R in the first quarter of 2013. Maximum discharge measured was 0.100 m^3/s on May 6, 2013. Minimum discharge measured was

0.024 m^3/s on June 24, 2013. The rating curve developed for the H-DC-R station was updated and revised using the discharge measurements collected in the first quarter of 2013. The 2012-2013 and revised 2013 rating curve equations for H-DC-R are shown in Table 3-2.

Table 3-2. Dome Creek at the Road (H-DC-R) rating equations.

Stage (m)	Discharge (m^3/s)	Offset (m)	Slope	Equation
Former Rating Curve, April, 2012 to March, 2013				
0.2747	0.002	0.16	-----	-----
0.6621	0.100	0.16	2.758	$Q = 0.666494\ (h\text{-}0.16)^{2.75760}$
1.062	0.477	0.16	2.671	$Q = 0.628053\ (h\text{-}0.16)^{2.67137}$
Revised Rating Curve, April, 2013 to June, 2013				
0.274	0.002	0.125	-	-
1.062	0.477	0.125	2.985	$Q = 0.579\ (h - 0.125)^{2.98}$

3.2.2 Back Creek Watershed

3.2.2.1 Back Creek (H-BC)

A station on Back Creek at H-BC was re-installed on May 16, 2013 when the channel was ice-free. The channel is stable and entrenched into alluvial sediments of both the Back Creek and Victoria Creek floodplains. Upstream placer activity increases the sediment load observed within the creek. 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; however discharges on May 16, 2013 were sufficiently high to use the ADV. All other discharge measurements were made using the salt dilution method.

A total of six measurements were collected between April 1 and June 30, 2013. The greatest discharge measured was 0.616 m^3/s on May 22, 2013. Former rating curves were revised and updated using the additional discharge measurements and are presented in Table 3-3.

Table 3-3. Back Creek (H-BC) rating curve equations.

Stage (m)	Discharge (m3/s)	Offset (m)	Slope	Equation
Former Rating Curve, April, 2012 to March, 2013				
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
Revised Rating Curve, April, 2013 to June, 2013				
1.63	0.001	1.49	-	-
2.168	0.602	1.49	4.057	Q = 2.91 (h – 1.49)4.06

Time-series stage and hydrographs are presented in Appendix D. The spring freshet occurred between May 23 and May 25, 2013 indicated by a period of abnormally elevated stage levels. The peak freshet stage was around 2.450 m. Mean discharge over the 2013 Q1 period was 0.15 m^3/s.

3.2.3 Minnesota Creek Watershed

3.2.3.1 Minnesota Creek (H-MN)

The station on Minnesota Creek was re-established as a continuous monitoring station once the channel became ice-free. A data logger was deployed on May 27, 2013. A total of seven discharge measurements were taken at H-MN primarily using the salt-dilution method. Two measurement events (one on May 16, 2013 and one on May 28, 2013) used the ADV for discharge measurements.

The Minnesota Creek channel is well defined with nearly vertical banks near the station and a cobble/gravel bed. The channel averaged 1.12 m in width and 0.41 m in depth. Maximum discharge recorded was 0.443 m^3/s during spring freshet. Frozen bed conditions generally persist well into the spring beyond freshet events and therefore affect the water stage elevations and accuracy of the discharge estimates.

The revised 2012-2013 rating curves for H-MN are presented in Table 3-4. Additional rating measurements collected between April 1 and June 30, 2013 were used to revise the station rating curves. According to the station hydrograph, discharge at H-MN ranged from below measurement confidence limits (0.001 m^3/s) to 0.443 m^3/s, with average discharge for the period of 0.07 m^3/s.

Table 3-4. Minnesota Creek (H-MN) rating curve equations.

Stage (m)	Discharge (m^3/s)	Offset (m)	Slope	Equation
Former Rating Curve, April, 2012 to March, 2013				
0.9095	0.006	0.5	-----	-----
1.086	0.114	0.5	8.461	$Q = 10.4987\ (h-0.5)^{8.46114}$
1.231	0.820	0.5	8.918	$Q = 13.4031\ (h-0.5)^{8.91813}$
Revised Rating Curve, April, 2013 to June, 2013				
0.09095	0.006	0.5	-	-
1.231	0.82	0.5	8.486	$Q = 11.7\ (h-0.50)^{8.49}$

3.2.4 Victoria Creek Watershed

3.2.4.1 Victoria Creek Reference (H-VC-REF)

The H-VC-REF station lies upstream of the Back Creek confluence and upstream of any influence of the Mount Nansen Site. A data logger was re-deployed at this station on May 16, 2013. A total of six discharge measurements were made between April 1 and June 30, 2013. Maximum discharge measured using the ADV was 2.074 m^3/s on May 16, 2013.

The 2012-2013 rating curve was revised using the six additional discharge measurements. The former and revised rating curve equations are presented in Table 3-5. Time-series stage and hydrograph data is presented in Appendix D. Based on the water level logger data, a high-flow event associated with spring freshet occurred on May 27, 2013.

Table 3-5. Victoria Creek Reference (H-VC-REF) rating curve equations.

Stage (m)	Discharge (m^3/s)	Offset (m)	Slope	Equation
Former Rating Curve, April, 2012 to March, 2013				
1.255	0.015	1.2	-----	-----
1.816	0.475	1.2	1.420	$Q = 0.945289\ (h\text{-}1.2)^{1.41949}$
2.12	1.933	1.2	3.498	$Q = 2.58760\ (h\text{-}1.2)^{3.49788}$
2.386	4.395	1.2	3.234	$Q = 2.53134\ (h\text{-}1.2)^{3.23424}$
Revised Rating Curve, April, 2013 to June, 2013				
1.69	0.18	1.45		
2.386	4.395	1.45	2.348	$Q = 5.13\ (h - 1.45)^{2.35}$

3.2.4.2 Upper Victoria Creek (H-VC-U)

The Upper Victoria Creek gauging station (H-VC-U) continuously monitoring stage elevations downstream of H-VC-REF, approximately 65 metres upstream of the Back Creek confluence. The station is known to receive groundwater contributions evidenced by thin ice cover during the winter period. A total of eight discharge measurements were collected between April 1 and June 30, 2013. Five of these measurements were used to update the 2012-2013 rating curves previously established. Former and revised rating curve expressions are presented in Table 3-6.

Maximum measured discharge was 2.701 m^3/s on May 28, 2013. Minimum discharge measurements were around 0.020 m^3/s in the early April period. Concurrent salt dilution and ADV measurements were collected on April 16, 2013.

Continuous stage records and time-series hydrographs for April 1 through June 30 are presented in Appendix D. Based on logger data, two notable peak discharges occurred in May 13 and May 27, 2013. According hydrographs created for H-VC-U, maximum discharge over the first quarter monitoring period was 7.977 m^3/s (May 27), with mean discharge of 1.022 m^3/s between April 1 and June 30, 2013.

Table 3-6. Upper Victoria Creek (H-VC-U) rating curve equations.

Stage (m)	Discharge (m^3/s)	Offset (m)	Slope	Equation
Former Rating Curve, April, 2012 to March, 2013				
1.986	0.038	1.85	-----	-----
2.385	2.632	1.85	3.098	$Q = 18.2757\ (h\text{-}1.85)^{3.09810}$
2.641	8.465	1.85	2.987	$Q = 17.0539\ (h\text{-}1.85)^{2.98748}$
Revised Rating Curve, April, 2013 to June, 2013				

Stage (m)	Discharge (m^3/s)	Offset (m)	Slope	Equation
1.997	0.097	1.81		
2.641	8.465	1.81	2.9997	$Q = 14.8 (h - 1.81)^{3.0}$

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

The continuous gauging station downstream of Back Creek on Victoria Creek (H-VC-DBC) was maintained over the winter months and through the Q1 period of 2013 (April 1 to June 30, 2013). The channel had an average width of 4.8 m and a depth 0.25 m at the discharge measurement location. All measurements were collected using the standard ADV method. A total of nine discharge measurements were taken at H-VC-DBC, with two concurrent salt-dilution and ADV measurements collected on April 16th and May 7, 2013. Maximum discharge measured was 2.612 m^3/s on May 16, 2013. Based on the continuous measurements, two peak discharge events occurred, on May 13, 2013 and May 27, 2013. Maximum discharge on May 27, 2013 was 7.587 m^3/s and is associated with the spring freshet. Mean discharge of 0.726 m^3/s between April 1 and June 30, 2013.

Continuous stage measurements and hydrograph is presented in Appendix D. Five of the nine discharge measurements were used to revise the 2012-2013 rating curves for H-VC-DBC. Revised and former rating curve expressions are shown in Table 3-7.

Table 3-7. Victoria Creek, downstream of Back Creek (H-VC-DBC) rating curve equations.

Stage (m)	Discharge (m^3/s)	Offset (m)	Slope	Equation
Former Rating Curve, April, 2012 to March, 2013				
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	$Q = 9.67846 (h-1.316)^{4.91302}$
Revised Rating Curve, April, 2013 to June, 2013				
1.782	0.06405	1.67		
2.586	10.61813	1.67	1.852	$Q = 12.5 (h - 1.67)^{1.85}$

3.2.4.4 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. Originally established as an instantaneous discharge measurement location, a continuous station was deployed in 2012. For 2013, a logger and staff gauge was re-deployed at the same location on May 15, 2013. The channel average 5.7 m in width and 0.20 m in depth, with channel conditions suitable for standard discharge measurement methods using the ADV. A total of nine discharge measurements were collection between April 1 and June 30, 2013. Concurrent salt dilution and ADV measurements were collected on April 16, 2013 and May 16, 2013. Maximum discharge measured was 3.283 m^3/s on May 28, 2013.

Rating curve expressions originally developed for the 2012-2013 station were revised using six of the discharge measurements which were collected when the channel was ice-free. Former and revised rating curve expressions for H-VC-UMN are presented in Table 3-8.

Table 3-8. Victoria Creek, upstream of Minnesota Creek (H-VC-UMN) rating curve equations.

Stage (m)	Discharge (m^3/s)	Offset (m)	Slope	Equation
Former Rating Curve, April, 2012 to March, 2013				
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	$Q = 4.25676\ (h-0.979)^{5.70783}$
Revised Rating Curve, April, 2013 to June, 2013				
1.411	0.04985	0.979		
2.140	9.98	0.979	5.3604	$Q = 4.48\ (h - 0.979)^{5.36}$

According to continuous logger records, peak discharges associated spring freshet occurred on May 27, 2013 with maximum discharge of 9.973 m^3/s. Average discharge between April 1 and June 30, 2013 at 1.238 m^3/s. Continuous stage and hydrograph records for H-VC-UMN are presented in Appendix D.

3.2.4.5 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-grade, meandering section of the channel. During the on-set of spring melt, the Mount Nansen Road washed out as a result of the culvert being blocked by overflow ice and significant re-routing of the Victoria Creek channel flow over significant quantities of overflow ice. Vehicle access to the Mount Nansen site was restricted the week of May 13, 2013 due to several road washouts. Flows were significant at this time with discharge at 3.208 m^3/s. Alternate transportation arrangements were made to transport the EDI field crew to the mine site by helicopter.

Channel widths averaged 6.7 m and 0.25 m in depth at the discharge measurement location. A total of eight discharge measurements were collected between April 1 and June 30, 2013. Concurrent salt dilution and ADV measurements were collected on April 15, 2013. Maximum discharge measured was 3.597 m^3/s on May 27, 2013, which was two weeks after the road washout.

Five discharge measurements were used to revise the H-VC-R rating curve. The former and revised rating curve expressions are presented in Table 3-9.

Table 3-9. Victoria Creek at Road (H-VC-R) rating curve equations.

Stage (m)	Discharge (m^3/s)	Offset (m)	Slope	Equation
Former Rating Curve, April, 2012 to March, 2013				
1.849	0.057	1.51	-----	-----
2.196	4.015	1.51	6.041	$Q = 39.1267\ (h\text{-}1.51)^{6.04113}$
2.307	9.974	1.51	6.067	$Q = 39.5133\ (h\text{-}1.51)^{6.06722}$
Revised Rating Curve, April, 2013 to June, 2013				
1.852	0.01365	1.61		
2.468	10.66791	1.61	5.263	$Q = 23.9\ (h - 1.61)^{5.26}$

Continuous stage measurements are collected at H-VC-R. Stage time-series and hydrographs are presented in Appendix D. According to the continuous record, two peak discharge events occurred between April 1 and June 30, 2013. Maximum discharge of 10.557 m^3/s occurred on May 12, 2013. A secondary high-flow event occurred on May 27, 2013 with a discharge of ~8.5 m^3/s. Average discharge between April 1 and June 30, 2013 is 0.951 m^3/s.

3.2.5 Pony Creek Watershed

3.2.5.1 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 km^2 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. A continuous monitoring station was established on May 16, 2013 using a stilling well, staff gauge and data logger in efforts to replace the non-functioning weir structure.

A total of seven discharge measurements were collected at H-PC-U between April 1 and June 30, 2013. Concurrent salt-dilution and ADV methods were used on May 15, 2013 and May 27, 2013. No volumetric measurements were collected from the weir structure. Maximum discharge measurements were made on May 27, 2013 with a discharge of 0.023 m^3/s. Minimum discharge measurements were close to reportable confidence limits at 0.001 m^3/s.

No rating curves exist for the H-PC-U station apart from the weir structure that no longer has water flowing through it. Therefore, only continuous stage elevations and instantaneous discharge measurements are presented in Appendix D.

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

A second hydrometric station is located downstream of H-PC-U below the black creek access road culvert and is named H-PC-DSP. The station was originally installed to supplement a hydrogeological investigation, however, the station does not appear to be hydrologically down-gradient of the pit.

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 is used to estimate discharge. A small rock weir was installed as a control immediately downstream of the stilling well and appears to be functioning as an effective control. A total of six discharge measurements were collected between April 1 and June 30, 2013. Maximum discharge measured was 0.019 m^3/s on May 15, 2013. An abnormally high discharge was measured on June 24, 2013 at 0.680 m^3/s and does not appear to be representative of the regional flows at the time of measurement.

Due to the limited number of rating measurements and accuracy of the data, no rating curve was developed for H-PC-DSP. Continuous time-series stage elevations and instantaneous discharge measurements are presented in Appendix D.

3.3 WATER QUALITY RESULTS

Water quality results for sampling within the Q1 period are discussed on a watershed by watershed basis in the sections below. These results include a summary of guideline and standard exceedances for each site and sampling trip as well as *in situ* water quality parameter. Appendix E has copies of all raw water quality data with guideline and standard exceedances highlighted for each sampling trip.

3.3.1 Dome Creek

Dome Creek was sampled at seven sites throughout the watershed. The WQ-DC-DX+105 and WQ-DC-U sites were sampled during all trips during the Q1 period as these sites remain open or accessible through the winter and spring. Several sites remained frozen to substrate in the earlier portion of the quarter, due to the 'glaciation' conditions that persist into the spring (WQ-DC-D1b, WQ-DC-U1, WQ-DC-U2, and WQ-DC-R). Sampling began for these sites generally towards late-May 2013.

During the Q1 period CCME guideline and/or Mount Nansen EQS exceedances existed in Dome Creek for TSS, Al, As, Cd, Cr, Cu, Fe, Pb, Hg, Mn, and Zn. See Table 3-10 and Table 3-11 for a summary of exceedances for each site during each visit and Appendix E for raw data. Note TSS and Mn exceedances are based on the Mount Nansen EQS, as there are no CCME guidelines for these parameters. Most other exceedances noted below are based on the CCME guidelines; however, Fe frequently exceeded both the CCME and EQS values. Note mercury exceedances for the CCME guideline were only found at the WQ-DC-DX, WQ-DC-DX+105 and WQ-DC-U sites on a few occasions. A summary of *in situ* water quality parameters for the Dome Creek sites are provided in Table 3-12. There were no cyanide exceedances during the Q1 period.

Table 3-10. Summary of parameters that exceeded CCME guidelines and/or Mount Nansen EQS for each site visit and site within the upper Dome Creek watershed for Q1 period (April 1 to June 30, 2013).

Sampling Trip Date	WQ-DC-DX	WQ-DC-DX+105	WQ-DC-D1b	WQ-DC-U1	WQ-DC-U2
Apr 17-19, 2013	-	Al, As, Cd, Fe, Mn, Zn	-	-	-
May 6-8, 2013	-	Al, As, Cd, Cu, Fe, Pb, Mn, Zn	-	-	-
May 15-17, 2013	Al, As, Cd, Cu	TSS, Al, As, Cd, Cr, Cu, Fe, Pb, Hg, Zn	-	-	-
May 21-23, 2013	Al, As, Cd, Cu	TSS, Al, As, Cd, Cr, Cu, Fe, Pb, Zn	-	-	TSS, Al, As, Cd, Cr, Cu, Fe, Pb, Mn, Zn
May 27-29, 2013	TSS, Al, As, Cd, Cr, Cu, Fe, Pb, Zn	TSS, Al, As, Cd, Cr, Cu, Fe, Pb, Mn, Hg, Zn	Al, As, Cd, Cu, Fe, Pb, Mn, Zn	Al, As, Cd, Fe	TSS, Al, As, Cd, Cr, Cu, Fe, Pb, Mn, Zn
Jun 10-12, 2013	TSS, Al, As, Cd, Cr, Cu, Fe, Pb, Hg, Zn	TSS, F, Al, As, Cd, Cr, Cu, Fe, Pb, Mn, Zn	F, Al, As, Cd, Cu, Fe, Pb, Zn	Al, As, Cd, Cr, Cu, Fe	TSS, Al, As, Cd, Cu, Fe
Jun 24-26, 2013	Al, As, Cd, Cr, Cu, Fe, Pb, Mn	Fe, Al, As, Cd, Mn, Zn	Al, As, Cd, Cu, Fe, Pb, Mn, Zn	TSS, Al, As, Cd, Cr, Cu, Fe	TSS, Al, As, Cd, Cr, Cu, Fe, Pb, Mn, Zn

Table 3-11. Summary of parameters that exceeded CCME guidelines and/or Mount Nansen EQS for each site visit and site within the mid- to lower-Dome creek watershed for the Q1 period (April 1 to June 30, 2013).

Sampling Trip Date	WQ-DC-U	WQ-DC-R
Apr 17-19, 2013	NH_3, Al, As, Cd, Cu, Fe, Mn	-
May6-8, 2013	Al, As, Cd, Fe, Pb, Mn	-
May 15-17, 2013	Al, As, Cd, Cu, Fe, Pb, Mn, Zn	-
May 21-23, 2013	TSS, Al, As, Cd, Cr, Cu, Fe, Pb, Mn, Hg, Zn	Al, As, Cd, Cr, Cu, Fe, Pb, Mn, Zn
May 27-29, 2013	TSS, Al, As, Cd, Cr, Cu, Fe, Pb, Mn, Zn	TSS, Al, As, Cd, Cr, Cu, Fe, Pb, Mn, Zn
Jun 10-12, 2013	TSS, Al, As, Cd, Cr, Cu, Fe, Pb, Mn	TSS, Al, As, Cd, Cr, Cu, Fe, Pb, Mn, Zn
Jun 24-26, 2013	Al, As, Cd, Cr, Cu, Fe, Mn	TSS, NH_3, Al, As, Cd, Cr, Cu, Fe, Pb, Mn

Table 3-12. *In-situ* water quality data for sites within the Dome Creek watershed for the Q1 period (April 1 to June 30, 2013).

Site ID	Trip Date	Water Temp (°C)	Specific Conductivity (µS/cm)	pH	Turbidity (NTU)
WQ-DC-D1b	29-May-13	0.1	1003.0	7.70	16.35
WQ-DC-D1b	12-Jun-13	1.3	1111.0	7.66	5.98
WQ-DC-D1b	25-Jun-13	7.6	1250.0	7.71	1.54
WQ-DC-DX	16-May-13	0.1	39.5	6.95	0.90
WQ-DC-DX	22-May-13	0.1	87.1	7.03	1.82
WQ-DC-DX	29-May-13	1.5	143.2	7.25	45.10
WQ-DC-DX	12-Jun-13	1.6	310.5	7.40	92.30
WQ-DC-DX	25-Jun-13	4.9	653.5	7.29	33.8
WQ-DC-DX+105	17-Apr-13	0.3	1178.0	6.86	22.90
WQ-DC-DX+105	8-May-13	0.3	870.1	6.72	14.45
WQ-DC-DX+105	16-May-13	0.6	201.6	6.81	46.80
WQ-DC-DX+105	22-May-13	1.8	273.7	7.09	29.10
WQ-DC-DX+105	29-May-13	7.3	296.2	6.99	266.00
WQ-DC-DX+105	11-Jun-13	2.3	803.8	6.77	35.90
WQ-DC-DX+105	25-Jun-13	1.7	1184.0	6.99	13.29
WQ-DC-R	22-May-13	0.0	736.0	8.01	19.84
WQ-DC-R	28-May-13	0.9	622.8	7.46	44.50
WQ-DC-R	12-Jun-13	1.2	500.5	6.93	31.10
WQ-DC-R	25-Jun-13	7.3	1069.0	7.59	50
WQ-DC-U	17-Apr-13	0.4	1920.0	7.48	38.40
WQ-DC-U	7-May-13	0.0	1594.0	8.00	25.70
WQ-DC-U	17-May-13	0.0	393.6	7.00	8.49
WQ-DC-U	22-May-13	0.0	100.5	7.18	1.39
WQ-DC-U	22-May-13	0.5	633.5	7.86	120.00
WQ-DC-U	29-May-13	1.1	838.1	7.29	13.34
WQ-DC-U	12-Jun-13	2.5	611.2	7.51	24.00
WQ-DC-U	25-Jun-13	19.5	1240.0	7.78	24.6
WQ-DC-U1	28-May-13	0.0	463.0	7.37	0.99
WQ-DC-U1	12-Jun-13	0.4	681.7	7.36	2.75
WQ-DC-U1	25-Jun-13	7.5	1122	7.63	8.16
WQ-DC-U2	22-May-13	0.0	601.2	7.89	51.10
WQ-DC-U2	29-May-13	0.7	809.9	7.66	13.35
WQ-DC-U2	12-Jun-13	1.3	662.2	7.21	7.49
WQ-DC-U2	25-Jun-13	7.8	991.0	7.33	79.7

3.3.2 Brown-McDade Pit Lake

The Brown-McDade pit lake was sampled on two occasions during the Q1 investigation period, April 2013 and June 2013. Pit lake sampling is scheduled to occur on a monthly basis, but the site could not be sampled in May due to safety concerns associated with ice conditions.

During the April 17-19, 2013 visit the lake was sampled beneath the ice at the surface, mid-depth (3.5 m) and at the bottom (7 m). During the June 10-12, 2013 sampling event, a sample was taken from surface, at mid-depth (2 m), and at the bottom (3.8 m). The differences in the sampling depths between the April 2013 and June 2013 trips is due to the total depth at the sampling location, which can vary from month to month depending on water levels in the pit lake. Note in general, the sampling location remains consistent from trip to trip, and thus results are still expected to be comparable between months.

Guideline and/or standard exceedances during the April 17-19, 2013 sampling event included As, Cd, Cu, and Zn at all depths, in addition to Mn for the WQ-PIT-3 sample. Note Mn exceedances are based on the Mount Nansen EQS, as there are no CCME guidelines for these parameters, while all other exceedances noted below are based on the CCME guidelines (Appendix E). Exceedances during the June 10-12, 2013 sampling event included additional parameters such as F, Al, Cr (at the surface only) and Pb. See Table 3-13 for a summary of exceedances (CCME and EQS) and Table 3-14 for a summary of *in situ* water quality parameters.

Table 3-13. Summary of parameters that exceeded CCME guidelines and/or Mount Nansen EQS for each sampling depth on the April 17-19, 2013 and June 10-12, 2013 sampling events.

Sampling Trip Date	WQ-PIT-1 (surface)	WQ-PIT-2 (mid-depth)	WQ-PIT-3 (bottom)
Apr 17-19, 2013	As, Cd, Cu, Zn	As, Cd, Cu, Zn	As, Cd, Cu, Mn, Zn
Jun 10-12, 2013	F, Al, Cd, Cr, Cu, Pb, Zn	F, Al, As, Cd, Cu, Pb, Zn	F, Al, As, Cd, Cu, Pb, Zn

Table 3-14. *In-situ* water quality data for the Brown McDade Pit Lake for the Q1 period (April 1 to June 30, 2013).

Site ID	Sample Depth (m)	Trip Date	Water Temp (°C)	Specific Conductivity (µS/cm)	pH	Turbidity (NTU)	Dissolved Oxygen (mg/L)
WQ-PIT-1	0.3	18-Apr-13	0.1	2093.0	7.22	0.42	-
WQ-PIT-1	0.3	11-Jun-13	8.7	1167.0	7.82	2.31	11.6
WQ-PIT-2	3.5	18-Apr-13	1.7	2103.0	7.31	0.49	-
WQ-PIT-2	2.0	11-Jun-13	8.3	1580.0	7.36	2.57	10.7
WQ-PIT-3	7.0	18-Apr-13	4.4	2808.0	6.72	0.66	-
WQ-PIT-3	3.8	11-Jun-13	4.5	2071.0	7.14	3.64	8.8

3.3.3 Tailings, Seepage Pond Discharge, and Mill Seeps

The tailings pond (WQ-TP) and seepage pond discharge site (WQ-SEEP) were sampled during every visit of the Q1 investigation period. The WQ-TP site consistently had CCME and/or EQS exceedances for Al, As, Cd, Cu, Fe, Pb, Mn, Zn, in addition to F on one occasion (Jun 10-12, 2013; Table 3-15). Note TSS and Mn exceedances are based on the Mount Nansen EQS, as there are no CCME guidelines for these parameters. Most other exceedances noted below are based on the CCME guidelines; however, Fe frequently exceeded both the CCME and EQS values (Appendix E). The WQ-SEEP site consistently had exceedances for Al, As, Cd, Cu, Fe, and Mn, in addition to occasional exceedances for Zn, Pb and Cr (Table 3-15). LT50 analysis at the WQ-SEEP site was scheduled on a bi-monthly basis, and during the Q1 period, only one LT50 sample was collected (May 17, 2013). The LT50 test passed, no toxicity for rainbow trout was detected.

The WQ-MS-S-03 seep was sampled during every visit during the Q1 period, except for the May 6-8, 2013 trip, when the seep was frozen to substrate. The site consistently exceeded guidelines and/or standards for Al, As, Cd, Fe, Pb, Mn and Zn. There were also occasional exceedances for TSS, Cr, Cu and F (Table 3-15).

The MS-S-08 seep was not sampled during any trips during the Q1 period, due to either being frozen to substrate, unsuitable for sampling (no observed flow), or dry.

In situ water quality parameters for each trip for each site are summarized in Table 3-16.

Table 3-15. Summary of parameters that exceeded CCME guidelines and/or Mount Nansen EQS for WQ-TP, WQ-SEEP and WQ-MS-S-03 for the Q1 period (April 1 to June 30, 2013).

Sampling Trip Date	WQ-TP	WQ-SEEP	WQ-MS-S-03
Apr 17-19, 2013	NH_3, Al, As, Cd, Cu, Fe, Pb, Mn, Zn	NH_3, Al, As, Cd, Cu, Fe, Mn, Zn	TSS, Al, As, Cd, Cu, Fe, Pb, Mn, Zn
May 6-8, 2013	NH_3, Al, As, Cd, Cu, Fe, Pb, Mn, Zn	NH_3, Al, As, Cd, Cu, Fe, Mn	-
May 15-17, 2013	Al, As, Cd, Cu, Fe, Pb, Mn, Zn	NH_3, Al, As, Cd, Cu, Fe, Mn	TSS, Al, As, Cd, Cr, Cu, Fe, Pb, Mn, Ag, Zn
May 21-23, 2013	Al, As, Cd, Cu, Fe, Pb, Mn, Zn	NH_3, Al, As, Cd, Cr, Cu, Fe, Mn	TSS, Al, As, Cd, Cu, Fe, Pb, Mn, Zn
May 27-29, 2013	Al, As, Cd, Cu, Fe, Pb, Mn, Zn	NH_3, Al, As, Cd, Cu, Fe, Pb, Mn, Zn	F, Al, As, Cd, Fe, Pb, Mn, Zn
Jun 10-12, 2013	F, Al, As, Cd, Cu, Fe, Pb, Mn, Zn	NH_3, Al, As, Cd, Cu, Fe, Mn	F, Al, As, Cd, Fe, Pb, Mn, Zn
Jun 24-26, 2013	Al, As, Cd, Cu, Fe, Pb, Mn, Zn	NH_3, Al, As, Cd, Cu, Fe, Mn	F, Al, As, Cd, Fe, Pb, Mn, Zn

Table 3-16. *In situ* water quality data for WQ-TP, WQ-SEEP and WQ-MS-S-03 for the Q1 period (April 1 to June 30, 2013).

Site ID	Trip Date	Water Temp (°C)	Specific Conductivity (µS/cm)	pH	Turbidity (NTU)
WQ-SEEP	17-Apr-13	1.1	1696.0	7.18	24.80
WQ-SEEP	7-May-13	1.2	1647.0	6.75	23.20
WQ-SEEP	17-May-13	1.0	1200.0	6.80	18.23
WQ-SEEP	22-May-13	2.4	1412.0	7.13	39.00
WQ-SEEP	29-May-13	2.9	1384.0	6.65	25.90
WQ-SEEP	11-Jun-13	6.2	1470.0	6.77	47.60
WQ-SEEP	25-Jun-13	11.1	1708.0	6.75	24.80
WQ-TP	17-Apr-13	1.2	2204.0	7.18	26.10
WQ-TP	7-May-13	0.5	2190.0	6.74	26.10
WQ-TP	17-May-13	0.3	333.0	7.55	7.08
WQ-TP	22-May-13	3.2	492.4	7.65	5.59
WQ-TP	29-May-13	10.3	695.0	7.30	-
WQ-TP	11-Jun-13	13.5	853.0	7.76	22.20
WQ-TP	25-Jun-13	19.7	1142.0	8.02	8.08
WQ-MS-S-03	17-Apr-13	0.1	1183.0	6.80	51.50
WQ-MS-S-03	16-May-13	0.6	1089.0	6.78	64.40
WQ-MS-S-03	22-May-13	0.7	1160.0	6.93	29.20
WQ-MS-S-03	29-May-13	1.4	1229.0	6.83	2.60
WQ-MS-S-03	11-Jun-13	1.1	1247.0	6.64	1.97
WQ-MS-S-03	25-Jun-13	10.4	1207.0	7.16	13.99

3.3.4 Victoria Creek

Victoria Creek was sampled at five sites throughout the watershed. All sites were sampled during every trip of the Q1 investigation period as conditions were suitable for sampling. During the first two site visits of the quarter, all sites had consistent exceedances in Al and Cd. Once channels were ice free and water levels were high to moderate, exceedances in additional parameters were found occasionally, including TSS, As, Cr, Cu, Fe, Pb and Zn. See Table 3-17 for a summary of exceedances for each trip. *In situ* water quality parameters for each trip are summarized in Table 3-18.

Table 3-17. Summary of parameters that exceeded CCME guidelines and/or Mount Nansen EQS for the Victoria Creek sites for the Q1 period (April 1 to June 30, 2013).

Sampling Trip Date	WQ-VC-REF	WQ-VC-U	WQ-VC-DBC	WQ-VC-UMN	WQ-VC-R
Apr 17-19, 2013	Al, Cd	Al, Cd	Al, Cd	Al, Cd	Al, Cd
May 6-8, 2013	Al, Cd	Al, Cd	Al, Cd	Al, Cd	Al, Cd
May 15-17, 2013	TSS, Al, Cd, Cr, Cu, Fe, Pb	TSS, Al, As, Cd, Cr, Cu, Fe, Pb	TSS, Al, As, Cd, Cr, Cu, Fe, Pb, Zn	Al, As, Cd, Cr, Cu, Fe, Pb	Al, Cd, Cu, Fe, Pb
May 21-23, 2013	Al, Cd, Cr, Cu, Fe, Pb	Al, Cd, Cr, Cu, Fe, Pb	TSS, Al, As, Cd, Cr, Cu, Fe, Pb	Al, Cd, Cr, Cu, Fe, Pb	Al, Cd, Cu, Fe, Pb
May 27-29, 2013	TSS, Al, As, Cd, Cr, Cu, Fe, Pb, Zn	TSS, Al, As, Cd, Cr, Cu, Fe, Pb	TSS, Al, As, Cd, Cr, Cu, Fe, Pb, Zn	TSS, Al, As, Cd, Cr, Cu, Fe, Pb	pH, TSS, Al, As, Cd, Cr, Cu, Fe, Pb, Zn
Jun 10-12, 2013	Al, Cd, Fe	Al, Cd, Fe	Al, Cd, Fe	Al, Cd, Fe	Al, Cd, Cu, Fe
Jun 24-26, 2013	Al, Cd, Cr, Cu, Fe, Pb	Al, Cd, Cr, Cu, Fe, Pb	Al, Cd, Cr, Cu, Fe, Pb	Al, Cd, Cr, Cu, Fe, Pb	Al, Cd, Cr, Cu, Fe, Pb

Table 3-18. *In situ* water quality data for sites within the Victoria Creek watershed for the Q1 period (April 1 to June 30, 2013).

Site ID	Trip Date	Water Temp (°C)	Specific Conductivity (µS/cm)	pH	Turbidity (NTU)
WQ-VC-DBC	16-Apr-13	0.0	251.8	6.86	0.68
WQ-VC-DBC	7-May-13	0.0	211.5	7.22	3.10
WQ-VC-DBC	16-May-13	0.9	63.9	6.84	102.00
WQ-VC-DBC	22-May-13	0.2	119.0	7.45	37.90
WQ-VC-DBC	28-May-13	6.1	50.7	7.06	56.50
WQ-VC-DBC	11-Jun-13	4.6	138.5	7.46	6.93
WQ-VC-DBC	25-Jun-13	7.9	189.1	7.41	27.9
WQ-VC-R+100	17-Apr-13	0.0	275.0	6.77	0.18
WQ-VC-R+100	8-May-13	0.0	401.2	7.22	1.86
WQ-VC-R+100	16-May-13	0.0	79.2	6.57	14.25
WQ-VC-R	22-May-13	0.0	147.3	6.66	9.73
WQ-VC-R	28-May-13	2.4	64.3	6.06	61.70
WQ-VC-R	11-Jun-13	4.0	162.0	7.44	8.79
WQ-VC-R	25-Jun-13	8	235.7	7.25	52.2
WQ-VC-REF	17-Apr-13	0.0	251.4	6.97	0.35
WQ-VC-REF	7-May-13	0.0	207.0	7.28	1.52
WQ-VC-REF	16-May-13	1.1	50.8	6.84	28.90
WQ-VC-REF	22-May-13	2.4	106.7	7.42	13.29
WQ-VC-REF	28-May-13	5.9	47.0	7.05	46.40
WQ-VC-REF	11-Jun-13	5.1	128.0	7.57	11.08

Site ID	Trip Date	Water Temp (°C)	Specific Conductivity (µS/cm)	pH	Turbidity (NTU)
WQ-VC-REF	25-Jun-13	10.9	178.5	7.59	23.3
WQ-VC-U	17-Apr-13	0.0	245.2	6.76	0.59
WQ-VC-U	7-May-13	0.0	207.6	7.20	1.63
WQ-VC-U	16-May-13	0.9	60.0	6.79	27.40
WQ-VC-U	22-May-13	0.1	114.1	7.49	17.73
WQ-VC-U	28-May-13	6.1	47.5	7.03	39.90
WQ-VC-U	11-Jun-13	4.5	128.5	7.47	6.20
WQ-VC-U	25-Jun-13	7.9	177.5	7.37	24.1
WQ-VC-UMN	16-Apr-13	0.0	279.9	6.70	0.37
WQ-VC-UMN	7-May-13	0.0	486.9	6.95	2.46
WQ-VC-UMN	16-May-13	0.0	91.2	6.86	20.20
WQ-VC-UMN	22-May-13	0.0	165.7	7.53	10.83
WQ-VC-UMN	28-May-13	3.1	72.2	6.83	60.50
WQ-VC-UMN	11-Jun-13	4.5	185.1	7.46	5.82
WQ-VC-UMN	25-Jun-13	7.8	252	7.67	30.4

3.3.5 Back Creek

The Back Creek site was sampled during five sampling events over the Q1 period, starting on the May 15-17, 2013 sampling trip and continuing through to the June 24-26, 2103 trip. Each trip consistently had exceedances for TSS, Al, As, Cd, Cr, Cu, Fe, Pb, and Zn (Table 3-19). Exceedances for Hg and Mn were also common. There was an exception however with the June 24-26, 2013 trip where only the concentrations of Al and Cd exceeded the guideline, and this may be attributed to the low suspended sediments found during that period. Taking a look at the *in situ* turbidity values for the June 24-26, 2013 sampling event, turbidity was only 1.08 NTU compared to turbidity values ranging from 53.3 NTU to 783.0 NTU for the other sampling events (Table 3-20) where there were guideline exceedances of additional parameters. See Table 3-19 for a summary of guideline exceedances for the WQ-BC site and Table 3-20 for a summary of *in situ* water quality results.

Table 3-19. Summary of parameters that exceeded CCME guidelines and/or Mount Nansen EQS for WQ-BC for the Q1 period (April 1 to June 30, 2013).

Sampling Trip Date	WQ-BC
Apr 17-19, 2013	-
May 6-8, 2013	-
May 15-17, 2013	TSS, Al, As, Cd, Cr, Cu, Fe, Pb, Mn, Hg, Zn
May 21-23, 2013	TSS, Al, As, Cd, Cr, Cu, Fe, Pb, Mn, Hg, Zn
May 27-29, 2013	TSS, Al, As, Cd, Cr, Cu, Fe, Pb, Mn, Zn
Jun 10-12, 2013	TSS, Al, As, Cd, Cr, Cu, Fe, Pb, Zn
Jun 24-26, 2013	Al, Cd

Table 3-20. I*n situ* water quality data for the Back Creek site for the Q1 period (April 1 to June 30, 2013).

Site ID	Trip Date	Water Temp (°C)	Specific Conductivity (µS/cm)	pH	Turbidity (NTU)
WQ-BC	16-May-13	2.8	64.8	7.06	783.0
WQ-BC	22-May-13	3.4	114.6	7.60	198.0
WQ-BC	28-May-13	7.0	86.5	7.28	346.0
WQ-BC	11-Jun-13	6.7	206.8	7.77	53.3
WQ-BC	25-Jun-13	14.9	310.4	8.02	1.1

3.3.6 Minnesota Creek

Minnesota Creek was sampled during five sampling events over the Q1 period, starting on the May 15-17, 2013 sampling trip and continuing through to the June 24-26, 2103 trip. Each sampling event consistently had exceedances for Al, Cd, Cu, and Fe, in addition to pH, TSS and Cr in some instances. See the summary table below for each sampling trip (Table 3-21). *In situ* water quality parameters for each trip are summarized in Table 3-22.

Table 3-21. Summary of parameters that exceeded CCME guidelines and/or Mount Nansen EQS for WQ-MN for the Q1 period (April 1 to June 30, 2013).

Sampling Trip Date	WQ-MN
Apr 17-19, 2013	-
May 6-8, 2013	-
May 15-17, 2013	pH, Al, Cd, Cr, Cu, Fe
May 21-23, 2013	pH, Al, Cd, Cu, Fe
May 27-29, 2013	pH, TSS, Al, Cd, Cr, Cu, Fe
Jun 10-12, 2013	TSS, Al, Cd, Cr, Cu, Fe
Jun 24-26, 2013	Al, Cd, Cu, Fe,

Table 3-22. *In situ* water quality data for the WQ-MN site for the Q1 period (April 1 to June 30, 2013).

Site ID	Trip Date	Water Temp (°C)	Specific Conductivity (µS/cm)	pH	Turbidity (NTU)
WQ-MN	17-May-13	0.0	25.4	6.32	11.98
WQ-MN	22-May-13	0.0	47.0	6.48	7.26
WQ-MN	28-May-13	0.6	45.8	6.38	26.30
WQ-MN	11-Jun-13	2.0	41.6	6.88	23.10
WQ-MN	25-Jun-13	4.5	84.5	6.32	11.08

3.3.7 Pony Creek and Adit Seep

Pony Creek was sampled at two sites, WQ-PC-D and WQ-PC-U. Samples were collected from May 15-17, 2013 onwards for the downstream site and from May 6-8, 2013 onwards for the upstream site. The WQ-ADIT-SEEP was also included in the investigation, and it was sampled from May 15-17, 2013 until June 10-12, 2013. The WQ-ADIT-SEEP was not sampled during the June 24-26, 2013 trip as the site was dry. This also coincided with Pony Creek flowing underground between the WQ-PC-U and WQ-PC-D sites during that trip only to reappear at the surface immediately at the WQ-PC-D site. Conditions in late June were very dry and streamflow across the Mount Nansen site were at low levels.

All sites consistently had exceedances Al, Cd, and Cu on every sampling event. Both Pony Creek sites also exceedances for As, Fe, Pb, Zn on occasion. The Adit Seep site an exceedance of Cr only on the June 10-12, 2013. See Table 3-23 for a summary of guideline exceedances for the Pony Creek and Adit Seep sites. *In situ* water quality parameters for each trip are summarized in Table 3-24.

Following a comparison of both chemical lab analysis and *in situ* parameters for the Pony Creek sites and the WQ-ADIT-SEEP site, EDI believes that the Adit Seep water is likely water from Pony Creek. The lower portion of Pony Creek was historically covered by a waste rock pile during the period when the mine was active, and this may have altered flow patterns, causing Pony Creek to branch into different channels, particularly during high flows. Furthermore, the WQ-ADIT-SEEP site also does not display typical qualities of a groundwater seep, as specific conductivities are low and similar to the surface water of Pony Creek.

Table 3-23. Summary of parameters that exceeded CCME guidelines and/or Mount Nansen EQS for the Pony Creek sites and the WQ-ADIT-SEEP for the Q1 period (April 1 to June 30, 2013).

Sampling Trip Date	WQ-PC-U	WQ-PC-D	WQ-ADIT-SEEP
Apr 17-19, 2013	-	-	-
May 6-8, 2013	Al, As, Cd, Cr, Cu, Fe, Pb, Zn	-	-
May 15-17, 2013	Al, Cd, Cu	Al, As, Cd, Cu, Fe, Pb, Zn	Al, Cd, Cu
May 21-23, 2013	Al, Cd, Cu	Al, Cd, Cu, Pb	Al, Cd, Cu
May 27-29, 2013	Al, Cd, Fe	Al, Cd, Cu, Fe	Al, Cd, Cu
Jun 10-12, 2013	Al, Cd	Al, Cd, Cu	Al, Cd, Cr, Cu
Jun 24-26, 2013	Al, Cd	Al, As, Cd, Cu, Pb, Zn	-

Table 3-24. *In situ* water quality data for sites within the Pony Creek watershed for the Q1 period (April 1 to June 30, 2013).

Site ID	Trip Date	Water Temp (°C)	Specific Conductivity (µS/cm)	pH	Turbidity (NTU)
WQ-PC-D	17-May-13	0.0	74.5	6.80	2.34
WQ-PC-D	22-May-13	1.7	105.3	7.25	13.92
WQ-PC-D	28-May-13	3.1	90.8	7.08	1.82
WQ-PC-D	12-Jun-13	2.8	207.0	7.27	2.23

Site ID	Trip Date	Water Temp (°C)	Specific Conductivity (µS/cm)	pH	Turbidity (NTU)
WQ-PC-D	25-Jun-13	6.0	411.1	6.9	4.60
WQ-PC-U	7-May-13	0.0	265.9	7.27	157.00
WQ-PC-U	17-May-13	0.0	64.8	6.67	16.69
WQ-PC-U	28-May-13	1.0	89.6	7.08	2.34
WQ-PC-U	12-Jun-13	1.6	190.8	7.24	1.26
WQ-PC-U	25-Jun-13	8.6	391.8	7.01	2.35
WQ-ADIT-SEEP	17-May-13	0.1	68.8	6.89	1.00
WQ-ADIT-SEEP	22-May-13	1.8	112.2	7.80	2.38
WQ-ADIT-SEEP	28-May-13	2.5	88.0	7.03	1.91
WQ-ADIT-SEEP	12-Jun-13	2.1	196.5	7.51	1.11

3.3.8 Pump House Well

The pump house well was sampled during every visit of the Q1 period. Bacteriological samples were collected during each trip, while drinking water package samples were only collected on a monthly basis. *In situ* water quality parameters for each trip are summarized in Table 3-25.

Bacteriological samples were collected and analyzed following each trip for total coliforms and E. coli. There was one exception during the May 15-17, 2013 trip where the sample could not be accepted by the lab due to holding times, as the sample was collected on a Friday and the lab does not accept samples on Fridays. In all cases total coliforms and E. coli were absent from the samples.

Chemical analysis of drinking water samples took place on April 17, 2013, June 12, 2013, and May 29, 2013. Chemical analysis drinking water package found no exceedances.

Table 3-25. *In situ* water quality data for the pump house well site for the Q1 period (April 1 to June 30, 2013)..

Site ID	Trip Date	Water Temp (°C)	Specific Conductivity (µS/cm)	pH	Turbidity (NTU)
WQ-PW	18-Apr-13	1.0	431.9	7.20	0.00
WQ-PW	17-May-13	0.6	385.1	7.33	0.00
WQ-PW	23-May-13	1.1	406.3	7.02	0.72
WQ-PW	29-May-13	2.0	433.2	6.42	0.31
WQ-PW	12-Jun-13	1.7	420.8	7.35	0.39
WQ-PW	26-Jun-13	1.5	411.8	70.7	0.19

3.3.9 Dry Creek Reference Site

The Dry Creek reference site was sampled on one occasion during the Q1 period, on the June 10-12, 2013 visit. Aluminum was the only exceedance based on the lab analysis. *In situ* water quality parameters for each trip are summarized in Table 3-26.

Table 3-26. *In situ* water quality data for the Dry Creek reference site well site for the Q1 period (April 1 to June 30, 2013).

Site ID	Date	Water Temp (°C)	Specific Conductivity (µS/cm)	pH	Turbidity (NTU)
WQ-DRY	12-Jun-13	0.9	322.8	7.53	0.5

3.3.10 QA/QC Program

Field blank and travel blank samples were included on every trip during the Q1 investigation period. Duplicate samples were also collected during each sampling event, with one duplicate collected during the April 17, 2013 trip and two duplicates collected at each subsequent trip. Table 3-27 summarizes the sample trip dates and sites where duplicate samples were collected.

All field blank and travel blank samples had did not exceed quality control guidelines and did not appear to be contaminated through field sampling methodologies, transportation or storage.

Duplicate 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. Since most of these larger percent differences included TSS, it is suspected that these differences are attributed to a high degree of natural variability as the sampling took place during the spring period, when water levels and suspended sediment loads are high, and natural variability over often minute timescales can fluctuate frequently. Also since suspended sediments are often associated with contaminants that bind to sediment particles, there can also be large fluctuations in other parameters, as was also often the case. See Appendix E for parameters that were flagged as +/-10%.

Table 3-27. Summary of sites randomly selected as duplicate samples for each sampling trip over the first quarter monitoring period.

Sampling Trip Date	Duplicate #1	Duplicate #2
April 15-17, 2013	WQ-VC-DBC-r	-
May 6-8, 2013	WQ-DC-DX+105-r	WQ-VC-R-r
May 15-17, 2013	WQ-VC-DBC-r	WQ-SEEP-r
May 21-23, 2013	WQ-SEEP-r	WQ-VC-U-r
May 27-29, 2013	WQ-PC-D-r	WQ-DC-U-r
June 10-12, 2013	WQ-VC-UMN-r	WQ-DC-DX-r
June 24-26, 2013	WQ-VC-UMN-r	WQ-PC-U-r

4 RECOMMENDATIONS

Based on results of the first quarter of the Mount Nansen Water Resources Investigations Program from April 1, 2013 to June 30, 2013, EDI recommends that monitoring should continue as scheduled with added consideration of several recommendations outlined below. These recommendations are geared towards improving the overall program data quality and efficiency.

- Hydrometric stations at H-DC-U1 and H-DC-U2 shall remain active, but should be considered for exclusion from hydrometric measurements. Ice accumulation and 'glaciation' over the winter period make gauging within the upper dome creek complex and unpredictable through the early- and late-open water periods.

- 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.

- Remove the weir structure from H-PC-U station and re-locate to H-DC-DX+105. The weir may function throughout the winter low-flow period and provide more robust station discharge data compared to salt tracer methods currently used. However, the weir should remain at or near H-PC-U if the structure can be re-installed in a more appropriate location.

- Remove the WQ-ADIT-SEEP site from the monitoring program. The water originating from the so-called 'seep' appears to be a portion of flow from Pony Creek that bypasses the culvert and flows through the rocks on the left downstream bank during high flows. Both the metal concentrations and the specific conductivities of the water from the WQ-ADIT-SEEP site are consistent with those of Pony Creek versus what is typical of groundwater seeps at the Mount Nansen site.

- Remove the WQ-MS-S-08 mill seep site from the monitoring program since seep appears to be no longer active as conditions during the Q1 quarter did not allow for sampling. If seepage water is identified as visible and flowing in the vicinity of WQ-MS-S-08, one-time samples may be collected to verify the seepage water chemistry.

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5.1 SPATIAL DATA

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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.

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APPENDIX A Q1 SITE AND STATION PHOTOGRAPHS

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Dome Creek Sites/Stations

Photo 1. H/WQ-DC-DX (Looking upstream).

Photo 2. H/WQ-DC-DX+105 (looking upstream)

Photo 3. H/WQ-DC-D1b (looking upstream).

Photo 4. H/WQ-DC-U1 (looking downstream).

Photo 5. H/WQ-DC-U2 (looking upstream).

Photo 6. H-DC-B (looking downstream).

Photo 7. H-DC-M/WQ-DC-U (looking upstream).

Photo 8. H-DC-R (looking downstream)

Photo 9. WQ-DC-R (looking upstream).

Victoria Creek Sites/Stations

Photo 1. H-VC-REF (looking upstream).

Photo 2. WQ-VC-REF (looking downstream).

Photo 3. H-VC-U (looking upstream).

Photo 4. WQ-VC-U (looking downstream).

Photo 5. H-VC-DBC (looking upstream).

Photo 6. WQ-VC-DBC (looking upstream).

Photo 7. H/WQ-VC-UMN (looking upstream).

Photo 8. H-VC-R (looking downstream).

Photo 9. WQ-VC-R site (looking upstream).

Pony Creek Sites/Stations

Photo 1. H-PC-U (looking upstream).

Photo 2. WQ-PC-U (looking downstream towards culvert inlet).

Photo 3. H-PC-DSP (looking upstream towards culvert outlet).

Photo 4. WQ-PC-D (looking downstream).

Minnesota Creek and Back Creek

Photo 1. H-MN (looking downstream).

Photo 2. WQ-MN (looking downstream).

Photo 3. H/WQ-BC (looking upstream).

Dry Creek Reference Site & Pump House Well Site

Photo 1. WQ-DRY (looking downstream).

Photo 2. WQ-PW.

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 first quarter period, April 1st to June 30th, 2013.

Station/Site Name	Apr 17, 2013	May 6-8, 2013	May 15-17, 2013	May 22-24, 2013	May 28-30, 2013	Jun 10-12, 2013	Jun 24-26, 2013
H-PC-U/WQ-PC-U	N_f	Y_w	Y	Y	Y	Y	Y
H-PC-DSP/WQ-PC-D	N_f	Y_h	Y	Y	Y	Y	Y
H-DC-DX/WQ-DC-DX	N_f	N_f	Y	Y	Y	Y	Y
H-DC-DX+105/WQ-DC-DX+105	N_{ns}	Y_w	Y	Y	Y	Y	Y
H-DC-D1/WQ-DC-D1	N_f	N_f	N_f	N_f	Site/Station dropped from program		
H-DC-D1b/WQ-DC-D1b	N_f	N_f	N_f	N_f	Y	Y	Y
H-DC-U1/WQ-DC-U1	N_f	N_f	N_f	N_f	Y_w	Y_w	Y
H-DC-U2/WQ-DC-U2	N_f	N_f	N_f	Yw	Y	Y	Y
H-DC-B	N_{ns}	Y	Y	Y	Y	Y	Y
H-DC-M/WQ-DC-U	Y	Y_w	Y	Y	Y	Y	Y
H-DC-R/WQ-DC-R	N_f	N_f	N_{ns}	N_{ns}	Y_w	Y	Y
H-SEEP/WQ-SEEP	Y	Y	Y	Y	Y	Y	Y
H-TP/WQ-TP	Y	Y_w	Y_w	Y_w	Y_w	Y	Y
WQ-PIT-1,2,3	Y	n/a	n/a	N_{ns}	N_{ns}	Y	N_{ns}
WQ-MS-S-03	Y	N_f	Y	Y	Y	Y	Y
WQ-MS-S-08	N_f	N_f	N_{ns}	N_{ns}	dry	dry	dry
WQ-ADIT-SEEP	N_f	N_f	Y	Y	Y	Y	dry
H-BC/WQ-BC	N_f	N_{ns}	Y	Y	Y	Y	Y
H-MN/WQ-MN	N_f	N_{ns}	Y	Y	Y	Y	Y
H-VC-REF/WQ-VC-REF	Y	Y_w	Y	Y	Y	Y	Y
H-VC-U/WQ-VC-U	Y	Y	Y	Y	Y	Y	Y
H-VC-DBC/WQ-VC-DBC	Y	Y	Y	Y	Y	Y	Y
H-VC-UMN/WQ-VC-UMN	Y	Y	Y	Y	Y	Y	Y
H-VC-R/WQ-VC-R	Y	Y	Y	Y	Y	Y	Y
WQ-PW	Y	Y	n/a	Y	Y	Y	Y
WQ-DRY	n/a	n/a	n/a	n/a	n/a	Y	N

Codes
N_f – site or station frozen to substrate (no sample or measurement collected)
N_{ns} – site or station conditions not suitable for sampling or measurements
Y – water sampling conducted/discharge measurement collected
Y_w – water quality only
Y_h – hydrology only
n/a – not applicable (not required at this time)

APPENDIX C Q1 EDI FIELD DATA SHEETS

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Project #: 13-Y-0
Project Name: Mount Nansen Surface Water - Hydrology

EDI ENVIRONMENTAL DYNAMICS INC.

Weather: O, -9°C

PC-

HID	H-DX+105	Date (dd.mmm.yy)	15-APR-2015	Discharge Measurement Instruments + Methods	
Station Name	Dome Creek DX+105	Q Measurement Start Time (HH:MM)	N/A PDT | PST	YSI | SWOFFER | PYGMY | ADV	MID-SECT. | POINT
		Q Measurement End Time (HH:MM)	n/a PDT | PST	SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time (HH:MM)	n/a PDT | PST	Channel Conditions	
		Logger Depth Reading (m)	n/a [ ] downloaded	NONE | ICE | BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP. SED.	

Water Level Logger	Serial # N/A	HOBO | Solinst | N/A	GPS waypoint	elevation	easting / northing
Photo #	[U/S] 6654	[D/S] 6653	[RDB] 6655	[LDB] 6656	[STAFF/WEIR] n/A

Site Comments

Snow + ice covered channel. Ice to bed along margins, and 5cm thick in channel. Flow rate very slow, Salt slug did not work, peak was very low and slow to go up. Appeared that channel was likely flowing through snow + slush.

Channel Measurements

Staff Gauge Height (m)	
Weir Head (m)	
Water Temperature (°C)	
Water Surface Slope (%)	
Average Width (m)	
Average Depth (m)	

Measurement Summary	Primary (e.g. ADV)	Secondary (e.g. salt)
Measurement Type [ADV, SS,V , W]	SALT	
Average Discharge (m^3/s)		
Discharge Meas. Accuracy +/- [%]		
Average Velocity (m/s)		
Cross-Sectional Area (m^2)		

Salt Tracer — SLUG | CONSTANT RATE | DRY | LOGGED | MANUAL | EC | CF.T YES | NO

Trial | Time (HH:MM)	Background EC | EC Peak EC_n(uS/cm) | EC_{pk}(uS/cm)	Mix Length L_m (m)	Mass of Salt Ms_a (kg)	Mix Vol. Volume (L)	Conc. Salt Slug Css (kg/L)
1 (18:20)	1208 | ____	17	0.05	10 L	~~0.00~~ 0.05 g/L
2 (:)	____ | ____				
3 (:)	____ | ____				
Csec (g/L)			SPC | Temp	____ | ____	____ | ____
SPC_o Calib. Tank (uS/cm)			____ | ____	____ | ____	____ | ____
Vol. Calib. Tank (L)			____ | ____	____ | ____	____ | ____
Vol Sec Mix (mL) Added:			____ | ____	____ | ____	____ | ____
CF.T =			____ | ____	____ | ____	____ | ____
Qsalt =			____ | ____	____ | ____	____ | ____

Volumetric

	[1]	[2]	[3]	[4]	[5]
Volume (L) =					
Time (sec)					
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Float (not reported)

	[1]	[2]	[3]	[4]	[5]
Distance (m) =					
Time (sec)					
Average v (m/s) =					
** Collect v_{avg} & w_{avg}	Average Velocity (m/s) =		Est. Meas. Error %		

Hydrometric Levels - Survey

YES | NO | REASON: NOT A CONTINUOUS STN. Survey Time (HH:MM): (WATER) BM Shift: Yes| No Logger Shift: Yes| No Staff Gauge Shifted?: Yes| No

Survey Circuit 1	Height of Instrument (m)	Rod (+/- 0.003 m)	Elevation (m)	±0.003	Survey Circuit 2	Height of Instrument (m)	Rod (+/- 0.003 m)	Elevation (m)	Station Measurements
Station	A	B	C		Station	A	B	C	Inside Well (m)
BM1	A = B + C		3.000		BM1	A = B + C		3.000	Outside Well (m)
BM2			A-B =		BM2			A-B =	TOS to TOP (m)
BM3			A-B =		BM3			A-B =	Bolt to TOP (m)
TOS			A-B =		TOS			A-B =	Sensor to Bolt (m)
WATER			A-B=		WATER			A-B=	Bed to Bolt (m)
CONTROL			A-B=		CONTROL			A-B=	Sensor to Bed (m)
HWM			A-B=		HWM			A-B=	

MID = 705

Field Staff: MM, CL
Data Entry By: ____ **Date:** ____
Reviewed By: ____ **Date:** ____

Project #: 13-Y-01
Project Name: Mount Nansen Surface Water - Hydrology

ENVIRONMENTAL DYNAMICS INC.

20 500

150 g/L

Weather: Sun, -9°C

HID	H-DC-M	Date (dd.mmm.yy)	15.APR.13	Discharge Measurement Instruments + Methods	
Station Name	Dome Creek Middle	Q Measurement Start Time (HH:MM)	16:18 PDT | PST	YSI | SWOFFER | PYGMY | ADV	MID-SECT. | POINT
		Q Measurement End Time (HH:MM)	17:00 PDT | PST	SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time (HH:MM)	- PDT | PST	Channel Conditions	
		Logger Depth Reading (m)	-0.3506 [ ] downloaded	NONE | ICE | BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP. SED.	

Water Level Logger	Serial # 1050018	HOBO | Solinst | N/A	GPS waypoint	elevation	easting	northing
Photo #	[U/S] 1748	[D/S] 1749	[RDB] 1750	[LDB] 1751	[STAFF/WEIR] 1752	

Site Comments

V_1 = 1 g/L = 1 g / 150 g/L

V = 66.7 mL

See Joel's notes

SITE HAD BEEN AFFECTED by maintenance from DES upstream in Diversion Channel. Overflow ie downstream. 11988/40K readings.

Channel Measurements

Staff Gauge Height (m)	
Weir Head (m)	
Water Temperature (°C)	
Water Surface Slope (%)	
Average Width (m)	
Average Depth (m)	

ement Summary	Primary (e.g. ADV)	Secondary (e.g. salt)
Measurement Type (ADV, SS,V , W)	SALT	
Average Discharge (m^3/s)		
Discharge Meas. Accuracy +/- [%]		
Average Velocity (m/s)		
Cross-Sectional Area (m^2)		

SLUG | CONSTANT RATE | DRY | LOGGED | MANUAL | SPC | EC | CF.T YES | NO

Salt Tracer	Trial | Time (HH:MM)	Background EC | EC Peak	Mix Length	Mass of Salt	Mix Vol.	Conc. Salt Slug
		SPC_o(uS/cm) | SPC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
	1 (16:18)	1598 | 2599	~40	0.3	20	0.15
	2 (16:27)	1607 | 2619	~40	0.3	20	0.15
	3 (:)	|				
	Csec (g/L)	1 g/L		SPC | Temp	1920 | 0.8	2328 | 0.8
	SPC_o Calib. Tank (uS/cm)	1644	35 mL	1487 | 0.8	1960 | 0.8	2162 | 0.8
	Vol. Calib. Tank (L)	1L	30 mL	1338 | 0.9	1998 | 0.8	2398 | 0.9
	Vol Sec Mix (mL) Added:	~~30~~	30 mL	1434 | 0.8	2934 | 0.8	|
	CF.T =	0.0003211	30 mL	1833 | 0.8	4069 | 0.8	|
	Qsalt =	4.0×10^{-4} m^3/s	30 mL	1878 | 0.8	2101 | 0.8	|
Volumetric	Volume (L) =					
	Time (sec)	[1]	[2]	[3]	[4]	[5]
	Average Q (L/s) =					
	Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		
Float (not reported)	Distance (m) =					
	Time (sec)	[1]	[2]	[3]	[4]	[5]
	Average v (m/s) =					
	** Collect v_{avg} & w_{avg}	Average Velocity (m/s) =		Est. Meas. Error %		

* Bagged

Hydrometric Levels - Survey

YES | NO REASON: NO WINTER LOGGER — Survey Time (HH:MM): (WATER) — BM Shift: Yes \| No — Logger Shift: Yes \| No — Staff Gauge Shifted?: Yes \| No

Survey Circuit 1	Height of Instrument (m)	Rod (+/- 0.003 m)	Elevation (m)	±0.003	Survey Circuit 2	Height of Instrument (m)	Rod (+/- 0.003 m)	Elevation (m)	Station Measurements	
Station	A	B	C		Station	A	B	C	Inside Well (m)	
BM1	A = B + C		3.000		BM1	A = B + C		3.000	Outside Well (m)	
BM2			A-B =		BM2			A-B =	TOS to TOP (m)	
BM3			A-B =		BM3			A-B =	Bolt to TOP (m)	
TOS			A-B =		TOS			A-B =	Sensor to Bolt (m)	
WATER			A-B=		WATER			A-B=	Bed to Bolt (m)	
CONTROL			A-B=		CONTROL			A-B=	Sensor to Bed (m)	
HWM			A-B=		HWM			A-B=		

MID = 706

* tried to buy salt but failed transfer. Started CF.T test.

Field Staff: MM, JM, CL, DS
Data Entry By: CL Date: 22/04/2013
Reviewed By: Date:

Project #: 13-Y-0
Project Name: Mount Nansen Surface Water - Hydrology

Weather: C / Sndy, -2°C

HID	VC-REF	Date (dd.mmm.yy)	16.04.13	Discharge Measurement Instruments + Methods	
Station Name	Victoria Creek Reference	Q Measurement Start Time (HH:MM)	18:02 PDT | PST	(YSI) | SWOFFER | PYGMY | ADV	MID-SECT. | POINT
		Q Measurement End Time (HH:MM)	19:30 (PDT) | PST	SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time (HH:MM)	n/a - PDT | PST	Channel Conditions	
		Logger Depth Reading (m)	n/a - [ ] downloaded	NONE | (ICE) | BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP. SED.	

Water Level Logger	Serial # None	HOBO | Solinst | N/A	GPS waypoint	elevation	easting / northing
Photo #	[U/S] 6686-87	[D/S] 6684-89	[RDB] 6690	[LDB] 6691	[STAFF/WEIR] n/a

Site Comments

10 mL added to Csec.
Site still ice + snow covered.

Salt Tracer — 10mL collected from 35

(SLUG) \| CONSTANT RATE \| DRY (LOGGED) \| MANUAL (SPC) \| EC (CF.T YES) \| NO

Trial | Time (HH:MM)	Background EC | EC Peak	Mix Length	Mass of Salt	Mix Vol.	Conc. Salt Slug
	EC_0(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_s (kg)	Volume (L)	Css (kg/L)
1 (18:02)	217.0 | 308.5	70	2	20	1.1g/L
2 (18:47)	218.6 | 312.1	70	2	20	0.11
3 (:)	|				
Csec (g/L)	1 g/L		SPC | Temp		
SPC_0 Calib. Tank (uS/cm)	234.5		331.4 | 0.0		
Vol. Calib. Tank (L)	1 L		335.3 | 0.0		
Vol Sec Mix (mL) Added:	15mL Sec	15 / 15	316.1 | 0.0		
CF.T =	3.91×10^{-6}		352.5 | 0.0		
Qsalt =	8.0×10^{-2} m³/s				

Channel Measurements

Staff Gauge Height (m)	n/a
Weir Head (m)	—
Water Temperature (°C)	0.0
Water Surface Slope (%)	—
Average Width (m)	—
Average Depth (m)	—

Volumetric

Volume (L) =	
Time (sec)	[1] [2] [3] [4] [5]
Average Q (L/s) =	
Avg. Q_{vol} (L/s) =	Avg Q_{vol} (m^3/s) =

Float (not reported)

Distance (m) =	
Time (sec)	[1] [2] [3] [4] [5]
Average v (m/s) =	
** Collect v_{avg} & w_{avg}	Average Velocity (m/s) = Est. Meas. Error %

ement Summary	Primary (e.g. ADV)	Secondary (e.g. salt)
Measurement Type (ADV, SS,V, W)	SALT	
Average Discharge (m^3/s)		
Discharge Meas. Accuracy +/- [%]		
Average Velocity (m/s)		
Cross-Sectional Area (m^2)		

Hydrometric Levels - Survey

YES (NO) REASON: NO WINTER LOGGER

Survey Time (HH:MM): (WATER) BM Shift: Yes\| No Logger Shift: Yes\| No Staff Gauge Shifted?: Yes\| No

Survey Circuit 1	Height of Instrument (m)	Rod (+/- 0.003 m)	Elevation (m)	±0.003	Survey Circuit 2	Height of Instrument (m)	Rod (+/- 0.003 m)	Elevation (m)	Station Measurements	
Station	A	B	C		Station	A	B	C	Inside Well (m)	
BM1	A = B + C		3.000		BM1	A = B + C		3.000	Outside Well (m)	
BM2			A-B =		BM2			A-B =	TOS to TOP (m)	
BM3			A-B =		BM3			A-B =	Bolt to TOP (m)	
TOS			A-B =		TOS			A-B =	Sensor to Bolt (m)	
WATER			A-B=		WATER			A-B=	Bed to Bolt (m)	
CONTROL			A-B=		CONTROL			A-B=	Sensor to Bed (m)	
HWM			A-B=		HWM			A-B=		

MID = 707

Field Staff: CL / MM
Data Entry By: CL Date: 22/04/2013
Reviewed By: Date:

Project #: 13-Y-C
Project Name: Mount Nansen Surface Water - Hydrology

Weather: Overc, -2°C

150
186
375

HID	H-VEU	Date (dd.mmm.yy)	16-APR-13	Discharge Measurement Instruments + Methods	
Station Name	Victoria Creek Upper	Q Measurement Start Time (HH:MM)	15:59 PDT | PST	YSI | SWOFFER | PYGMY | ADV	MID-SECT. | POINT
		Q Measurement End Time (HH:MM)	17:09 PDT | PST	SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time (HH:MM)	15:53 PDT | PST	Channel Conditions	
		Logger Depth Reading (m)	-6.234 downloaded	NONE | ICE | BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP. SED.	

Water Level Logger	Serial # 1049522	BATT: 100% HOBO | Solinst | N/A	T = 0.950	GPS waypoint	elevation	easting	northing
Photo #	[U/S] 6681	[D/S] 6682	[RDB] 6683	[LDB] 6684	[STAFF/WEIR] 6685		

Site Comments

Added 13mL to SS.
Ice ~ 1-15cm thick.
small amount of open water
conducted ADV, just u/s of stilling well.

Channel Measurements

Staff Gauge Height (m)	N/A
Weir Head (m)	N/A
Water Temperature (°C)	0.0
Water Surface Slope (%)	N/A
Average Width (m)	3.4
Average Depth (m)	0.158

ement Summary	Primary (e.g. ADV)	Secondary (e.g. salt)
Measurement Type (ADV, SS,V, WI)	ADV	SALT
Average Discharge (m^3/s)	0.0623	
Discharge Meas. Accuracy +/- [%]	3.7	
Average Velocity (m/s)	0.116	
Cross-Sectional Area (m^2)	0.536	

MID: 713 708

Salt Tracer — SLUG | CONSTANT RATE | DRY — LOGGED | MANUAL — SPC | EC — CF.T | YES | NO

Trial | Time (HH:MM)	Background EC | EC Peak	Mix Length	Mass of Salt	Mix Vol.	Conc. Salt Slug
	EC_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_o (kg)	Volume (L)	Css (kg/L)
1 (16:14)	250.0 | 396.1	60	1.5	20 L	0.075
2 (16:45)	251.8 | 701.7	80	1.5	20 L	0.075
3 (:)	|				
Csec (g/L)	1		SPC | Temp	386.8 | 0.0	|
SPC_o Calib. Tank (uS/cm)	187.7	0	187.7 | 0.0	412.0 | 0.0	|
Vol. Calib. Tank (L)	1	30	264.7 | 0.0	431.1 | 0.0	|
Vol Sec Mix (mL) Added:	~~15~~ 30 + 15mL	15	287.2 | 0.0	|	|
CF.T =	5.7×10^{-6}	15	317.6 | 0.0	|	|
Qsalt =	2.0×10^{-2} m^3/s	15	350.6 | 0.0	|	|

Volumetric

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Float (not reported)

Distance (m) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average v (m/s) =					
** Collect v_{avg} & w_{avg}	Average Velocity (m/s) =		Est. Meas. Error %		

Hydrometric Levels - Survey

YES | NO | REASON:

Survey Time (HH:MM): (WATER) 16:30 BM Shift: Yes | No Logger Shift: Yes | No Staff Gauge Shifted?: Yes | No

Survey Circuit 1	Height of Instrument (m)	Rod (+/- 0.003 m)	Elevation (m)	±0.003	Survey Circuit 2	Height of Instrument (m)	Rod (+/- 0.003 m)	Elevation (m)	Station Measurements	
Station	A	B	C		Station	A	B	C		
BM1	A = B + C	1.363	3.000		BM1	A = B + C	1.289	3.000	Inside Well (m)	
BM2		1.001	A-B = 3.362	0.001	BM2		0.928	A-B = 3.361	Outside Well (m)	
BM3	4.363	1.119	A-B = 3.244	0.001	BM3	4.289	1.046	A-B = 3.243	TOS to TOP (m)	
TOS		1.475	A-B = 2.888		TOS		1.401	A-B = 2.888	Bolt to TOP (m)	
WATER			A-B=		WATER			A-B=	Sensor to Bolt (m)	
CONTROL			A-B=		CONTROL			A-B=	Bed to Bolt (m)	
HWM			A-B=		HWM			A-B=	Sensor to Bed (m)	

MID = 708

Field Staff: MM, CL
Data Entry By: CL Date: 12/04/2013
Reviewed By: Date:

Project #: 13-Y-0
Project Name: Mo... Nansen Surface Water - Hydrology

416

TARGET: 381 µs/cm

Weather: P/ , 0°C

HID	H-VC-DBC	Date (dd.mmm.yy)	16-APR-2013	Discharge Measurement Instruments + Methods			
Station Name	Victoria Ck Downstream of Rock creek.	Q Measurement Start Time (HH:MM)	~13:45 PDT | PST	YSI | SWOFFER | PYGMY | ADV MID-SECT. | POINT			
		Q Measurement End Time (HH:MM)	14:30 PDT | PST	SALT-TRACER | WEIR | VOLUMETRIC | FLOAT | ROD			
		Logger Download/Inst Time (HH:MM)	14:11 - PDT | PST	Channel Conditions			
		Logger Depth Reading (m)	0.1183 - [ ] downloaded	T = -0.025	NONE | ICE | BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP. SED.		
Water Level Logger	Serial # 1049137	HOBO | Solinst | N/A		GPS waypoint	elevation	easting	northing
Photo #	[U/S] 6672	[D/S] 6673	[RDB] 6674	[LDB] 6675	[STAFF/WEIR] 6676		

Site Comments

Take 20 mL for SS. CF.T test T=0.0°C
*#3 trial is 2nd YSI installed 0.5m downstream recorded in folder 2. (14:02:43 = 14:02:49)
2nd YSI PRO2PLUS #1 (Erratic) YSI PRO2PLUS #2
SOME OPEN WATER. ICE ~ 2cm - 15cm THICK

Channel Measurements

Staff Gauge Height (m)	N/A ICE
Weir Head (m)	—
Water Temperature (°C)	0.0
Water Surface Slope (%)	N/A
Average Width (m)	7.90
Average Depth (m)	0.155

Measurement Summary	Primary (e.g. ADV)	Secondary (e.g. salt)
Measurement Type [ADV, SS,V, W]	ADV	Salt
Average Discharge (m^3/s)	0.0611	
Discharge Meas. Accuracy +/- [%]	7.2	
Average Velocity (m/s)	0.438	
Cross-Sectional Area (m^2)	0.139	

MID: 714 709

Salt Tracer ✓ | Volumetric X | Float (not reported) X

SLUG | CONSTANT RATE | DRY LOGGED | MANUAL SPC | EC CF.T YES | NO

Trial | Time (HH:MM)	Background EC | EC Peak	Mix Length	Mass of Salt	Mix Vol.	Conc. Salt Slug
	EC_n(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (13:47)	254.6 | 414.4	55	1 kg	20	0.05 | 50g
2 (14:05)	257.8 | 416.0	55	1 kg	20	0.05 | 50g
* 3 (14:05)	254.1 | 402.1	+2.5 m	"	"	" | "
Csec (g/L)	1		SPC | Temp	405.2 | -0.1	|
SPC_o Calib. Tank (uS/cm)	199.6	0	199.6 | -0.1	403.0 | -0.1	|
Vol. Calib. Tank (L)	1	15m	290.7 | -0.1	|	|
Vol Sec Mix (mL) Added:	15mL	15m	314.5 | -0.1	|	|
CF.T =	7.41×10^{-6} ~~4.99×10^{-6}~~	15m	246.2 | -0.1	|	|
Qsalt =	3.0×10^{-2} m^3/s	15m	375.2 | -0.1	|	|
Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		
Distance (m) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average v (m/s) =					
** Collect v_{avg} & w_{avg}	Average Velocity (m/s) =		Est. Meas. Error %		

Hydrometric Levels - Survey

YES | NO | REASON:

Survey Time (HH:MM): (WATER) 14:30 BM Shift: Yes No Logger Shift: Yes No Staff Gauge Shifted?: Yes No

Survey Circuit 1	Height of Instrument (m)	Rod (+/- 0.003 m)	Elevation (m)	±0.003	Survey Circuit 2	Height of Instrument (m)	Rod (+/- 0.003 m)	Elevation (m)	Station Measurements	
Station	A	B	C		Station	A	B	C		
BM1	A = B+C 4.554	1.553	3.000	0	BM1	A = B+C 4.542	1.542	3.000	Inside Well (m)	
BM2		1.527	A-B = 3.027	0.001	BM2		1.514	A-B = ~~1.514~~ 3.028	Outside Well (m)	
BM3		1.635	A-B = 2.919	0	BM3		1.623	A-B = 2.919	TOS to TOP (m)	
TOS		2.202	A-B = 2.352	0.001	TOS		2.191	A-B = 2.351	Bolt to TOP (m)	
WATER			A-B=		WATER			A-B=	Sensor to Bolt (m)	
CONTROL			A-B=		CONTROL			A-B=	Bed to Bolt (m)	
HWM			A-B=		HWM			A-B=	Sensor to Bed (m)	

MID = 709

Field Staff: MM / CL
Data Entry By: CL Date: 22/04/2013
Reviewed By: Date:

Project #: 13-Y-0
Project Name: Mount Nansen Surface Water - Hydrology

Weather: Sunny OC

H-

HID	VC-UMN	Date (dd.mmm.yy)	16-APR-2013	Discharge Measurement Instruments + Methods	
Station Name	H-VC-UMN Victoria Ck Upstream of Mine	Q Measurement Start Time (HH:MM)	10:44 PDT / PST	YSI / SWOFFER / PYGMY / ADV / MID-SECT. / POINT	
		Q Measurement End Time (HH:MM)	12:14 PDT / PST	SALT TRACER / WEIR / VOLUMETRIC / FLOAT / ROD	
		Logger Download/Inst Time (HH:MM)	n/a - PDT / PST	Channel Conditions	
		Logger Depth Reading (m)	n/a - [ ] downloaded	NONE / ICE / BACKWATER / > BANKFULL / ZERO FLOW / HIGH SUSP. SED.	

Water Level Logger	Serial # n/a	HOBO / Solinst / n/a	GPS waypoint	elevation	easting	northing
Photo #	[U/S] 6664	[D/S] 6665	[RDB] 6663, 67	[LDB] 6666	[STAFF/WEIR] 6669	

Site Comments

~2 ft ice to bank, 1/3 Channel not frozen @ deepest pt on RR

$V_1 = \frac{C_{sec} \times V_2}{C_{ss}}$ $C_{ss} = 75$ g/L $V_2 = 1$ L $C_{sec} = 1$ g/L

@CF.T only for 2nd Trial on rck, Δ'd [SS]

Channel Measurements

Staff Gauge Height (m)	n/a
Weir Head (m)	n/a
Water Temperature (°C)	0.0
Water Surface Slope (%)	n/a
Average Width (m)	1.1
Average Depth (m)	0.141

Salt Tracer

SLUG / CONSTANT RATE | DRY | LOGGED / MANUAL | SPC / EC | CF.T (YES) / NO

Trial | Time (HH:MM)	Background EC | EC Peak	Mix Length	Mass of Salt	Mix Vol.	Conc. Salt Slug
	EC_{pk}(uS/cm) | EC_{pk}(uS/cm)	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (10:44 | 10:50)	[redacted] | 360.8	62 m	1.5	20	0.075/75 g/L
2 (11 | 25)	280.2 | [redacted]	62	1.8	20	0.09
3 (— | —)	— | 400.4	—	—	—	—
Csec (g/L)	1		SPC | Temp	— | —	— | —
SPC_o Calib. Tank (uS/cm)	2937 | 0.7°C	15 mL	323.2 | 0.0	— | —	— | —
Vol. Calib. Tank (L)	1	15 mL	360.8 | 0.0	— | —	— | —
Vol Sec Mix (mL) Added:	[redacted]	15 mL	394.7 | 0.0	— | —	— | —
CF.T = 4.22×10^{-6}	[redacted]	15 mL	428.1 | 0.0	— | —	— | —
Qsalt =	7.8×10^{-7} m³/s		— | —	— | —	— | —

Volumetric

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Float (not reported)

Distance (m) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average v (m/s) =					
** Collect v_{AVE} & w_{AVE}	Average Velocity (m/s) =		Est. Meas. Error %		

Measurement Summary	Primary (e.g. ADV)	Secondary (e.g. salt)
Measurement Type [ADV, SS, V, W]	ADV	SALT
Average Discharge (m^3/s)	0.0585	0.0[redacted] m³/s
Discharge Meas. Accuracy +/- [%]	3.4	[redacted]
Average Velocity (m/s)	0.376	
Cross-Sectional Area (m^2)	0.155	

HID 715 710

Hydrometric Levels - Survey

YES / (NO) REASON: NO WINTER LOGGER | Survey Time (HH:MM): (WATER) | BM Shift: Yes \| No | Logger Shift: Yes \| No | Staff Gauge Shifted?: Yes \| No

Survey Circuit 1	Height of Instrument (m)	Rod (+/- 0.003 m)	Elevation (m)	±0.003	Survey Circuit 2	Height of Instrument (m)	Rod (+/- 0.003 m)	Elevation (m)	Station Measurements	
Station	A	B	C		Station	A	B	C	Inside Well (m)	
BM1	A = B + C		3.000		BM1	A = B + C		3.000	Outside Well (m)	
BM2			A-B =		BM2			A-B =	TOS to TOP (m)	
BM3			A-B =		BM3			A-B =	Bolt to TOP (m)	
TOS			A-B =		TOS			A-B =	Sensor to Bolt (m)	
WATER			A-B=		WATER			A-B=	Bed to Bolt (m)	
CONTROL			A-B=		CONTROL			A-B=	Sensor to Bed (m)	
HWM			A-B=		HWM			A-B=		

MID = 710

Field Staff: MM, CL
Data Entry By: CL Date: 22/04/2013
Reviewed By: Date:

Project #: 13-Y-0
Project Name: Mount Nansen Surface Water - Hydrology

Weather: clear -4°C

HID	H-VC-R	Date (dd.mmm.yy)	15. APR. 13	Discharge Measurement Instruments + Methods	
Station Name	Victoria Creek at Road	Q Measurement Start Time (HH:MM)	13:00 PDT | PST	(YSI) SWOFFER | PYGMY (ADV)	MID-SECT. | POINT
		Q Measurement End Time (HH:MM)	14:30 PDT | PST	(SALT TRACER) WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time (HH:MM)	12:57 (PDT) | PST	Channel Conditions	
		Logger Depth Reading (m)	0.0932m M/downloaded	NONE (ICE) BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP. SED.	

Water Level Logger	Serial # 1041103	HOBO (Solinst) N/A	GPS waypoint	elevation	easting	northing
Photo #	[U/S] 6650	[D/S] 6649	[RDB] 6652	[LDB] 6651	[STAFF/WEIR]	

Site Comments

Real time logger level 0.0932m
temp 0.022°C

Channel is ice + snow covered. some depressions where thin ice. Overflow ice at road culvert, ice had flown over road.

Channel Measurements

Staff Gauge Height (m)	n/a
Weir Head (m)	—
Water Temperature (°C)	0.0
Water Surface Slope (%)	n/a
Average Width (m)	1.8
Average Depth (m)	0.094

Measurement Summary	Primary (e.g. ADV)	Secondary (e.g. salt)
Measurement Type (ADV, SS,V , W)	ADV	SS
Average Discharge (m^3/s)	0.034	4.0×10^{-2}
Discharge Meas. Accuracy +/- [%]	10.2	
Average Velocity (m/s)	0.169	
Cross-Sectional Area (m^2)	0.169	

MID 716 711

Salt Tracer — (SLUG) CONSTANT RATE | DRY (LOGGED) MANUAL (SPC) EC CF.T (YES) NO

Trial | Time (HH:MM)	Background EC | EC Peak	Mix Length	Mass of Salt	Mix Vol.	Conc. Salt Slug
	EC_0(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (13 :15)	275.7 | 431.1	100	2.20	20	0.11
2 (14 :00)	278 | 425.5	100	2.2	20	0.11
3 (:)	|				
Csec (g/L)	1		SPC | Temp	5mL 344.5 | 1.3	|
SPC_0 Calib. Tank (uS/cm)	289.5 // 1.4°C	5mL	296.6 | 1.4	10mL 365.6 | 1.3	|
Vol. Calib. Tank (L)	1 L	5mL	308.9 | 1.4	10 380.3 | 1.3	|
Vol Sec Mix (mL) Added:	9 mL	5mL	319.1 | 1.4	10 398.3 | 1.3	|
CF.T =	4.53×10^{-6}	5mL	327.9 | 1.4	10 476.4 | 1.3	|
Qsalt =	4.0×10^{-2} m^3/s	5mL	336.1 | 1.4	10 493.2 | 1.3	|

Volumetric

	[1]	[2]	[3]	[4]	[5]
Volume (L) =					
Time (sec)					
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Float (not reported)

	[1]	[2]	[3]	[4]	[5]
Distance (m) =					
Time (sec)					
Average v (m/s) =					
** Collect v_{avg} & w_{avg}	Average Velocity (m/s) =		Est. Meas. Error %		

Hydrometric Levels - Survey

(YES) | NO | REASON: Survey Time (HH:MM): (WATER) 13:56 BM Shift: Yes| No SMALL +3 Logger Shift: Yes|(No) Staff Gauge Shifted?: Yes|(No)

Survey Circuit 1	Height of Instrument (m)	Rod (+/- 0.003 m)	Elevation (m)	±0.003	Survey Circuit 2	Height of Instrument (m)	Rod (+/- 0.003 m)	Elevation (m)	Station Measurements	
Station	A	B	C		Station	A	B	C	Inside Well (m)	
BM1	A = B + C 4.125	1.125	3.000		BM1	A = B + C 4.145	1.145	3.000	Outside Well (m)	
BM2		~~1.125~~ 0.750	A-B = 3.375		BM2		0.723	A-B = 3.422	TOS to TOP (m)	
BM3		~~1.005~~ 1.005	A-B = 3.120		BM3		0.977	A-B = 3.168	Bolt to TOP (m)	
TOS		1.611	A-B = 2.514		TOS		1.585	A-B = 2.560	Sensor to Bolt (m)	
WATER	Frozen		A-B=		WATER			A-B=	Bed to Bolt (m)	
CONTROL			A-B=		CONTROL			A-B=	Sensor to Bed (m)	
HWM			A-B=		HWM			A-B=		

adjusted height of reference

BM1 1.145
BM2 0.720 3.425
BM3 0.975 3.170
TOS 1.582 2.568

MID = ~~711~~ 711

Field Staff: MM, JM, CL, DS
Data Entry By: CL Date: 22/04/2013
Reviewed By: Date:

Project #: 13-Y-0
Project Name: Mount Nansen Surface Water - Hydrology

Weather: Sunny, clear, cold

HID	H SEEP	Date (dd.mmm.yy)	April 17 2013	Discharge Measurement Instruments + Methods
Station Name		Q Measurement Start Time (HH:MM)	12:04 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 Depth Reading (m)	- [ ] downloaded	NONE | ICE | BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP. SED.

Water Level Logger	Serial #	HOBO | Solinst | N/A	GPS waypoint	elevation	easting / northing
Photo #	[U/S]	[D/S]	[RDB]	[LDB]	[STAFF/WEIR]

Site Comments

Flow meter reading 149.756 LPM
Photos 1742 - 44
Hose is found on side of diffusion culvert & needs to be removed in place.

Channel Measurements

Staff Gauge Height (m)	/
Weir Head (m)	/
Water Temperature (°C)	/ 1.1°C
Water Surface Slope (%)	/
Average Width (m)	/
Average Depth (m)	/

Measurement Summary	Primary (e.g. ADV)	Secondary (e.g. salt)
Measurement Type (ADV, SS,V, W)	Volumetrl	
Average Discharge (m^3/s)	0.003	
Discharge Meas. Accuracy +/- [%]		
Average Velocity (m/s)		
Cross-Sectional Area (m^2)		

Salt Tracer — N/A

SLUG | CONSTANT RATE | DRY LOGGED | MANUAL SPC | EC CF.T YES | NO

Trial | Time (HH:MM)	Background EC | EC Peak	Mix Length	Mass of Salt	Mix Vol.	Conc. Salt Slug
	EC_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (:)	____ | ____				
2 (:)	____ | ____				
3 (:)	____ | ____				
Csec (g/L)			SPC | Temp	____ | ____	____ | ____
SPC_o Calib. Tank (uS/cm)			____ | ____	____ | ____	____ | ____
Vol. Calib. Tank (L)			____ | ____	____ | ____	____ | ____
Vol Sec Mix (mL) Added:			____ | ____	____ | ____	____ | ____
CF.T =			____ | ____	____ | ____	____ | ____
Qsalt =			____ | ____	____ | ____	____ | ____

Volumetirc

Volume (L) =	18	18	16	18	17
Time (sec)	[1] 6.58	[2] 7.07	[3] 5.22	[4] 6.88	[5] 6.66
Average Q (L/s) =	2.7	2.5	3.1	2.6	2.6
Avg. Q_{vol} (L/s) =	2.7		Avg Q_{vol} (m^3/s) =	0.003	

Float (not reported) — N/A

Distance (m) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average v (m/s) =					
** Collect v_{avg} & w_{avg}	Average Velocity (m/s) =		Est. Meas. Error %		

MID 712

Hydrometric Levels - Survey

YES | NO | REASON: No S.L. Survey Time (HH:MM): (WATER) BM Shift: Yes| No Logger Shift: Yes| No Staff Gauge Shifted?: Yes| No

Survey Circuit 1	Height of Instrument (m)	Rod (+/- 0.003 m)	Elevation (m)	±0.003	Survey Circuit 2	Height of Instrument (m)	Rod (+/- 0.003 m)	Elevation (m)	Station Measurements
Station	A	B	C		Station	A	B	C	Inside Well (m)
BM1	A = B + C		3.000		BM1	A = B + C		3.000	Outside Well (m)
BM2			A-B =		BM2			A-B =	TOS to TOP (m)
BM3			A-B =		BM3			A-B =	Bolt to TOP (m)
TOS			A-B =		TOS			A-B =	Sensor to Bolt (m)
WATER			A-B=		WATER			A-B=	Bed to Bolt (m)
CONTROL			A-B=		CONTROL			A-B=	Sensor to Bed (m)
HWM			A-B=		HWM			A-B=	

MID = 712

Field Staff: DS, JM
Data Entry By: CL Date: 22/04/2013
Reviewed By: Date:

Project #: 12-Y-0129
Project Name: Mount Nansen - Hydrology

ENVIRONMENTAL DYNAMICS INC.

Field Dates: May 6-9, 2013

1)Ice Descriptions:
Frozen to bed - Water flowing beneath - Logger submerged in flowing water - Ice thickness - Anchor ice present - Frazil ice present
2) ~~Must bring loggers WITH the team to install in stilling wells should they be within flowing water.~~
3) If a measurement is not feasible, fully document why and take photos.
4) Only download over-wintered data loggers on FINAL trip to Nansen (i.e. late May)

- take SG reading or survey water level

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)
[X]	~~ATM-DG2~~	Atmospheric at Diversion Channel	Continuous Baro Logger	1) HOBO download DL AT END OF MONTH	NO	HOBO	None	None	—	—	n/a	—
[X]	~~ATM-DG4~~	Atmospheric at Diversion Channel (Back-up logger)	Continuous Baro Logger	1) Solinst download	NO	Solinst Baro-logger	None	None	—	—	n/a	—
[X]	H-PC-U	Upper Pony Creek	Instantaneous	1) Q measurement if water flowing. 2) Weir head (H) if flowing.	n/a	n/a	Weir (H) Volumetric at Weir	None	OVERLOW, NOT FOR Q	NOT SUITABLE MEASUREMENT		
[X]	H-PC-DSP	Pony Creek Downstream of Pit	Instantaneous	1) Q measurement if water flowing.	n/a	n/a	Volumetric (at culvert) Salt (0.2 kg)	None	13-05-08	09:35	—	—
[X]	H-DC-DX	Dome Creek DX	Instantaneous	1) Q measurement if water flowing.	n/a	n/a	None	None	FROZEN TO SUBSTATE		n/a	
[X]	H-DC-DX+105	Dome Creek DX+105	Instantaneous	1) Q measurement, salt tracer. NOTE: salt tracer unsuccessful on previous trip.	n/a	n/a	Volumetric Salt (0.1 kg) CF.T	None	13-MAY-06	17:42	n/a	n/a
[ ]	~~H-DC-D1~~	Dome Creek D1	~~Instantaneous~~	~~1) Q measurment if water flowing.~~	n/a	n/a	Salt (0.1 kg) CF.T	None			n/a	
[X]	H-DC-D1b	Dome Creek D1b	Instantaneous	1) Q measurment if water flowing.	n/a	n/a	Salt (0.1 kg) CF.T	None	NOT SUITABLE FOR MEASUREMENT		n/a	
[X]	H-DC-U1	Upper Dome Creek 1	Instantaneous	1) Q measurement if water flowing.	n/a	n/a	Salt (0.1 kg) CF.T	None	GLACIATED, NOT SUITABLE FOR MEASUREMENT			

Field Staff: MM, BSm, MK, DS

Project #: 12-Y-0129
Project Name: Mount Nansen - Hydrology

Field Dates: May 6 - 7, 2013

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)
[X]	H-DC-U2	Upper Dome Creek 2	Instantaneous	1) Q measurement if water flowing.	n/a	n/a	Salt (0.1 kg) CF.T	None	GLACIATION, NOT SUITABLE FOR MEASUREMENT		n/a	
[✓]	H-DC-B	Diversion Channel at Bridge	Instantaneous	1) Q measurment if water flowing.	n/a	n/a	Salt (0.2 kg) CF.T	None	13-MAY-06	17:10	n/a	n/a
[X]	H-DC-M	Middle Dome Creek	Continuous	1) Q measurement if water flowing.	YES	Solinst 1050018	Salt (0.3 kg) CF.T	None	13-MAY-06	15:53	CONDITIONS NOT SUITABLE	
[X]	H-DC-R	Dome Creek at Road	Instantaneous	1) Q measurement if water flowing.	n/a	n/a	Volumetric (at culvert) Salt (0.2 - 0.4 kg) CF.T	None	13-MAY-06	14:58	CONDITIONS n/a NOT SUITABLE FOR SS.	
[X]	H-VC-REF	Victoria Creek Reference	Instantaneous	1) Q measurement.	NO	none	ADV Salt (2.2 kg) CF.T	None	NO SUITABLE FOR SS OR (OVERFLOW)		LOCATION ADV	
[✓]	H-VC-U	Upper Victoria Creek	Continuous	1) Q measurment.	YES	Solinst 1049522	ADV Salt (1.5 kg) CF.T	None	13-MAY-07	14:00	0.145	n/a
[✓]	H-VC-DBC	Victoria Creek D/S of Back Creek	Continuous	1) Q mesurement	YES	Solinst 1049137	ADV Salt (1 kg) CF.T	None	13-MAY-07	12:18	0.462	n/a
[X]	H-BC	Back Creek	Instantaneous	1) Q measurement if water flowing.	n/a	n/a	Salt (0.2 kg) CF.T	None	CONDITIONS		NOT SUITABLE (OVERFLOW)	
[✓]	H-VC-UMN	Victoria Creek U/S of Minnesota Creek	Instantaneous	1) Q measurement.	NO	none	ADV Salt (2 kg) CF.T	None	13-MAY-07	10:11	n/a	n/a
[X]	H-MN	Minnesota Creek	Instantaneous	1) Q measurement.	n/a	n/a	Salt (0.2-0.4 kg) CF.T	None	CONDITIONS		NOT SUITABLE (OVERFLOW)	

Field Staff: MM, BSm, DS, MK

Project #: 12-Y-0129
Project Name: Mount Nansen - Hydrology

Field Dates: May 6-9, 2013

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)
[✓]	H-VC-R	Victoria Creek at Road	Continuous	1) Q measurement.	YES	Solinst 1041103	ADV Salt (2.2 kg) CF.T	None	13.MAY06	13:15	0.362	—
[✓]	H-SEEP	Seepage Pond Outlet	Instantaneous / Water Level	1) Q measurement at pipe outlet 2) Q measurement at flow meter in pumphouse	n/a	n/a	None	None	13.05.08	09:47	—	—
[X]	H-TP	Tailings Pond	Water Level Only	1) Water level if water surface is free.	n/a	n/a	None	None	ICE, NO LVL READING TAKEN			

Field Staff: MM, BSm, DS, MK

Project #: 13-4-0167
Project Name: NANSEN

EDI

partly cloud
Weather: +3°C, calm

HID	H - DC-DX+105	Date	06 May 2013	Discharge Measurement Instruments + Methods	
Station Name	Dome Creek DX +105	Q Measurement Start Time:	17:42 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV	MID-SECT | POINT
		Q Measurement End Time:	18:44 (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] 6772	[D/S] 6771	[RDB] 6773	[LDB] 6774	[STAFF/WEIR]

Site Comments

Water open, but not moving much at both the SS input + YSI input locations. SPC_0 fluctuating a lot, may be due to snow in channel or GW. Started at 790 then ↓ 740 → 700. Took ~ 20 min till SPC ↑. Trial 2 similar SPC_0 kept ↓, then peaked + went down to 6later SPC_0

Channel Measurements

Staff Gauge Height (m):	n/a
Weir Head (m):	n/a
Water Temperature (°C):	0.2
Water Surface Slope (%):	n/a
Average Width (m):	n/a
Average Depth (m):	n/a

Measurement Summary	Primary	Secondary
Meas. Type:	SS	
Measurment ID (MID):		
Average Q (m^3/s):	0.002 (E)	
Q Meas. Accuracy +/- [%]:		
Average Velocity (m/s):		
Cross-Sectional Area (m^2):		

Salt Tracer

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_0(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (17:42)	790 | 935	15	0.1000	20	
2 (18:25)	~~615~~ | ~~765~~	15	0.1000	10	
3 (:)	(517) | (771)				
V_1 for Sec. Mix (mL)	100	← from Trial 2	Vol. Added (mL)	SPC (uS/cm)	Temp
Csec (g/L):	1 g/L		1. 60	595.3	0.6
Vol. Calib. Tank (L):	1 L		2. 60	695.3	0.6
SPC_0 Calib. Tank	481.8 / 0.79		3. 60	780.8	0.7
CF.T =	4.67 x 10-5	ESTIMATE	4. 60	861.8	0.7
Qsalt =	0.002	*USE TRIAL 2 ONLY Q=0.002	5. 60	931.2	0.7
		CF.T	6.		
			7.		
			8.		
			9.		

Notes:
TOOK LONG TIME TO PEAK, OR EVEN INCREASE. VERY SLOW FLOW, TURBID.

Volum.

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

YES | NO | REASON: Not a continuous stn. 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	ID (m)	
BM1	A = B + C		3.000		BM1	A = B + C		3.000	OD (m)	
BM2	A = B + C		A-B=		BM2	A = B + C		A-B=	TOS to TOP (m)	
BM3	A = B + C		A-B=		BM3	A = B + C		A-B=	Bolt to TOP (m)	
TOS	A = B + C		A-B=		TOS	A = B + C		A-B=	Sensor to Bolt (m)	
WATER	A = B + C		A-B=		WATER	A = B + C		A-B=	Bed to Bolt (m)	
CONTROL	A = B + C		A-B=		CONTROL	A = B + C		A-B=	Sensor to Bed (m)	
HWM	A = B + C		A-B=		HWM	A = B + C		A-B=		
BANKFULL	A = B + C		A-B=		BANKFULL	A = B + C		A-B=		
BS (BM1)	A = B + C		A-B=		BS (BM1)	A = B + C		A-B=		

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

Project #: 13-Y-0167
Project Name: NANJEMS

EDI ENVIRONMENTAL DYNAMICS INC.

Weather: sunny, 0°C
no wind

HID	H-SEEP	Date	08 MAY 2015	Discharge Measurement Instruments + Methods
Station Name	Seepage	Q Measurement Start Time:	9:27 PDT | PST	YSI | SWOFFER | PYGMY | ADV MID-SECT | POINT
		Q Measurement End Time:	9:42 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	EASTING	NORTHING
Photo #	[U/S] See below	[D/S]	[RDB]	[LDB]	[STAFF/WEIR]	

Site Comments

pump reading 204.787 LPM = 0.003m³/s
6858 - 60 (photos)

Channel Measurements

Staff Gauge Height (m):	N/A (ice)
Weir Head (m):	n/a
Water Temperature (°C):	n/a
Water Surface Slope (%):	n/a
Average Width (m):	n/a
Average Depth (m):	n/a

Measurement Summary	Primary	Secondary
Meas. Type:	✓	PUMP
Measurment ID (MID):		
Average Q (m³/s):	0.0029	0.003
Q Meas. Accuracy +/- [%]:		
Average Velocity (m/s):		
Cross-Sectional Area (m²):		

Salt Tracer

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_o(uS/cm) | EC_{pk}(uS/cm)	L_m (m)	Ms_o (kg)	Volume (L)	Css (kg/L)
1 (:)	____ | ____				
2 (:)	____ | ____				
3 (:)	____ | ____				

V_1 for Sec. Mix (mL)	
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	1 L
SPC_0 Calib. Tank	
CF.T =	
Qsalt =	

Notes:

CF.T

Vol. Added (mL)	SPC (uS/cm)	Temp
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		

Volum.

Volume (L) =	20	20	20	20	20
Time (sec)	[1] 07.53	[2] 06.92	[3] 07.04	[4] 06.36	[5] 07.17
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =	2.891		Avg Q_{vol} (m^3/s) =	0.0029	

Hydrometric Levels - Survey

YES | NO REASON: NOT A CONTINUOUS STN. 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	ID (m)	
BM1	A = B + C		3.000		BM1	A = B + C		3.000	OD (m)	
BM2	A = B + C				BM2	A = B + C			TOS to TOP (m)	
BM3	A = B + C				BM3	A = B + C			Bolt to TOP (m)	
TOS	A = B + C				TOS	A = B + C			Sensor to Bolt (m)	
WATER	A = B + C				WATER	A = B + C			Bed to Bolt (m)	
CONTROL	A = B + C				CONTROL	A = B + C			Sensor to Bed (m)	
HWM	A = B + C				HWM	A = B + C				
BANKFULL	A = B + C				BANKFULL	A = B + C				
BS (BM1)	A = B + C				BS (BM1)	A = B + C				

Field Staff: B Sim, MM
Data Entry By: _____ Date: _____
Reviewed By: _____ Date: _____

Project #: 17-Y-967
Project Name: NANIEN

EDI

Weather: partly cloudy, light wind, +3°C

HID	DCB	Date	06 May 2013	Discharge Measurement Instruments + Methods
Station Name	Dome Creek @ Bridge	Q Measurement Start Time:	17:00 PDT | PST	YSI | SWOFFER | PYGMY | ADV MID-SECT | POINT
		Q Measurement End Time:	17:10 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] 6767	[D/S] 6768	[RDB] 6770	[LDB] 6769	[STAFF/WEIR] n/a

Site Comments

Channel open, water flowing over ice. High suspended sediments. Fast flow

Channel Measurements

Staff Gauge Height (m):	N/A
Weir Head (m):	
Water Temperature (°C):	0.0 °C
Water Surface Slope (%):	
Average Width (m):	
Average Depth (m):	

Measurement Summary	Primary	Secondary
Meas. Type:	SS	
Measurment ID (MID):		
Average Q (m^3/s):	0.022	
Q Meas. Accuracy +/- [%]:		
Average Velocity (m/s):		
Cross-Sectional Area (m^2):		

Salt Tracer

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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (17:00)	1528 | 2000	40	.3000	20	0.015
2 (17:07)	1474 | 2452	40	.3000	20	0.015
3 (:)	|				

V_1 for Sec. Mix (mL)	66
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	1 L
SPC_0 Calib. Tank	1579 | 1.7 °C
CF.T =	4.44 E-05
Qsalt = AVG.	0.022

Notes: salt slug peaked fast and went down to background

CF.T: Trial = 0.027, Trial 2: 0.017

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.	30 mL	1593	1.3
2.	30	1633	1.5
3.	30	1674	1.5
4.	30	1712	1.6
5.	60	1775	1.7
6.	60	1839	1.8
7.	60	1897	1.7
8.	60	1932	2.7
9.	60	1978	2.8

Volum.

	[1]	[2]	[3]	[4]	[5]
Volume (L) =					
Time (sec)					
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

→ cont'd on back

Hydrometric Levels - Survey

YES | NO | REASON: No continuous STN. 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	ID (m)	
BM1	A = B + C		3.000		BM1	A = B + C		3.000	OD (m)	
BM2	A = B + C				BM2	A = B + C			TOS to TOP (m)	
BM3	A = B + C				BM3	A = B + C			Bolt to TOP (m)	
TOS	A = B + C				TOS	A = B + C			Sensor to Bolt (m)	
WATER	A = B + C				WATER	A = B + C			Bed to Bolt (m)	
CONTROL	A = B + C				CONTROL	A = B + C			Sensor to Bed (m)	
HWM	A = B + C				HWM	A = B + C				
BANKFULL	A = B + C				BANKFULL	A = B + C				
BS (BM1)	A = B + C				BS (BM1)	A = B + C				

Field Staff: B.Sm. M.M.
Data Entry By: _____ Date: _____
Reviewed By: _____ Date: _____

Project #: 13-4-0167
Project Name: HANSON

EDI

Weather: mostly cloudy, calm

HID	H-DC-M	Date	01-MAY-13	Discharge Measurement Instruments + Methods
Station Name	Dome Creek Middle	Q Measurement Start Time:	15:53 (HH:MM) PDT | PST	~~VSV~~ ~~SWOFFER~~ | PYGMY | ADV MID-SECT | POINT
		Q Measurement End Time:	16:00 (HH:MM) PDT | PST	~~SALT TRACER~~ | WEIR | VOLUMETRIC | FLOAT | ROD
		Logger Download/Inst Time:	n/a (HH:MM) PDT | PST	Channel Conditions
		Logger Reading (m)	n/a [ ] downloaded	NONE | ICE | BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP. SED

Logger:	Serial #	HOBO | Solinst | N/A	GPS Waypoint	ZONE	EASTING	NORTHING
Photo #	[U/S] 6755, 56, 58, 59, 60, 65	[D/S] 6754, 57, 61	[RDB] 6763	[LDB] 6762		[STAFF/WEIR] 6764

Site Comments

Some open water from diversion channel, then goes under ice. There is water flowing over ice as well, through snow on left bank, ~ 1/2 to 2/3 of main channel flow volume. This water drops into main channel at staff gauge.

Channel Measurements

Staff Gauge Height (m):	n/a
Weir Head (m):	n/a
Water Temperature (°C):	0.2
Water Surface Slope (%):	
Average Width (m):	
Average Depth (m):	

Measurement Summary	Primary	Secondary
Meas. Type:	~~SS~~	
Measurment ID (MID):		
Average Q (m^3/s):	N/A	N/A
Q Meas. Accuracy +/- [%]:		
Average Velocity (m/s):		
Cross-Sectional Area (m^2):		

Salt Tracer — ~~SS NOT USED~~ — 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_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	~~Volume (L)~~	Css (kg/L)
1 (15:53)	1521 | 1907	46	0.30	20	15 g/L
2 (16:09)	1514 |	46	0.30	20	"
3 (:)	|				

V_1 for Sec. Mix (mL)	66
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	1 L
SPC_0 Calib. Tank	1519 / 0.7 °C
CF.T =	
Qsalt =	

Notes: SS NOT SUITABLE DUE TO CONDITIONS. NO Q MEASUREMENT POSSIBLE

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.	60	1658	0.7
2.	60	1787	0.8
3.	60	1902	0.8
4.	60	2004	0.8
5.			
6.			
7.			
8.			
9.			

Volum.

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

YES \| NO \| REASON: — Survey Time (HH:MM): (WATER) 16:10 — BM Shift: Yes\| No — Logger Shift: Yes\| No — Staff Gauge Shifted? Yes\| No

Circuit #1	H I	Rod Read	Elevation (m)	± 0.003
Station	A	B	C	
BM1	~~A=B+C~~ 1.398	1.398	3.000	
BM2	~~A=B+C~~ 3.398	2.087	2.311	.005
BM3	A = B + C			
TOS	~~A=B+C~~ 3.398	1.935	2.463	.001
WATER	~~A=B+C~~ 3.398	2.769	1.630	.002
CONTROL	A = B + C			
HWM	A = B + C			
BANKFULL	A = B + C			
BS (BM1)	A = B + C			

Circuit #2	H I	Rod Read	Elevation (m)	Station Measurements
Station	A	B	C	ID (m)
BM1	~~A=B+C~~ 4.362	1.362	3.000	OD (m)
BM2	~~A=B+C~~ 4.362	2.048	2.314	TOS to TOP (m)
BM3	~~A=B+C~~	~~2.048~~		Bolt to TOP (m)
TOS	~~A=B+C~~ 4.362	1.900	2.462	Sensor to Bolt (m)
WATER	~~A=B+C~~ 4.362	2.730	1.632	Bed to Bolt (m)
CONTROL	A = B + C			Sensor to Bed (m)
HWM	A = B + C			
BANKFULL	A = B + C			
BS (BM1)	A = B + C			

BM3 under snow/ice

Field Staff: MM BSm
Data Entry By: ____ Date: ____
Reviewed By: ____ Date: ____

Project #: 13-4-0167
Project Name: NAASEN

EDI

Weather: Overcast 0°C Calm

HID	H-DC-R	Date	06-MAY-2013	Discharge Measurement Instruments + Methods
Station Name	Dome Creek at Road	Q Measurement Start Time:	14:58 (HH:MM) PDT | PST	~~CYS~~ | ~~SWOFFER~~ | PYGMY | ADV MID-SECT. | POINT
		Q Measurement End Time:	(HH:MM) PDT | PST	~~SALT TRACER~~ | WEIR | VOLUMETRIC | FLOAT | ROD
		Logger Download/Inst Time:	n/a (HH:MM) PDT | PST	Channel Conditions
		Logger Reading (m)	n/a [ ] downloaded	NONE | ICE | BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP. SED.

Pt. of Q Rd 6745-51

Logger:	Serial # n/a	HOBO | Solinst | N/A	GPS Waypoint	ZONE	EASTING	NORTHING
Photo #	[U/S] 6736, 38, 44	[D/S] 6735, 37, 43	[RDB] 6739, 42	[LDB] 6740, 41	[STAFF/WEIR] n/a	

Site Comments

Open channel across road and over ice. Flowing through vegetation, slush and small amount of water across valley; some backwater areas and ~~small~~ slow flow, not captured in main channel. NOT SUITABLE FOR Q MEAS.

Channel Measurements

Staff Gauge Height (m):	n/a
Weir Head (m):	n/a
Water Temperature (°C):	0.0
Water Surface Slope (%):	n/a
Average Width (m):	1.10
Average Depth (m):	0.060

Measurement Summary	Primary	Secondary
Meas. Type:	~~NONE~~	
Measurment ID (MID):		
Average Q (m^3/s):	CONDITIONS NOT	
Q Meas. Accuracy +/- [%]:	SUITABLE	
Average Velocity (m/s):	n/a	
Cross-Sectional Area (m^2):	n/a	

Salt Tracer

SLUG | CONSTANT RATE | DRY LOGGED | MANUAL SPEC | EC 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)	Css (kg/L)
1 (14:58)	1407 | ~~1445~~	40	0.300	20	15 g/L
2 (15:09)	1399 |	40	0.300	20	15 g/L
3 (:)	|				

V_1 for Sec. Mix (mL)	666
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	~~11~~ 900mL
SPC_o Calib. Tank	1535 / 1.1°C
CF.T =	
Qsalt =	

Notes: ~~SS fluor peak~~ CONDITIONS NOT SUITABLE FOR SS TRACER. FLOW THROUGH MULTIPLE CHANNELS + ABOVE + BELOW ICE

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.	60	1646	1.2
2.	60	1746	1.1
3.	60	1843	1.3
4.	60	1917	1.3
5.	60	1995	1.3
6.	60	2060	1.5
7.			
8.			
9.			

Volum.

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

YES | NO REASON: No continuous stn yet | 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	ID (m)	
BM1	A = B + C		3.000		BM1	A = B + C		3.000	OD (m)	
BM2	A = B + C		A-B=		BM2	A = B + C		A-B=	TOS to TOP (m)	
BM3	A = B + C		A-B=		BM3	A = B + C		A-B=	Bolt to TOP (m)	
TOS	A = B + C		A-B=		TOS	A = B + C		A-B=	Sensor to Bolt (m)	
WATER	A = B + C		A-B=		WATER	A = B + C		A-B=	Bed to Bolt (m)	
CONTROL	A = B + C		A-B=		CONTROL	A = B + C		A-B=	Sensor to Bed (m)	
HWM	A = B + C		A-B=		HWM	A = B + C		A-B=		
BANKFULL	A = B + C		A-B=		BANKFULL	A = B + C		A-B=		
BS (BM1)	A = B + C		A-B=		BS (BM1)	A = B + C		A-B=		

~~MAIN channel suitable for SS estimate. Face flows but mixing length may not be sufficient. Channel constantly flows under ice + underneath.~~

Field Staff: MW, BS
Data Entry By: _____ Date: _____
Reviewed By: _____ Date: _____

Project #: 13-Y-0167
Project Name: NANSEN

EDI ENVIRONMENTAL DYNAMICS INC.

Weather: SUNNY, 0°C
no wind.

HID	H-PC-DSP	Date	08-May-2013	Discharge Measurement Instruments + Methods	
Station Name	Perry Creek D/S of pit	Q Measurement Start Time:	9:35 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV	MID-SECT. | POINT
		Q Measurement End Time:	9:37 (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] Culvert 6856-57	[D/S] Photos 6946-50	[RDB]	[LDB]	[STAFF/WEIR] N/A	

Site Comments

measured flow out of culvert, volumetric measurement only captured half of flow - multiply Q value by 2 to get actual Q. Station still covered in deep snow

Channel Measurements

Staff Gauge Height (m):	n/a
Weir Head (m):	n/a
Water Temperature (°C):	n/a
Water Surface Slope (%):	n/a
Average Width (m):	n/a
Average Depth (m):	n/a

Measurement Summary	Primary	Secondary
Meas. Type:	✓	
Measurment ID (MID):		
Average Q (m^3/s):	0.000335	
Q Meas. Accuracy +/- [%]:	20	
Average Velocity (m/s):		
Cross-Sectional Area (m^2):		

Salt Tracer

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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (:)	____ | ____				
2 (:)	____ | ____				
3 (:)	____ | ____				

		CF.T	Vol. Added (mL)	SPC (uS/cm)	Temp
V_1 for Sec. Mix (mL)			1.		
Csec (g/L):	1 g/L		2.		
Vol. Calib. Tank (L):	1 L		3.		
SPC_0 Calib. Tank			4.		
CF.T =			5.		
Qsalt =			6.		
Notes:			7.		
			8.		
			9.		

Volum.

Volume (L) =	3	3	4	3 / 4
Time (sec)	[1] 24.88	[2] 23.84	[3] 25.14	[4] 19.07 / [5] 21.31
Average Q (L/s) =				
Avg. Q_{vol} (L/s) =	0.168 (x 2)		Avg Q_{vol} (m^3/s) =	0.0002 (x 2)

17.78

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	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	ID (m)	
BM1	A = B + C		3.000		BM1	A = B + C		3.000	OD (m)	
BM2	A = B + C				BM2	A = B + C			TOS to TOP (m)	
BM3	A = B + C				BM3	A = B + C			Bolt to TOP (m)	
TOS	A = B + C				TOS	A = B + C			Sensor to Bolt (m)	
WATER	A = B + C				WATER	A = B + C			Bed to Bolt (m)	
CONTROL	A = B + C				CONTROL	A = B + C			Sensor to Bed (m)	
HWM	A = B + C				HWM	A = B + C				
BANKFULL	A = B + C				BANKFULL	A = B + C				
BS (BM1)	A = B + C				BS (BM1)	A = B + C				

Field Staff: B.Sm MM, MK, DS
Data Entry By: _____ Date: _____
Reviewed By: _____ Date: _____

Project #: 13-Y-0167
Project Name: NANAIMO

EDI

Weather: 0°C mostly sunny, calm

HID	H-VC-UMN	Date	07-MAY-13	Discharge Measurement Instruments + Methods	
Station Name	Victoria Cr u/s intake	Q Measurement Start Time:	10:10 (HH:MM) (PDT) | PST	YSI | SWOFFER | PYGMY | (ADV) MID-SECT. | POINT	
		Q Measurement End Time:	10:50 (HH:MM) (PDT) | PST	SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time:	n/a (HH:MM) PDT | PST	Channel Conditions	
		Logger Reading (m)	[ ] downloaded	NONE | (ICE) | (BACKWATER) | > BANKFULL | ZERO FLOW | HIGH SUSP. SED.	
Logger:	Serial # No WINTER LOGGER	HOBO | Solinst | (N/A)		GPS Waypoint	ZONE EASTING NORTHING
Photo #	[U/S] 6721, 84	[D/S] 6780, 85, 86	[RDB] 6796	[LDB] 6782	[STAFF/WEIR] 6783

Site Comments

Open lead u/s of stilling well, where water was backed up by ice. Some water flowing under + over ice and through snow downstream of station, not suitable for SF, only ADV.

Channel Measurements

Staff Gauge Height (m):	—
Weir Head (m):	—
Water Temperature (°C):	0.0
Water Surface Slope (%):	—
Average Width (m):	3.10
Average Depth (m):	0.36

Measurement Summary	Primary	Secondary
Meas. Type:	ADV	N/A
Measurment ID (MID):		
Average Q (m^3/s):	0.620	
Q Meas. Accuracy +/- [%]:	4.9	
Average Velocity (m/s):	0.145	
Cross-Sectional Area (m^2):	1.117	

Salt Tracer

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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (:)	____ | ____				
2 (:)	____ | ____				
3 (:)	____ | ____				

V_1 for Sec. Mix (mL)	
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	1 L
SPC_0 Calib. Tank	
CF.T =	
Qsalt =	

Notes:

CF.T

Vol. Added (mL)	SPC (uS/cm)	Temp
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		

Volum.

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/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	H I	Rod Read	Elevation (m)	± 0.003
Station	A	B	C	
BM1	A = B + C		3.000	
BM2	A = B + C			
BM3	A = B + C			
TOS	A = B + C			
WATER	A = B + C			
CONTROL	A = B + C			
HWM	A = B + C			
BANKFULL	A = B + C			
BS (BM1)	A = B + C			

Circuit #2	H I	Rod Read	Elevation (m)
Station	A	B	C
BM1	A = B + C		3.000
BM2	A = B + C		
BM3	A = B + C		
TOS	A = B + C		
WATER	A = B + C		
CONTROL	A = B + C		
HWM	A = B + C		
BANKFULL	A = B + C		
BS (BM1)	A = B + C		

Station Measurements	ID (m)
OD (m)	
TOS to TOP (m)	
Bolt to TOP (m)	
Sensor to Bolt (m)	
Bed to Bolt (m)	
Sensor to Bed (m)	

Field Staff: MM, BSm
Data Entry By: _____ Date: _____
Reviewed By: _____ Date: _____

Project #: 13-4-0167
Project Name: NANSEN

Weather: mostly cloudy, light wind, 0°C

HID	H-VC-U	Date	07-May-2013	Discharge Measurement Instruments + Methods: YSI / SWOFFER / PYGMY / ADV / MID-SECT / POINT; SALT TRACER / WEIR / VOLUMETRIC / FLOAT / ROD
Station Name	Upper Victoria Creek	Q Measurement Start Time:	14:12 (HH:MM) PDT / PST	Channel Conditions: NONE / ICE / BACKWATER / > BANKFULL / ZERO FLOW / HIGH SUSP. SED
		Q Measurement End Time:	15:00 (HH:MM) PDT / PST	GPS Waypoint: ZONE / EASTING / NORTHING
		Logger Download/Inst Time:	n/a (HH:MM) PDT / PST	
		Logger Reading (m)	n/a [ ] downloaded	
Logger:	Serial #	HOBO / Solinst / N/A		
Photo #	[U/S] 6811	[D/S] 6812	[RDB] 6813	[LDB] 6814 [STAFF/WEIR] 6815

Site Comments

- open water at station
- some ice (~15cm thick) along stream margins
- logger not D/L this trip

Channel Measurements

Staff Gauge Height (m):	0.145 * ice
Weir Head (m):	n/a
Water Temperature (°C):	0.0°C
Water Surface Slope (%):	n/a
Average Width (m):	4.25
Average Depth (m):	0.183

Measurement Summary	Primary	Secondary
Meas. Type:	ADV	~~SS~~
Measurment ID (MID):		
Average Q (m^3/s):	1252	~~0.0000~~
Q Meas. Accuracy +/- [%]:	6.3	
Average Velocity (m/s):	0.161	
Cross-Sectional Area (m^2):	0.777	

Salt Tracer — 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_o(uS/cm) / EC_{pk}(uS/cm)	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (14:12)	207.1 / 351.1	same as USUG	1.70	20	85
2 (14:30)	207.4 / 346.1	"	"	20	85
3 (:)	/				
V_1 for Sec. Mix (mL):	~~1.7~~ ~~7.3~~ 7.35				
Csec (g/L):	1 g/L				
Vol. Calib. Tank (L):	1L				
SPC_0 Calib. Tank	207.5 / 3.1				
CF.T =	~~1.01~~ ~~1.05~~				
Qsalt =					

Notes: conducted CFT @ camp, did not take enough V from SV * should have been 11.7

DO NOT INCLUDE SS (CFT OFF)

Vol. Added (mL)	SPC (uS/cm)	Temp
1: 30	238.2	3.2
2: 30	271.2	3.3
3: 30	300.6	3.3
4: 30	329.5	3.3
5: 30	357.9	3.3
6.		
7.		
8.		
9.		

Volum.

	[1]	[2]	[3]	[4]	[5]
Volume (L) =					
Time (sec)					
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

YES / NO | REASON

Survey Time (HH:MM) (WATER) 15:05 BM Shift: Yes / No Logger Shift: Yes / No Staff Gauge Shifted?: Yes / No

Circuit #1	HI	Rod Read	Elevation (m)	± 0.003
Station	A	B	C	
BM1	4.214	1.214	3.000	
BM2	4.193	0.850	3.364	.001
BM3	4.193	0.969	3.245	.002
TOS	4.193	1.327	2.887	.001
WATER	4.193	2.178	2.036	0
CONTROL	A = B + C			
HWM	A = B + C			
BANKFULL	A = B + C			
BS (BM1)	A = B + C			

Circuit #2	HI	Rod Read	Elevation (m)	Station Measurements
Station	A	B	C	ID (m)
BM1	4.193	1.193	3.000	OD (m)
BM2	4.193	0.830	3.363	TOS to TOP (m)
BM3	4.193	0.950	3.243	Bolt to TOP (m)
TOS	4.193	1.305	2.888	Sensor to Bolt (m)
WATER	4.193	2.157	2.036	Bed to Bolt (m)
CONTROL	A = B + C			Sensor to Bed (m)
HWM	A = B + C			
BANKFULL	A = B + C			
BS (BM1)	A = B + C			

Field Staff: B.Sm. M.M.
Data Entry By: _____ Date: _____
Reviewed By: _____ Date: _____

Project #: 17-4-0167
Project Name: NANSEN

EDI

1°C light breeze
Weather: sunny

HID	HI-VC-DBC	Date	07-MAY-13	Discharge Measurement Instruments + Methods
Station Name	Victoria Ck d/s of Back Ck	Q Measurement Start Time:	12:18 PDT | PST	YSI | SWOFFER | PYGMY | ADV MID-SECT | POINT
		Q Measurement End Time:	12:46 PDT | PST	SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD
		Logger Download/Inst Time:	13:00 PDT | PST	Channel Conditions
		Logger Reading (m)	n/a [ ] 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]
	6798	6799	6800	6801	6802

Site Comments

Open water leads at salt input and YSI input locations. other areas, ice ~10-15cm thick.

Logger not D/L this trip.

Channel Measurements

Staff Gauge Height (m):	0.462 *ice
Weir Head (m):	n/a
Water Temperature (°C):	0°C
Water Surface Slope (%):	n/a
Average Width (m):	2.050
Average Depth (m):	0.184

Measurement Summary	Primary	Secondary
Meas. Type:	ADV	SS
Measurment ID (MID):		
Average Q (m^3/s):	0.2095	0.15
Q Meas. Accuracy +/- [%]:	4.6	
Average Velocity (m/s):	0.555	
Cross-Sectional Area (m^2):	0.378	

Salt Tracer

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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (12:18)	213.6 | 386.5	same as usual	1.2	20	60
2 (12:27)	213.7 | 380.0	" "	1.2	20	60
3 (:)	|				

V_1 for Sec. Mix (mL)	~~17~~ (16.6)
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	1 L
SPC_o Calib. Tank	213.7 / 2.8
CF.T =	8.14 E -06
Qsalt =	0.15

Notes: Conducted CFT @ camp.

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.	30	271.7	2.8
2.	30	329.4	2.8
3.	30	380.3	2.8
4.	30	428.8	2.9
5.			
6.			
7.			
8.			
9.			

Volum.

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

YES \| NO \| REASON: Survey Time (HH:MM): (WATER) 13:10 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	Rod Read	Elevation (m)	Station Measurements	
Station	A	B	C		Station	A	B	C	ID (m)	
BM1	A=3.302	1.302	3.000		BM1	A=3.318	1.318	3.000	OD (m)	
BM2	A=3.302	1.275	3.027	Ø	BM2	A=3.318	1.291	3.027	TOS to TOP (m)	
BM3	A=3.302	1.384	2.918	Ø	BM3	A=3.318	1.400	2.918	Bolt to TOP (m)	
TOS	A=3.302	1.952	2.350	.001	TOS	A=3.318	1.967	2.351	Sensor to Bolt (m)	
WATER	A=3.302	2.487	1.815	.002	WATER	A=3.318	2.508	1.810	Bed to Bolt (m)	
CONTROL	A = B + C		A-B=	.004	~~CONTROL~~	A = B + C, A=3.318	2.507	1.811	Sensor to Bed (m)	
HWM	A = B + C		A-B=		HWM	A = B + C		A-B=		
BANKFULL	A = B + C		A-B=		BANKFULL	A = B + C		A-B=		
BS (BM1)	A = B + C		A-B=		BS (BM1)	A = B + C		A-B=		

Field Staff: B.Sm. M.M.
Data Entry By: _____ Date: _____
Reviewed By: _____ Date: _____

Project #: 13-4-0167
Project Name: NANAIMO

EDI

Weather: ~0°C partly clearly. some light snow, no wind

HID	H-VC-R	Date	06-05-2013	Discharge Measurement Instruments + Methods	
Station Name	Victoria Creek at Road	Q Measurement Start Time:	13:05 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY (ADV)	MID-SECT | POINT
		Q Measurement End Time:	14:10 (HH:MM) PDT | PST	SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time:	N/A (HH:MM) PDT | PST	Channel Conditions	
		Logger Reading (m)	N/A [ ] downloaded	NONE | ICE | BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP. SED.	
Logger:	Serial # DID NOT DL THIS TRIP	HOBO | Solinst | N/A		GPS Waypoint	ZONE EASTING NORTHING
Photo #	[U/S] 6732	[D/S] 6730 - 31	[RDB] 6729	[LDB] 6733	[STAFF/WEIR] 6728

Site Comments

Large sections of open water. 60% open at station. Winter ADV location open. Ice and snow on banks. Collected samples for SS CFT. Did Q comp.

Channel Measurements

Staff Gauge Height (m):	0.362 * ice
Weir Head (m):	n/a
Water Temperature (°C):	0.0
Water Surface Slope (%):	n/a
Average Width (m):	3.150
Average Depth (m):	0.140

Measurement Summary	Primary	Secondary
Meas. Type:	ADV	~~SALT~~ SS
Measurment ID (MID):		
Average Q (m^3/s):	0.1218	0.10
Q Meas. Accuracy +/- [%]:	10.3	
Average Velocity (m/s):	0.276	—
Cross-Sectional Area (m^2):	0.441	—

Salt Tracer

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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (13:15)	494.0 | 668.4	~~60~~ 60	2.2	20	110
2 (13:40)	481.6 | 706.7	60	11	11	11
3 (:)	|				

V_1 for Sec. Mix (mL)	9 Css
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	1 L
SPC_o Calib. Tank	499.5 / 21.0°C
CF.T =	5.39×10^{-6}
Qsalt =	0.10

Notes: collected 9mL from SS for sec. soln

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.	524.6 ↔ 20mL		2.2
2.	20mL	~~2000~~ 754.1	2.3
3.	20mL	580.6	2.4
4.	30mL	618.8	2.4
5.	30mL	657.6	2.4
6.	30mL	722.8	2.4
7.			
8.			
9.			

Volum.

	[1]	[2]	[3]	[4]	[5]
Volume (L) =					
Time (sec)					
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

YES | NO | REASON: —

Survey Time (HH:MM): (WATER) 14:20 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	ID (m)	
BM1	3.9903	0.993	3.000		BM1	3.975 C	0.975	3.000	OD (m)	
BM2	3.A=9903	0.566	3.427	.001	BM2	3.A=975	0.549	3.426	TOS to TOP (m)	
BM3	A = B + C 3.993	0.822	3.171	Ø	BM3	3A=975	0.804	3.171	Bolt to TOP (m)	
TOS	A = B + C 3.993	1.437	2.556	Ø	TOS	3A=975	1.409	2.566	Sensor to Bolt (m)	
WATER	A = B + C 3.993	2.065	1.928	Ø	WATER	3.=975	2.047	1.928	Bed to Bolt (m)	
CONTROL	A = B + C		A-B=		CONTROL	A = B + C		A-B=	Sensor to Bed (m)	
HWM	A = B + C		A-B=		HWM	A = B + C		A-B=		
BANKFULL	A = B + C		A-B=		BANKFULL	A = B + C		A-B=		
BS (BM1)	A = B + C		A-B=		BS (BM1)	A = B + C		A-B=		

Field Staff: MM, BSm

Data Entry By: _____ Date: _____

Reviewed By: _____ Date: _____

Project #: Y-0167
Project Name: ADHANSEN

0.0050
20 | 0.100

Weather: Hot, 2°C

H-DX

HID	H-DX DX+105	Date	15/MAY/2013	Discharge Measurement Instruments + Methods	
Station Name	DX+105 Dome Ck.	Q Measurement Start Time:	15:06 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV	MID-SECT. | POINT
		Q Measurement End Time:	15:47 (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	ZONE	EASTING	NORTHING
Photo #	[U/S] 183 / 188	[D/S] 184 / 189	[RDB] 186 / 191	[LDB] 187 / 190	[STAFF/WEIR]	

Site Comments

Channel mostly open at DX-DX+105
High flows, mod. turbidity.
DX-DX mostly open, some ~~water~~ ponds braiding + some ice still present. Vol. measurement at culvert

SLUG \| CONSTANT RATE \| DRY LOGGED \| MANUAL SPC \| EC CF.T YES \| NO

Salt Tracer

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)	Css (kg/L)
1 (15:18)	208.8 | 412.4	35	0.100	20L	0.005
2 (15:32)	207.5 | ____	35			
3 (:)	____ | ____				
V_1 for Sec. Mix (mL)	~~200~~ 100				
Csec (g/L):	1 g/L				
Vol. Calib. Tank (L):	~~1~~ 500mL				
SPC_0 Calib. Tank	204.9				
CF.T =	~~1.183x10⁻⁴~~	1.18E-4			
Qsalt =	0.0151				

Notes: Reduced Calib Tank to 500mL b/c not enough volume.
CF.T = 1.18x10⁻⁴ cl-W

CF.T

Vol. Added (mL)	SPC (uS/cm)	Temp
1. 0	204.9	0.6°C
2. 20	223.5	0.6°C
3. 30	266.5	0.7°C
4. 30	293.6	0.8°C
5. 30	339.3	0.9°C
6. 30	381.4	0.9°C
7. 30	403.5	0.9°C
8. 30	427.6	0.9°C
9.		

Channel Measurements

Staff Gauge Height (m):	n/a
Weir Head (m):	n/a
Water Temperature (°C):	0.5°C
Water Surface Slope (%):	n/a
Average Width (m):	n/a
Average Depth (m):	n/a

Measurement Summary	Primary	Secondary
Meas. Type:	SS	Vol.
Measurment ID (MID):	729	730
Average Q (m^3/s):	~~0.0073~~ 0.0151	0.0073
Q Meas. Accuracy +/- [%]:		
Average Velocity (m/s):		
Cross-Sectional Area (m^2):		

Volum. @ culvert

Volume (L) =	~~20~~ 17	19	19	18	20
Time (sec)	[1] 2.29	[2] 2.84	[3] 2.54	[4] 2.58	[5] 2.59
Average Q (L/s) =	7.4	6.7	7.48	6.98	7.7
Avg. Q_{vol} (L/s) =	7.3		Avg Q_{vol} (m^3/s) =	0.0073	

Hydrometric Levels - Survey

YES \| NO \| REASON: NO CONTINUOUS STN. 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	ID (m)
Station	A	B	C		Station	A	B	C		
BM1	A = B + C		3.000		BM1	A = B + C		3.000	OD (m)	
BM2	A = B + C		A-B =		BM2	A = B + C		A-B =	TOS to TOP (m)	
BM3	A = B + C		A-B =		BM3	A = B + C		A-B =	Bolt to TOP (m)	
TOS	A = B + C		A-B =		TOS	A = B + C		A-B =	Sensor to Bolt (m)	
WATER	A = B + C		A-B=		WATER	A = B + C		A-B=	Bed to Bolt (m)	
CONTROL	A = B + C		A-B=		CONTROL	A = B + C		A-B=	Sensor to Bed (m)	
HWM	A = B + C		A-B=		HWM	A = B + C		A-B=		
BANKFULL	A = B + C		A-B=		BANKFULL	A = B + C		A-B=		
BS (BM1)	A = B + C		A-B=		BS (BM1)	A = B + C		A-B=		

Field Staff: DS CL JM
Data Entry By: CL Date: 30 MAY 2013
Reviewed By: Date:

Project #: -0167
Project Name: Nansen

Weather: Overc 2°C

HID	H-DC-6M	Date	15/MAY/2013	Discharge Measurement Instruments + Methods	
Station Name	Dome creek MIDDLE	Q Measurement Start Time:	10:18 (HH:MM) PDT | PST	SWOFFER | PYGMY | ADV MID-SECT | POINT	
		Q Measurement End Time:	10:58 (HH:MM) PDT | PST	SALT TRACER |WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time:	10:18 (HH:MM) PDT | PST	Channel Conditions	
		Logger Reading (m)	-0.3482 downloaded	NONE | ICE | BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP. SED.	
Logger:	Serial # 1050018	HOBO | Solinst | N/A		GPS Waypoint	ZONE EASTING NORTHING
Photo #	[U/S] 0039	[D/S] 0040	[RDB] 0041	[LDB] 0042	[STAFF/WEIR] 0043

Site Comments

Survey notes in JM's Book - Pg 1
Site well channelized. Stilling well still frozen, not able to retrofit well.
Water temp @ 00°
Could not find BM#3
Mod. suspended sediments

Channel Measurements

Staff Gauge Height (m):	0.299
Weir Head (m):	n/a
Water Temperature (°C):	0.0°C
Water Surface Slope (%):	
Average Width (m):	
Average Depth (m):	

Measurement Summary	Primary	Secondary
Meas. Type:	SALT(SS)	
Measurment ID (MID):	731	
Average Q (m^3/s):	0.1308	
Q Meas. Accuracy +/- [%]:		
Average Velocity (m/s):		
Cross-Sectional Area (m^2):		

Salt Tracer

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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_e (kg)	Volume (L)	Css (kg/L)
1 (10 :28)	260.5 | 361.5	~50m (JM)	0.300	20	0.015
2 (10 :31)	259.2 | 374.9	"	"	"	0.015
3 (:)	|				

V_1 for Sec. Mix (mL)	66 mL
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	1 L
SPC_0 Calib. Tank	245.5
CF.T =	3.619×10^{-5}
Qsalt =	0.1308

Notes:
Used 1 NaCl Subsequent trips.

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.	0	245.5	0.2
2.	20 mL	280.3	0.2
3.	20 mL	314.6	0.2
4.	20	341.4	0.3
5.	20	374.8	0.3
6.	20	403.0	0.4
7.			
8.			
9.			

Volum.

Volume (L) =	(n/a)			
Time (sec)	[1]	[2]	[3]	[4] [5]
Average Q (L/s) =				
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/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
Station	A	B	C	
BM1	4.624	1.624	3.000	
BM2	A = B + C	2.310	2.314	
BM3	A = B + C		A-B=	
TOS	A = B + C	2.162	2.462	
WATER	A = B + C	2.862	1.762	
CONTROL	A = B + C		A-B=	
HWM	A = B + C		A-B=	
BANKFULL	A = B + C		A-B=	
BS (BM1)	A = B + C	1.624	A-B=	

Circuit #2	H I	Rod Read	Elevation (m)	Station Measurements	
Station	A	B	C	ID (m)	
BM1	4.597	1.597	3.000	OD (m)	
BM2	A = B + C	2.283	2.314	TOS to TOP (m)	
BM3	A = B + C		A-B=	Bolt to TOP (m)	
TOS	A = B + C	2.135	2.462	Sensor to Bolt (m)	
WATER	A = B + C	2.831	1.766	Bed to Bolt (m)	
CONTROL	A = B + C		A-B=	Sensor to Bed (m)	
HWM	A = B + C		A-B=		
BANKFULL	A = B + C		A-B=		
BS (BM1)	A = B + C	1.597	A-B=		

Field Staff: DS CL JM
Data Entry By: CL Date: 30 MAY 2013
Reviewed By: Date:

Project #: Y-0167
Project Name: Ivanhoe

Weather: Over ___ °C

HID	H-DC-B	Date	15/MAY/2013	Discharge Measurement Instruments + Methods	
Station Name	Diversion Ch. at Bridge	Q Measurement Start Time:	11:20 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV	MID-SECT. | POINT
		Q Measurement End Time:	11:46 (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 # n/a	HOBO | Solinst | N/A	GPS Waypoint	ZONE	EASTING / NORTHING
Photo #	[U/S] 0050	[D/S] 0051	[RDB] 0052	[LDB] 0053	[STAFF/WEIR]

Site Comments

Channel open. Ice + snow on banks to bed. High suspended sediment + fast flows.

Channel Measurements

Staff Gauge Height (m):	n/a
Weir Head (m):	n/a
Water Temperature (°C):	0°C
Water Surface Slope (%):	75cm
Average Width (m):	(12-20cm) 75cm
Average Depth (m):	12-20cm

Measurement Summary	Primary	Secondary
Meas. Type:	SALT (SS)	
Measurment ID (MID):	732	
Average Q (m^3/s):	0.1192	
Q Meas. Accuracy +/- [%]:		
Average Velocity (m/s):		
Cross-Sectional Area (m^2):		

Salt Tracer

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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (11:28)	244.6 | 437.0		0.20	20 L	0.01
2 (11:32)	245.6 | 479.2		0.20	20	0.01
3 (:)	___ | ___				

V_1 for Sec. Mix (mL)	~~500mL~~ 50mL
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	1x 500mL
SPC_0 Calib. Tank	
CF.T =	5.47×10^{-5}
Qsalt =	0.1192

Notes: V. fast rel. water + peak

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.	0	247.6	0.3
2.	10	262.2	0.4
3.	10	297.6	0.4
4.	10	301.1	0.4
5.	20	332.6	0.5
6.	20	360.6	0.5
7.	20	386.0	0.5
8.	30	427.2	0.6
9.	30	466.4	0.7

Volum.

Volume (L) =				
Time (sec)	[1]	[2]	[3]	[4] [5]
Average Q (L/s) =				
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/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	ID (m)
BM1	A = B + C		3.000		BM1	A = B + C		3.000	OD (m)
BM2	A = B + C		A-B =		BM2	A = B + C		A-B =	TOS to TOP (m)
BM3	A = B + C		A-B =		BM3	A = B + C		A-B =	Bolt to TOP (m)
TOS	A = B + C		A-B =		TOS	A = B + C		A-B =	Sensor to Bolt (m)
WATER	A = B + C		A-B =		WATER	A = B + C		A-B =	Bed to Bolt (m)
CONTROL	A = B + C		A-B =		CONTROL	A = B + C		A-B =	Sensor to Bed (m)
HWM	A = B + C		A-B =		HWM	A = B + C		A-B =	
BANKFULL	A = B + C		A-B =		BANKFULL	A = B + C		A-B =	
BS (BM1)	A = B + C		A-B =		BS (BM1)	A = B + C		A-B =	

Field Staff: CL / JM / DS
Data Entry By: CL Date: 30 MAY 2013
Reviewed By: ___ Date: ___

Project #: Y-0167
Project Name: NADYCA

Weather: 0°C, snow

HID	H-SEEP	Date	15/MAY/2013	Discharge Measurement Instruments + Methods	
Station Name	SEEP	Q Measurement Start Time:	11:00 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV	MID-SECT. | POINT
		Q Measurement End Time:	11:10 (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] 0049 (Site Photo)	[D/S]	[RDB]	[LDB]	[STAFF/WEIR]

Site Comments

Flow meter 186.203 LPM = #0048 photo

Channel Measurements

Staff Gauge Height (m):	
Weir Head (m):	
Water Temperature (°C):	
Water Surface Slope (%):	
Average Width (m):	
Average Depth (m):	

Measurement Summary	Primary	Secondary
Meas. Type:	V	
Measurment ID (MID):	733	
Average Q (m^3/s):	0.0026	
Q Meas. Accuracy +/- [%]:		
Average Velocity (m/s):		
Cross-Sectional Area (m^2):		

Salt Tracer

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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (:)	____ | ____				
2 (:)	____ | ____				
3 (:)	____ | ____				

		CF.T	Vol. Added (mL)	SPC (uS/cm)	Temp
V_1 for Sec. Mix (mL)			1.		
Csec (g/L):	1 g/L		2.		
Vol. Calib. Tank (L):	1 L		3.		
SPC_0 Calib. Tank			4.		
CF.T =			5.		
Qsalt =			6.		
Notes:			7.		
			8.		
			9.		

Volum.

Volume (L) =	~~20~~ 19	~~20~~ 19	~~20~~ 19	20L	20L
Time (sec)	[1] 7.75	[2] 7.31	[3] 7.62	[4] 7.37	[5] 7.25
Average Q (L/s) =	2.45	2.43	2.57	2.75	2.75
Avg. Q_{vol} (L/s) =	2.570		Avg Q_{vol} (m^3/s) =	0.0026	

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	ID (m)	
BM1	A = B + C		3.000		BM1	A = B + C		3.000	OD (m)	
BM2	A = B + C		A-B=		BM2	A = B + C		A-B=	TOS to TOP (m)	
BM3	A = B + C		A-B=		BM3	A = B + C		A-B=	Bolt to TOP (m)	
TOS	A = B + C		A-B=		TOS	A = B + C		A-B=	Sensor to Bolt (m)	
WATER	A = B + C		A-B=		WATER	A = B + C		A-B=	Bed to Bolt (m)	
CONTROL	A = B + C		A-B=		CONTROL	A = B + C		A-B=	Sensor to Bed (m)	
HWM	A = B + C		A-B=		HWM	A = B + C		A-B=		
BANKFULL	A = B + C		A-B=		BANKFULL	A = B + C		A-B=		
BS (BM1)	A = B + C		A-B=		BS (BM1)	A = B + C		A-B=		

Field Staff: CL DM PS
Data Entry By: CL Date: 30 MAY 2013
Reviewed By: Date:

Project #: 17-0167
Project Name: NANUSEN

Weather: Sun, 5°C

HID	H-PC-U	Date	15/MAY/2013	Discharge Measurement Instruments + Methods	
Station Name	Pony Ck Upper	Q Measurement Start Time:	13:33 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV	MID-SECT. | POINT
		Q Measurement End Time:	14:05 (HH:MM) PDT | PST	SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time:	n/a (HH:MM) PDT | PST	Channel Conditions	
		Logger Reading (m)	— [ ] downloaded	NONE | ICE | BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP. SED.	

Logger:	Serial # no logger, n/a	HOBO | Solinst | N/A	GPS Waypoint	ZONE	EASTING NORTHING
Photo #	[U/S] 0073	[D/S] 0074	[RDB] 0075	[LDB] 0076	[STAFF/WEIR] 0077 + 78

Site Comments

SS @ Hydro stn. No stilling well present
Frozen bed/ice @ stn. Wier has 3 flows-round channels active.
[Logger length 1.1595m]

Channel Measurements @ WIER

Staff Gauge Height (m):	N/A
Weir Head (m):	0.550m (back from weir 30cm)
Water Temperature (°C):	
Water Surface Slope (%):	
Average Width (m):	
Average Depth (m):	

Measurement Summary	Primary	Secondary
Meas. Type:	SALT(SS)	✓
Measurment ID (MID):	734	735
Average Q (m^3/s):	0.0191	0.0028
Q Meas. Accuracy +/- [%]:		
Average Velocity (m/s):		
Cross-Sectional Area (m^2):		

Salt Tracer — 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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_e (kg)	Volume (L)	Css (kg/L)
1 (13:40)	544.8 | 798.2	30	.300	20	0.015
2 (13:47)	45.9 | 769.5	30	.300	20	0.015
3 (:)	|				

V_1 for Sec. Mix (mL)	66 mL
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	1 L
SPC_0 Calib. Tank	1 L
CF.T =	3.47×10^{-5}
Qsalt =	0.0191

Notes:
Wier taken volumetric not capturing all flows... only part of upstream flow at SS.

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.	0	45.3	0.1
2.	30	96.4	0.1
3.	30	197.3	0.2
4.	30	238.6	0.2
5.	30	245.1	0.2
6.	30	279.2	0.2
7.	60	377.1	0.2
8.	60	432.2	0.2
9.	60	500.5	0.3

Volum.

Volume (L) =	18	20	20	19	19
Time (sec)	[1] 6.77	[2] 7.02	[3] 6.84	[4] 6.42	[5] 7.00
Average Q (L/s) =	2.66	2.85	2.92	2.96	2.71
Avg. Q_{vol} (L/s) =	2.82		Avg Q_{vol} (m^3/s) =	0.0028	

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	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	ID (m)	
BM1	A = B + C		3.000		BM1	A = B + C		3.000	~~OD (m)~~	
BM2	A = B + C		A-B=		BM2	A = B + C		A-B=	~~TOS to TOP (m)~~	
BM3	A = B + C		A-B=		BM3	A = B + C		A-B=	~~Bolt to TOP (m)~~	
TOS	A = B + C		A-B=		TOS	A = B + C		A-B=	~~Sensor to Bolt (m)~~	
WATER	A = B + C		A-B=		WATER	A = B + C		A-B=	~~Bed to Bolt (m)~~	
CONTROL	A = B + C		A-B=		CONTROL	A = B + C		A-B=	Sensor to Bed (m)	
HWM	A = B + C		A-B=		HWM	A = B + C		A-B=	Logg Length to Bolt	1.1595
BANKFULL	A = B + C		A-B=		BANKFULL	A = B + C		A-B=		
BS (BM1)	A = B + C		A-B=		BS (BM1)	A = B + C		A-B=		

Weir - at v-notch = 0.071m.

Field Staff: CL, DS, JM
Data Entry By: CL Date: 30 MAY 2013
Reviewed By: Date:

Project #: 13-7-0167 (~~13-7-003~~)
Project Name: Hunter

Weather: Sun, ~ °C

HID	14-PC-DSP	Date	15/MAY/2013	Discharge Measurement Instruments + Methods	
Station Name	Pony Ck. Downstream of pit	Q Measurement Start Time:	12:41 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV MID-SECT. | POINT	
		Q Measurement End Time:	13:14 (HH:MM) PDT | PST	SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time:	12:58 (HH:MM) PDT | PST	Channel Conditions	
		Logger Reading (m)	[ ] downloaded	NONE | ICE | BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP. SED.	
Logger:	Serial # see ndtg.	HOBO | Solinst | N/A		GPS Waypoint	ZONE EASTING NORTHING
Photo #	[U/S] 0068	[D/S] 0069	[RDB] 0070	[LDB] 0071	[STAFF/WEIR] # 0072

Site Comments

LOGGER SENSOR TO METAL TOP = 1.168 m (line on HOBO)
Installed retrofit cable replacement

Channel Measurements

Staff Gauge Height (m):	0.328 m
Weir Head (m):	-
Water Temperature (°C):	0.5°C
Water Surface Slope (%):	
Average Width (m):	
Average Depth (m):	

Measurement Summary	Primary	Secondary
Meas. Type:	SALT (SI)	
Measurment ID (MID):	736	
Average Q (m^3/s):	0.019	
Q Meas. Accuracy +/- [%]:		
Average Velocity (m/s):		
Cross-Sectional Area (m^2):		

Salt Tracer — SLUG | CONSTANT RATE | DRY LOGGED | MANUAL SPC | EC CF.T YES | NO

Trial Time	SPC_B | SPC_P EC_0(uS/cm) | EC_{pk}(uS/cm) |	Mix Length L_m (m)	Mass of Salt Ms_a (kg)	Mix Vol. Volume (L)	[Salt Slug] Css (kg/L)
1 (12:41)	51.8 | ~~268.3~~	~30	0.2	20	0.01
2 (12:48)	252.8 | 274.3		0.2	20	0.01
3 (:)	|				

V_1 for Sec. Mix (mL)	~~100~~ 50 mL
Csec (g/L):	~~1~~ g/L 19
Vol. Calib. Tank (L):	1 L 500mL
SPC_0 Calib. Tank	51.5
CF.T =	~~5.825 x10^{-5}~~ ~~5.32E-5~~
Qsalt =	0.019

CF.T = 1.02×10^{-4}

Notes: Put in D/S of culvert
T = 0.5°C, v/fast wave

Vol. Added (mL)	SPC (uS/cm)	Temp
1. 0	51.5	1.6°C
2. 20	~~146.~~ 86.0	1.7°C
3. 20	112.0	2.1
4. 20	142.0	1.9°C
5. 20	168.3	2.1°C
6. 30	205.6	2.3°C
7. 30	244.9	2.4°C
8. 30	280.2	2.6°C
9.		

Volum.

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/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
Station	A	B	C	
BM1	4.462	1.462	3.000	
BM2	A = B + C	1.246	3.216	
BM3	A = B + C	0.776	3.686	
TOS	A = B + C	1.262	3.200	
WATER	A = B + C	1.938	2.524	
~~CONTROL~~ Logger	A = B + C	1.013	3.449	
HWM	A = B + C		A-B=	
BANKFULL	A = B + C		A-B=	
BS (BM1)	A = B + C	1.462	3.000	

Circuit #2	H I	Rod Read	Elevation (m)
Station	A	B	C
BM1	4.432	1.432	3.000
BM2	A = B + C	1.215	3.217
BM3	A = B + C	0.746	3.686
TOS	A = B + C	1.231	3.201
WATER	A = B + C	1.906	2.526
~~CONTROL~~ Logger	A = B + C	0.982	3.450
~~HWM~~	A = B + C		A-B=
BANKFULL	A = B + C		A-B=
BS (BM1)	A = B + C	1.432	3.000

Station Measurements	
ID (m)	
OD (m)	
TOS to TOP (m)	
Bolt to TOP (m)	
Sensor to Bolt (m)	
Bed to Bolt (m)	
Sensor to Bed (m)	
Logger Rod	1.168

Field Staff: CL DS JM
Data Entry By: CL Date: 30 MAY 2013
Reviewed By: Date:

Project #: Y-0067
Project Name: _____

Weather: Sun 5°C

HID	H-VC-UMN	Date	16-MAY-2013	Discharge Measurement Instruments + Methods	
Station Name	Victoria Creek Upstream of Min. S Creek	Q Measurement Start Time:	10:06 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV	MID-SECT. | POINT
		Q Measurement End Time:	10:40 (HH:MM) PDT | PST	SALT | TRACER | WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time:	10:28 (HH:MM) PDT | PST	Channel Conditions	
		Logger Reading (m)	— [ ] downloaded	NONE | ICE | BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP. SED.	
Logger:	Serial # 9896527	HOBO | Solinst | N/A		GPS Waypoint	ZONE EASTING NORTHING
Photo #	[U/S] 0081	[D/S] 0082	[RDB] 0083	[LDB] 0084	[STAFF/WEIR] 0087/0086

Site Comments

1.157m Logger line — Top of Metal Well Retro fit = Logger & Angle Iron

Channel Measurements

Staff Gauge Height (m):	0.885 m
Weir Head (m):	—
Water Temperature (°C):	~~0.0~~ -0.1°C
Water Surface Slope (%):	
Average Width (m):	6.10 m
Average Depth (m):	0.320

Measurement Summary	Primary	Secondary
Meas. Type:	ADV	SS
Measurment ID (MID):	738	737
Average Q (m^3/s):	2.0619	1.97
Q Meas. Accuracy +/- [%]:	2.2%	
Average Velocity (m/s):	1.058	
Cross-Sectional Area (m^2):	1.949	

Salt Tracer — 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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (10:08) 5sec	92.0 | 170.4	67	2.5	20	0.125
2 (10:14) 3sec	91.9 | 159.0	90	2.5	20	0.125
3 (:)	|				

V_1 for Sec. Mix (mL)	8
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	1 L
SPC_0 Calib. Tank	96.3
CF.T =	3.71E-6
Qsalt =	1.97

Notes: Salt mixing lengthened on 2nd trial to ensure mixing.

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.	0	96.3	0.4
2.	~~30~~ 10	102.7	0.5
3.	10	136.5	0.5
4.	10	155.5	0.7
5.	10	177.4	0.7
6.			
7.			
8.			
9.			

Volum. N/A

Volume (L) =				
Time (sec)	[1]	[2]	[3]	[4] [5]
Average Q (L/s) =				
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =	

Hydrometric Levels - Survey

YES | NO | REASON: Survey Time (HH:MM): (WATER) 10:30 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	ID (m)
BM1	4.196 A+C	1.196	3.000	0	BM1	4.160 A+C	1.160	3.000	OD (m)
BM2	A = B + C	1.189	3.007	0.002	BM2	A = B + C	1.155	3.005	~~TOS to TOP (m)~~
BM3	A = B + C	1.518	2.678	0.001	BM3	A = B + C	1.483	2.677	~~Bolt to TOP (m)~~
TOS	A = B + C	2.213	1.983	0.002	TOS	A = B + C	2.179	~~1.981~~	~~Sensor to Bolt (m)~~
WATER	A = B + C	2.319	1.877	0.000	WATER	A = B + C	2.283	~~1.877~~	~~Bed to Bolt (m)~~
~~CONTROL~~	A = B + C	1.997	2.199	0.001	LOGGER/~~CONTROL~~	A = B + C	1.962	2.198	~~Sensor to Bed (m)~~
HWM	A = B + C	1.807	2.389	0.004	HWM	A = B + C	1.767	2.393	LOGGER ROD (m) 1.157 m
BANKFULL	A = B + C	1.615	2.581	0.010	BANKFULL	A = B + C	1.589	2.571	
BS (BM1)	A = B + C	1.195	3.000	0	BS (BM1)	A = B + C	1.160	3.000	

Logger

Field Staff: DS CL JM
Data Entry By: CL Date: 20 MAY 2013
Reviewed By: _____ Date: _____

Project #: 1-167
Project Name: Minnesota

Weather: Sun, 5°C

HID	H-MN	Date	16/MAY/2012	Discharge Measurement Instruments + Methods	
Station Name	Minnesota Creek	Q Measurement Start Time:	8:39 (HH:MM) PDT | PST	SWOFFER | PYGMY | ADV MID-SECT. | POINT	
		Q Measurement End Time:	9:10 (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

Frozen Bed to water flowing over, well channel defination, ADV + SALT slug performed. Stn. still frozen to top + submerged. No survey b/c station is submerged + frozen hybrid

Channel Measurements

Staff Gauge Height (m):	
Weir Head (m):	
Water Temperature (°C):	~0.1°C
Water Surface Slope (%):	
Average Width (m):	~2.6
Average Depth (m):	0.132

Measurement Summary	Primary	Secondary
Meas. Type:	ADV	SS **
Measurment ID (MID):	740	739
Average Q (m^3/s):	0.3526	0.0761
Q Meas. Accuracy +/- [%]:	1.8%	
Average Velocity (m/s):	1.025	
Cross-Sectional Area (m^2):	0.0344	

** SS + ADV do not line up SS approx to low

Salt Tracer

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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (9:05)	28.1 | 332.2	32	0.5	20	0.025
2 (9:08)	28.2 | 290.3	32	0.5	20	0.025
3 (:)	|				

V_1 for Sec. Mix (mL)	40
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	1 L
SPC_0 Calib. Tank mL	1000
CF.T =	2.59 E-5
Qsalt =	0.0761 **

Notes: T = 0.0°C
Unusual mixing length due to pools & eddies

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.	6	28.4	0.1
2.	30	70.0	0.2
3.	30	127.1	0.2
4.	30	173.9	0.3
5.	30	195.9	0.3
6.	30	228.1	0.3
7.	30	249.2	0.3
8.	60	318.8	0.3
9.			

Volum.

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/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	ID (m)	
BM1	A = B + C		3.000		BM1	A = B + C		3.000	OD (m)	
BM2	A = B + C		A-B =		BM2	A = B + C		A-B =	TOS to TOP (m)	
BM3	A = B + C		A-B =		BM3	A = B + C		A-B =	Bolt to TOP (m)	
TOS	A = B + C		A-B =		TOS	A = B + C		A-B =	Sensor to Bolt (m)	
WATER	A = B + C		A-B=		WATER	A = B + C		A-B=	Bed to Bolt (m)	
CONTROL	A = B + C		A-B=		CONTROL	A = B + C		A-B=	Sensor to Bed (m)	
HWM	A = B + C		A-B=		HWM	A = B + C		A-B=		
BANKFULL	A = B + C		A-B=		BANKFULL	A = B + C		A-B=		
BS (BM1)	A = B + C		A-B=		BS (BM1)	A = B + C		A-B=		

Field Staff: CL / JM / DS
Data Entry By: CL Date: 30 MAY 2013
Reviewed By: Date:

Project #: 67-Y-13
Project Name: MT NANSEN

Weather: Sun & cloud, Calm, 12°C

HID	H Bc	Date	16 05 2013	Discharge Measurement Instruments + Methods	
Station Name	Back creek	Q Measurement Start Time:	13:20 PDT | PST	YSI | SWOFFER | PYGMY | ADV. MID-SECT. | POINT	
		Q Measurement End Time:	13:50 (HH:MM) PDT | PST	SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time:	13:42 (HH:MM) PDT | PST	Channel Conditions	
		Logger Reading (m)	/ [ ] downloaded	NONE | ICE | BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP. SED.	

Logger:	Serial # 9896531	HOBO | Solinst | N/A	GPS Waypoint	ZONE	EASTING	NORTHING	
Photo #	[U/S] 0107	[D/S] 0108	[RDB] 0109	[LDB] 0110	[STAFF/WEIR] 0111		

Site Comments

Logger Line - Top of metal 1.160 m (logger rod)
retro fit logger installed on Drilled Angle Iron

Channel Measurements

Staff Gauge Height (m):	0.445
Weir Head (m):	/
Water Temperature (°C):	2.7°C
Water Surface Slope (%):	/
Average Width (m):	1.7
Average Depth (m):	0.225

Measurement Summary	Primary	Secondary
Meas. Type:	ADV	SS
Measurment ID (MID):	741	~~748~~ 742
Average Q (m^3/s):	0.3395	0.18
Q Meas. Accuracy +/- [%]:	2.2%	
Average Velocity (m/s):	0.886	
Cross-Sectional Area (m^2):	0.383	

Salt Tracer

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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (14:06)	71.8 | 119.2		0.2	20	0.01
2 (14:10)	71.4 | 76 (incorrect)		0.2	20	0.01
3 (:)	____ | ____				

V_1 for Sec. Mix (mL)	200 ~~50~~	
Csec (g/L):	1 g/L	
Vol. Calib. Tank (L):	14 ~~XL 500~~	
SPC_0 Calib. Tank	76.0	
CF.T =	4.42×10^{-5}	
Qsalt =	0.18	

Notes:
T= 2.8°C
V. turbid, high bed load

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.	0	76.0	2.7
2.	20	89.4	2.7
3.	20	139.7	2.7
4.	10	167.7	2.8
5.	10	177.3	2.7
6.			
7.			
8.			
9.			

Volumetric

N/A

Volume (L) =				
Time (sec)	[1]	[2]	[3]	[4] [5]
Average Q (L/s) =				
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =	

Hydrometric Levels - Survey

YES | NO | REASON: Survey Time (HH:MM): (WATER) ± 0.003 BM Shift: Yes| No Logger Shift: Yes| No Staff Gauge Shifted?: Yes| No

Circuit #1	H I	Rod Read	Elevation (m)	Circuit #2	H I	Rod Read	Elevation (m)	Station Measurements	
Station	A	B	C	Station	A	B	C	ID (m)	
BM1	4.399 A = B + C	1.399	3.000	BM1	A = B + C		3.000	OD (m)	
BM2	A = B + C	1.397	3.002	BM2	A = B + C			~~TOS to TOP (m)~~	
BM3	A = B + C	1.363	3.036	BM3	A = B + C			~~Bolt to TOP (m)~~	
TOS	A = B + C	1.755	2.644	TOS	A = B + C			~~Sensor to Bolt (m)~~	
WATER	A = B + C	2.317	2.082	WATER	A = B + C			~~Bed to Bolt (m)~~	
~~CONTROL~~ Logger	A = B + C	1.520	2.879	Logger ~~CONTROL~~	A = B + C			~~Sensor to Bed (m)~~	
HWM	A = B + C			HWM	A = B + C			LOGGER ROD	1.160
BANKFULL	A = B + C			BANKFULL	A = B + C				
BS (BM1)	A = B + C	1.399	3.000	BS (BM1)	A = B + C				

Field Staff: JM DS CL
Data Entry By: CL Date: 30 MAY 2013
Reviewed By: Date:

Project #: 7
Project Name: Mt Hansen

Weather: Sunny 1-bar Calm +15°C

HID	H-VC-U	Date	16-05-2013	Discharge Measurement Instruments + Methods	
Station Name	Victoria Crk Upper	Q Measurement Start Time:	12:33 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV MIDSECT | POINT	
		Q Measurement End Time:	13:15 (HH:MM) PDT | PST	SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time:	12:58 (HH:MM) PDT | PST	Channel Conditions	
		Logger Reading (m)	0.0040 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] 0102	[D/S] 0103	[RDB] 0104	[LDB] 0105	[STAFF/WEIR] C 106

Site Comments

- Good conditions, flow is near peak flow.
- No maintenance required
- ~~Need~~ Stilling wells need retrofit with logger rod.
  - need to check Tosser winter,
  - may have squeezed glycol out.

~~H2O S = 2.329 0.0040~~

N/A

Channel Measurements

Staff Gauge Height (m):	0.448
Weir Head (m):	/
Water Temperature (°C):	0.8°C
Water Surface Slope (%):	- .
Average Width (m):	5.400
Average Depth (m):	0.427

Measurement Summary	Primary	Secondary
Meas. Type:	ADV	
Measurment ID (MID):	743	
Average Q (m^3/s):	2.1366	
Q Meas. Accuracy +/- [%]:	1.9	
Average Velocity (m/s):	0.928	
Cross-Sectional Area (m^2):	2.303	

Salt Tracer

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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_e (kg)	Volume (L)	Css (kg/L)
1 (:)	____ | ____				
2 (:)	____ | ____				
3 (:)	____ | ____				

		CF.T	Vol. Added (mL)	SPC (uS/cm)	Temp
V_1 for Sec. Mix (mL)	= 1 / Css		1.		
Csec (g/L):	1 g/L		2.		
Vol. Calib. Tank (L):	1 L		3.		
SPC_0 Calib. Tank			4.		
CF.T =			5.		
Qsalt =			6.		
Notes:			7.		
			8.		
			9.		

N/A

Volumetric

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

YES | NO | REASON: Survey Time (HH:MM) (WATER) ± 0.003 BM Shift: Yes| No Logger Shift: Yes| No Staff Gauge Shifted?: Yes| No

Circuit #1	H I	Rod Read	Elevation (m)		Circuit #2	H I	Rod Read	Elevation (m)	Station Measurements	
Station	A	B	C		Station	A	B	C	ID (m)	1.262
BM1	4372 A = B + C	1.372	3.000		BM1	4346 A = B + C	1.346	3.000	OD (m)	1.270
BM2	A = B + C	1.009	3.363	0	BM2	A = B + C	0.983	3.363	TOS to TOP (m)	
BM3	A = B + C	1.128	3.244	1	BM3	A = B + C	1.102	3.243	Bolt to TOP (m)	
TOS	A = B + C	1.483	2.889	0	TOS	A = B + C	1.457	2.889	Sensor to Bolt (m)	
WATER	A = B + C	2.043	2.329	2	WATER	A = B + C	2.019	2.327	Bed to Bolt (m)	
~~CONTROL~~	~~A = B + C~~				~~CONTROL~~	~~A = B + C~~			Sensor to Bed (m)	
~~HWM~~	~~A = B + C~~				~~HWM~~	~~A = B + C~~				
BANKFULL	A = B + C	1.905	2.467		BANKFULL	A = B + C	1.814	2532		
BS (BM1)	A = B + C	1.372	3.000	✓	BS (BM1)	A = B + C	1.346	3.000		

Field Staff: DS JM CL
Data Entry By: ____ Date: 30 MAY 2013
Reviewed By: ____ Date: ____

Project #: -Y-0167
Project Name: Nansen

Weather: Overcast Little wind

HID	14-VC-REF	Date	16 MAY 2013	Discharge Measurement Instruments + Methods	
Station Name	Victoria Creek Reference	Q Measurement Start Time:	14:30 (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:	13:15 (HH:MM) PDT | PST	Channel Conditions	
		Logger Reading (m)	[ ] downloaded	NONE | ICE | BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP. SED.	

Logger:	Serial # 9908152	HOBO | Solinst | N/A	GPS Waypoint	ZONE	EASTING	NORTHING
Photo #	[U/S] 0211	[D/S] 0212	[RDB] 0213 0214	[LDB] 0213	[STAFF/WEIR] 0210	

Site Comments

Near Bankfull. Trail on entrance hike has evidence of high flow > 2' of current
116.5 cm = length of logger rod to sensor line. installed at 15:15 16 MAY 2013

Channel Measurements

Staff Gauge Height (m):	.801
Weir Head (m):	/
Water Temperature (°C):	1.0
Water Surface Slope (%):	/
Average Width (m):	5.806
Average Depth (m):	0.349

Measurement Summary	Primary	Secondary
Meas. Type:	ADV	
Measurment ID (MID):	744	
Average Q (m^3/s):	2.0745	
Q Meas. Accuracy +/- [%]:	2.4	
Average Velocity (m/s):	1.023	
Cross-Sectional Area (m^2):	2.027	

N/A

Salt Tracer

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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (:)	____ | ____				
2 (:)	____ | ____				
3 (:)	____ | ____				

		CF.T	Vol. Added (mL)	SPC (uS/cm)	Temp
V_1 for Sec. Mix (mL)			1.		
Csec (g/L):	1 g/L		2.		
Vol. Calib. Tank (L):	1 L		3.		
SPC_0 Calib. Tank			4.		
CF.T =			5.		
Qsalt =			6.		
Notes:			7.		
			8.		
			9.		

N/A

Volum.

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

YES | NO | REASON: Survey Time (HH:MM) (WATER) ± 0.003 BM Shift: Yes| No Logger Shift: Yes| No Staff Gauge Shifted?: Yes| No

Circuit #1	H I	Rod Read	Elevation (m)		Circuit #2	H I	Rod Read	Elevation (m)	Station Measurements	
Station	A	B	C		Station	A	B	C	ID (m)	
BM1	4.475 A = B + C	1.475	3.000		BM1	A = B + C		3.000	OD (m)	—
BM2	A = B + C	1.507	2.968		BM2	A = B + C		A-B =	TOS to TOP (m)	—
BM3	A = B + C	1.428	3.047		BM3	A = B + C		A-B =	Bolt to TOP (m)	—
TOS	A = B + C	2.165	2.310		TOS	A = B + C		A-B =	Sensor to Bolt (m)	—
WATER	A = B + C	2.379	2.096		WATER	A = B + C		A-B =	Bed to Bolt (m)	—
~~CONTROL~~ Logger	A = B + C	1.971	2.504		CONTROL	A = B + C		A-B =	Sensor to Bed (m)	—
HWM	A = B + C	1.981	2.494		HWM	A = B + C		A-B =	LOGGER ROD	1.165 m
BANKFULL	A = B + C	1.745	2.730		BANKFULL	A = B + C		A-B =		
BS (BM1)	A = B + C	1.475	3.000		BS (BM1)	A = B + C		A-B =		

May 17 - took winterization off logger + re-deployed bc of incorrect values.
STAFF 0.632.

Field Staff: DS - CL - JM
Data Entry By: CL Date: 30-MAY2013
Reviewed By: Date:

Project #: Y-0167
Project Name: NWASP

Weather: over cast Snow Calm -1°C

HID	H-VC-R	Date	15/MAY/2013	Discharge Measurement Instruments + Methods
Station Name	Victoria Creek at Road	Q Measurement Start Time:	08:15 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV | MID-SECT | POINT
		Q Measurement End Time:	9:4 (HH:MM) PDT | PST	SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD
		Logger Download/Inst Time:	08:2 (HH:MM) PDT | PST	Channel Conditions
		Logger Reading (m)	0.2938 [↓downloaded]	NONE | ICE | BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP. SED.

Logger:	Serial # 1041163	HOBO | Solinst | N/A	GPS Waypoint	ZONE	EASTING NORTHING
Photo #	[U/S] 0022	[D/S] 0023	[RDB] 0019	[LDB] 0020	[STAFF/WEIR] 0021 0018

Site Comments

Flow High
Well was Leaning D/S N 50° to Creek Bed
Well was Righted & Secured (will Need Proper Mounting next visit)
Sediment on top of well from Last Beer Pushed over By High Flows

Channel Measurements

Staff Gauge Height (m):	0.674 (Well Marker on well 0.99)
Weir Head (m):	
Water Temperature (°C):	
Water Surface Slope (%):	
Average Width (m):	
Average Depth (m):	

Measurement Summary	Primary	Secondary
Meas. Type:	ADV	
Measurment ID (MID):	745	
Average Q (m^3/s):	3.2075	
Q Meas. Accuracy +/- [%]:	1.7	
Average Velocity (m/s):	1.174	
Cross-Sectional Area (m^2):	2.733	

Salt Tracer

N/A 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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (:)	____ | ____				
2 (:)	____ | ____				
3 (:)	____ | ____				

		CF.T	Vol. Added (mL)	SPC (uS/cm)	Temp
V_1 for Sec. Mix (mL)	=1 / Css		1.		
Csec (g/L):	1 g/L		2.		
Vol. Calib. Tank (L):	1 L		3.		
SPC_0 Calib. Tank			4.		
CF.T =			5.		
Qsalt =			6.		
Notes:			7.		
			8.		
			9.		

Volum.

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

YES \| NO \| REASON: Survey Time (HH:MM): (WATER) ± 0.003 BM Shift: Yes \| No Logger Shift: Yes \| No Staff Gauge Shifted?: Yes \| No

Circuit #1	H I	Rod Read	Elevation (m)		Circuit #2	H I	Rod Read	Elevation (m)	Station Measurements	
Station	A	B	C		Station	A	B	C	ID (m)	
BM1	4.458	1.042	3.000		BM1	A = B + C 4.016	1.016	3.000	OD (m)	
BM2	A = B + C	0.620	3.422	1	BM2	A = B + C	0.593	3.423	TOS to TOP (m)	
BM3	A = B + C	0.873	3.169	0	BM3	A = B + C	0.847	3.169	Bolt to TOP (m)	
TOS	A = B + C	1.418	2.624	1	TOS	A = B + C	1.391	2.625	Sensor to Bolt (m)	
WATER	A = B + C	1.728	2.314	1	WATER	A = B + C	1.703	2.313	Bed to Bolt (m)	
CONTROL	A = B + C		A-B=		CONTROL	A = B + C		A-B=	Sensor to Bed (m)	
HWM	A = B + C	1.521	2.521	1	HWM	A = B + C	1.495	2.521		
BANKFULL	A = B + C	1.493	2.549	16	BANKFULL	A = B + C	1.453 1.449	2.567		
BS (BM1)	A = B + C	1.042	A-B=		BS (BM1)	A = B + C	1.016	A-B=		

Logger reading at Time of D/L
LvL 0.2938 Reading 2.5138 Free
Temp −0.0°C

Field Staff: JM DS CL
Data Entry By: CL Date: 30 MAY 2013
Reviewed By: Date:

Project #: Y 0167
Project Name: NOMSEN

Weather: clear calm +10

HID	14 VC DBC	Date	16 05 2013	Discharge Measurement Instruments + Methods	
Station Name	Victoria crk D/S of Beale creek	Q Measurement Start Time:	11:50 (HH:MM) EDT | PST	FSS | SWOFFER | PYGMY | ADV MID-SECT | POINT	
		Q Measurement End Time:	12:45 (HH:MM) PDT | PST	SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time:	11:55 (HH:MM) EDT | PST	Channel Conditions	
		Logger Reading (m)	0.3169 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] 0090	[D/S] 0091	[RDB] 0092	[LDB] 0093	[STAFF/WEIR] 0094 - 95

Site Comments

Water level High, good conditions to gauge. Need to retro-fit stilling well.

Channel Measurements

Staff Gauge Height (m):	0.725
Weir Head (m):	
Water Temperature (°C):	0.6
Water Surface Slope (%):	
Average Width (m):	0.237
Average Depth (m):	0.417

Measurement Summary	Primary	Secondary
Meas. Type:	ADV	
Measurment ID (MID):	746	
Average Q (m^3/s):	2.6119	
Q Meas. Accuracy +/- [%]:	1.9%	
Average Velocity (m/s):	1.098	
Cross-Sectional Area (m^2):	2.379	

Salt Tracer — N/A — 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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (:)	____ | ____				
2 (:)	____ | ____				
3 (:)	____ | ____				

V_1 for Sec. Mix (mL)	
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	1 L
SPC_0 Calib. Tank	
CF.T =	
Qsalt =	

Notes:

CF.T

Vol. Added (mL)	SPC (uS/cm)	Temp
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		

Volum. — N/A

Volume (L) =				
Time (sec)	[1]	[2]	[3]	[4] [5]
Average Q (L/s) =				
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/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	ID (m)	1.277 m
BM1	4.492 A = B + C	1.492	3.000		BM1	4.457 A = B + C	1.457	3.000	OD (m)	
BM2	A = B + C	1.465	3.027	0	BM2	A = B + C	1.430	3027	TOS to TOP (m)	
BM3	A = B + C	1.574	2.918	0	BM3	A = B + C	1.539	2916	Bolt to TOP (m)	
TOS	A = B + C	2.147	2.345	1	TOS	A = B + C	2.113	2.344	Sensor to Bolt (m)	
WATER	A = B + C	2.407	2.085	11	WATER	A = B + C	2361	2096	Bed to Bolt (m)	
~~CONTROL~~	~~A = B + C~~				~~CONTROL~~	~~A = B + C~~			Sensor to Bed (m)	
HWM	A = B + C	2.108	2,384	1	HWM	A = B + C	2,074	2,383		
BANKFULL	A = B + C	1.568	2.924	5	BANKFULL	A = B + C	1.538	2.919		
BS (BM1)	A = B + C	1.492	3.000	✓	BS (BM1)	A = B + C	1.457	3.000		

Field Staff: CL JM DS
Data Entry By: CL Date: 30 MAY 2013
Reviewed By: Date:

Project #: 67
Project Name: IVANHOE

Weather: Sun 2°C

HID	H-PC-U	Date	21-MAY-2013
Station Name	Pony Ck. Upstream	Q Measurement Start Time:	16:20 (HH:MM) PDT | PST
		Q Measurement End Time:	17:00 (HH:MM) PDT | PST
		Logger Download/Inst Time:	16:53 (HH:MM) PDT | PST
		Logger Reading (m)	n/A [ ] downloaded

Discharge Measurement Instruments + Methods
YSI | SWOFFER | PYGMY | ADV MID-SECT | POINT
SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD

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] 0050	[D/S] 0051	[RDB] 0052	[LDB] 0053 [STAFF/WEIR] 0055/0054

Site Comments
Installed staff gauge + stilling well. Surveyed b/f re-install of logger + staff gauge
Minor pieces of ice remain on channel banks.
Weir not taken due to overflow.

Channel Measurements

Staff Gauge Height (m):	0.292
Weir Head (m):	0.053
Water Temperature (°C):	0.3°C
Water Surface Slope (%):	
Average Width (m):	
Average Depth (m):	

Measurement Summary	Primary	Secondary
Meas. Type:	SALT	
Measurment ID (MID):	751	
Average Q (m^3/s):	0.011	
Q Meas. Accuracy +/- [%]:		
Average Velocity (m/s):		
Cross-Sectional Area (m^2):		

Salt Tracer

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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (16:22)	73.1 | 275.8	25	0.100	20	0.005
2 (16:29)	75.8 | 249.0	25			
3 (:)	|				

V_1 for Sec. Mix (mL)	100 mL
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	~~5~~ 500
SPC_0 Calib. Tank	
CF.T =	1.01×10^{-4}
Qsalt =	0.011

Notes:
T= 0.3°C

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.	0	73.2	0.7
2.	20	137.5	0.8°C
3.	20	151.4	0.9
4.	20	177.5	1.0
5.	30	222.3	1.1°C
6.	30	254.9	1.2°C
7.			
8.			
9.			

Volum.

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

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	5.359	2.359	3.000		BM1	5.335	2.335	3.000	Log'r Rod Length: 1.159
BM2	A+B+C	1.799	3.560		BM2	A+B+C	1.776	3.559	Log'r Rod to Bol:
BM3	A+B+C	1.499	3.860		BM3	A+B+C	1.475	3.860	
TOS	A+B+C		A-B=		TOS	A+B+C		A-B=	
WATER	A+B+C	2.894	2.465		WATER	A+B+C	2.862	2.473	
LOG'R ROD:	A+B+C	1.882	3.477		~~CONTROL~~ Log'R.D	A+B+C	1.858	3.497	
HWM	A+B+C		A-B=		HWM	A+B+C		A-B=	
BANKFULL	A+B+C		A-B=		BANKFULL	A+B+C		A-B=	
BS (BM1)	A+B+C	2.359	3.000		BS (BM1)	A+B+C	2.336	2.999	

Field Staff: CL, DS, JM
Data Entry By: CL Date: 03 JUN 2013
Reviewed By: Date:

Project #: 7
Project Name: ANADISEN

Weather: Sun, 12°C

HID	H-DC-DX+105	Date	21-MAY-2013
Station Name	Dome Ck. DX+105	Q Measurement Start Time:	17:41 (HH:MM) PDT | PST
		Q Measurement End Time:	18:19 (HH:MM) PDT | PST
		Logger Download/Inst Time:	— (HH:MM) PDT | PST
		Logger Reading (m)	— [ ] downloaded

Discharge Measurement Instruments + Methods
CSI | SWOFFER | PYGMY | ADV | MID-SECT | POINT
SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD

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] 67	[D/S] 68	[RDB] 69	[LDB] 70	[STAFF/WEIR]

Site Comments
Slow channel - well defined. Saturated banks + floodplain.
Rd Volumetric @ culvert on Road.

Channel Measurements

Staff Gauge Height (m):	~~1.01~~
Weir Head (m):	—
Water Temperature (°C):	1.0°C
Water Surface Slope (%):	
Average Width (m):	
Average Depth (m):	

Measurement Summary	Primary	Secondary
Meas. Type:	SALT	VOLUME
Measurment ID (MID):	747	748
Average Q (m^3/s):	0.011	0.002
Q Meas. Accuracy +/- [%]:		
Average Velocity (m/s):		
Cross-Sectional Area (m^2):		

Salt Tracer

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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (17:46)	391.4 | 1800	32	0.200	20	0.01
2 (17:55)	400.8 | 1801	32	0.200	20	0.01
3 (:)	— | —				

V_1 for Sec. Mix (mL)	50 mL
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	~~5~~ 500
SPC_0 Calib. Tank	
CF.T =	5.01×10^{-5}
Qsalt =	0.011

Notes: T = 1.0°C

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.	0	395.7	0.7
2.	20	464.1	0.7
3.	30	500.5	0.7
4.	60	580.8	0.8
5.	60	685.4	0.8
6.	60	751.4	0.8
7.	120	872.5	0.8
8.	120	993	0.8
9.			

Volum.

Volume (L) =	18	19	19	19	18
Time (sec)	[1] 7.62	[2] 8.01	[3] 8.02	[4] 8.03	[5] 7.94
Average Q (L/s) =	2.36	2.37	2.37	2.37	2.27
Avg. Q_{vol} (L/s) =	2.35		Avg Q_{vol} (m^3/s) =	0.00235	

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	A+B+C		3.000	Log'r Rod Length:
BM2	A+B+C		A-B=		BM2	A+B+C		A-B=	Log'r Rod to Bot:
BM3	A+B+C		A-B=		BM3	A+B+C		A-B=	
TOS	A+B+C		A-B=		TOS	A+B+C		A-B=	
WATER	A+B+C		A-B=		WATER	A+B+C		A-B=	
LOG'R ROD:	A+B+C		A-B=		CONTROL	A+B+C		A-B=	
HWM	A+B+C		A-B=		HWM	A+B+C		A-B=	
BANKFULL	A+B+C		A-B=		BANKFULL	A+B+C		A-B=	
BS (BM1)	A+B+C		A-B=		BS (BM1)	A+B+C		A-B=	

Field Staff: DS JM CC
Data Entry By: CC Date: 03/JUN/2013
Reviewed By: Date:

Project #: 67
Project Name: Kranjac

Weather: Su. 12°

HID	H-DC-M	Date	21 MAY 2013
Station Name	Dime Ck Middle	Q Measurement Start Time:	13:55 (HH:MM) PDT | PST
		Q Measurement End Time:	14:15 (HH:MM) PDT | PST
		Logger Download/Inst Time:	17:00 (HH:MM) PDT | PST
		Logger Reading (m)	−0.1993 downloaded

Discharge Measurement Instruments + Methods
YSI | SWOFFER | PYGMY | ADV MID-SECT. | POINT
SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD

Channel Conditions
NONE | ICE | BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP. SED.

Logger:	Serial # 10500018	HOBO | Solinst | N/A	GPS Waypoint	ZONE	EASTING NORTHING
Photo #	[U/S] 0024	[D/S] 0025	[RDB] 0026	[LDB] 0027	[STAFF/WEIR] 0028

Site Comments

Stn needs 1/4" bolt + wingnut, wired temporarily
Logger Rod retrofit installed @ ~ 14:10
Shore Ice on LDB still remains
Staff reading @ time of survey (14:30) = 0.240 m

Channel Measurements

Staff Gauge Height (m):	0.228 *
Weir Head (m):	—
Water Temperature (°C):	
Water Surface Slope (%):	
Average Width (m):	
Average Depth (m):	

Measurement Summary	Primary	Secondary
Meas. Type:	SS	
Measurment ID (MID):	749	
Average Q (m^3/s):	0.456	
Q Meas. Accuracy +/- [%]:		
Average Velocity (m/s):		
Cross-Sectional Area (m^2):		

Salt Tracer

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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 14:07	749.2 | 1057		0.5	20	0.025
2 14:12	746.9 | 1041		0.5	20	0.025
3 (:)	|				

V_1 for Sec. Mix (mL)	40 mL
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	1 L
SPC_0 Calib. Tank	
CF.T =	4.67×10^{-6}
Qsalt =	0.456

Notes:
r^2 for CF.T = 0.800
+BAD?

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.	0	420	1.0
2.	15	437.1	
3.	20	877.9	
4.	20	952	
5.	30	1009	
6.	30	1055	1.0
7.			
8.			
9.			

Volum.

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

YES | NO | REASON

Survey Time (HH:MM): (WATER) 14:20 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	4.593	1.593	3.000		BM1	4.564	1.564	3.000	Log'r Rod Length:	1.161 m
BM2	A+B+C	2.280	2.313	1	BM2	A+B+C	2.250	2.314	Log'r Rod to Bot:	1.210 m
BM3	A+B+C	1.879	2.714	0	BM3	A+B+C	1.850	2.714		
TOS	A+B+C	2.130	2.463	0	TOS	A+B+C	2.101	2.463		
WATER	A+B+C	2.886	1.707	2	WATER	A+B+C	2.859	1.705		
LOG'R ROD:	A+B+C	1.905	2.688	1	~~CONTROL~~ (mj)	A+B+C	1.877	2.687		
~~HWM~~	A+B+C		A+B=		~~HWM~~	A+B+C		A+B=		
~~BANKFULL~~	A+B+C		A+B=		~~BANKFULL~~	A+B+C		A+B=		
BS (BM1)	A+B+C	1.593	3.000	0	BS (BM1)	A+B+C	1.564	3.000		

Field Staff: DS CL SM
Data Entry By: CL Date: 03 JUN 2013
Reviewed By: Date:

Project #: 17
Project Name: Wansen

Weather: Sun, 15°C

HID	17 - DCB	Date	21 MAY 2013 (DD/MM/YYYY)	Discharge Measurement Instruments + Methods	
Station Name	Diversion channel at bridge	Q Measurement Start Time:	14:44 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV	MID-SECT. | POINT
		Q Measurement End Time:	15:10 (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

~~Installed Station~~
Could not install stn. due to frozen ground. SS channel for Q. Some ice remains on banks

Channel Measurements

Staff Gauge Height (m):	—
Weir Head (m):	—
Water Temperature (°C):	
Water Surface Slope (%):	
Average Width (m):	
Average Depth (m):	

Measurement Summary	Primary	Secondary
Meas. Type:	SALT	
Measurment ID (MID):	760	
Average Q (m^3/s):	0.107	
Q Meas. Accuracy +/- [%]:		
Average Velocity (m/s):		
Cross-Sectional Area (m^2):		

Salt Tracer

BLOG \| CONSTANT RATE \| DRY LOGGED \| MANUAL SPEC \| EC 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)	Css (kg/L)
1 (14:48)	684.8 | 959	48	0.5	20	0.025
2 (14:56)	672.1 | 946.0	48			
3 (:)	— | —				

V_t for Sec. Mix (mL)	40 mL
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	1 L
SPC_0 Calib. Tank	708.0
CF.T =	1.75×10^{-5}
Qsalt =	0.107

Notes:
T = 0.3°C
pH = 7.55

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.	0	708.0	0.4
2.	20	759.3	0.5
3.	20	786.2	0.5
4.	20	827.7	0.5
5.	20	916.0	0.6
6.	20	897.0	0.6
7.	20	927.7	0.6
8.	20	970	0.6
9.			

Volum.

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/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+C		3.000		BM1	A+B+C		3.000	Log'r Rod Length:	
BM2	A+B+C		A-B =		BM2	A+B+C		A-B =	Log'r Rod to Bot:	
BM3	A+B+C		A-B =		BM3	A+B+C		A-B =		
TOS	A+B+C		A-B =		TOS	A+B+C		A-B =		
WATER	A+B+C		A-B=		WATER	A+B+C		A-B=		
LOG'R ROD:	A+B+C		A-B=		CONTROL	A+B+C		A-B=		
HWM	A+B+C		A-B=		HWM	A+B+C		A-B=		
BANKFULL	A+B+C		A-B=		BANKFULL	A+B+C		A-B=		
BS (BM1)	A+B+C		A-B=		BS (BM1)	A+B+C		A-B=		

Field Staff: CC, DS, JM
Data Entry By: CC Date: 03 JUN 2013
Reviewed By: Date:

Project #: 17
Project Name: _____

Weather: Sun, 12°C

N-PC-DSR

HID	N-PC-DSR	Date	21 MAY 2013
Station Name	Pony Ck. Downstream of pit.	Q Measurement Start Time:	15:31 (HH:MM) PDT | PST
		Q Measurement End Time:	16:05 (HH:MM) PDT | PST
		Logger Download/Inst Time:	15:38 (HH:MM) PDT | PST
		Logger Reading (m)	____ [ ] downloaded

Discharge Measurement Instruments + Methods: YSI | SWOFFER | PYGMY | ADV | MID-SECT. | POINT
SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD
Channel Conditions: NONE | ICE | BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP. SED.

Logger: Serial # 9896521 | HOBO | Solinst | N/A

GPS Waypoint: ZONE | EASTING | NORTHING

Photo #: [U/S] 0045 | [D/S] 0046 | [RDB] 0047 | [LDB] 0048 | [STAFF/WEIR] 0049

Site Comments

Channel Measurements

Staff Gauge Height (m):	0.280
Weir Head (m):	—
Water Temperature (°C):	—
Water Surface Slope (%):	—
Average Width (m):	
Average Depth (m):	

Measurement Summary	Primary	Secondary
Meas. Type:	SALT	
Measurment ID (MID):	752	
Average Q (m^3/s):	0.004	
Q Meas. Accuracy +/- [%]:		
Average Velocity (m/s):		
Cross-Sectional Area (m^2):		

Salt Tracer: 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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (15:35)	104 | 572.5		0.200	20	0.01
2 (15:41)	112.1 | 532.5		0.200	20	0.01
3 (:)	____ | ____				

V_1 for Sec. Mix (mL)	50 Css
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	~~5~~ 500mL
SPC_0 Calib. Tank	
CF.T =	7.27×10^{-5}
Qsalt =	0.004

Notes:
T = 0.2°C
pH ~ 6.9

CF.T

Vol. Added (mL)	SPC (uS/cm)	Temp
1. 0	108.7	0.8
2. 30	170.4	
3. 60	298.5	
4. 60	388.9	
5. 60	468.3	
6. 60	549.2	1.5
7.		
8.		
9.		

Volum.

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

YES | NO | REASON: Survey Time (HH:MM): (WATER) 11:05 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	4.477	1.477	3.000		BM1	4.453	1.453	3.000	Log'r Rod Length:	1.168
BM2		1.260	3.217		BM2		1.237	3.216	Log'r Rod to Bot:	1.235
BM3		0.791	3.686		BM3		0.768	3.685		
TOS		1.277	3.200		TOS		1.253	3.200		
WATER		2.005	2.472		WATER		1.980	2.473		
LOG'R ROD:		1.029	3.448		~~CONTROL~~ Logger Rod		1.006	3.447		
HWM			—		HWM		~~1.006~~			
BANKFULL			—		BANKFULL					
BS (BM1)		1.476	— 3.001		BS (BM1)		1.453	3.000		

Field Staff: EL, JM, DS
Data Entry By: EL Date: 03 JUN 2013
Reviewed By: _____ Date: _____

Project #: 167
Project Name: Hansen

Weather: Sun. 12°C

HID	H-UC-UMN	Date	22 MAY 2013	Discharge Measurement Instruments + Methods	
Station Name	Victoria Ck. Upstream of Minnesota Ck.	Q Measurement Start Time:	09:15 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV | MIDSECT | POINT	
		Q Measurement End Time:	09:43 (HH:MM) PDT | PST	SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time:	9:54 (HH:MM) PDT | PST	Channel Conditions	
		Logger Reading (m)	— [✓] downloaded	NONE | ICE | BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP. SED	
Logger:	Serial # 9896527	HOBO | Solinst | N/A		GPS Waypoint	ZONE EASTING NORTHING
Photo #	[U/S] 0106	[D/S] 0107	[RDB] 0107	[LDB] 0108	[STAFF/WEIR] 0109

Site Comments

Ice on margins due to cold temps. Moderate flow. Logger in @ 9:54

Channel Measurements

Staff Gauge Height (m):	0.686 (- ~~corrections~~)
Weir Head (m):	—
Water Temperature (°C):	0.0°C
Water Surface Slope (%):	—
Average Width (m):	5.55
Average Depth (m):	0.182

Measurement Summary	Primary	Secondary
Meas. Type:	ADV	
Measurment ID (MID):	753	
Average Q (m^3/s):	0.4475	
Q Meas. Accuracy +/- [%]:	3.1	
Average Velocity (m/s):	0.442	
Cross-Sectional Area (m^2):	1.012	

Salt Tracer

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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (:)	____ | ____				
2 (:)	____ | ____				
3 (:)	____ | ____				

		CF.T	Vol. Added (mL)	SPC (uS/cm)	Temp
V_1 for Sec. Mix (mL)	~~V_1 Css~~		1.		
Csec (g/L):	1 g/L		2.		
Vol. Calib. Tank (L):	1 L		3.		
SPC_0 Calib. Tank			4.		
CF.T =			5.		
Qsalt =			6.		
Notes:			7.		
			8.		
			9.		

Volum.

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

YES | NO | REASON: Survey Time (HH:MM): (WATER) 9:51 ± 0.003 BM Shift: Yes| No Logger Shift: Yes| No Staff Gauge Shifted?: Yes| No

Circuit #1	H I	Rod Read	Elevation (m)	Circuit #2	H I	Rod Read	Elevation (m)	Station Measurements
Station	A	B	C	Station	A	B	C	ID (m)
BM1	4~~3~~.191 A=B+C	1.191	3.000	BM1	A=B+C		3.000	~~OD~~ (m)
BM2	A=B+C	1.185	3~~3~~.006	BM2	A=B+C		A-B=	TOS to TOP (m)
BM3	A=B+C	1.512	2.679	BM3	A=B+C		A-B=	~~Bolt to TOP~~ (m)
TOS	A=B+C	2.201	1~~0~~.99	TOS	A=B+C		A-B=	Sensor to Bolt (m)
~~WATER~~ Hyd	A=B+C	2.250	1~~9~~.941	WATER	A=B+C		A-B=	Bed to Bolt (m)
~~CONTROL~~ Log.	A=B+C	1.993	2~~3~~.198	CONTROL	A=B+C		A-B=	~~Sensor to Bed~~ (m)
HWM	A=B+C		A-B=	HWM	A=B+C		A-B=	Logger Rod L= 1.157
BANKFULL	A=B+C	—	A-B=	BANKFULL	A=B+C		A-B=	Top Log. to Bot=
BS (BM1)	4~~3~~.191 A=B+C	1.191	3.000	BS (BM1)	A=B+C		A-B=	

Field Staff: CC / JM / DS

Data Entry By: CC Date: 03 Jun 2013

Reviewed By: Date:

Project #: 7
Project Name: WALKER

Weather: Sun, 12°C

HID	H-VC-R	Date	21/MAY/2013	Discharge Measurement Instruments + Methods	
Station Name	Victoria Ck Road	Q Measurement Start Time:	12:23 (HH:MM) EDT | PST	YSI | SWOFFER | PYGMY | ADV	MID-SECT. | POINT
		Q Measurement End Time:	1:30 (HH:MM) PDT | PST	SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time:	12:28 (HH:MM) EDT | PST	Channel Conditions	
		Logger Reading (m)	0.4352 downloaded	NONE | ICE | BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP. SED.	
Logger:	Serial # 1041103	HOBO | Solinst | N/A		GPS Waypoint	ZONE EASTING NORTHING
Photo #	[U/S] 0011	[D/S] 0012	[RDB] 0013	[LDB] 0014	[STAFF/WEIR] 0015 old

New 0016 0017

Site Comments

Logger Shift * Securing well with New Tee post
Staff Shift *
well Pulled @ 12:42pm Logger Back in @ 13:12
Re surveyed New well install

Channel Measurements

Staff Gauge Height (m):	0.598 old / 0.656 m New
Weir Head (m):	
Water Temperature (°C):	0.9°C
Water Surface Slope (%):	
Average Width (m):	8.9
Average Depth (m):	0.172

Measurement Summary	Primary	Secondary
Meas. Type:	ADV	
Measurment ID (MID):	754	
Average Q (m^3/s):	1.221	
Q Meas. Accuracy +/- [%]:	6.9	
Average Velocity (m/s):	0.798	
Cross-Sectional Area (m^2):	1.53	

Salt Tracer

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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (:)	____ | ____				
2 (:)	____ | ____				
3 (:)	____ | ____				

		CF.T	Vol. Added (mL)	SPC (uS/cm)	Temp
V_1 for Sec. Mix (mL)	= 1 / Css		1.		
Csec (g/L):	1 g/L		2.		
Vol. Calib. Tank (L):	1 L		3.		
SPC_0 Calib. Tank			4.		
CF.T =			5.		
Qsalt =			6.		
Notes:			7.		
			8.		
			9.		

Volum.

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

YES | NO | REASON: Survey Time (HH:MM) (WATER) 12:35 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	4.171	1.171	3.000		BM1	4.143	1.143	3.000	Log'r Rod Length: 1.166 m installed
BM2		0.749	3.422	1	BM2		0.722	3.421	Log'r Rod to Bot: 1.221 m
BM3		1.003	3.168	1	BM3		0.976	3.167	
TOS		1.546	2.625	1	TOS		1.519	2.624	
WATER		1.949	2.222	1	WATER		1.922	2.221	
LOG'R ROD:			A-B=		CONTROL			A-B=	
HWM			A-B=		HWM			A-B=	
BANKFULL			A-B=		BANKFULL			A-B=	
BS (BM1)		1.171	3.000		BS (BM1)		1.143	3.000	

New well Survey @ 13:20
TEE POST installed Logger ROD installed
Well Re-Wired installed horizontal Stays
Before next winter Direct read left installed.

	HI	ROD	elev
BM1	4.120	1.120	3.000
Water		1.899	2.221
TOS	1 of 2	1.561	2.559
Logr ROD		1.341	2.779
BM1		1.120	3.000

Field Staff: DS JM CL
Data Entry By: CC Date: 03 JUN 2013
Reviewed By: Date:

Project #: 169
Project Name: Jarvis

Weather: Sun, 15°C

HID	VI-VC-REF	Date	22 MAY 2013	Discharge Measurement Instruments + Methods	
Station Name	Victoria Ck Reference	Q Measurement Start Time:	13:43 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV	MID-SECT | POINT
		Q Measurement End Time:	13:23 (HH:MM) PDT | PST	SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time:	13:30 (HH:MM) PDT | PST	Channel Conditions	
		Logger Reading (m)	— [✓] downloaded	NONE | ICE | BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP. SED.	
Logger:	Serial # 9908152	HOBO | Solinst | N/A		GPS Waypoint	ZONE EASTING NORTHING
Photo #	[U/S] 137	[D/S] 138	[RDB] 139	[LDB] 140	[STAFF/WEIR] 141

Site Comments

Excellent site. Moderate flow. Jimmy Rod's working well
Logger Backup @ 15:32

Channel Measurements

Staff Gauge Height (m):	0.539
Weir Head (m):	—
Water Temperature (°C):	2.2°C
Water Surface Slope (%):	—
Average Width (m):	5.2
Average Depth (m):	0.211

Measurement Summary	Primary	Secondary
Meas. Type:	ADV	
Measurment ID (MID):	755	
Average Q (m^3/s):	0.6792	
Q Meas. Accuracy +/- [%]:	4.5	
Average Velocity (m/s):	0.613	
Cross-Sectional Area (m^2):	1.099	

Salt Tracer

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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (:)	____ | ____				
2 (:)	____ | ____				
3 (:)	____ | ____				

		CF.T	Vol. Added (mL)	SPC (uS/cm)	Temp
V_1 for Sec. Mix (mL)			1.		
Csec (g/L):	1 g/L		2.		
Vol. Calib. Tank (L):	1 L		3.		
SPC_0 Calib. Tank			4.		
CF.T =			5.		
Qsalt =			6.		
Notes			7.		
			8.		
			9.		

Volum.

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

YES \| NO \| REASON:

Survey Time (HH:MM): (WATER) 13:30 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	ID (m)	
BM1	4.488	1.488	3.000		BM1	A=B+C		3.000	~~OD (m)~~	
BM2	A=B+C	1.521	2.967		BM2	A=B+C			TOS to TOP (m)	
BM3	A=B+C	1.442	3.046		BM3	A=B+C			Bolt to TOP (m)	
TOS	A=B+C	2.179	2.309		TOS	A=B+C			Sensor to Bolt (m)	
WATER	A=B+C	2.640	1.848		WATER	A=B+C			Bed to Bolt (m)	
~~CONTROL~~	A=B+C	1.986	2.502		CONTROL	A=B+C			~~Sensor to Bed (m)~~	
~~HWM~~	~~A=B+C~~	—	—	—	HWM	A=B+C			Logg'r to Bed	1.210
BANKFULL	A=B+C	—	—		BANKFULL	A=B+C				
BS (BM1)	A=B+C	1.488	3.001		BS (BM1)	A=B+C				

Logger

Field Staff: CL / JM / DS
Data Entry By: CL Date: 03 JUN 2013
Reviewed By: Date:

Project #: 7617
Project Name: Vancon

Weather: Sun, 15°C

HID	H-VC-U	Date	22-MAY-2013	Discharge Measurement Instruments + Methods
Station Name	Victoria Ck Upper	Q Measurement Start Time:	11:30 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV MIDSECT | POINT
		Q Measurement End Time:	12:09 (HH:MM) PDT | PST	SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD
		Logger Download/Inst Time:	11:50 (HH:MM) PDT | PST	Channel Conditions
		Logger Reading (m)	-0.0472 [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] 0127	[D/S] 0128	[RDB] 0129	[LDB] 0130	[STAFF/WEIR] 0131		

Site Comments

Logger rod installed = 1.167
Logger to Bed = 1.285
Logger Back in @ = 12:05

New Read = -0.110/m @ 12:09

Channel Measurements

Staff Gauge Height (m):	0.300
Weir Head (m):	—
Water Temperature (°C):	0.2°C
Water Surface Slope (%):	—
Average Width (m):	5.250
Average Depth (m):	0.270

Measurement Summary	Primary	Secondary
Meas. Type:	ADV	
Measurment ID (MID):	756	
Average Q (m^3/s):	0.7270	
Q Meas. Accuracy +/- [%]:	2.8	
Average Velocity (m/s):	0.513	
Cross-Sectional Area (m^2):	1.418	

Salt Tracer

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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (:)	____ | ____				
2 (:)	____ | ____				
3 (:)	____ | ____				

V_1 for Sec. Mix (mL)	
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	1 L
SPC_0 Calib. Tank	
CF.T =	
Qsalt =	

Notes:

CF.T

Vol. Added (mL)	SPC (uS/cm)	Temp
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		

Volum.

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

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	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	~~ID (m)~~	
BM1	4.368	1.360	3.000		BM1	A = B + C		3.000	~~OD (m)~~	
BM2	A = B + C	0.998	3.362		BM2	A = B + C			~~TOS to TOP (m)~~	
BM3	A = B + C	1.116	3.244		BM3	A = B + C			~~Bolt to TOP (m)~~	
TOS	A = B + C	1.471	2.889		TOS	A = B + C			~~Sensor to Bolt (m)~~	
WATER	A = B + C	2.186	2.174		WATER	A = B + C			~~Bed to Bolt (m)~~	
~~CONTROL~~ Logger	A = B + C	1.225	3.135		~~CONTROL~~ Logger	A = B + C			Sensor to Bed (m)	
HWM	A = B + C				HWM	A = B + C			Logger length	1.167 m
BANKFULL	A = B + C				BANKFULL	A = B + C			Ref to Bolt.	1.285 m
BS (BM1)	A = B + C	1.360	3.000		BS (BM1)	A = B + C				

BM#2 shifty, needs replacement

Field Staff: DS JM CL
Data Entry By: CL Date: 03 JUN 2013
Reviewed By: Date:

Project #: 617
Project Name: ATANSEN

Weather: Sun, 12°C

HID	H-VC-DBC	Date	22 May 2013
Station Name	Victoria Ck. Downstream of Bank Ck	Q Measurement Start Time:	10:90 (HH:MM) PDT | PST
		Q Measurement End Time:	11:17 (HH:MM) PDT | PST
		Logger Download/Inst Time:	10:43 (HH:MM) PDT | PST
		Logger Reading (m)	0.2698 ✓downloaded

Discharge Measurement Instruments + Methods
YSI | SWOFFER | PYGMY | ADV | MID-SECT | POINT
SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD

Channel Conditions
NONE | ICE | BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP. SED

Logger:	Serial # 1049137	HOBO | Solinst | N/A	GPS Waypoint	ZONE	EASTING NORTHING
Photo #	[U/S] 0116	[D/S] 0117	[RDB] 0118	[LDB] c 119	[STAFF/WEIR] c 120

Site Comments

Logr Rod installed. watercolor was in good condition. Before removal
~~Logger Rod~~ logger-Rod 1.165 m Logger Back in @ 10:58
logger Rod - Bolton 1.266 m

Channel Measurements

Staff Gauge Height (m):	0.564 m
Weir Head (m):	✓
Water Temperature (°C):	~0.0°C
Water Surface Slope (%):	
Average Width (m):	4.840
Average Depth (m):	0.283

Measurement Summary	Primary	Secondary
Meas. Type:	ADV	
Measurment ID (MID):	757	
Average Q (m^3/s):	0.8010	
Q Meas. Accuracy +/- [%]:	2.4	
Average Velocity (m/s):	0.584	
Cross-Sectional Area (m^2):	1.371	

Salt Tracer

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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (:)	____ | ____				
2 (:)	____ | ____				
3 (:)	____ | ____				

		CF.T	Vol. Added (mL)	SPC (uS/cm)	Temp
V_1 for Sec. Mix (mL)			1.		
Csec (g/L):	1 g/L		2.		
Vol. Calib. Tank (L):	1 L		3.		
SPC_0 Calib. Tank			4.		
CF.T =			5.		
Qsalt =			6.		
Notes			7.		
			8.		
			9.		

Volum.

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

YES | NO | REASON: Survey Time (HH:MM): (WATER) 11:00 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	ID (m)	
BM1	4.551 A = B + C	1.551	3.000		BM1	A = B + C		3.000	~~OD (m)~~	
BM2	A = B + C	1.524	3.027		BM2	A = B + C			~~TOS to TOP (m)~~	
BM3	A = B + C	1.634	2.917		BM3	A = B + C			~~Bolt to TOP (m)~~	
TOS	A = B + C	2.208	2.343		TOS	A = B + C			~~Sensor to Bolt (m)~~	
WATER	A = B + C	2.666	1.885		WATER	A = B + C			~~Rod to Bolt (m)~~	
~~CONTROL~~ Logr Rod	A = B + C	1.990	2.561		CONTROL	A = B + C			~~Sensor to Rod (m)~~	
HWM	A = B + C				HWM	A = B + C			Logr Rod	1.165 m
BANKFULL	A = B + C				BANKFULL	A = B + C			Logr to Bolt	1.266 m
BS (BM1)	A = B + C	1.551	3.000	✓	BS (BM1)	A = B + C				

Field Staff: DS JM CL
Data Entry By: CL Date: 03 June 2013
Reviewed By: Date:

Project #: 17
Project Name: Swinson

Weather: Sun. 12°C

HID	W-DX	Date	21-MAY-2013
Station Name	DX.	Q Measurement Start Time:	18:25 (HH:MM) PDT | PST
		Q Measurement End Time:	19:31 (HH:MM) PDT | PST
		Logger Download/Inst Time:	— (HH:MM) PDT | PST
		Logger Reading (m)	— [ ] downloaded

Discharge Measurement Instruments + Methods
YSI | SWOFFER | PYGMY | ADV MID-SECT. | POINT
SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD

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] 0072	[D/S] 0073	[RDB] 0071	[LDB] 0074	[STAFF/WEIR] —

Site Comments

V. low flow. Still ice/snow on site occupying part of the channel - Attempting salt
SS takes v. long to complete

Channel Measurements

Staff Gauge Height (m):	
Weir Head (m):	
Water Temperature (°C):	
Water Surface Slope (%):	
Average Width (m):	
Average Depth (m):	

Measurement Summary	Primary	Secondary
Meas. Type:	SALT	
Measurment ID (MID):	758	
Average Q (m^3/s):	0.003	
Q Meas. Accuracy +/- [%]:		
Average Velocity (m/s):		
Cross-Sectional Area (m^2):		

Salt Tracer

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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (18:30)	102.5 | 148.6		0.05	20	0.0025
2 (18:54)	122.9 | 149.2		0.05	20	0.0025
3 (:)	— | —				

V_1 for Sec. Mix (mL)	200 mL
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	500mL
SPC_0 Calib. Tank	
CF.T =	1.86×10^{-4}
Qsalt =	0.003

Notes: V. low; lots of NaCl storage in sphagnum substrate

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.	0	109.2	0.1°C
2.	20	129.7	0.1°C
3.	40	196.8	0.1°C
4.	60	275.9	0.1°C
5.	60	339.9	0.2°C
6.	60	403.2	0.2
7.	60	460.6	0.2
8.			
9.			

Volum.

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

YES | NO | REASON: no staff gauge for SS1 | 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	ID (m)	
BM1	A = B + C		3.000		BM1	A = B + C		3.000	OD (m)	
BM2	A = B + C		A-B =		BM2	A = B + C		A-B =	TOS to TOP (m)	
BM3	A = B + C		A-B =		BM3	A = B + C		A-B =	Bolt to TOP (m)	
TOS	A = B + C		A-B =		TOS	A = B + C		A-B =	Sensor to Bolt (m)	
WATER	A = B + C		A-B =		WATER	A = B + C		A-B =	Bed to Bolt (m)	
CONTROL	A = B + C		A-B =		CONTROL	A = B + C		A-B =	Sensor to Bed (m)	
HWM	A = B + C		A-B =		HWM	A = B + C		A-B =		
BANKFULL	A = B + C		A-B =		BANKFULL	A = B + C		A-B =		
BS (BM1)	A = B + C		A-B =		BS (BM1)	A = B + C		A-B =		

Field Staff: CC, JM, DS
Data Entry By: CC Date: 03 Jun 2013
Reviewed By: Date:

Project #: 217
Project Name: Wanzen

Weather: Sun, 12°C

HID	17-MN	Date	22 MAY 2013	Discharge Measurement Instruments + Methods	
Station Name	Minnesota Creek	Q Measurement Start Time:	8:44 (HH:MM) PDT | PST	(YSI) | SWOFFER | PYGMY | ADV	MID-SECT. | POINT
		Q Measurement End Time:	9:15 (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] 0215	[D/S] 0216	[RDB] 0218	[LDB] 0217	[STAFF/WEIR]	

Site Comments

Majority of stream still frozen & bed. Channel well defined.
Well still a block of ice, slowly becoming ice free. Cannot install logger.

Channel Measurements

Staff Gauge Height (m):	0.918
Weir Head (m):	—
Water Temperature (°C):	0.0°C
Water Surface Slope (%):	—
Average Width (m):	—
Average Depth (m):	—

Measurement Summary	Primary	Secondary
Meas. Type:	SALT	
Measurment ID (MID):	759	
Average Q (m^3/s):	0.010	
Q Meas. Accuracy +/- [%]:		
Average Velocity (m/s):		
Cross-Sectional Area (m^2):		

Salt Tracer

SLUG | CONSTANT RATE | DRY | LOGGED | MANUAL | SPS | EC | 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)	Css (kg/L)
1 (8 : 58)	46.9 | 153.2	37	0.200	20	0.01
2 (9 : 04)	47.8 | 149.9	37	0.200	20	0.01
3 (:)	|				

V_1 for Sec. Mix (mL)	50 mL
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	~~5~~ 500mL
SPC_0 Calib. Tank	
CF.T =	5.11×10^{-5}
Qsalt =	0.010

Notes:

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.	0	48.2	0.4°C
2.	20	84.4	0.3°C
3.	20	114.3	0.3°C
4.	20	148.8	0.4°C
5.	20	180.6	0.4°C
6.			
7.			
8.			
9.			

Volum.

Volume (L) =				
Time (sec)	[1]	[2]	[3]	[4] [5]
Average Q (L/s) =				
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =	

Hydrometric Levels - Survey

YES \| NO \| REASON:

Survey Time (HH:MM): (WATER) 9:15 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	ID (m)	
BM1	3.659	0.659	3.000		BM1	A = B + C		3.000	OD (m)	
BM2	A = B + C	1.337	2.322		BM2	A = B + C		A-B=	TOS to TOP (m)	
BM3	A = B + C	0.933	2.726		BM3	A = B + C		A-B=	Bolt to TOP (m)	
TOS	A = B + C	2.191	1.548		TOS	A = B + C		A-B=	Sensor to Bolt (m)	
WATER	A = B + C	2.185	1.474		WATER	A = B + C		A-B=	Bed to Bolt (m)	
CONTROL	A = B + C	—	A-B=		CONTROL	A = B + C		A-B=	Sensor to Bed (m)	
HWM	A = B + C	—	A-B=		HWM	A = B + C		A-B=		
BANKFULL	A = B + C	—	A-B=		BANKFULL	A = B + C		A-B=		
BS (BM1)	A = B + C	0.659	3.000		BS (BM1)	A = B + C		A-B=		

Field Staff: CL, JM, DS
Data Entry By: CL Date: 03 Jun 2013
Reviewed By: Date:

Project # 7167
Project Name: Janssen

Weather: Sn, 16°

HID	14-BC	Date	22 May 2013	Discharge Measurement Instruments + Methods	
Station Name	Back Ck	Q Measurement Start Time:	12:25 (HH:MM) PDT | PST	(YSI) SWOFFER | PYGMY | ADV	MID-SECT | POINT
		Q Measurement End Time:	12:57 (HH:MM) PDT | PST	SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time:	12:15 (HH:MM) PDT | PST	Channel Conditions	
		Logger Reading (m)	[ ] downloaded	NONE | ICE | BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP. SED.	
Logger:	Serial # 9896531	HOBO | Solinst | N/A		GPS Waypoint	ZONE EASTING NORTHING
Photo #	[U/S] 0132	[D/S] 0133	[RDB] 0134	[LDB] 0135	[STAFF/WEIR] 0.0136

Site Comments

- Well is silting up; removed silt & logger rod
- replaced logger rod into same spot

Channel Measurements

Staff Gauge Height (m):	0.298
Weir Head (m):	—
Water Temperature (°C):	6.
Water Surface Slope (%):	
Average Width (m):	
Average Depth (m):	

Measurement Summary	Primary	Secondary
Meas. Type:	SALT	
Measurment ID (MID):	760	
Average Q (m^3/s):	0.616	
Q Meas. Accuracy +/- [%]:		
Average Velocity (m/s):		
Cross-Sectional Area (m^2):		

Salt Tracer

SLUG | CONSTANT RATE | DRY — LOGGED | MANUAL — (EC) | 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)	Css (kg/L)
1 (12:28)	142.7 | 152.3		0.050	20	0.0025
2 (12:40)	141.4 | 252.0		0.550	20	0.0275
3 (:)	____ | ____				

V_1 for Sec. Mix (mL)	~~40~~ 36 mL
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	1 L
SPC_0 Calib. Tank	
CF.T =	1.74×10^{-5}
Qsalt =	0.616

Notes: V. low 1st salt. upped [NaCl] for 55. Did CF.T for 2nd trial

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.	0	149.7	4.3°
2.	20	197.8	5.0°
3.	20	227.4	5.0°
4.	20	268.0	4.8°
5.	20	307.7	4.7°
6.	20	335.2	4.6
7.	20	366.9	4.8.
8.			
9.			

Volum.

Volume (L) =				
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =				
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

(YES) | NO | REASON: TO SEE IF THINGS ARE MOVING — Survey Time (HH:MM): (WATER) 13:05 — 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	ID (m)
BM1	4.389 A = B + C	1.389	3.000		BM1	A = B + C		3.000	OD (m)
BM2	A = B + C	1.387	3.002		BM2	A = B + C		A-B=	TOS to TOP (m)
BM3	A = B + C	1.352?	3.037		BM3	A = B + C		A-B=	Bolt to TOP (m)
TOS	A = B + C	1.745	2.644		TOS	A = B + C		A-B=	Sensor to Bolt (m)
WATER	A = B + C	2.465	1.926		WATER	A = B + C		A-B=	Bed to Bolt (m)
~~CONTROL~~ Logger	A = B + C	1.509	2.88		CONTROL	A = B + C		A-B=	Sensor to Bed (m)
HWM	A = B + C		A-B=		HWM	A = B + C		A-B=	
BANKFULL	A = B + C		A-B=		BANKFULL	A = B + C		A-B=	
BS (BM1)	A = B + C	1.390	2.999	± 3 mm	BS (BM1)	A = B + C		A-B=	

Field Staff: CL / JM / DS
Data Entry By: CL Date: 03 JUN 2013
Reviewed By: Date:

Project #: 67
Project Name: Wanlsen

Weather: Sun 10.4°C

HID	11-DC-R	Date	21/MAY/2013	Discharge Measurement Instruments + Methods	
Station Name	Dome Ck Road	Q Measurement Start Time:	13:45 (HH:MM) PDT | PST	n/m	YSI | SWOFFER | PYGMY | ADV MID-SECT | POINT
		Q Measurement End Time:	(HH:MM) PDT | PST	n/m	SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD
		Logger Download/Inst Time:	(HH:MM) PDT | PST	Channel Conditions	
		Logger Reading (m)	[ ] downloaded	NONE | DS | BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP. SED.	

Logger:	Serial #	HOBO | Solinst | N/A	GPS Waypoint	ZONE	EASTING	NORTHING
Photo #	[U/S] 0018	[D/S] 0019	[RDB] 0020	[LDB] 21	[STAFF/WEIR] N/A	

Site Comments

* side channel near Bm#3
- DS 0022, US 0023

* Site still frozen to substrate, channel flowing on top of ice, multiple channels

Channel Measurements

Staff Gauge Height (m):	
Weir Head (m):	
Water Temperature (°C):	
Water Surface Slope (%):	
Average Width (m):	
Average Depth (m):	

Measurement Summary	Primary	Secondary
Meas. Type:	n/A	n/A
Measurment ID (MID):		
Average Q (m^3/s):		
Q Meas. Accuracy +/- [%]:		
Average Velocity (m/s):		
Cross-Sectional Area (m^2):		

Salt Tracer

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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (:)	____ | ____				
2 (:)	____ | ____				
3 (:)	____ | ____				

		CF.T	Vol. Added (mL)	SPC (uS/cm)	Temp
V_1 for Sec. Mix (mL)	=1/Css		1.		
Csec (g/L):	1 g/L		2.		
Vol. Calib. Tank (L):	1 L		3.		
SPC_0 Calib. Tank			4.		
CF.T =			5.		
Qsalt =			6.		
Notes:			7.		
			8.		
			9.		

Volum.

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

YES | NO | REASON: Still ice, frozen channel 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	A+B+C		3.000	Log'r Rod Length:	
BM2	A+B+C		A-B=		BM2	A+B+C		A-B=	Log'r Rod to Bot:	
BM3	A+B+C		A-B=		BM3	A+B+C		A-B=		
TOS	A+B+C		A-B=		TOS	A+B+C		A-B=		
WATER	A+B+C		A-B=		WATER	A+B+C		A-B=		
LOG'R ROD:	A+B+C		A-B=		CONTROL	A+B+C		A-B=		
HWM	A+B+C		A-B=		HWM	A+B+C		A-B=		
BANKFULL	A+B+C		A-B=		BANKFULL	A+B+C		A-B=		
BS (BM1)	A+B+C		A-B=		BS (BM1)	A+B+C		A-B=		

Field Staff: CL, JM, PS
Data Entry By: cc Date: 03 Jun 2013
Reviewed By: Date:

Project #: Y 0165
Project Name: IVANSEN

Weather: Cloud, ~4 winds ~ 17°c

HID	H - DC - M	Date	27 05 2013	Discharge Measurement Instruments + Methods	
Station Name	Dome Creek Middle	Q Measurement Start Time:	14:30 (HH:MM) PDT | PST	(YSI) | SWOFFER | PYGMY | ADV	MID-SECT. | POINT
		Q Measurement End Time:	15:15 (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] 179	[D/S] 180	[RDB] 181	[LDB] 182	[STAFF/WEIR] 183		

Site Comments

Flow levels high.
Logger Not DL @ This Trip

Channel Measurements

Staff Gauge Height (m):	0.332
Weir Head (m):	/
Water Temperature (°C):	1.1°
Water Surface Slope (%):	/
Average Width (m):	
Average Depth (m):	

Measurement Summary	Primary	Secondary
Meas. Type:	SS	
Measurment ID (MID):	767	
Average Q (m^3/s):	0.21	
Q Meas. Accuracy +/- [%]:		
Average Velocity (m/s):		
Cross-Sectional Area (m^2):		

N/A

Salt Tracer

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_0(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (14 :38)	548.0 | 622.0	56	0.300	20	~~0.075~~
2 (14 :47)	549.1 | 678.2	56	0.500	20	
3 (15 :01)	556.3 | 782.3	56	0.800	20	0.04

			Vol. Added (mL)	SPC (uS/cm)	Temp
V_1 for Sec. Mix (mL)	~~675~~ 25 mL		1 50	650.3	3.0
Csec (g/L):	1 g/L		2 30	692.5	2.9
Vol. Calib. Tank (L):	1 L		3 30	720.6	3.6
SPC_0 Calib. Tank	587.5 / 2.6°		4 30	752.2	3.7
CF.T =	* 1.79 x 10^{-5}	- using 2nd trial only	5 30	782.5	3.0
Qsalt = m^3/s	0.21		6		
Notes: CF.T Done for Trial #3			7		
CL: What volume used for CF.T? Ok cleared 18/06/2013			8		
			9		

Volum. N/A

	[1]	[2]	[3]	[4]	[5]
Volume (L) =					
Time (sec)					
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

REASON: YES | NO Logger Not DL — Survey Time: — 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				Log'r Rod to Botm:	
BM3	A-B-C		A-B=		BM3					
TOS	A-B-C		A-B=		TOS					
WATER	A-B-C		A-B=		WATER					
LOG'R ROD:	A-B-C		A-B=		LOG'R ROD:					
HWM	A-B-C		A-B=		HWM					
BANKFULL	A-B-C		A-B=		BANKFULL					
BS (BM1)	A-B+C		A-B=		BS (BM1)					

Field Staff: CB BSm JM
Data Entry By: ____ Date: ____
Reviewed By: ____ Date: ____

Project #: 7
Project Name: NSEM

Weather: Sun & cloud +17°C Calm

HID	H DC B	Date	27 05 2013	Discharge Measurement Instruments + Methods	
Station Name	Diversion Channel @ Bridge	Q Measurement Start Time:	15:40 (HH:MM) PDT | PST	(X) | SWOFFER | PYGMY | ADV	MID-SECT | POINT
		Q Measurement End Time:	16:00 (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] 183	[D/S] 184	[RDB] 185	[LDB] 186	[STAFF/WEIR] 187		

Site Comments

No Ice on Shore except under Bridge
Flows Med-High
Logger installed 17:50
well Points.
U/S 197 D/S 198 RDB 199 LDB 200
well Requires Jimmy Rod
staff 201/202

Channel Measurements

Staff Gauge Height (m):	0.210 @ 17:52
Weir Head (m):	
Water Temperature (°C):	6.6
Water Surface Slope (%):	
Average Width (m):	
Average Depth (m):	

Measurement Summary	Primary	Secondary
Meas. Type:	SS	
Measurment ID (MID):	766	
Average Q (m^3/s):	0.3040	
Q Meas. Accuracy +/- [%]:		
Average Velocity (m/s):		
Cross-Sectional Area (m^2):		

N/A

Salt Tracer

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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (15 : 40)	545.3 | 919.6	29	0.400	20	0.02
2 (15 : 44)	545.1 | 843.	29	0.400	20	0.02
3 (:)	|				

V_1 for Sec. Mix (mL)	50 mL
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	1 L
SPC_0 Calib. Tank	542.0 / 1.0
CF.T = r^2 |	2.65 x 10^-5
Qsalt =	0.3040

Notes

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.	30	597.0	1.1
2.	30	649.6	1.3
3.	30	699.5	1.3
4.	30	741.0	1.3
5.	30	788.1	1.3
6.	30	827.0	1.3
7.	30	867.4	1.2
8.	30	904.4	1.3
9.	30	936.0	1.3

N/A

Volum.

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

N/A ~~No Level~~ Survey Time: 17:45 BM Shift: Yes| No Logger Shift: Yes| No Staff Gauge Shifted?: Yes| No

Circuit #1	H I	Rod Read	Elevation (m)	± 0.003
Station	A	B	C	
BM1	3.993	0.993	3.000	
BM2	3.993	0.635	3.358	.001
BM3	3.993	0.997	2.996	.001
TOS	3.993	1.644	2.349	.001
WATER	3.993	2.416	1.577	.006
LOG'R ROD:	3.993	1.467	2.526	0
HWM				
BANKFULL				
BS (BM1)	3.993	0.993	3.000	0

Circuit #2	H I	Rod Read	Elevation (m)
Station	A	B	C
BM1	3.978	0.978	3.000
BM2	3.978	0.621	3.357
BM3	3.978	0.983	2.995
TOS	3.978	1.630	2.348
WATER	3.978	2.407	1.571
LOG'R ROD:	3.978	1.452	2.526
HWM			
BANKFULL			
BS (BM1)	3.978	.978	3.000

Station Measurements	
Log'r Rod Length:	1.044
Log'r Rod to Botm:	1.230

Field Staff: JM BS CB
Data Entry By: Date:
Reviewed By: Date:

Project #: 67
Project Name: VANSEN

Weather: Overc 1 Lite wnd +1?

HID	H DC U2	Date	27 05 2013	Discharge Measurement Instruments + Methods	
Station Name	Dome creek upper #2	Q Measurement Start Time:	16:24 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV	MID-SECT. | POINT
		Q Measurement End Time:	16:35 (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] 193	[D/S] 194	[RDB] 195	[LDB] 196	[STAFF/WEIR]	

Site Comments

Stream still flowing through & over ~1.5 of ice

N/A

Sp. 583.6
Spc. 579.7

Salt Tracer — St \| 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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (16:24)	586.6 | 827.5		0.300	20	0.015
2 (16:30)	587.7 | 9022			20	
3 (:)	____ | ____				

V_1 for Sec. Mix (mL)	67mL
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	1 L
SPC_0 Calib. Tank	622.3/0.5
CF.T =	6.36 x10^{-5}
Qsalt =	0.06

Notes: Tried 4 samples for CFT calib. tank to get background spc

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.	30	619.1	0.7
2.	30	676.4	0.9
3.	60	725.8	1.0
4.	60	769.4	1.0
5.	60	810.4	1.0
6.	60	852.8	0.9
7.	60	880.1	1.1
8.	60	909.8	1.1
9.	60	940	1.1

Channel Measurements

Staff Gauge Height (m):	
Weir Head (m):	
Water Temperature (°C):	0.2°C
Water Surface Slope (%):	
Average Width (m):	
Average Depth (m):	

Measurement Summary	Primary	Secondary
Meas. Type:	SS	
Measurment ID (MID):	765	
Average Q (m^3/s):	0.06	
Q Meas. Accuracy +/- [%]:		
Average Velocity (m/s):		
Cross-Sectional Area (m^2):		

N/A

Volum.

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

N/A No Station — Survey Time: — 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					BM2				Log'r Rod to Botm:	
BM3					BM3					
TOS					TOS					
WATER					WATER					
LOG'R ROD:					LOG'R ROD:					
HWM					HWM					
BANKFULL					BANKFULL					
BS (BM1)					BS (BM1)					

Field Staff: JM CB BSn
Data Entry By: _____ Date: _____
Reviewed By: _____ Date: _____

Project #: 67
Project Name: NANISEN

Weather: overcast ~15°C, light wind & rain

HID	H PC U	Date	27 05 2013	Discharge Measurement Instruments + Methods	
Station Name	Perry creek upper	Q Measurement Start Time:	18 : 26 PDT | PST	(X) | SWOFFER | PYGMY | ADV	MID-SECT. | POINT
		Q Measurement End Time:	18 : 41 PDT | PST	SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time:	18:23 PDT | PST	Channel Conditions	
		Logger Reading (m)	— [L] downloaded	NONE | ICE | BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP. SED.	
Logger:	Serial # 9896522	HOBO | Solinst | N/A		GPS Waypoint	ZONE EASTING NORTHING
Photo #	[U/S] 203	[D/S] 204	[RDB] 205	[LDB] 206	[STAFF/WEIR] 207

Site Comments

water level high, Large main flow Bypassing weir RDB, water seeping under weir
logger Back in @ 18:26
weir 208 - 210

Channel Measurements

Staff Gauge Height (m):	0.355
Weir Head (m):	0.088
Water Temperature (°C):	0.4°
Water Surface Slope (%):	—
Average Width (m):	
Average Depth (m):	

Measurement Summary	Primary	Secondary
Meas. Type:	SS	Volumetric
Measurment ID (MID):	776	777
Average Q (m^3/s):	0.023	1.4×10^{-3}
Q Meas. Accuracy +/- [%]:		
Average Velocity (m/s):		
Cross-Sectional Area (m^2):		

Salt Tracer — N/A — 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_o(uS/cm) | EC_{pk}(uS/cm)	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (18 : 26)	46.0 | 268.8	10	0.100	20	0.005
2 (18 : 35)	46.2 | 193.9	10	0.100	20	0.005
3 (:)	|				

V_1 for Sec. Mix (mL)	200mL
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	1 L
SPC_0 Calib. Tank	49.0
CF.T =	1.60×10^{-4}
Qsalt =	0.023

Notes:

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.	40mL	90.2	0.7
2.	40mL	127.5	0.7
3.	30mL	159.8	0.6
4.	30mL	178.6	0.8
5.	30mL	225.8	0.5
6.	30mL	219.3	0.6
7.	30mL	243.2	0.6
8.	30mL	264.3	0.6
9.			

Volum. — N/A

Volume (L) =	19		19		19		20		20
Time (sec)	[1] 12.60		[2] 13.50		[3] 14.10		[4] 13.39		[5] 13.12
Average Q (L/s) =	1.507		1.407		1.347		1.493		1.524
Avg. Q_{vol} (L/s) =	1.4 L/s				Avg Q_{vol} (m^3/s) =		1.4×10^{-3}		

Hydrometric Levels - Survey

N/A — Survey Time: 19 30 — 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	5.134	2.134	3.000		BM1			3.000	Log'r Rod Length:	
BM2		1.589	3.545		BM2				Log'r Rod to Botm:	
BM3		1.268	3.866		BM3					
TOS		1.946	3.188		TOS					
WATER		2.608	2.526		WATER					
LOG'R ROD:		1.706	3.428		LOG'R ROD:					
HWM	/	/	/	/	HWM	/	/	/	/	/
BANKFULL	/	/	/	/	BANKFULL	/	/	/	/	/
BS (BM1)		2.134	3.000		BS (BM1)					

Field Staff: CL JM BSM
Data Entry By: _____ Date: _____
Reviewed By: _____ Date: _____

Project #: 17
Project Name: INNISEN

Weather: over cast Calm 15°C

HID	H MN	Date	28 05 2017	Discharge Measurement Instruments + Methods	
Station Name	Mannisha creek	Q Measurement Start Time:	9:56 PDT | PST	YSI | SWOFFER | PYGMY | ADV	MID-SECT | POINT
		Q Measurement End Time:	10:10 PDT | PST	SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download Time:	09:40 PDT | PST	Channel Conditions	
		Logger Reading (m)	[ ] downloaded	NONE | ICE | BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP. SED	

Logger:	Serial # 9908128	HOBO | Solinst | N/A	GPS Waypoint	ZONE	EASTING	NORTHING	
Photo #	[U/S] 220	[D/S] 221	[RDB] 222	[LDB] 223	[STAFF/WEIR] 224		

Site Comments

* logger in @ 9:40
Jimmy - Rod tied in, no id on bed of stream.

ADV
start 09:34
end 10:20

Channel Measurements

Staff Gauge Height (m):	0.526
Weir Head (m):	/
Water Temperature (°C):	0.6
Water Surface Slope (%):	/
Average Width (m):	1.700
Average Depth (m):	0.206

Measurement Summary	Primary	Secondary
Meas. Type:	ADV	SS
Measurment ID (MID):	773	774
Average Q (m^3/s):	0.0865	0.048
Q Meas. Accuracy +/- [%]:	3.8%	
Average Velocity (m/s):	0.247	
Cross-Sectional Area (m^2):	0.349	

Salt Tracer — N/A — 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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (9 :56)	44.7 | 175.3	27	0.3	20	.015
2 (10 :02)	44.7 | 189.7	27	0.3	20	
3 (:)	|				

V_1 for Sec. Mix (mL)	67
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	1 L
SPC_0 Calib. Tank	48.1 / 0.9
CF.T =	4.13×10^{-5}
Qsalt =	0.048

Notes:
* cut off end of 2nd trial YSI once SPC returns to SPC (forgot to stop logging before beginning CFT)

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.	30	91.8	1.0
2.	30	134.4	1.1
3.	30	172.2	1.1
4.	30	210.7	1.1
5.			
6.			
7.			
8.			
9.			

Volum. — N/A

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

N/A — Survey Time: 9:30 — 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	3.245	0.245	3.000		BM1	3.233	0.233	3.000	Log'r Rod Length:	1.489
BM2	3.245	0.914	2.331	Ø	BM2	3.233	0.902	2.331	Log'r Rod to Botm:	1.573
BM3	3.245	0.520	2.725	Ø	BM3	3.233	0.508	2.725		
TOS	3.245	1.699	1.546	.001	TOS	3.233	1.686	1.547		
WATER	3.245	2.184	1.061	.005	WATER	3.233	2.169	1.064		
LOG'R ROD:	3.245	1.157	2.088	Ø	LOG'R ROD:	3.238	1.145	2.088		
HWM	A-B= /	/	A-B= /	/	HWM	/	/	/	/	
BANKFULL	A-C= /	/	A-B= /	/	BANKFULL	/	/	/		
BS (BM1)	3.245	0.245	3.000	Ø	BS (BM1)	3.233	0.233	3.000		

Field Staff: CB BSA JA
Data Entry By: _____ Date: _____
Reviewed By: _____ Date: _____

Project #: _____
Project Name: NANSEN

LDI ENVIRONMENTAL DYNAMICS INC.

Weather: overcast calm

HID	H PC DSP	Date	28 05 2013	Discharge Measurement Instruments + Methods	
Station Name	Perry Creek D/S p.t	Q Measurement Start Time:	14:50 (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:	18:41 (HH:MM) PDT | PST	Channel Conditions	
		Logger Reading (m)	~~18.44~~ [ ] downloaded	NONE | ICE | BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP. SED	
Logger:	Serial # 9896521	HOBO | Solinst | N/A		GPS Waypoint	ZONE EASTING NORTHING
Photo #	[U/S] 258	[D/S] 259	[RDB] 266	[LDB] 261	[STAFF/WEIR] 262

Site Comments

N/A

Channel Measurements

Staff Gauge Height (m):	0.304
Weir Head (m):	/
Water Temperature (°C):	1.3
Water Surface Slope (%):	
Average Width (m):	
Average Depth (m):	

Measurement Summary	Primary	Secondary
Meas. Type:	SS	
Measurment ID (MID):	778.	
Average Q (m^3/s):	0.016	
Q Meas. Accuracy +/- [%]:		
Average Velocity (m/s):		
Cross-Sectional Area (m^2):		

Salt Tracer

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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (18:50)	90.6 | 395.2	20	.200	20	0.01
2 (18:57)	91.7 | 407.5	20	.200	20	0.01
3 (:)	|				

V_1 for Sec. Mix (mL)	100 mL
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	1 L
SPC_0 Calib. Tank	91.6 / 1.5°C
CF.T =	7.55×10^{-5}
Qsalt =	0.016

Notes:

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.	30	127.1	1.5
2.	30	159.4	1.7
3.	60	222.3	1.8
4.	60	276.5	1.7
5.	60	325.6	1.6
6.	60	370.4	1.6
7.	60	409.1	1.6
8.			
9.			

Volum. N/A

Volume (L) =				
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =				
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

N/A (reason) — Survey Time: 19:02 — 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	4.459	1.459	3.000		BM1	4.448	1.448	3.000	Log'r Rod Length:	unchanged
BM2		1.242	3.217	0	BM2		1.231	3.217	Log'r Rod to Botm:	1.264
BM3		0.784	3.675	1	BM3		0.774	3.674		
TOS		1.257	3.202	1	TOS		1.247	3.201		
WATER		1.960	2.499	8	WATER		1.957	2.491		
LOG'R ROD:		1.068	3.451	1	LOG'R ROD:		0.998	3.456		
HWM					HWM					
BANKFULL					BANKFULL					
BS (BM1)		1.459	3.000	✓	BS (BM1)		1.448	3.000		

Field Staff: DSA CB JA

Data Entry By: _____ Date: _____

Reviewed By: _____ Date: _____

Project #: 57
Project Name: NANSEN

Weather: Sunshole calm 17°C

HID	H DC DIB	Date	29 05 2013	Discharge Measurement Instruments + Methods	
Station Name	Dome creek DIB	Q Measurement Start Time:	11:11 (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] 283	[D/S] 284	[RDB] 285	[LDB] 286	[STAFF/WEIR] /	

Site Comments

Channel Through Ice, Flow appears med-high
287-288 Pond upstream

Channel Measurements

Staff Gauge Height (m):	/
Weir Head (m):	/
Water Temperature (°C):	0.1
Water Surface Slope (%):	
Average Width (m):	
Average Depth (m):	

Measurement Summary	Primary	Secondary
Meas. Type:	SS	
Measurment ID (MID):	764	
Average Q (m^3/s):	0.0102	
Q Meas. Accuracy +/- [%]:		
Average Velocity (m/s):		
Cross-Sectional Area (m^2):		

Salt Tracer (N/A)

SLUG | CONSTANT RATE | DRY — LOGGED | MANUAL — SBC | EC — CF.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)	Ms_o (kg)	Volume (L)	Css (kg/L)
1 (11 : 11)	975 | 1379	22	0.200	20	0.01
2 (11 : 16)	965 | 1367	22	0.2030	20	0.01
3 (:)	|				

V_1 for Sec. Mix (mL)	100 mL
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	1 L
SPC_0 Calib. Tank	965 / 0.3°C
CF.T =	5.97×10^{-5}
Qsalt =	0.0102

Notes: * Trial #2 used 0.203 kg

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.	30	984	0.3
2.	60	1088	0.3
3.	60	1153	0.3
4.	60	1222	0.3
5.	60	1280	0.3
6.	60	1332	0.3
7.	60	1390	0.3
8.			
9.			

Volum. (N/A)

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

(N/A) No Station — Survey Time: — 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				Log'r Rod to Botm:	
BM3	A+B+C		A-B=		BM3					
TOS	A+B+C		A-B=		TOS					
WATER	A+B+C		A-B=		WATER					
LOG'R ROD:	A+B+C		A-B=		LOG'R ROD:					
HWM	A+B+C		A-B=		HWM					
BANKFULL	A+B+C		A-B=		BANKFULL					
BS (BM1)	A+B+C		A-B=		BS (BM1)					

Field Staff: BSm CB JM
Data Entry By: _____ Date: _____
Reviewed By: _____ Date: _____

Project #: 17
Project Name: ANSER

Weather: Sun 20°C Calm

HID	17 DC D1	Date	29 05 2017	Discharge Measurement Instruments + Methods	
Station Name	Dome Creek D1	Q Measurement Start Time:	11:52 (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] 289	[D/S] 290	[RDB] 291	[LDB] 292	[STAFF/WEIR]

Site Comments

Channel consolidated but flowing over & under ice following normal summer channel

Channel Measurements

Staff Gauge Height (m):	
Weir Head (m):	
Water Temperature (°C):	1.5°C @ YSI location
Water Surface Slope (%):	Ice channel
Average Width (m):	
Average Depth (m):	

Measurement Summary	Primary	Secondary
Meas. Type:	SS	
Measurment ID (MID):	761	
Average Q (m^3/s):	0.0117	
Q Meas. Accuracy +/- [%]:		
Average Velocity (m/s):		
Cross-Sectional Area (m^2):		

Salt Tracer (N/A)

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_o(uS/cm) | EC_{pk}(uS/cm)	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (11:52)	493.7 | 809.0	17	0.1	20	0.005
2 (11:58)	492.3 | 887.9	17	0.1	20	0.005
3 (:)	|				

V_1 for Sec. Mix (mL)	200mL
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	1 L
SPC_o Calib. Tank	590.4 / 2.72
CF.T =	1.28×10^{-4}
Qsalt =	0.0117

Notes:

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.	30 mL	630.4	2.8°C
2.	30 mL	666.7	2.8
3.	60 mL	733.4	2.7
4.	60 mL	791.2	2.7
5.	60 mL	843.4	2.7°C
6.			
7.			
8.			
9.			

Volum. (N/A)

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

N/A (Reason) No Station — Survey Time: — 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					BM2				Log'r Rod to Botm:	
BM3					BM3					
TOS					TOS					
WATER					WATER					
LOG'R ROD:					LOG'R ROD:					
HWM					HWM					
BANKFULL					BANKFULL					
BS (BM1)					BS (BM1)					

Field Staff: RSA CE JM

Data Entry By: _____ Date: _____

Reviewed By: _____ Date: _____

Project #: 17
Project Name: IVANSEN

Sun & Clouds + 20° Calm
Weather:

HID	LI DC DX+105	Date	29 05 2013	Discharge Measurement Instruments + Methods	
Station Name	Dome creek Dec ex Plus one reco five	Q Measurement Start Time:	12:57 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV	MID-SECT. | POINT
		Q Measurement End Time:	13:08 (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] 0299	[D/S] 0300	[RDB] 0301	[LDB] 0302	[STAFF/WEIR]

Site Comments

Channel Measurements

Staff Gauge Height (m):	
Weir Head (m):	
Water Temperature (°C):	7.8°C
Water Surface Slope (%):	
Average Width (m):	
Average Depth (m):	

Measurement Summary	Primary	Secondary
Meas. Type:	SS	
Measurment ID (MID):	763	
Average Q (m^3/s):	0.0249	
Q Meas. Accuracy +/- [%]:		
Average Velocity (m/s):		
Cross-Sectional Area (m^2):		

Salt Tracer — N/A

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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (12:57)	271.6 | 573.5	32	0.100	20	0.005
2 (13:03)	296.5 | 584.4	32	0.100	20	0.005
3 (:)	|				

V_1 for Sec. Mix (mL)	200 mL Csec
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	1 L
SPC_0 Calib. Tank	293.1 / 7.7°C
CF.T =	1.32×10^{-4}
Qsalt =	0.0249

Notes:

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.	30	330.1	7.9
2.	30	361.8	8.0
3.	60	431.6	8.1
4.	60	486.8	8.3
5.	60	539.7	8.2
6.	60	584.5	8.3
7.			
8.			
9.			

Volum. — N/A

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

N/A No Station. — Survey Time: — 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+B		3.000		BM1			3.000	Log'r Rod Length:
BM2	A-B+C		A-B=		BM2				Log'r Rod to Botm:
BM3	A-B+C		A-B=		BM3				
TOS	A-B+C		A-B=		TOS				
WATER	A-B+C		A-B=		WATER				
LOG'R ROD:	A-B+C		A-B=		LOG'R ROD:				
HWM	A-B+C		A-B=		HWM				
BANKFULL	A-B+C		A-B=		BANKFULL				
BS (BM1)	A-B+C		A-B=		BS (BM1)				

Field Staff: JH BSn CB
Data Entry By: _____ Date: _____
Reviewed By: _____ Date: _____

Project #: '67
Project Name: NANSEN

Weather: Sunny few clouds 20°C, light wind.

HID	A - DC - DX	Date	29/05/13	Discharge Measurement Instruments + Methods	
Station Name	Dome Creek	Q Measurement Start Time:	13:44 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV	MID-SECT. | POINT
		Q Measurement End Time:	14:07 (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

Channel Measurements

Staff Gauge Height (m):	
Weir Head (m):	
Water Temperature (°C):	2.5°C
Water Surface Slope (%):	
Average Width (m):	
Average Depth (m):	

Measurement Summary	Primary	Secondary
Meas. Type:	SS	
Measurment ID (MID):	762	
Average Q (m^3/s):	0.002	
Q Meas. Accuracy +/- [%]:		
Average Velocity (m/s):		
Cross-Sectional Area (m^2):		

Salt Tracer — N/A

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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (13:44)	148.5 | 161.0	18	0.0635 / 0.0665 ?	20 / 20	.0025
2 (13:54)	148.9 |	19			
3 (:)	|				

		CF.T	Vol. Added (mL)	SPC (uS/cm)	Temp
V_1 for Sec. Mix (mL)	~1/Css ?		1. 60	248.0	2.1
Csec (g/L):	1 g/L		2. 100	327.6	2.5
Vol. Calib. Tank (L):	1 L		3. 100	498.2	2.5
SPC_0 Calib. Tank	151.5 / 2.0°C		4. 100	593.9	2.6
CF.T = *	1.45×10^{-4}		5. 100	676.3	2.6
Qsalt =	0.002		6. 100	747.3	2.7
			7. 100	811.7	2.7
			8. 100	866.7	2.7
			9. 100	918.-	2.7

Notes:
* no idea how much V_1 was used.

Volum. — N/A

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

N/A (control) No Station — Survey Time: — 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				Log'r Rod to Botm:	
BM3	A+B=C		A-B=		BM3					
TOS	A+B=C		A-B=		TOS					
WATER	A+B=C		A-B=		WATER					
LOG'R ROD:	A+B=C		A-B=		LOG'R ROD:					
HWM	A+B=C		A-B=		HWM					
BANKFULL	A+B=C		A-B=		BANKFULL					
BS (BM1)	A+B=C		A-B=		BS (BM1)					

Field Staff: B.Sm., J.M., C.B.
Data Entry By: _____ Date: _____
Reviewed By: _____ Date: _____

Project #: 67
Project Name: NSEN

Weather: Sun + cloud Plus ice Calm

HID	H-DC-R	Date	27-05-2013	Discharge Measurement Instruments + Methods
Station Name	Dome creek @ Road	Q Measurement Start Time:	14:10 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	EASTING	NORTHING
Photo #	[U/S] 173	[D/S] 174	[RDB] 175	[LDB] 176	[STAFF/WEIR]	

Site Comments

Stream channel flowing to LDB over significant vegetation & under ice still remaining in channel Not suitable for gauging U/S 177 D/S 178 LDB channel

Channel Measurements

Staff Gauge Height (m):	
Weir Head (m):	
Water Temperature (°C):	
Water Surface Slope (%):	
Average Width (m):	
Average Depth (m):	

Measurement Summary	Primary	Secondary
Meas. Type:	NONE	
Measurment ID (MID):		
Average Q (m^3/s):		
Q Meas. Accuracy +/- [%]:		
Average Velocity (m/s):		
Cross-Sectional Area (m^2):		

Salt Tracer — N/A — 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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (:)	____ | ____				
2 (:)	____ | ____				
3 (:)	____ | ____				

		CF.T	Vol. Added (mL)	SPC (uS/cm)	Temp
V_1 for Sec. Mix (mL)	=1 / Csa		1.		
Csec (g/L):	1 g/L		2.		
Vol. Calib. Tank (L):	1 L		3.		
SPC_0 Calib. Tank			4.		
CF.T =			5.		
Qsalt =			6.		
			7.		
			8.		
			9.		

Notes:

Volum. — N/A

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

N/A No Station or Q measurement — Survey Time: — 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				Log'r Rod to Botm:	
BM3	A+B+C		A-B=		BM3					
TOS	A+B+C		A-B=		TOS					
WATER	A+B+C		A-B=		WATER					
LOG'R ROD:	A+B+C		A-B=		LOG'R ROD:					
HWM	A+B+C		A-B=		HWM					
BANKFULL	A+B+C		A-B=		BANKFULL					
BS (BM1)	A+B+C		A-B=		BS (BM1)					

Field Staff: BSM JM CB
Data Entry By: Date:
Reviewed By: Date:

Project # 3Y0167
Project Name: NANSEN

Weather: partly cloudy, light wind, 17°C

HID	VIC-REF	Date	29-05-13	Discharge Measurement Instruments + Methods	
Station Name	Victoria Cr. Reference	Q Measurement Start Time:	16:53 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV	MID-SECT. | POINT
		Q Measurement End Time:	17:05 (HH:MM) PDT | PST	SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time:	(HH:MM) PDT | PST	Channel Conditions	
		Logger Reading (m)	17:17 [-] downloaded	NONE | ICE | BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP. SED	
Logger:	Serial # 9908152	HOBO | Solinst | N/A		GPS Waypoint	ZONE EASTING NORTHING
Photo #	[U/S] 253	[D/S] 254	[RDB] 255	[LDB] 257	[STAFF/WEIR] 256

Site Comments

Logger silted in well. Raised after survey resurveyed. Logger staff @ 17:17 High flows.

Channel Measurements

Staff Gauge Height (m):	0.870
Weir Head (m):	
Water Temperature (°C):	5.8
Water Surface Slope (%):	
Average Width (m):	6.1
Average Depth (m):	0.415

Measurement Summary	Primary	Secondary
Meas. Type:	ADV	
Measurment ID (MID):	768	
Average Q (m^3/s):	3.0259	
Q Meas. Accuracy +/- [%]:	3.6	
Average Velocity (m/s):	1.197	
Cross-Sectional Area (m^2):	2.528	

Salt Tracer (N/A)

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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (:)	____ | ____				
2 (:)	____ | ____				
3 (:)	____ | ____				

V_1 for Sec. Mix (mL)	
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	1 L
SPC_0 Calib. Tank	
CF.T =	
Qsalt =	

Notes:

CF.T

Vol. Added (mL)	SPC (uS/cm)	Temp
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		

Volum. (N/A)

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

YES | NO | REASON:

Survey Time (HH:MM): (WATER) 16 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	4.256	1.256	3.000		BM1	4.247	1.247	3.000	Log'r Rod Length:	unk.
BM2	4.256	1.289	2.967	.033	BM2		1.279	2.968	Log'r Rod to Botm:	
BM3	4.256	1.208	3.048	.001	BM3		1.200	3.047		
TOS	4.256	1.953	2.303	.001	TOS		1.943	2.304		
WATER	4.256	2.046	2.208	.006	WATER		2.033	2.214		
LOG'R ROD:	4.256	1.763	2.493	.001	LOG'R ROD:		1.755	2.492		
HWM					HWM					
BANKFULL					BANKFULL					
BS (BM1)	4.256	1.256	3.000	0	BS (BM1)		1.247	3.000		

3 circuit

BM1	4.329	1.329	3.000
Log'r Rod	↓	1.794	2.535
BM1		1.329	3.000

*raised logger rod instead of de-silting

Field Staff: B.Sm, JH, CB
Data Entry By: Date:
Reviewed By: Date:

Project #: 07
Project Name: NANSEN

LDI ENVIRONMENTAL DYNAMICS INC.

Weather: Overcast Calm ± 1S 1.4 Rain Heavy Rain

HID	17 VC U	Date	28 05 2017	Discharge Measurement Instruments + Methods	
Station Name	Victoria creek Upper	Q Measurement Start Time:	14:51 PDT | PST	YSI | SWOFFER | PYGMY | ~~ADV~~ ~~MID-SECT~~ | POINT	
		Q Measurement End Time:	15:28 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 # N/A	HOBO | ~~Solinst~~ | N/A	GPS Waypoint	ZONE	EASTING	NORTHING
Photo #	[U/S] 241	[D/S] 242	[RDB] 243	[LDB] 244	[STAFF/WEIR] 245	

Site Comments

Logger not all the way High flows

Channel Measurements

Staff Gauge Height (m):	0.495
Weir Head (m):	/
Water Temperature (°C):	6.0
Water Surface Slope (%):	/
Average Width (m):	5.900
Average Depth (m):	0.441

Measurement Summary	Primary	Secondary
Meas. Type:	ADV	
Measurment ID (MID):	769	
Average Q (m^3/s):	2.701	
Q Meas. Accuracy +/- [%]:	2.5%	
Average Velocity (m/s):	1.039	
Cross-Sectional Area (m^2):	2.600	

Salt Tracer (N/A)

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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (:)	____ | ____				
2 (:)	____ | ____				
3 (:)	____ | ____				

V_1 for Sec. Mix (mL)	=1 / Csec
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	1 L
SPC_0 Calib. Tank	
CF.T =	
Qsalt =	

Notes:

CF.T

Vol. Added (mL)	SPC (uS/cm)	Temp
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		

Volum. (N/A)

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

N/A Survey Time: 15:28 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	4.396	1.396	3.000		BM1	4.358	1.358	3.000	Log'r Rod Length:	
BM2		1.033	3.363		BM2		0.995	3.363	Log'r Rod to Botm:	
BM3		1.156	3.240		BM3		1.119	3.239		
TOS		1.507	2.889		TOS		1.470	2.888		
WATER		2.042	2.354		WATER		2.005	2.353		
LOG'R ROD:		1.262	3.134		LOG'R ROD:		1.223	3.175		
HWM					HWM					
BANKFULL					BANKFULL					
BS (BM1)	4.396	1.396	3.000		BS (BM1)	4.358	1.358	3.000		

Field Staff: JM BS CB
Data Entry By: _____ Date: _____
Reviewed By: _____ Date: _____

Project #: 17
Project Name: NANSEN

Weather: overcast, light rain 15°C, light wind

HID	H-BC	Date	28-05-13	Discharge Measurement Instruments + Methods	
Station Name	Back Creek	Q Measurement Start Time:	15:53 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV	MID-SECT. | POINT
		Q Measurement End Time:	16:05 (HH:MM) PDT | PST	SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time:	(HH:MM) PDT | PST	Channel Conditions	
		Logger Reading (m)	16:10 [✓] downloaded	NONE | ICE | BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP. SED.	
Logger:	Serial # 98965531	HOBO | Solinst | N/A		GPS Waypoint	ZONE EASTING NORTHING
Photo #	[U/S] 248	[D/S] 249	[RDB] 250	[LDB] 251	[STAFF/WEIR] 252

Site Comments

Logger DL & placed back @ same elev & tied length. Flow High. ADV ~~Solinst~~ performed

Channel Measurements

Staff Gauge Height (m):	.300
Weir Head (m):	
Water Temperature (°C):	7.1
Water Surface Slope (%):	
Average Width (m):	2.0
Average Depth (m):	0.187

Measurement Summary	Primary	Secondary
Meas. Type:	ADV	
Measurment ID (MID):	770	
Average Q (m^3/s):	0.2916	
Q Meas. Accuracy +/- [%]:	2.4	
Average Velocity (m/s):	0.781	
Cross-Sectional Area (m^2):	0.373	

Salt Tracer (N/A)

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_0(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (:)	____ | ____				
2 (:)	____ | ____				
3 (:)	____ | ____				

V_1 for Sec. Mix (mL)	~1 / Css
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	1 L
SPC_0 Calib. Tank	
CF.T =	
Qsalt =	

Notes:

CF.T

Vol. Added (mL)	SPC (uS/cm)	Temp
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		

Volum. (N/A)

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

N/A (location) Survey Time: 16:00 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	4.139	1.139	3.000		BM1	4.171	1.171	3.000	Log'r Rod Length:	same
BM2		1.135	3.004	Ø	BM2		1.167	3.004	Log'r Rod to Botm:	1.254
BM3		1.102	3.037	Ø	BM3		1.134	3.037		
TOS		1.494	2.645	Ø	TOS		1.526	2.645		
WATER		2.130	2.009	.005	WATER		2.167	2.004		
LOG'R ROD:		1.258	2.881	Ø	LOG'R ROD:		1.290	2.881		
HWM				Ø	HWM					
BANKFULL					BANKFULL					
BS (BM1)		1.139	3.000	Ø	BS (BM1)		1.171	3.000		

Field Staff: BSam, JM, CB.
Data Entry By: _____ Date: _____
Reviewed By: _____ Date: _____

Project #: 167
Project Name: NANSEN

Weather: Sunny, partly cloudy, 17°C, light wind

HID	H-VC-DBC	Date	28-05-12	Discharge Measurement Instruments + Methods	
Station Name	Victoria Cr. d/s Back Cr.	Q Measurement Start Time:	14:05 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV	MID-SECT. | POINT
		Q Measurement End Time:	14:44 (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] 2030	[D/S] 2037	[RDB] 2038	[LDB] 2039	[STAFF/WEIR] 2040

Site Comments

Logger not DL This Trip. water Lvl High.

Channel Measurements

Staff Gauge Height (m):	0.790
Weir Head (m):	/
Water Temperature (°C):	5.8°C
Water Surface Slope (%):	/
Average Width (m):	5.950
Average Depth (m):	0.456

Measurement Summary	Primary	Secondary
Meas. Type:	ADV	
Measurment ID (MID):	771	
Average Q (m^3/s):	3.0798	
Q Meas. Accuracy +/- [%]:	2.5	
Average Velocity (m/s):	1.112	
Cross-Sectional Area (m^2):	2.770	

Salt Tracer (N/A)

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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (:)	____ | ____				
2 (:)	____ | ____				
3 (:)	____ | ____				

V_1 for Sec. Mix (mL)	
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	1 L
SPC_0 Calib. Tank	
CF.T =	
Qsalt =	

Notes:

CF.T

Vol. Added (mL)	SPC (uS/cm)	Temp
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		

Volum. (N/A)

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

N/A (Logger) — Survey Time: 14:05 — 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	4.465	1.465	3.000		BM1	4.453	1.453	3.000	Log'r Rod Length:	Same
BM2		1.438	3.027		BM2		1.426	3.027	Log'r Rod to Botm:	
BM3		1.554	2.911		BM3		1.541	2.912		
TOS		2.130	2.335		TOS		2.118	2.335		
WATER		2.310	2.155		WATER		2.297	2.156		
LOG'R ROD:		1.610	2.855		LOG'R ROD:		1.599	2.854		
HWM	/	/	/	/	HWM	/	/	/	/	/
BANKFULL					BANKFULL					
BS (BM1)		1.465			BS (BM1)		1.453			

Field Staff: BSm, CB, JM

Data Entry By: _____ Date: _____

Reviewed By: _____ Date: _____

Project #: 67
Project Name: HANSEN

Weather: +15°C

HID	H VC UMN	Date	28 05 2013	Discharge Measurement Instruments + Methods	
Station Name	Victoria creek up stream of Hansen creek	Q Measurement Start Time:	10:45 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | (ADV) MID-SECT. | POINT	
		Q Measurement End Time:	11:45 (HH:MM) PDT | PST	SALT TRACER |WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time:	11:24 (HH:MM) PDT | PST	Channel Conditions	
		Logger Reading (m)	——— [ ] downloaded	(NONE) | ICE | BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP. SED.	
Logger:	Serial # 9896527	(HOBO) | Solinst | N/A		GPS Waypoint	ZONE EASTING NORTHING
Photo #	[U/S] 228	[D/S] 229	[RDB] 232	[LDB] 230	[STAFF/WEIR] 231

Site Comments

Flows High

Channel Measurements

Staff Gauge Height (m):	0.965m
Weir Head (m):	
Water Temperature (°C):	3.6
Water Surface Slope (%):	
Average Width (m):	6.3
Average Depth (m):	0.425

Measurement Summary	Primary	Secondary
Meas. Type:	ADV	
Measurment ID (MID):	772	
Average Q (m^3/s):	3.2834	
Q Meas. Accuracy +/- [%]:	2.2	
Average Velocity (m/s):	1.227	
Cross-Sectional Area (m^2):	2.676	

Salt Tracer (N/A)

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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (:)	——— | ———				
2 (:)	——— | ———				
3 (:)	——— | ———				

		CF.T	Vol. Added (mL)	SPC (uS/cm)	Temp
V_1 for Sec. Mix (mL)			1.		
Csec (g/L):	1 g/L		2.		
Vol. Calib. Tank (L):	1 L		3.		
SPC_0 Calib. Tank			4.		
CF.T =			5.		
Qsalt =			6.		
Notes:			7.		
			8.		
			9.		

Volum. (N/A)

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

N/A (Baseline) — Survey Time: 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
Station	A	B	C	
BM1	3.988	0.988	3.000	
BM2		0.982	3.006	
BM3		1.311	2.677	
TOS		2.002	1.986	
WATER		2.057	1.931	
LOG'R ROD:		1.787	2.201	
HWM				
BANKFULL				
BS (BM1)		0.988		

Circuit #2	H I	Rod Read	Elevation (m)	Station Measurements	
Station	A	B	C		
BM1	3.976	0.976	3.000	Log'r Rod Length:	Same as above
BM2		0.969	3.007	Log'r Rod to Botm:	1.258
BM3		1.299	2.677		
TOS		1.993	19.85		
WATER		2.039	1.937		
LOG'R ROD:		1.778	2.198		
HWM					
BANKFULL					
BS (BM1)		0.976			

Field Staff: CB BSm JM
Data Entry By: _____ Date: _____
Reviewed By: _____ Date: _____

Project #: 07
Project Name: NANSEN

Weather: Sun 1a +19°C

HID	H VC - R	Date	May 27 2013	Discharge Measurement Instruments + Methods	
Station Name	Victoria creek @ Road	Q Measurement Start Time:	12:53 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY ~~ADV~~ MID-SECT | POINT	
		Q Measurement End Time:	13:35 (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] 166	[D/S] 167	[RDB] 168	[LDB] 169	[STAFF/WEIR] 170 171

Site Comments

Stilling well Bent D/S Due to increased flows
logger Not DL This Trip
High flows compared to last Trip
well righted & Secured. Photo 0172

Channel Measurements

Staff Gauge Height (m):	0.710m
Weir Head (m):	
Water Temperature (°C):	4.8°C
Water Surface Slope (%):	
Average Width (m):	9.550
Average Depth (m):	0.304

Measurement Summary	Primary	Secondary
Meas. Type:	ADV	
Measurment ID (MID):	775	
Average Q (m^3/s):	3.5971	
Q Meas. Accuracy +/- [%]:	1.7	
Average Velocity (m/s):	1.241	
Cross-Sectional Area (m^2):	2.899	

Salt Tracer (N/A)

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_o(uS/cm) | EC_{pk}(uS/cm)	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (:)	____ | ____				
2 (:)	____ | ____		Survey	Circuit #3	
3 (:)	____ | ____				

			~~Vol. Added (mL)~~ A	SPC (uS/cm) B	Temp C
V_1 for Sec. Mix (mL)		BM1	1. 3.938	0.938	3.000
Csec (g/L):	1 g/L	BM2	2.	0.514	3.424
Vol. Calib. Tank (L):	1 L	BM3	3.	0.768	3.170
SPC_0 Calib. Tank		TOS	4.	1.373	2.565
CF.T =		WATER	5.	1.632	2.306
Qsalt =		LOG'R ROD	6.	1.152	2.786
Notes:			7.		
		BS (BM1)	8.		
			9. 0.938		

Volum. (N/A)

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

N/A (Baseline) Survey Time: 13:00 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	3.962	0.962	3.000		BM1	3.954	0.954	3.000	Log'r Rod Length:
BM2		0.539	3.423	1	BM2		0.526	3.434	Log'r Rod to Botm:
BM3		0.791	3.171	.007	BM3		0.772	3.182	
TOS		1.397	2.565	6	TOS		1.378	2.576	
WATER		1.659	2.303	7	WATER		1.639	2.315	
LOG'R ROD:		1.177	2.785	1	LOG'R ROD:		1.168	2.786	
HWM					HWM				
BANKFULL					BANKFULL				
BS (BM1)		0.962	3.000		BS (BM1)	~	0.954	3.954	

Field Staff: BSn CB. JM
Data Entry By: _____ Date: _____
Reviewed By: _____ Date: _____

Project #: 12-Y-0129
Project Name: Mount Nansen - Hydrology

Field Dates: June 10-13, 2013

General Site Tasks/ Communications

1)Download ALL data loggers present. Gather a surface water elevation whenever stream discharge is measured at stations.
2)FIX H-VC-R and make more robust for high flow events.
3) If a measurement is not feasible, fully document why and take photos.
4) Fill in ALL data boxes & Site Comment boxes on field sheets to document site conditinos (even if site is unchanged).

#	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	13 06 10	16:33	n/a	
2	[✓]	ATM-DC4	Atmospheric at Diversion Channel (Back-up logger)	Continuous Baro Logger	1) Solinst download	NO	Solinst Baro-logger	None	None	13-06-10	16:33	n/a	-0.3904
3	[✓]	H-PC-U	Upper Pony Creek	Instantaneous	1) Q measurement if water flowing. 2) Logger download.	YES	HOBO	Salt (0.05 kg) CF.T	Check Survey	13-06-12	10:50		
4	[✓]	H-PC-DSP	Pony Creek Downstream of Pit	Instantaneous	1) Q measurement if water flowing. 2) Logger download.	YES	HOBO	Salt (0.1 kg) CF.T	None	13-06-12	9:46	0.234	
5	[✓]	H-DC-DX	Dome Creek DX	Instantaneous	1) Q measurement if water flowing.	n/a	n/a	Salt (0.025 kg) CF.T	None	13-06-12	12:31	n/a	
6	[✓]	H-DC-DX+105	Dome Creek DX+105	Instantaneous	1) Q measurement if water flowing.	n/a	n/a	Volumetric Salt (0.025 kg) CF.T	None	13-06-11	19:17	n/a	N/A
7	[X]	H-DC-D1	Dome Creek D1	n/a	n/a - no longer monitoring	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
8	[✓]	H-DC-D1b	Dome Creek D1b	Instantaneous	1) Q measurement if water flowing.	n/a	n/a	Salt (0.1 kg) CF.T	None	13-06-10	19:02	n/a	N/A
9	[✓]	H-DC-U1	Upper Dome Creek 1	Instantaneous	1) Q measurement if water flowing.	YES	HOBO	Salt (0.1 kg) CF.T	None	13-06-10	17:35		
10	[✓]	H-DC-U2	Upper Dome Creek 2	Instantaneous	1) Q measurement if water flowing.	n/a	n/a	Salt (0.1 kg) CF.T	None	13-06-10	17:45	n/a	N/A
11	[✓]	H-DC-B	Diversion Channel at Bridge	Continuous	1) Q measurement if water flowing. 2) Logger download.	YES	HOBO	Salt (0.1 kg) CF.T	None	13-06-10	16:31	0.159	
12	[✓]	H-DC-M	Middle Dome Creek	Continuous	1) Q measurement if water flowing. 2) Logger download.	YES	Solinst 1050018	Salt (0.3 kg) CF.T	None	13-06-10	15:48	0.208	-0.2133

see DC-B sheet for Time

photos: LDB 361 RDB360 DIS 359 U/S 359
ow flow braided through vegetation + some ice, stream unsuitable for salt gauging.

Field Staff: BSM, JM, DS

Project #: 12-Y-0129
Project Name: Mount Nansen - Hydrology

Field Dates: June 10-13, 2013

#	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)
13	[M]	H-DC-R	Dome Creek at Road	Continuous	1) Q measurement if water flowing. ✓ 2) Install station. ✓	YES	Solinst	Volumetric (at culvert) Salt (0.3 kg) CF.T	None	13-06-10	14:30	.350	~~1.161~~
14	[M]	H-VC-REF	Victoria Creek Reference	Continuous	1) Q measurement if water flowing. 2) Logger download.	YES	HOBO	ADV	None	13-06-11	15:24		
15	[M]	H-VC-U	Upper Victoria Creek	Continuous	1) Q measurement if water flowing. 2) Logger download.	YES	Solinst 1049522	ADV	None	13-06-10	12:16	2.358	-0.1384
16	[M]	H-VC-DBC	Victoria Creek D/S of Back Creek	Continuous	1) Q measurement if water flowing. 2) Logger download.	YES	Solinst 1049137	ADV	None	13-06-11	11:10	0.528	0.1635
17	[M]	H-BC	Back Creek	Continuous	1) Q measurement if water flowing. 2) Logger download.	YES	HOBO	Salt (0.1 kg) CF.T	None	13-06-11	12:32	.260	
18	[M]	H-VC-UMN	Victoria Creek U/S of Minnesota Creek	Continuous	1) Q measurement if water flowing. 2) Logger download.	YES	HOBO	ADV	None	13-06-11	9:56	0.711	
19	[M]	H-MN	Minnesota Creek	Instantaneous	1) Q measurement if water flowing. 2) Logger download.	YES	HOBO	Salt (0.1 kg) CF.T	None	13-06-11	9:37	.552	
20	[M]	H-VC-R	Victoria Creek at Road	Continuous	1) Q measurement if water flowing. 2) Logger download.	YES	Solinst 1041103	ADV	None	13-06-10	13:30	0.550	1.31
21	[M]	H-SEEP	Seepage Pond Outlet	Instantaneous / Water Level	1) Q measurement at pipe outlet 2) Q measurement at flow meter in pumphouse	no	n/a	Volumetric	None	13-06-11	16:55		
22	[M]	H-TP	Tailings Pond	Water Level Only	1) Requires staff gauge install.	YES	n/a	None	None	13-06-11	18:40		

Field Staff: BSm, JM, DS

Project #: 13-Y-0167
Project Name: Mount Nansen, AAM

Weather: overcast, light wind, 14°C

HID	H- PC - U	Date	12 June 2013	Discharge Measurement Instruments + Methods	
Station Name	Pony Creek Upper	Q Measurement Start Time:	10:48 (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:	11:03 (HH:MM) PDT | PST	Channel Conditions	
		Logger Reading (m)	N/A [ ] downloaded	NONE | ICE | BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP. SED.	
Logger:	Serial # 9896522	HOBO | Solinst | N/A		GPS Waypoint	ZONE EASTING NORTHING
Photo #	[U/S] 469	[D/S] 470	[RDB] 471	[LDB] 472	[STAFF/WEIR] 473

Site Comments

- flow u/s of site is predominantly under weir + to the RDB side see photos 477-479
- more placer activity in the area d/s, see photos 474-476

Channel Measurements

Staff Gauge Height (m):	2.39
Weir Head (m):	0.028
Water Temperature (°C):	1.8 °C
Water Surface Slope (%):	
Average Width (m):	
Average Depth (m):	

Measurement Summary	Primary	Secondary
Meas. Type:	SS	
Measurment ID (MID):		
Average Q (m^3/s):		
Q Meas. Accuracy +/- [%]:		
Average Velocity (m/s):		
Cross-Sectional Area (m^2):		

Salt Tracer — N/A

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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (10:48)	123.3 | 262.4	14	.050	20	.0025
2 (11:04)	124.3 | 269.4	14	.050	20	
3 (:)	|				

V_t for Sec. Mix (mL)	400
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	1 L
SPC_o Calib. Tank	125.0 / 2.2
CF.T =	
Qsalt =	

Notes:

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.	20	160.5	2.1
2.	20	189.9	2.1
3.	20	219.7	2.2
4.	20	247.9	2.2
5.	20	275.3	2.3
6.			
7.			
8.			
9.			

Volum. — N/A

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

N/A (mm/dd/yy) — Survey Time: 11:05 — 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	5.049	2.049	3.000		BM1	5.025	2.025	3.000	Log'r Rod Length:	
BM2	4~~8~~.049	1.459	3.060	.001	BM2	4~~8~~.025	1.464	3.561	Log'r Rod to Botm:	1.365
BM3	4~~8~~.049	1.139	3.910	.002	BM3	4~~8~~.025	1.113	3.912		
TOS	4~~8~~.049	1.810	3.239	.001	TOS	4~~8~~.025	1.785	3.240		
WATER	4~~8~~.049	2.572	2.577	.002	WATER	4~~8~~.025	2.546	2.579		
LOG'R ROD:	4~~8~~.049	1.570	3.479	.001	LOG'R ROD:	4~~8~~.025	1.545	3.580		
HWM					HWM					
BANKFULL					BANKFULL					
BS (BM1)	5.049	2.049	3.000	0	BS (BM1)	5.025	2.025	3.000		

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

Project #: 13-Y-0167
Project Name: Mount Nansen, AAM

EDI

Weather: overcast, light wind, 15°C

HID	H- PC-DSP	Date	12 June 2013	Discharge Measurement Instruments + Methods	
Station Name	Porty Creek d/s of Pit	Q Measurement Start Time:	9:46 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV	MID-SECT. | POINT
		Q Measurement End Time:	10:08 (HH:MM) PDT | PST	SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time:	9:42 (HH:MM) PDT | PST	Channel Conditions	
		Logger Reading (m)	N/A [✓] downloaded	NONE | ICE | BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP. SED.	

Logger:	Serial # 989 6521	HOBO | Solinst | N/A	GPS Waypoint	ZONE	EASTING	NORTHING
Photo #	[U/S] 464	[D/S] 465	[RDB] 466	[LDB] 467	[STAFF/WEIR] 469	

Site Comments

Channel Measurements

Staff Gauge Height (m):	0.234
Weir Head (m):	
Water Temperature (°C):	1.9°C
Water Surface Slope (%):	
Average Width (m):	
Average Depth (m):	

Measurement Summary	Primary	Secondary
Meas. Type:	SG	
Measurment ID (MID):		
Average Q (m^3/s):		
Q Meas. Accuracy +/- [%]:		
Average Velocity (m/s):		
Cross-Sectional Area (m^2):		

Salt Tracer — N/A

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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (9 :46)	193.8 | 489.1	13 m	.100	20	.010
2 (9 :57)	194.9 | 473.2	13 m	.100	20	
3 (:)	|				

V_1 for Sec. Mix (mL)	200
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	1 L
SPC_0 Calib. Tank	195.3 / 2.2°C
CF.T =	
Qsalt =	

Notes:

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.	30	245.2	2.2
2.	30	291.6	2.3
3.	60	375.2	2.2
4.	60	453.2	2.2
5.	60	525.1	2.2
6.			
7.			
8.			
9.			

Volum. — N/A

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

N/A (station) — Survey Time: 10:06 — 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				Log'r Rod to Botm:	
BM3	A+B+C		A-B=		BM3					
TOS	A+B+C		A-B=		TOS					
WATER	A+B+C		A-B=		WATER					
LOG'R ROD:	A+B+C		A-B=		LOG'R ROD:					
HWM	A+B+C		A-B=		HWM					
BANKFULL	A+B+C		A-B=		BANKFULL					
BS (BM1)	A+B+C		A-B=		BS (BM1)					

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

Project #: 13-Y-0167
Project Name: Mount Nansen, AAM

EDI

Weather: Partly cloudy, 16°C, light wind

HID	H- DC-DX	Date	12 June 2013	Discharge Measurement Instruments + Methods	
Station Name	Dome Creek DX	Q Measurement Start Time:	12:31 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV	MID-SECT. | POINT
		Q Measurement End Time:	12:39 (HH:MM) PDT | PST	SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time:	N/A (HH:MM) PDT | PST	Channel Conditions	
		Logger Reading (m)	N/A [ ] downloaded	NONE | ICE | BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP. SED	

Logger:	Serial # N/A	HOBO | Solinst | N/A	GPS Waypoint	ZONE	EASTING	NORTHING
Photo #	[U/S] 0294	[D/S] 0292	[RDB] 0293	[LDB] 0295	[STAFF/WEIR] N/A	

Site Comments

lots of silt build up in YSI - SPC, jumpy during salt tracer.

Channel Measurements

Staff Gauge Height (m):	
Weir Head (m):	N/A
Water Temperature (°C):	2.5°C
Water Surface Slope (%):	
Average Width (m):	
Average Depth (m):	

Measurement Summary	Primary	Secondary
Meas. Type:	SS	V
Measurment ID (MID):		
Average Q (m^3/s):		
Q Meas. Accuracy +/- [%]:		
Average Velocity (m/s):		
Cross-Sectional Area (m^2):		

Salt Tracer (N/A)

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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (12:31)	308.7 | 1159	8	.025	20	.00125
2 (12:35)	7944 | 1129	8	.025	20	
3 (:)	|				

V_1 for Sec. Mix (mL)	800
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	1 L
SPC_0 Calib. Tank	335.7 / 2.5°C
CF.T =	
Qsalt =	

Notes: Ran out of salt slug...

CF.T

Vol. Added (mL)	SPC (uS/cm)	Temp
1. 30	361.6	2.7
2. 60	434.7	2.6
3. 60	494.5	2.6
4. 100	585.2	2.6
5. 100	677.6	2.6
6. 100	758.2	2.6
7.		
8.		
9.		

200 salt sl. 250 mL CFW

Volum. (N/A)

Volume (L) =	19		19		19		18.5		19
Time (sec)	[1] 11.35		[2] 11.34		[3] 11.30		[4] 11.09		[5] 11.53
Average Q (L/s) =									
Avg. Q_{vol} (L/s) =					Avg Q_{vol} (m^3/s) =				

Hydrometric Levels - Survey

N/A (Session) Survey Time: 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				Log'r Rod to Botm:	
BM3	A+B=C		A-B=		BM3					
TOS	A+B=C		A-B=		TOS					
WATER	A+B=C		A-B=		WATER					
LOG'R ROD:	A+B=C		A-B=		LOG'R ROD:					
HWM	A+B=C		A-B=		HWM					
BANKFULL	A+B=C		A-B=		BANKFULL					
BS (BM1)	A+B=C		A-B=		BS (BM1)					

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

Project #: 13-Y-0167
Project Name: Mount Nansen, AAM

EDI ENVIRONMENTAL DYNAMICS INC.

Weather: partly cloudy, 14°C, light wind

HID	H- DY105	Date	11 June 2013	Discharge Measurement Instruments + Methods	
Station Name	Dome Creek DY 105	Q Measurement Start Time:	19:17 (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:	N/A (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] 0289	[D/S] 0288	[RDB] 0290	[LDB] 0291	[STAFF/WEIR] N/A

Site Comments

N/A

Channel Measurements

Staff Gauge Height (m):	N/A
Weir Head (m):	
Water Temperature (°C):	2.6°C
Water Surface Slope (%):	
Average Width (m):	
Average Depth (m):	

Measurement Summary	Primary	Secondary
Meas. Type:	Sp	
Measurment ID (MID):		
Average Q (m^3/s):		
Q Meas. Accuracy +/- [%]:		
Average Velocity (m/s):		
Cross-Sectional Area (m^2):		

Salt Tracer

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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (19 : 17)	797.5 | 971	27	.025	20	0.00125
2 (19 : 23)	796.6 | 951	27	.025	20	
3 (:)	____ | ____				

V_1 for Sec. Mix (mL)	300
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	1 L
SPC_0 Calib. Tank	804.0 / 2.7°C
CF.T =	
Qsalt =	

Notes:

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.	20	828.9	2.7
2.	30	862.3	2.7
3.	30	890	2.6
4.	30	925	2.7
5.	30	953	2.8
6.	30	980	2.8
7.	30	1005	2.8
8.			
9.			

Volum. N/A

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

N/A — Survey Time: — BM Shift: Yes| No — Logger Shift: Yes| No — Staff Gauge Shifted?: Yes| No

Circuit #1	H I	Rod Read	Elevation (m)	± 0.003
Station	A	B	C	
BM1	A+B=C		3.000	
BM2	A+B=C		A-B=	
BM3	A+B=C		A-B=	
TOS	A+B=C		A-B=	
WATER	A+B=C		A-B=	
LOG'R ROD:	A+B=C		A-B=	
HWM	A+B=C		A-B=	
BANKFULL	A+B=C		A-B=	
BS (BM1)	A+B=C		A-B=	

Circuit #2	H I	Rod Read	Elevation (m)	Station Measurements	
Station	A	B	C		
BM1			3.000	Log'r Rod Length:	
BM2				Log'r Rod to Botm:	
BM3					
TOS					
WATER					
LOG'R ROD:					
HWM					
BANKFULL					
BS (BM1)					

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

Project #: 13-Y-0167
Project Name: Mount Nansen, AAM

EDI ENVIRONMENTAL DYNAMICS INC.

Weather: overcast, 13°C

HID	H-DC-D1b	Date	10-Jun 2013	Discharge Measurement Instruments + Methods	
Station Name	Dome Creek D/S 1b	Q Measurement Start Time:	19:02 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV	MID-SECT. | POINT
		Q Measurement End Time:	19:34 (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] 373	[D/S] 374	[RDB] 375	[LDB] 376	[STAFF/WEIR] N/A	

Site Comments

flow levels moderate. Stream course flowing through & under thick shore ice (up to 1m thick). Channel assuming summertime path & goes underground

Channel Measurements

Staff Gauge Height (m):	N/A
Weir Head (m):	
Water Temperature (°C):	1.6
Water Surface Slope (%):	
Average Width (m):	
Average Depth (m):	

Measurement Summary	Primary	Secondary
Meas. Type:	SS	
Measurment ID (MID):		
Average Q (m^3/s):		
Q Meas. Accuracy +/- [%]:		
Average Velocity (m/s):		
Cross-Sectional Area (m^2):		

Salt Tracer — N/A

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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (19:02)	1068 | 1197	17	.100	20	100
2 (19:13)	1071 | 1344	17	.200	20	
3 (:)	|				

V_1 for Sec. Mix (mL)	200
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	1 L
SPC_0 Calib. Tank	1074 / 1.7
CF.T =	
Qsalt =	

Notes:

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.	30	1121	1.7
2.	20	1149	1.8
3.	20	1177	1.8
4.	20	1202	1.8
5.	20	1231	1.8
6.			
7.			
8.			
9.			

Volum. — N/A

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

N/A (datum) — Survey Time: — 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				Log'r Rod to Botm:	
BM3	A+B=C		A-B=		BM3					
TOS	A+B=C		A-B=		TOS					
WATER	A+B=C		A-B=		WATER					
LOG'R ROD:	A+B=C		A-B=		LOG'R ROD:					
HWM	A+B=C		A-B=		HWM					
BANKFULL	A+B=C		A-B=		BANKFULL					
BS (BM1)	A+B=C		A-B=		BS (BM1)					

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

Project #: 13-Y-0167
Project Name: Mount Nansen, AAM

EDI ENVIRONMENTAL DYNAMICS INC.

Weather: overcast 13°C calm

HID	H- DC-US	Date	10-Oct-2013	Discharge Measurement Instruments + Methods	
Station Name	Dome Creek Upper 2	Q Measurement Start Time:	17:45 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV	MID-SECT. | POINT
		Q Measurement End Time:	17:59 (HH:MM) PDT | PST	SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time:	(HH:MM) PDT | PST	Channel Conditions	
		Logger Reading (m)	N/A [ ] downloaded	NONE | ICE | BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP. SED.	

Logger:	Serial # N/A	HOBO | Solinst | N/A	GPS Waypoint	ZONE	EASTING	NORTHING
Photo #	[U/S] 362	[D/S] 363	[RDB] 364	[LDB] 365	[STAFF/WEIR] N/A	

Site Comments

flow levels moderate. Stream course flowing through vegetation + under ice.

Channel Measurements

Staff Gauge Height (m):	N/A
Weir Head (m):	
Water Temperature (°C):	1.1
Water Surface Slope (%):	
Average Width (m):	
Average Depth (m):	

Measurement Summary	Primary	Secondary
Meas. Type:	SS	
Measurment ID (MID):		
Average Q (m^3/s):		
Q Meas. Accuracy +/- [%]:		
Average Velocity (m/s):		
Cross-Sectional Area (m^2):		

Salt Tracer — N/A

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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (17:45)	748.8 |	21	.100	20	100
2 (17:51)	736.5 | 837.6	21	.100	20	
3 (:)	|				

V_1 for Sec. Mix (mL)	200
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	1 L
SPC_0 Calib. Tank	748.5 / 1.2°C
CF.T =	
Qsalt =	

Notes:

CF.T

Vol. Added (mL)	SPC (uS/cm)	Temp
1. 30	793.8	1.3
2. 30	841.3	1.2
3. 30	882.1	1.3
4. 30	922.	1.4
5.		
6.		
7.		
8.		
9.		

Volum. — N/A

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

N/A — Survey Time: — 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				Log'r Rod to Botm:	
BM3	A+B=C		A-B=		BM3					
TOS	A+B=C		A-B=		TOS					
WATER	A+B=C		A-B=		WATER					
LOG'R ROD:	A+B=C		A-B=		LOG'R ROD:					
HWM	A+B=C		A-B=		HWM					
BANKFULL	A+B=C		A-B=		BANKFULL					
BS (BM1)	A+B=C		A-B=		BS (BM1)					

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

Project #: 13-Y-0167
Project Name: Mount Nansen, AAM

EDI ENVIRONMENTAL DYNAMICS INC.

Weather: Overcast | Rain Periodical | +13°C

HATH 04 Solinst 1041027
HATH 02 Hobo 9896533

HID	H- DC - B	Date	16 Jun 2013	Discharge Measurement Instruments + Methods	
Station Name	Diversion Channel @ Bridge	Q Measurement Start Time:	16:31 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV	MID-SECT. | POINT
		Q Measurement End Time:	16:38 (HH:MM) PDT | PST	SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time:	16:49 (HH:MM) PDT | PST	Channel Conditions	
		Logger Reading (m)	N/A downloaded	NONE | ICE | BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP. SED.	

Logger:	Serial # 990154	HOBO | Solinst | N/A	GPS Waypoint	ZONE	EASTING	NORTHING
Photo #	[U/S] 353	[D/S] 354	[RDB] 355	[LDB] 356	[STAFF/WEIR] 357	

Site Comments

Channel Measurements

Staff Gauge Height (m):	.159
Weir Head (m):	
Water Temperature (°C):	
Water Surface Slope (%):	
Average Width (m):	
Average Depth (m):	

Measurement Summary	Primary	Secondary
Meas. Type:	SS	
Measurment ID (MID):		
Average Q (m^3/s):		
Q Meas. Accuracy +/- [%]:		
Average Velocity (m/s):		
Cross-Sectional Area (m^2):		

Salt Tracer — N/A

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_0(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (16:71)	733.9 | ____	34	0.1	20	0.005
2 (:)	731.9 | 812.7	34	0.1	20	0.005
3 (:)	____ | ____				

V_1 for Sec. Mix (mL)	200
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	1 L
SPC_0 Calib. Tank	718.3 / 5.7
CF.T =	
Qsalt =	

Notes

CF.T

Vol. Added (mL)	SPC (uS/cm)	Temp
1. 30	772.0	3.5
2. 30	818.8	3.8
3. 30	865	5.3
4. 30	909	3.8
5.		
6.		
7.		
8.		
9.		

Volum. — N/A

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

N/A (reason) — Survey Time 16:41 — 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	4.119	1.119	3.000		BM1	4.104	1.104	3.000	Log'r Rod Length:	1.549
BM2	4.119	0.762	3.357	.001	BM2	4.104	1.748	3.356	Log'r Rod to Botm:	1.545
BM3	4.119	1.123	2.996	0	BM3	4.104	1.108	2.996		
TOS	4.119	1.773	2.346	.001	TOS	4.104	1.757	2.347		
WATER	4.119	2.599	1.520	.001	WATER	4.104	2.585	1.519		
LOG'R ROD:	4.119	1.594	A-B=	N/A	LOG'R ROD:	4.104	1.170	34		
HWM			A-B=		HWM					
BANKFULL			A-C=		BANKFULL					
BS (BM1)	4.119	1.119	3.000	0	BS (BM1)	4.104	1.104	3.000		

↳ Changed logger between survey 1 + 2 Shifted

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

Real Time Lvl - 0.3904 m
Download Time @ 16:33

Project #: 13-Y-0167
Project Name: Mount Nansen, AAM

EDI

Weather: overcast little wind +13°, light rain

HID	H-DC-M	Date	10 Jun 2013	Discharge Measurement Instruments + Methods
Station Name	Dome creek middle	Q Measurement Start Time:	15:48 (HH:MM) (PDT) | PST	(YSI) | SWOFFER | PYGMY | ADV MID-SECT. | POINT
		Q Measurement End Time:	15:58 (HH:MM) PDT | PST	SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD
		Logger Download/Inst Time:	15:44 (HH:MM) PDT | PST	Channel Conditions
		Logger Reading (m)	-0.2133 m (d)ownloaded	(NONE) | ICE | BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP. SED.

Logger:	Serial # 1050018	HOBO | Solinst | N/A	GPS Waypoint	ZONE	EASTING	NORTHING
Photo #	[U/S] 348	[D/S] 349	[RDB] 350	[LDB] 351	[STAFF/WEIR] 352	

Site Comments

creek flow moderate.

Channel Measurements

Staff Gauge Height (m):	0.208
Weir Head (m):	
Water Temperature (°C):	6.0°C
Water Surface Slope (%):	
Average Width (m):	
Average Depth (m):	

Measurement Summary	Primary	Secondary
Meas. Type:	SS	
Measurment ID (MID):		
Average Q (m^3/s):		
Q Meas. Accuracy +/- [%]:		
Average Velocity (m/s):		
Cross-Sectional Area (m^2):		

Salt Tracer — N/A

(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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (15:46)	775.4 | 942	55 m	0.300	20	0.015
2 (:)	777.5 | 936	55 m	0.300	20	0.015
3 (:)	|				

V_1 for Sec. Mix (mL)	67 (1 Css)
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	1 L
SPC_0 Calib. Tank	780 / 6.3°C
CF.T =	
Qsalt =	

Notes:

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.	30	834	6.5
2.	30	834	6.5
3.	30	930	6.7
4.	30	975	7.0
5.			
6.			
7.			
8.			
9.			

Volum. — N/A

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

N/A (Position) — Survey Time: 16:00 — 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	4.444	1.444	3.000		BM1	4.421	1.421	3.000	Log'r Rod Length:	
BM2	4.444	2.133	2.311	.002	BM2	4.471	2.105	2.313	Log'r Rod to Botm:	
BM3	4.444	1.732	2.712	.001	BM3	4.421	1.708	2.713		
TOS	4.444	1.984	2.460	0	TOS	4.421	1.961	2.460		
WATER	4.444	2.777	1.667	.003	WATER	4.421	2.757	1.664		
LOG'R ROD:	4.444	1.755	2.686	0	LOG'R ROD:	4.421	1.735	2.686		
HWM					HWM					
BANKFULL					BANKFULL					
BS (BM1)	4.444	1.444	3.000	0	BS (BM1)	4.421	1.421	3.000		

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

Project #: 13-Y-0167
Project Name: Mount Nansen, AAM

EDI

overcast, Lite winds
Periodic showers
Weather: + 13°C

HID	H-DC-R	Date	10-06-2013	Discharge Measurement Instruments + Methods	
Station Name	Dome Creek at Road	Q Measurement Start Time:	14:41 HH:MM PDT | PST	YSI | SWOFFER | PYGMY | ADV	MID-SECT. | POINT
		Q Measurement End Time:	14:51 HH:MM PDT | PST	SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time:	14:30 HH:MM PDT | PST	Channel Conditions	
		Logger Reading (m)	N/A [ ] downloaded	NONE | ICE | BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP. SED.	

Logger:	Serial # 9858715	HOBO | Solinst | N/A	GPS Waypoint	ZONE	EASTING	NORTHING
Photo #	[U/S] 340	[D/S] 341	[RDB] 342	[LDB] 343	[STAFF/WEIR] 344	

Site Comments

Channel devided u/s of well + d/s Through veg - trial 2 very sudden peak, salt quenching suspect.
- salt trial section was done on main channel with stilling well

Channel Measurements

Staff Gauge Height (m):	0.350
Weir Head (m):	—
Water Temperature (°C):	5.4
Water Surface Slope (%):	
Average Width (m):	
Average Depth (m):	

Measurement Summary	Primary	Secondary
Meas. Type:	SS	
Measurment ID (MID):		
Average Q (m^3/s):		
Q Meas. Accuracy +/- [%]:		
Average Velocity (m/s):		
Cross-Sectional Area (m^2):		

N/A

Salt Tracer

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_0(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (14:41)	699.3 865	17	.300	20	0.015
2 (14:46)	696.5 1053	17	.300	20	—
3 (:)	— | —				

V_1 for Sec. Mix (mL)	67mL
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	1 L
SPC_0 Calib. Tank	694.4 / 5.0°C
CF.T =	
Qsalt =	

Notes

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.	20	729.5	5.0
2.	20	758.4	5.1
3.	20	796.3	5.0
4.	30	853.	5.1
5.	30	902	5.1
6.	30	944	5.1
7.	30	988	5.2
8.	30	1030	5.2
9.	30	1066	5.3

Volumetric

N/A

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

N/A (Weston) — Survey Time: 14:55 — 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	3.603	0.603	3.000		BM1	3.575	0.575	3.000	Log'r Rod Length:	1.464
BM2	3.603	0.667	2.936	.002	BM2	3.575	0.637	2.938	Log'r Rod to Botm:	1.543
BM3	3.603	1.280	2.323	.001	BM3	3.575	1.251	2.324		
TOS	3.603	2.307	1.296	.001	TOS	3.575	2.278	1.297		
WATER	3.603	2.907	0.696	0	WATER	3.575	2.879	0.696		
LOG'R ROD:	3.603	1.910	1.693	0	LOG'R ROD:	3.575	1.982	1.693		
HWM					HWM					
BANKFULL					BANKFULL					
BS (BM1)	3.603	0.603	3.000	0	BS (BM1)	3.575	0.575	3.000		

Photos of flow Through LDD Veg 345-346 D/S
Photo of culvert @ Rd u/s of well 347 Not suitable for Volumetric

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

Project #: 13-Y-0167
Project Name: Mount Nansen, AAM

Weather: drizzle, overcast 12°C

HID	H- VC-REF	Date	11-JUNE-2013	Discharge Measurement Instruments + Methods	
Station Name	Victoria creek reference	Q Measurement Start Time:	13:11 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV	MID-SECT | POINT
		Q Measurement End Time:	13:40 (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)	N/A [ ] downloaded	NONE | ICE | BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP. SED.	

Logger:	Serial # 9988152	HOBO | Solinst | N/A	GPS Waypoint	ZONE	EASTING	NORTHING
Photo #	[U/S] 416	[D/S] 417	[RDB] 419	[LDB] 419	[STAFF/WEIR] ~~415~~ 420	

Site Comments

Logger silted @ well. Silted logger to bottom = 1.048. Raised 0.038m from silted height. Logger back in well @ 13:11

Channel Measurements

Staff Gauge Height (m):	0.950
Weir Head (m):	
Water Temperature (°C):	5.00C
Water Surface Slope (%):	
Average Width (m):	4.450
Average Depth (m):	0.778

Measurement Summary	Primary	Secondary
Meas. Type:	ADV	
Measurment ID (MID):		
Average Q (m^3/s):	.5403	
Q Meas. Accuracy +/- [%]:	1.9	
Average Velocity (m/s):	0.437	
Cross-Sectional Area (m^2):	1.237	

Salt Tracer — N/A

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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (:)	____|____				
2 (:)	____|____				
3 (:)	____|____				

		CF.T	Vol. Added (mL)	SPC (uS/cm)	Temp
V_1 for Sec. Mix (mL)	=V1/Css		1.		
Csec (g/L):	1 g/L		2.		
Vol. Calib. Tank (L):	1 L		3.		
SPC_0 Calib. Tank			4.		
CF.T =			5.		
Qsalt =			6.		
Notes:			7.		
			8.		
			9.		

Volum. — N/A

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

N/A (reason) — Survey Time: 13:25 — 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	4.81904	1.104	3.000		BM1			3.000	Log'r Rod Length:	
BM2	A+B-C=	1.138	A+B=		BM2				Log'r Rod to Botm:	1.205
BM3	A+B-C=	1.061	A+B=		BM3					
TOS	A+B-C=	1.901	A+B=		TOS					
WATER	A+B-C=	2.259	A+B=		WATER					
LOG'R ROD:	A+B-C=	1.529	A+B=		LOG'R ROD:					
HWM	A+B-C=		A+B=		HWM					
BANKFULL	A+B-C=		A+B=		BANKFULL					
BS (BM1)	A+B-C=	1.104	A+B=		BS (BM1)					

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

Project #: 13-Y-0167
Project Name: Mount Nansen, AAM

EDI

Weather: Drizzle, overcast 12°C

HID	H- VC-U	Date	11-June 2013	Discharge Measurement Instruments + Methods	
Station Name	Upper Victoria Creek	Q Measurement Start Time:	11:43 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV	MID-SECT. | POINT
		Q Measurement End Time:	12:16 (HH:MM) PDT | PST	SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time:	12:27 (HH:MM) PDT | PST	Channel Conditions	
		Logger Reading (m)	-0.1308 [↓] downloaded	NONE | ICE | BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP. SED	

Logger:	Serial # 10495222	HOBO | Solinst | N/A	GPS Waypoint	ZONE	EASTING	NORTHING

Photo #	[U/S] 401	[D/S] 402	[RDB] 403	[LDB] 404	[STAFF/WEIR] 405

Site Comments

Channel Measurements

Staff Gauge Height (m):	2.38
Weir Head (m):	
Water Temperature (°C):	4.4
Water Surface Slope (%):	
Average Width (m):	5.350
Average Depth (m):	0.227

Measurement Summary	Primary	Secondary
Meas. Type:	ADV	
Measurment ID (MID):		
Average Q (m^3/s):	0.4822	
Q Meas. Accuracy +/- [%]:	2.5	
Average Velocity (m/s):	0.398	
Cross-Sectional Area (m^2):	1.212	

Salt Tracer (N/A)

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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (:)	____ | ____				
2 (:)	____ | ____				
3 (:)	____ | ____				

		CF.T	Vol. Added (mL)	SPC (uS/cm)	Temp
V_1 for Sec. Mix (mL)	~1 Cup		1.		
Csec (g/L):	1 g/L		2.		
Vol. Calib. Tank (L):	1 L		3.		
SPC_0 Calib. Tank			4.		
CF.T =			5.		
Qsalt =			6.		
Notes			7.		
			8.		
			9.		

Volum. (N/A)

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

N/A (reason) | Survey Time: 12:14 | 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	4.042	1.042	3.000		BM1			3.000	Log'r Rod Length:	
BM2	A-B=C	0.582	A-B=		BM2				Log'r Rod to Botm:	
BM3	A-B=C	.799	A-B=		BM3					
TOS	A-B=C	1.150	A-B=		TOS					
WATER	A-B=C	1.904	A-B=		WATER					
LOG'R ROD:	A-B=C	0.905	A-B=		LOG'R ROD:					
HWM	A-B=C		A-B=		HWM					
BANKFULL	A-B=C		A-B=		BANKFULL					
BS (BM1)	A-B=C	1.042	A-B=		BS (BM1)					

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

Project #: 13-Y-0167
Project Name: Mount Nansen, AAM

Weather: Overcast, rain, 12°C

HID	H- VC-DBC	Date	11-June 2013	Discharge Measurement Instruments + Methods	
Station Name	Victoria Creek d/s Back Cree	Q Measurement Start Time:	11:10 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV	MID-SECT | POINT
		Q Measurement End Time:	11:37 (HH:MM) PDT | PST	SALT TRACER |WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time:	(HH:MM) PDT | PST	Channel Conditions	
		Logger Reading (m)	0.1635 [ ] downloaded	NONE | ICE | BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP. SED	

Logger:	Serial # 10491137	HOBO | Solinst | N/A	GPS Waypoint	ZONE	EASTING	NORTHING
Photo #	[U/S] 396	[D/S] 397	[RDB] 398	[LDB] 399	[STAFF/WEIR] 400	

Site Comments

N/A

Channel Measurements

Staff Gauge Height (m):	.528
Weir Head (m):	
Water Temperature (°C):	4.5°C
Water Surface Slope (%):	
Average Width (m):	4.950
Average Depth (m):	0.246

Measurement Summary	Primary	Secondary
Meas. Type:	ADV	
Measurment ID (MID):		
Average Q (m^3/s):	0.5649	
Q Meas. Accuracy +/- [%]:	2.3	
Average Velocity (m/s):	0.473	
Cross-Sectional Area (m^2):	1.194	

Salt Tracer

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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (:)	____|____				
2 (:)	____|____				
3 (:)	____|____				

		CF.T	Vol. Added (mL)	SPC (uS/cm)	Temp
V_1 for Sec. Mix (mL)	=V1/Css		1.		
Csec (g/L):	1 g/L		2.		
Vol. Calib. Tank (L):	1 L		3.		
SPC_0 Calib. Tank			4.		
CF.T =			5.		
Qsalt =			6.		
Notes:			7.		
			8.		
			9.		

Volum. N/A

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

N/A (reason) Survey Time: 11:13 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	4.343	1.343	3.000		BM1	4.331	1.331	3.000	Log'r Rod Length:	
BM2	4.343	1.316	3.027	.001	BM2	4.331	1.305	3.026	Log'r Rod to Bolm:	
BM3	4.343	1.427	2.916	.001	BM3	4.331	1.416	2.915		
TOS	4.343	2.005	2.338	.001	TOS	4.331	1.994	2.337		
WATER	4.343	2.465	1.878	.009	WATER	4.331	2.494	1.837		
LOG'R ROD:	4.343	1.787	2.556	.001	LOG'R ROD:	4.331	1.776	2.555		
HWM					HWM					
BANKFULL					BANKFULL					
BS (BM1)	4.343	1.343	3.000		BS (BM1)	4.331	1.331			

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

Project #: 13-Y-0167
Project Name: Mount Nansen, AAM

EDI

Weather: overcast drizzle 12°C

HID	H- TBC	Date	11 June 2013	Discharge Measurement Instruments + Methods			
Station Name	Back Creek	Q Measurement Start Time:	12:12 (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:	12:37 (HH:MM) PDT | PST	Channel Conditions			
		Logger Reading (m)	N/A [ ] downloaded	NONE | ICE | BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP. SED.			
Logger:	Serial # 9896531	HOBO | Solinst | N/A		GPS Waypoint	ZONE	EASTING	NORTHING
Photo #	[U/S] 406	[D/S] 407	[RDB] 408	[LDB] 409	[STAFF/WEIR] 410		

Site Comments

N/A

SLUG | CONSTANT RATE | DRY LOGGED | MANUAL SPC | EC CF.T YES | NO

Salt Tracer

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)	Css (kg/L)
1 (12:45)	204.4 | 721.1	29	0.100	20	100
2 (12:47)	202.5 | 274.4	29	0.100	20	
3 (:)	|				
V_1 for Sec. Mix (mL)	200				
Csec (g/L):	1 g/L				
Vol. Calib. Tank (L):	1 L				
SPC_0 Calib. Tank	205.6 | 6.7				
CF.T =					
Qsalt =					

Notes:

CF.T

Vol. Added (mL)	SPC (uS/cm)	Temp
1. 250	203.6	6.7
2. 50	240.2	6.7
3. 10	255.8	6.7
4. 10	273.9	6.8
5. 10	291.9	6.8
6.		
7.		
8.		
9.		

Channel Measurements

Staff Gauge Height (m):	0.260
Weir Head (m):	
Water Temperature (°C):	10.6°C
Water Surface Slope (%):	
Average Width (m):	
Average Depth (m):	

Measurement Summary	Primary	Secondary
Meas. Type:	VS	
Measurment ID (MID):		
Average Q (m^3/s):		
Q Meas. Accuracy +/- [%]:		
Average Velocity (m/s):		
Cross-Sectional Area (m^2):		

Volum.

N/A

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

N/A (Historical) Survey Time: 13:03 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	4.146	1.145	3.000		BM1			3.000	Log'r Rod Length:	
BM2	A+B=C	1.173	A-B=		BM2				Log'r Rod to Botm:	
BM3	A+B=C	1.107	A-B=		BM3					
TOS	A+B=C	1.501	A-B=		TOS					
WATER	A+B=C	2.220	A-B=		WATER					
LOG'R ROD:	A+B=C	1.266	A-B=		LOG'R ROD:					
HWM	A+B=C		A-B=		HWM					
BANKFULL	A+B=C		A-B=		BANKFULL					
BS (BM1)	A+B=C	1.143	A-B=		BS (BM1)					

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

Project #: 13-Y-0167
Project Name: Mount Nansen, AAM

EDI

Weather: ~~over cast~~ Rain +10 Calm

HID	H- VC UMN	Date	11 Jun 2013	Discharge Measurement Instruments + Methods			
Station Name	Victoria crk upstream of Minnisota crk	Q Measurement Start Time:	09:56 (HH:MM) ~~EDT~~ | PST	YSI | SWOFFER | PYGMY | ADV MID-SECT. | POINT			
		Q Measurement End Time:	10:26 (HH:MM) ~~EDT~~ | PST	SALT TRACER |WEIR | VOLUMETRIC | FLOAT | ROD			
		Logger Download/Inst Time:	09:51 (HH:MM) ~~PDT~~ | PST	Channel Conditions			
		Logger Reading (m)	/ [ ] downloaded	NONE | ICE | BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP. SED.			
Logger:	Serial # 9189652?	HOBO | Solinst | N/A		GPS Waypoint	ZONE	EASTING	NORTHING
Photo #	[U/S] 391	[D/S] 392	[RDB] 393	[LDB] 394	[STAFF/WEIR] 395		

Site Comments

Channel Measurements

Staff Gauge Height (m):	0.711 m
Weir Head (m):	/
Water Temperature (°C):	4.32
Water Surface Slope (%):	/
Average Width (m):	5.8
Average Depth (m):	0.209

Measurement Summary	Primary	Secondary
Meas. Type:	ADV	
Measurment ID (MID):		
Average Q (m^3/s):	0.661	
Q Meas. Accuracy +/- [%]:	3.8	
Average Velocity (m/s):	0.547	
Cross-Sectional Area (m^2):	1.210	

Salt Tracer (N/A)

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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (:)	____|____				
2 (:)	____|____				
3 (:)	____|____				

		CF.T	Vol. Added (mL)	SPC (uS/cm)	Temp
V_1 for Sec. Mix (mL)	~~Ct / Css~~		1.		
Csec (g/L):	1 g/L		2.		
Vol. Calib. Tank (L):	1 L		3.		
SPC_0 Calib. Tank			4.		
CF.T =			5.		
Qsalt =			6.		
Notes:			7.		
			8.		
			9.		

Volum. (N/A)

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

N/A (Station) Survey Time: 10:30 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	4.148	1.148	3.000		BM1			3.000	Log'r Rod Length:	Unchanged
BM2	A+B=C	1.141	3.007		BM2				Log'r Rod to Botm:	1.235
BM3	A+B=C	1.470	2.678		BM3					
TOS	A+B=C	2.165	1.983		TOS					
WATER	A+B=C	2.456	1.692		WATER					
LOG'R ROD:	A+B=C	1.945	2.203		LOG'R ROD:					
HWM	A+B=C	/	A-B=		HWM					
BANKFULL	A+B=C	/	A-B=		BANKFULL					
BS (BM1)	A+B=C	1.148	3.000	✓	BS (BM1)					

Field Staff: DS JM BS

Data Entry By: _____ **Date:** _____

Reviewed By: _____ **Date:** _____

Project #: 13-Y-0167
Project Name: Mount Nansen, AAM

Weather: overcast, light rain 12°C

HID	H- MN	Date	11 - June - 2013	Discharge Measurement Instruments + Methods	
Station Name	Minnesota Creek	Q Measurement Start Time:	9:37 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV MID-SECT. | POINT	
		Q Measurement End Time:	9:54 (HH:MM) PDT | PST	SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time:	9:34 (HH:MM) PDT | PST	Channel Conditions	
		Logger Reading (m)	N/A [ ] downloaded	NONE | ICE | BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP. SED.	
Logger:	Serial # 9908128	HOBO | Solinst | N/A		GPS Waypoint	ZONE EASTING NORTHING
Photo #	[U/S] 383	[D/S] 384	[RDB] 385	[LDB] 386	[STAFF/WEIR] 387

Site Comments

install new logger rod

Channel Measurements

Staff Gauge Height (m):	.552
Weir Head (m):	
Water Temperature (°C):	2.0°C
Water Surface Slope (%):	
Average Width (m):	
Average Depth (m):	

Measurement Summary	Primary	Secondary
Meas. Type:	SS	
Measurment ID (MID):		
Average Q (m^3/s):		
Q Meas. Accuracy +/- [%]:		
Average Velocity (m/s):		
Cross-Sectional Area (m^2):		

Salt Tracer — N/A

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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_e (kg)	Volume (L)	Css (kg/L)
1 (9 : 37)	41.6 |	45	0.100	20	~~0.50~~
2 (9 :47)	41.7 | 110.8	45	0.200	20	0.51
3 (:)	|				

V_1 for Sec. Mix (mL)	100
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	1 L
SPC_0 Calib. Tank	42.8 / 2.5°C
CF.T =	
Qsalt =	

Notes:

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.	30	102.0	2.6
2.	20	139.5	2.7
3.	20	176.7	2.8
4.	20	215.2	2.8
5.			
6.			
7.			
8.			
9.			

Volum. — N/A

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

N/A (reason) — Survey Time: 10:05 — 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	3.402	0.402	3.000		BM1	3.372	0.372	3.000	Log'r Rod Length:	1.488
BM2	3.412	1.010	2.402	.001	BM2	3.372	1.039	2.333	Log'r Rod to Botm:	1.526
BM3	2.402	0.685	1.717	.001	BM3	2.372	.656	1.716		
TOS	4.402	1.952	2.450	.001	TOS	2.372	1.523	1.849		
WATER	3.402	2.315	1.087	0	WATER	3.372	2.285	1.087		
LOG'R ROD:	3.402	1.338	2.064	0	LOG'R ROD:	3.372	1.308	2.064		
HWM					HWM					
BANKFULL					BANKFULL					
BS (BM1)	3.402	0.402	3.000	0	BS (BM1)	3.372	0.372	3.000		

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

Project #: 13-Y-0167
Project Name: Mount Nansen, AAM

EDI ENVIRONMENTAL DYNAMICS INC.

Weather: mostly overcast rain, 18°C

HID	H- VC R	Date	June 10 2013	Discharge Measurement Instruments + Methods	
Station Name	Victoria Crk @ Road	Q Measurement Start Time:	13 23 (HH:MM) PDT | PST	YSI | 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:	13:40 (HH:MM) PDT | PST	Channel Conditions	
		Logger Reading (m)	.0755 [ ] downloaded	NONE | ICE | BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP. SED.	

Logger:	Serial # 10411053	HOBO | Solinst | N/A	GPS Waypoint	ZONE	EASTING	NORTHING
Photo #	[U/S] 336	[D/S] 336	[RDB] 337	[LDB] 338	[STAFF/WEIR] 339	

Site Comments

- Stream flow normal
- creek bottom layer due to freshette, eroded under staff gauge

Channel Measurements

Staff Gauge Height (m):	.550
Weir Head (m):	
Water Temperature (°C):	6.4
Water Surface Slope (%):	
Average Width (m):	7.3000
Average Depth (m):	0.203

Measurement Summary	Primary	Secondary
Meas. Type:	ADV	
Measurment ID (MID):		
Average Q (m^3/s):	0.7346	
Q Meas. Accuracy +/- [%]:	2.9%	
Average Velocity (m/s):	0.496	
Cross-Sectional Area (m^2):	1.481	

Salt Tracer (N/A)

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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (:)	____ | ____				
2 (:)	____ | ____				
3 (:)	____ | ____				

V_1 for Sec. Mix (mL)	
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	1 L
SPC_o Calib. Tank	
CF.T =	
Qsalt =	

Notes:

CF.T

Vol. Added (mL)	SPC (uS/cm)	Temp
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		

Volum. (N/A)

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

N/A (reason) Survey Time: 13:20 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	3.800	.800	3.000		BM1	3.847	.847	3.000	Log'r Rod Length:	
BM2		.457	3.423	.001	BM2	3.847	.423	0.424	Log'r Rod to Botm:	1.31
BM3	3.880	.710	3.170	.001	BM3	3.847	.676	3.171		
TOS		1.312	2.568	.001	TOS	3.847	1.278	2.569		
WATER		1.760	2.114	.003	WATER	3.847	1.730	2.117		
LOG'R ROD:		1.090	2.790		LOG'R ROD:	3.847	1.057	2.790		
HWM					HWM					
BANKFULL					BANKFULL					
BS (BM1)		.800	3.000		BS (BM1)		.847	3.000		

Field Staff: BSm, DS, SH
Data Entry By: _____ Date: _____
Reviewed By: _____ Date: _____

Project #: 13-Y-0167
Project Name: Mount Nansen, AAM

EDI

Weather: Overcast, 14°C

HID	H- SEEP	Date	11 - June 2013	Discharge Measurement Instruments + Methods
Station Name	Seepage Pond	Q Measurement Start Time:	16:53 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV MID-SECT. | POINT
		Q Measurement End Time:	16:56 (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]	0280

Site Comments

photos 0272-76 (volumetric)
1296.285 LDM – photos 0279-0277

Channel Measurements

Staff Gauge Height (m):	0.292
Weir Head (m):	
Water Temperature (°C):	
Water Surface Slope (%):	
Average Width (m):	
Average Depth (m):	

Measurement Summary	Primary	Secondary
Meas. Type:	Volumetric	
Measurment ID (MID):		
Average Q (m^3/s):		
Q Meas. Accuracy +/- [%]:		
Average Velocity (m/s):		
Cross-Sectional Area (m^2):		

Salt Tracer — N/A

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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (:)	____ | ____				
2 (:)	____ | ____				
3 (:)	____ | ____				

V_1 for Sec. Mix (mL)	~1 / Css
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	1 L
SPC_0 Calib. Tank	
CF.T =	
Qsalt =	

Notes:

CF.T

Vol. Added (mL)	SPC (uS/cm)	Temp
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		

Volum. — N/A

Volume (L) =		20	20	19	20	19.5
Time (sec)	[1] 8.06	[2] 8.04	[3] 8.07	[4] 8.11	[5] 7.99	
Average Q (L/s) =						
Avg. Q_{vol} (L/s) =				Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

N/A (mission)

Survey Time:

BM Shift: Yes| No Logger Shift: Yes| No Staff Gauge Shifted?: Yes| No

Circuit #1	H I	Rod Read	Elevation (m)	± 0.003
Station	A	B	C	
BM1	A+B+C		3.000	
BM2	A+B+C		A-B =	
BM3	A+B+C		A-B =	
TOS	A+B+C		A-B =	
WATER	A+B+C		A-B =	
LOG'R ROD:	A+B+C		A-B =	
HWM	A+B+C		A-B =	
BANKFULL	A+B+C		A-B =	
BS (BM1)	A+B+C		A-B =	

Circuit #2	H I	Rod Read	Elevation (m)	Station Measurements	
Station	A	B	C		
BM1			3.000	Log'r Rod Length:	
BM2				Log'r Rod to Botm:	
BM3					
TOS					
WATER					
LOG'R ROD:					
HWM					
BANKFULL					
BS (BM1)					

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

Project #: 12-Y-0129
Project Name: Mount Nansen - Hydrology

EDI ENVIRONMENTAL DYNAMICS INC.

Field Dates: MH DS JM
130624-25

General Site Tasks/ Communications

1)Download ALL data loggers present. Gather a surface water elevation whenever stream discharge is measured at stations.
2)Attempt to de-silt wells prior to moving data logger rod (JimmyRod).
3) If a measurement is not feasible, fully document why and take photos.
*4) **Fill in ALL data boxes & Site Comment boxes on field sheets to document site conditions (even if site is unchanged).***
5) During salt slugs, minimum SPC rise is only +10x resolution of conductivity meter.

#	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	13.06.24	14:51	n/a	DL
2	[ ]	ATM-DC4	Atmospheric at Diversion Channel (Back-up logger)	Continuous Baro Logger	1) Solinst download	NO	Solinst Baro-logger	None	None	13 06 24	14:52	n/a	-0,5220 DL
3	[ ]	H-PC-U	Upper Pony Creek	Instantaneous	1) Q measurement if water flowing. 2) Logger download.	YES	HOBO	Salt (0.025 kg) CF.T	None	13 06 24	18:07	0.173	DL
4	[ ]	H-PC-DSP	Pony Creek Downstream of Pit	Instantaneous	1) Q measurement if water flowing. 2) Logger download.	YES	HOBO	Salt (0.025 kg) CF.T Volumetric	None	13 06 24	17:45	0.165	DL
5	[ ]	H-DC-DX	Dome Creek DX	Instantaneous	1) Q measurement if water flowing.	n/a	n/a	Salt (0.01 kg) CF.T	None	13 06 25	17:40	n/a	—
6	[ ]	H-DC-DX+105	Dome Creek DX+105	Instantaneous	1) Q measurement if water flowing.	n/a	n/a	Volumetric Salt (0.025 kg) CF.T	None	13 06 25	17:17	n/a	—
8	[ ]	H-DC-D1b	Dome Creek D1b	Instantaneous	1) Q measurement if water flowing.	n/a	n/a	Salt (0.1 kg) CF.T	None	13 06 25	16:20	n/a	—
9	[ ]	H-DC-U1	Upper Dome Creek 1	Instantaneous	1) Q measurement if water flowing.	YES	HOBO	Salt (0.1 kg) CF.T	None	13 06 24	15:23	—	—
10	[ ]	H-DC-U2	Upper Dome Creek 2	Instantaneous	1) Q measurement if water flowing.	n/a	n/a	Salt (0.1 kg) CF.T	None	13 06 24	15:55	n/a	—
11	[ ]	H-DC-B	Diversion Channel at Bridge	Continuous	1) Q measurement if water flowing. 2) Logger download.	YES	HOBO	Salt (0.1 kg) CF.T	None	13 06 24	14:36	0.108	DL
12	[ ]	H-DC-M	Middle Dome Creek	Continuous	1) Q measurement if water flowing. 2) Logger download.	YES	Solinst 1050018	Salt (0.1 kg) CF.T	None	13 06 24	14:00	0.181	-0.3674
13	[ ]	H-DC-R	Dome Creek at Road	Continuous	1) Q measurement if water flowing. 2) Install station.	YES	Solinst	Volumetric (at culvert) Salt (0.1 kg) CF.T	None	13 06 24	13:10	0.146	DL

Field Staff:

Project #: 12-Y-0129
Project Name: Mount Nansen - Hydrology

Field Dates: JM MM DS
130624-25

#	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)
14	[ ]	H-VC-REF	Victoria Creek Reference	Continuous	1) Q measurement if water flowing. 2) Logger download.	YES	HOBO	ADV	None	13 06 25	12:01	0.395	DL
15	[ ]	H-VC-U	Upper Victoria Creek	Continuous	1) Q measurement if water flowing. 2) Logger download.	YES	Solinst 1049522	ADV	None	13 06 25	11:01	0.169	-0.3347 DL
16	[ ]	H-VC-DBC	Victoria Creek D/S of Back Creek	Continuous	1) Q measurement if water flowing. 2) Logger download.	YES	Solinst 1049137	ADV	None	13 06 25	10:30	0.432	-0.0373 DL
17	[ ]	H-BC	Back Creek	Continuous	1) Q measurement if water flowing. 2) Logger download.	YES	HOBO	Salt (0.1 kg) CF.T	None	13 06 25	11:54	0.198	DL
18	[ ]	H-VC-UMN	Victoria Creek U/S of Minnesota Creek	Continuous	1) Q measurement if water flowing. 2) Logger download.	YES	HOBO	ADV	None	13 06 25	08:31	0.634	DL
19	[ ]	H-MN	Minnesota Creek	Instantaneous	1) Q measurement if water flowing. 2) Logger download.	YES	HOBO	Salt (0.05 kg) CF.T	None	13 06 25	08:16	0.424	
20	[ ]	H-VC-R	Victoria Creek at Road	Continuous	1) Q measurement if water flowing. 2) Logger download.	YES	Solinst 1041103	ADV	None	13 06 24	12:02	0.488	.0562 DL
21	[ ]	H-SEEP	Seepage Pond Outlet	Instantaneous / Water Level	1) Q measurement at pipe outlet 2) Q measurement at flow meter in pumphouse	no	n/a	Volumetric	None	13 06 25	15:07	-.165	
22	[ ]	H-TP	Tailings Pond	Water Level Only	1) Requires staff gauge install.	YES	n/a	None	None				

staff submerged see plate

Field Staff:

Project #: 0167
Project Name: NANSEN

Weather: Sun & cloud +24°C Calm

HID	H-PC-U	Date	24 06 13	Discharge Measurement Instruments + Methods	
Station Name	Pony creek upr	Q Measurement Start Time:	18:07 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:	18:12 PDT | PST	Channel Conditions	
		Logger Reading (m)	[ ] downloaded	NONE | ICE | BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP. SED.	
Logger:	Serial # 9896522	HOBO | Solinst | N/A		GPS Waypoint	
Photo #	[U/S] 550	[D/S] 551	[RDB] 552	[LDB] 553	[STAFF/WEIR] 554

Site Comments

flow is low
No flow over weir (Pic 555-556)
100% of flow traveling under RDB side of weir
No flow bypassing u/s Berm.

Channel Measurements

Staff Gauge Height (m):	0.173
Weir Head (m):	N/A
Water Temperature (°C):	9.3
Water Surface Slope (%):	~
Average Width (m):	
Average Depth (m):	

Measurement Summary	Primary	Secondary
Meas. Type:	SS	
Measurment ID (MID):		
Average Q (m^3/s):		
Q Meas. Accuracy +/- [%]:		
Average Velocity (m/s):		
Cross-Sectional Area (m^2):		

Salt Tracer

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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (18 07)	228.3 | 401.7	15	0.02	20	0.001
2 (:)	____ | ____				
3 (:)	____ | ____				

V_1 for Sec. Mix (mL)	1000
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	1 L
SPC_o Calib. Tank	229.9/11.4
CF.T =	
Qsalt =	

Notes:
Sec Sol = 250mL SS in 250mL

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1	10	240.4	11.4
2	10	250.0	11.5
3	10	257.4	10.8
4	30	281.4	10.8
5	30	307.3	10.6
6	30	329.6	10.5
7	30	348.4	10.6
8	30	366.9	10.6
9	30	386.9	10.4
10	30	405.2	10.5

Volum.

Volume (L) =				
Time (sec)	[1]	[2]	[3]	[4]
Average Q (L/s) =				[5]
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =	

Hydrometric Levels - Survey

YES | NO | REASON: Survey Time (HH:MM) (WATER) 18:30 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	5.420	2.420	3.000		BM1			3.000	Log'r Rod Length:	1.160
BM2		1.846	3.574		BM2				Log'r Rod to Botm:	1.398
BM3		1.497	3.923		BM3					
TOS		2.163	3.257		TOS					
WATER		2.988	2.432		WATER					
LOG'R ROD:		1.921	3.499		LOG'R ROD:					
HWM					HWM					
~~BANKFULL~~ *	Control	3.098	2.322		BANKFULL					
BS (BM1)		2.421	2.999	✓	BS (BM1)					

* Control point substrate over veg, spring reed was pressed down.

Field Staff: JM MM DS
Data Entry By: Date:
Reviewed By: Date:

Project #: 13-Y-0167
Project Name: Mount Nansen, AAM

Weather: Sun & cloud / Calm + 20°C

HID	H- PC DSP	Date	24 06 (dd-mmm) 2013	Discharge Measurement Instruments + Methods	
Station Name	Pony Creek D/S at P1	Q Measurement Start Time:	17:45 (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:	17:31 (HH:MM) ~~PDT~~ | PST	Channel Conditions	
		Logger Reading (m)	[ ] downloaded	NONE | ICE | BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP. SED.	
Logger:	Serial # 989 6521	~~HOBO~~ | Solinst | N/A		GPS Waypoint	ZONE EASTING NORTHING
Photo #	[U/S] 545	[D/S] 546	[RDB] 547	[LDB] 548	[STAFF/WEIR] 549

Site Comments

Flow is low.
Sedimentation occurring out side of well but not inside

Channel Measurements

Staff Gauge Height (m):	0.165
Weir Head (m):	/
Water Temperature (°C):	/
Water Surface Slope (%):	
Average Width (m):	
Average Depth (m):	

Measurement Summary	Primary	Secondary
Meas. Type:	Vol	
Measurment ID (MID):		
Average Q (m^3/s):		
Q Meas. Accuracy +/- [%]:		
Average Velocity (m/s):		
Cross-Sectional Area (m^2):		

Salt Tracer ~~N/A~~

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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (:)	____ | ____				
2 (:)	____ | ____				
3 (:)	____ | ____				

V_1 for Sec. Mix (mL)	~~≥1 / Css~~
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	1 L
SPC_0 Calib. Tank	
CF.T =	
Qsalt =	

Notes:

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1.			
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			

Volum. ~~N/A~~

Volume (L) =	20	20	20	20	20
Time (sec)	[1] 29.9	[2] 30.1	[3] 28.2	[4] 28.8	[5] 29.0
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

N/A (method) Survey Time: 17:36 BM Shift: Yes| No Logger Shift: Yes| No Staff Gauge Shifted?: Yes| No

Circuit #1	H I	Rod Read	Elevation (m)	± 0.003
Station	A	B	C	
BM1	4.306	1.306	3.000	
BM2		1.088	3.218	
BM3		0.656	3.650	
TOS		1.126	3.180	
WATER		1.955	2.351	
LOG'R ROD:		0.876	3430	
HWM				
~~BANKFULL~~	Control	2.046	2.260	
BS (BM1)		1.306	3.000	

Circuit #2	H I	Rod Read	Elevation (m)
Station	A	B	C
BM1			3.000
BM2			
BM3			
TOS			
WATER			
LOG'R ROD:			
HWM			
BANKFULL			
BS (BM1)			

Station Measurements	
Log'r Rod Length:	1.167
Log'r Rod to Bolm:	1.260

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

Project #: 13-Y-0167
Project Name: NANUK

Weather: 24°C light wind cloud/haze

HID	H-DC-DX	Date	25-JUN-2013	Discharge Measurement Instruments + Methods	
Station Name	Dave Creek at DX	Q Measurement Start Time:	17:40 PDT | PST	YSI | SWOFFER | PYGMY | ADV MID-SECT | POINT	
		Q Measurement End Time:	PDT | PST	SALT TRACER |WEIR | VOLUMETRIC | SLOAT | 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		
Photo #	[U/S] 766	[D/S] 765	[RDB] 764	[LDB] 763	[STAFF/WEIR]

Site Comments

Took volumetric at culvert.
Low flows

Channel Measurements

Staff Gauge Height (m):	—
Weir Head (m):	—
Water Temperature (°C):	
Water Surface Slope (%):	—
Average Width (m):	—
Average Depth (m):	—

Measurement Summary	Primary	Secondary
Meas. Type:	Vol	
Measurment ID (MID):		
Average Q (m^3/s):		
Q Meas. Accuracy +/- [%]:		
Average Velocity (m/s):		
Cross-Sectional Area (m^2):		

Salt Tracer

N/A — 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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (:)	____ | ____				
2 (:)	____ | ____				
3 (:)	____ | ____				

V_1 for Sec. Mix (mL)	
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	1 L
SPC_0 Calib. Tank	
CF.T =	
Qsalt =	

Notes

CF.T

Vol. Added (mL)	SPC (uS/cm)	Temp
1		
2		
3		
4		
5		
6		
7		
8		
9		

Volum.

Volume (L) =	15	15	15	16	16
Time (sec)	[1] 105.5	[2] 104.4	[3] 106.1	[4] 108.6	[5] 109.5
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

YES \| NO REASON: NOT A CONTINUOUS STN.

Survey Time (HH:MM): (WATER) ± 0.003 — BM Shift: Yes\| No — Logger Shift: Yes\| No — Staff Gauge Shifted?: Yes\| No

Circuit #1	H I	Rod Read	Elevation (m)	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				BM2				Log'r Rod to Botm:
BM3				BM3				
TOS				TOS				
WATER				WATER				
LOG'R ROD:				LOG'R ROD:				
HWM				HWM				
BANKFULL				BANKFULL				
BS (BM1)				BS (BM1)				

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

Project #: 0167
Project Name: NANUSLEA

EDI

Weather: Cloud & Haze ~ 20-24 C lite wind

HID	H DC DX+105	Date	25 06 13	Discharge Measurement Instruments + Methods	
Station Name	Dome Creek at DX+105	Q Measurement Start Time:	17:17 PDT | PST	(YSI) SWOFFER | PYGMY | ADV	MID-SECT | POINT
		Q Measurement End Time:	17:35 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	
Photo #	[U/S] 758 copy	[D/S] 759 copy	[RDB] 760 copy	[LDB] 762	[STAFF/WEIR] /

Site Comments

Low Susp Sed
low - moderate flow

Channel Measurements

Staff Gauge Height (m):	/
Weir Head (m):	
Water Temperature (°C):	2.8
Water Surface Slope (%):	/
Average Width (m):	/
Average Depth (m):	/

Measurement Summary	Primary	Secondary
Meas. Type:	SS	
Measurment ID (MID):		
Average Q (m^3/s):		
Q Meas. Accuracy +/- [%]:		/
Average Velocity (m/s):		
Cross-Sectional Area (m^2):		

Salt Tracer

(SLUG) \| CONSTANT RATE \| DRY \| LOGGED \| MANUAL \| SED \| EC 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)	Css (kg/L)
1 (17 : 17)	1180 | 1354	26	0.02	20	0.001
2 (17 : 27)	1182 |	26	0.02	20	0.001
3 (:)	|				

V_1 for Sec. Mix (mL)	1000 mL
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	1 L
SPC_0 Calib. Tank	1145 3.7°C
CF.T =	
Qsalt =	

Notes: Tooml See sofa Stagemeter + Tooml from SS

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1	10	1191	3.9
2	20	1209	4.0
3	20	1242	4.0
4	20	1248	4.1
5	20	1264	4.2
6	20	1282	4.3
7	20	1297	4.4
8	20	1310	4.5
9			

Volumetric (N/A)

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

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	H I	Rod Read	Elevation (m)	± 0.003
Station	A	B	C	
BM1			3.000	
BM2				
BM3				
TOS				
WATER				
LOG'R ROD:				
HWM				
BANKFULL				
BS (BM1)				

Circuit #2	H I	Rod Read	Elevation (m)	Station Measurements	
Station	A	B	C		
BM1			3.000	Log'r Rod Length:	
BM2				Log'r Rod to Botm:	
BM3					
TOS					
WATER					
LOG'R ROD:					
HWM					
BANKFULL					
BS (BM1)					

Field Staff: JH MA DS
Data Entry By: _____ Date: _____
Reviewed By: _____ Date: _____

13-4-
Project #: 0167
Project Name: NANSEN

EDI

Weather: Overcast Haze Lite wind + 2e -2Y

HID	H DC D1B	Date	13 06 25	Discharge Measurement Instruments + Methods
Station Name	Dome creek D one B	Q Measurement Start Time:	16:20 PDT | PST	YSI | SWOFFER | PYGMY | ADV MID-SECT. | POINT
		Q Measurement End Time:	16:34 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	EASTING	NORTHING

Photo #	[U/S] 750	[D/S] 751	[RDB] 753	[LDB] 752	[STAFF/WEIR] —

Site Comments

Moderate to high flow level, Low-Mod turbidity, organic particles and suspended sediment
Some ice still over channel, not affecting flow.

Channel Measurements

Staff Gauge Height (m):	—
Weir Head (m):	—
Water Temperature (°C):	7.5
Water Surface Slope (%):	—
Average Width (m):	—
Average Depth (m):	—

Measurement Summary	Primary	Secondary
Meas. Type:	SS	
Measurment ID (MID):		
Average Q (m^3/s):		
Q Meas. Accuracy +/- [%]:		
Average Velocity (m/s):	—	
Cross-Sectional Area (m^2):	—	

Salt Tracer

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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (16 : 2e)	1222 | 1299	17	0.02	20	0.001
2 (16 : 27)	1241 | 1293	14	0.02	20	0.001
3 (:)	|				

			Vol. Added (mL)	SPC (uS/cm)	Temp
V_1 for Sec. Mix (mL)	1000 mL		1. 10	1272	7.0°C
Csec (g/L):	1 g/L		2. 10	1260	
Vol. Calib. Tank (L):	1 L		3. 10	1290	7.8°C
SPC_0 Calib. Tank	[illegible] 7.8°C		4. 10	1299	7.9°C
CF.T =		CF.T	5.		
Qsalt =			6.		
			7.		
			8.		
			9.		

Notes:
Sec Sol = 500mL SS in 500mL stormwater
* Trial one YSI not in ideal local: moved U/S to swift water ~3m cut off first 20 sec of Trial one of Ss (SPC fluctuations)

Volume

N/A

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

YES | NO | REASON: No CONTINUOUS STN Station | 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					BM2				Log'r Rod to Botm:
BM3					BM3				
TOS					TOS				
WATER					WATER				
LOG'R ROD:					LOG'R ROD:				
HWM					HWM				
BANKFULL					BANKFULL				
BS (BM1)					BS (BM1)				

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

Project #: 0167
Project Name: NADSEN

Weather: Sun Calm Plus 24°C

HID	H DC U1	Date	24 06 13	Discharge Measurement Instruments + Methods	
Station Name	Dome creek upper #1	Q Measurement Start Time:	15:23 PDT | PST	YSI | SWOFFER | PYGMY | ADV	MID-SECT | POINT
		Q Measurement End Time:	15:30 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 EASTING NORTHING
Photo #	[U/S] 537	[D/S] 538	[RDB] 539	[LDB] 540	[STAFF/WEIR]

Site Comments

Channel Measurements

Staff Gauge Height (m):	
Weir Head (m):	
Water Temperature (°C):	6.6°C
Water Surface Slope (%):	
Average Width (m):	
Average Depth (m):	

Measurement Summary	Primary	Secondary
Meas. Type:		
Measurment ID (MID):		
Average Q (m^3/s):		
Q Meas. Accuracy +/- [%]:		
Average Velocity (m/s):		
Cross-Sectional Area (m^2):		

Salt Tracer

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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (15:25)	1109 | 1388	16	0.025	20	0.00125
2 (:)	|				
3 (:)	|				

V_1 for Sec. Mix (mL)	800
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	1 L
SPC_0 Calib. Tank	1123 / 7.1°C
CF.T =	
Qsalt =	

Notes: Sec Sol = 400mL 5S in 500mL

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1	10	1138	7.1
2	10	1144	7.0
3	20	1166	7.0
4	20	1184	7.0
5	20	1200	7.1
6	20	1219	7.1
7	20	1233	7.2
8	30	1255	7.2
9	30	1285	7.1

Volum.

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/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					BM2				Log'r Rod to Botm:	
BM3					BM3					
TOS					TOS					
WATER					WATER					
LOG'R ROD:					LOG'R ROD:					
HWM					HWM					
BANKFULL					BANKFULL					
BS (BM1)					BS (BM1)					

CF.T	Vol Added	SPC	Temp
#10	30	1305	7.2
#11	30	1327	7.2

Field Staff: MM DS JM
Data Entry By: Date:
Reviewed By: Date:

Project #: 0167
Project Name: NANSEN

EDI ENVIRONMENTAL DYNAMICS INC.

Weather: Sun Calm +24°C

HID	H DC 02	Date	24 06 13	Discharge Measurement Instruments + Methods	
Station Name		Q Measurement Start Time:	15:55 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 | NA		GPS Waypoint	ZONE EASTING NORTHING
Photo #	[U/S] 541	[D/S] 542	[RDB] 543	[LDB] 544	[STAFF/WEIR]

Site Comments

Channel Measurements

Staff Gauge Height (m):	
Weir Head (m):	
Water Temperature (°C):	7.1°C
Water Surface Slope (%):	
Average Width (m):	
Average Depth (m):	

Measurement Summary	Primary	Secondary
Meas. Type:	SS	
Measurment ID (MID):		
Average Q (m^3/s):		
Q Meas. Accuracy +/- [%]:		
Average Velocity (m/s):		
Cross-Sectional Area (m^2):		

Salt Tracer

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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (15:55)	985 | 1037	20	0.025	20	0.00125
2 (:)	|				
3 (:)	|				

		CF.T	Vol. Added (mL)	SPC (uS/cm)	Temp
V_1 for Sec. Mix (mL)	800		1. 10	1012	8.5
Csec (g/L):	1 g/L		2. 10	1022	8.6
Vol. Calib. Tank (L):	1 L		3. 10	1031	8.6
SPC_0 Calib. Tank	1008 / 7.8°		4. 10	1046	
CF.T =			5.		
Qsalt =			6.		
			7.		
			8.		
			9.		

Notes: Sec Sol = 400mL SS in 500mL

Volumetric (NA)

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/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					BM2				Log'r Rod to Botm:	
BM3					BM3					
TOS					TOS					
WATER					WATER					
LOG'R ROD:					LOG'R ROD:					
HWM					HWM					
BANKFULL					BANKFULL					
BS (BM1)					BS (BM1)					

Field Staff: MM DS SM
Data Entry By: _____ Date: _____
Reviewed By: _____ Date: _____

Project #: 13-Y-0167
Project Name: Mount Nansen, AAM

EDI

Sun Lite wind
Weather: + 24 °C

HID	H- DC B	Date	24 06 (mm/dd) 2013	Discharge Measurement Instruments + Methods	
Station Name	Diversion channel @ Bridge.	Q Measurement Start Time:	14:36 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV	MID-SECT. | POINT
		Q Measurement End Time:	14:41 (HH:MM) PDT | PST	SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time:	14:35 (HH:MM) PDT | PST	Channel Conditions	
		Logger Reading (m)	downloaded	NONE | ICE | BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP. SED.	
Logger:	Serial # 9908154	HOBO | Solinst | N/A		GPS Waypoint	ZONE EASTING NORTHING
Photo #	[U/S] 532	[D/S] 533	[RDB] 534	[LDB] 535	[STAFF/WEIR] 536

Site Comments

ATM 02 DL 14:51 # 9896533
ATM 04 DL 14:52 # 1041027 Read: -0.5220m

Channel Measurements

Staff Gauge Height (m):	0.108m
Weir Head (m):	
Water Temperature (°C):	17.6
Water Surface Slope (%):	
Average Width (m):	
Average Depth (m):	

Measurement Summary	Primary	Secondary
Meas. Type:	SS	
Measurment ID (MID):		
Average Q (m^3/s):		
Q Meas. Accuracy +/- [%]:		
Average Velocity (m/s):		
Cross-Sectional Area (m^2):		

Salt Tracer — N/A

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_0(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (14:31)	1158 | 1265	30	0.050	20	0.0025
2 (:)	|				
3 (:)	|				
V_1 for Sec. Mix (mL)	400 Css	Sprinkle injectate into bucket			
Csec (g/L):	1 g/L				
Vol. Calib. Tank (L):	1 L				
SPC_0 Calib. Tank	1160 / 17.7				
CF.T =					
Qsalt =					

Notes: Sec Salt = 200mL SS in 500mL

CF.T

Vol. Added (mL)	SPC (uS/cm)	Temp
1. 10	1180	17.7
2. 10	1202	17.7
3. 10	1223	17.7
4. 10	1243	17.7
5. 10	1263	17.7
6.		
7.		
8.		
9.		

Volum. — N/A

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

N/A (reason) — Survey Time: 14:40 — 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	4.278	1.278	3.000		BM1			3.000	Log'r Rod Length:	1.459
BM2	A+B-C	0.922	3.356		BM2				Log'r Rod to Botm:	1.530
BM3	A+B-C	1.284	2.994		BM3					
TOS	A+B-C	1.934	2.344		TOS					
WATER	A+B-C	2.818	1.460		WATER					
LOG'R ROD:	A+B-C	1.344	2.934		LOG'R ROD:					
HWM	A+B-C		A-B=		HWM					
BANKFULL	A+B-C		A-B=		BANKFULL					
BS (BM1)	A+B-C	1.279	2.999	1 ✓	BS (BM1)					

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

Project #: 13-Y-0167
Project Name: Mount Nansen, AAM

Weather: Sun, calm, +24°C

HID	H- DC M	Date	24 06 2013	Discharge Measurement Instruments + Methods			
Station Name	Dam crk Middle	Q Measurement Start Time:	1400 (HH:MM) EDT | PST	~~YSI~~ | SWOFFER | PYGMY | ADV	MID-SECT. | POINT		
		Q Measurement End Time:	14:18 (HH:MM) EDT | PST	~~SALT TRACER~~ | WEIR | VOLUMETRIC | FLOAT | ROD			
		Logger Download/Inst Time:	13:59 (HH:MM) EDT | PST	Channel Conditions			
		Logger Reading (m)	-0,3674 [~~+~~downloaded]	~~NONE~~ | ICE | BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP. SED.			
Logger:	Serial # 1050018	HOBO | Solinst | N/A		GPS Waypoint	ZONE	EASTING	NORTHING
Photo #	[U/S] 527	[D/S] 528	[RDB] 529	[LDB] 530	[STAFF/WEIR] 531		

Site Comments

N/A

SLUG \| CONSTANT RATE \| DRY LOGGED \| MANUAL SPC \|EC CF.T YES\| NO

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_a (kg)	Volume (L)	Css (kg/L)
1 (14:00)	1213 | 1308	50	0,1000	20	0.005
2 (:)	____ | ____				
3 (:)	____ | ____				

V_t for Sec. Mix (mL)	200 Css
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	1 L
SPC_0 Calib. Tank	1214 / 18°C
CF.T =	
Qsalt =	

Notes: only one SS Trial performed. Src Sol. = 100mL SS in 500mL

CF.T

Vol. Added (mL)	SPC (uS/cm)	Temp
1. 10	1231	18
2. 10	1247	18
3. 10	1263	18
4. 10	1279	18
5. 10	1308	18
6.		
7.		
8.		
9.		

Channel Measurements

Staff Gauge Height (m):	0,181
Weir Head (m):	
Water Temperature (°C):	17.8
Water Surface Slope (%):	
Average Width (m):	
Average Depth (m):	

Measurement Summary	Primary	Secondary
Meas. Type:	SS	
Measurment ID (MID):		
Average Q (m^3/s):		
Q Meas. Accuracy +/- [%]:		
Average Velocity (m/s):		
Cross-Sectional Area (m^2):		

Volum. N/A

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

N/A (Transect) Survey Time: 14:13 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	4.480	1.480	3.000		BM1			3.000	Log'r Rod Length:	
BM2	A+B=C	2.168	2.312		BM2				Log'r Rod to Botm:	1.050 m
BM3	A+B=C	1.768	2.712		BM3					
TOS	A+B=C	2.026	2.454		TOS					
WATER	A+B=C	2.860	1.620		WATER					
LOG'R ROD:	A+B=C	1.802	2.678		LOG'R ROD:					
HWM	A+B=C		A-B=		HWM					
BANKFULL	A+B=C		A-B=		BANKFULL					
BS (BM1)	A+B=C	1.480	3.000	✓	BS (BM1)					

Field Staff: MM JM DS

Data Entry By: _____ Date: _____

Reviewed By: _____ Date: _____

Project #: 0167
Project Name: NANSEN

EDI ENVIRONMENTAL DYNAMICS INC.

Weather: Sun Calm +22°C

HID	1H DC R	Date	24 06 13	Discharge Measurement Instruments + Methods	
Station Name	Dome crk @ Road	Q Measurement Start Time:	13:10 PDT | PST	SWOFFER | PYGMY | ADV	MID-SECT | POINT
		Q Measurement End Time:	PDT | PST	SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time:	13:10 PDT | PST	Channel Conditions	
		Logger Reading (m)	/ [downloaded]	NONE | ICE | BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP SED	

Logger:	Serial # 9858715	HOBO | Solinst | N/A	GPS Waypoint				
Photo #	[U/S] 522	[D/S] 523	[RDB] 524	[LDB] 525	[STAFF/WEIR] 526		

Site Comments

flow levels low. Mod high turbidity
no sedimentation in net,
orange staining on logs, SG, etc.

Channel Measurements

Staff Gauge Height (m):	0.146
Weir Head (m):	/
Water Temperature (°C):	11.4°C
Water Surface Slope (%):	
Average Width (m):	
Average Depth (m):	

Measurement Summary	Primary	Secondary
Meas. Type:	SS	
Measurment ID (MID):		
Average Q (m^3/s):		
Q Meas. Accuracy +/- [%]:		
Average Velocity (m/s):		
Cross-Sectional Area (m^2):		

Salt Tracer

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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_o (kg)	Volume (L)	Css (kg/L)
1 (13 : 10)	1012 | 1120	30	0.1000	20	0.005
2 (13 :)	13 |	30	0.1000	20	0.005
3 (:)	|				

V_1 for Sec. Mix (mL)	~~100~~ 500 mL	500mL Sec. Sol'n volume +V, = 1/1L	CF.T	Vol. Added (mL)	SPC (uS/cm)	Temp
Csec (g/L):	1 g/L			1 10	1033	11.5
Vol. Calib. Tank (L):	1 L ~~1.5~~			2 10	1048	11.5
SPC_0 Calib. Tank	1010 / 11.6°C			3 10	1064	11.6
CF.T =				4 10	1081	11.6
Qsalt =				5 10	1091	11.6
Notes: t = ~~1~~ 2 s logging interval				6 10	1117	11.6
				7		
				8		
				9		

Volum.

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

YES \| NO \| REASON — Survey Time (HH:MM) (WATER) 13:26 — 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	3.747	0.747	3.000		BM1			3.000	Log'r Rod Length:	
BM2		0.808	2.939		BM2				Log'r Rod to Botm:	
BM3		1.425	2.322		BM3					
TOS		2.463	1.284		TOS					
WATER		3.307	0.440		WATER					
LOG'R ROD:		2.065	1.682		LOG'R ROD:					
HWM					HWM					
BANKFULL					BANKFULL					
BS (BM1)		0.747	3.000	✓	BS (BM1)					

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

Project #: 0167
Project Name: NANSEN

Weather: Sun & cloud Cln + 20

HID	H VC REF	Date	25 06 13	Discharge Measurement Instruments + Methods	
Station Name	Victoria Crk Reference	Q Measurement Start Time:	12:01 PDT | PST	YSI | SWOFFER | PYGMY | ADV MID-SECT | POINT	
		Q Measurement End Time:	12:37 PDT | PST	SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time:	12:47 PDT | PST	Channel Conditions	
		Logger Reading (m)	downloaded	NONE | ICE | BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP. SED.	
Logger:	Serial # 9908152	HOBO | Solinst | N/A		GPS Waypoint	ZONE EASTING NORTHING
Photo #	[U/S] 693	[D/S] 694	[RDB] 695	[LDB] 697	[STAFF/WEIR] 696

Site Comments

Creek w/ lvl low & more turbid than usual

Channel Measurements

Staff Gauge Height (m):	0.395
Weir Head (m):	
Water Temperature (°C):	10.5
Water Surface Slope (%):	
Average Width (m):	4.2
Average Depth (m):	0.154

Measurement Summary	Primary	Secondary
Meas. Type:	ADV	
Measurment ID (MID):		
Average Q (m^3/s):	0.1860	
Q Meas. Accuracy +/- [%]:	3.9	
Average Velocity (m/s):	0.288	
Cross-Sectional Area (m^2):	0.646	

N/A

Salt Tracer — 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_o(uS/cm) | EC_{pk}(uS/cm)	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (:)	____ | ____				
2 (:)	____ | ____				
3 (:)	____ | ____				

V_1 for Sec. Mix (mL)	
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	1 L
SPC_0 Calib. Tank	
CF.T =	
Qsalt =	

Notes:

CF.T

Vol. Added (mL)	SPC (uS/cm)	Temp
1		
2		
3		
4		
5		
6		
7		
8		
9		

Volum.

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

YES | NO | REASON:

Survey Time (HH:MM) (WATER) 12:40 — 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	4.411	1.411	3.000		BM1			3.000	Log'r Rod Length:	1.168
BM2		1.447	2.964		BM2				Log'r Rod to Botm:	1.184
BM3		1.370	3.041		BM3					
TOS		2.109	2.302		TOS					
WATER		2.715	1.696		WATER					
LOG'R ROD:		1.838	2.573		LOG'R ROD:					
HWM					HWM					
~~BANKFULL~~	Control	3.021	1.390		BANKFULL					
BS (BM1)		1.412	2.999	✓	BS (BM1)					

Field Staff: MA DS JM

Data Entry By: _____ Date: _____

Reviewed By: _____ Date: _____

Project #: 0167
Project Name: NANSEN

EDI

Weather: Sun Calm + 22°

HID	H VC U	Date	25 06 17	Discharge Measurement Instruments + Methods	
Station Name	Victoria Upper	Q Measurement Start Time:	11:08 PDT | PST	YSI | SWOFFER | PYGMY | ADV | MINISCAT | POINT	
		Q Measurement End Time:	11:36 PDT | PST	SALT TRACER | WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time:	11:15 PDT | PST	Channel Conditions	
		Logger Reading (m)	-0.3347 [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] 645	[D/S] 646	[RDB] 647	[LDB] 648	[STAFF/WEIR] 650

Site Comments

No silting in well detected.
Higher than usual turbidity

Channel Measurements

Staff Gauge Height (m):	0.169
Weir Head (m):	—
Water Temperature (°C):	8.1
Water Surface Slope (%):	—
Average Width (m):	4.85
Average Depth (m):	0.192

Measurement Summary	Primary	Secondary
Meas. Type:	ADV	
Measurment ID (MID):		
Average Q (m^3/s):	0.2080	
Q Meas. Accuracy +/- [%]:	3.3	
Average Velocity (m/s):	0.224	
Cross-Sectional Area (m^2):	0.938	

Salt Tracer (NA)

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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (:)	____ | ____				
2 (:)	____ | ____				
3 (:)	____ | ____				

		CF.T	Vol. Added (mL)	SPC (uS/cm)	Temp
V_1 for Sec. Mix (mL)			1		
Csec (g/L):	1 g/L		2		
Vol. Calib. Tank (L):	1 L		3		
SPC_0 Calib. Tank			4		
CF.T =			5		
Qsalt =			6		
Notes			7		
			8		
			9		

Volumetric (NA)

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

YES | NO | REASON:

Survey Time (HH:MM): (WATER) 11:20 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	4.256	1.256	3.000		BM1			3.000	Log'r Rod Length:	
BM2		0.895	3.361		BM2				Log'r Rod to Botm:	1.285
BM3		1.009	3.247		BM3					
TOS		1.359	2.897		TOS					
WATER		2.190	2.066		WATER					
LOG'R ROD:		1.112	3.144		LOG'R ROD:					
HWM				—	HWM					
~~BANKFULL~~ Control		2.420	1.836		BANKFULL					
BS (BM1)		1.256	3.000	✓	BS (BM1)					

Field Staff: JM MM DS
Data Entry By: Date:
Reviewed By: Date:

Project #: 0167
Project Name: NAI/SEA

EDI

Weather: sunny cloud +2c Calm

HID	~~HwD~~ H vc PBc	Date	25 06 13	Discharge Measurement Instruments + Methods	
Station Name	Victoria ck D/S of Back ck	Q Measurement Start Time:	10:30 (HH:MM) ~~PDT~~ | PST	YSI | SWOFFER | PYGMY | ADV ~~MID-SECT~~ | POINT	
		Q Measurement End Time:	10:55 (HH:MM) ~~PDT~~ | PST	SALT TRACER |WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time:	10:36 (HH:MM) ~~PDT~~ | PST	Channel Conditions	
		Logger Reading (m)	-0.573 [ ] 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] 583	[D/S] 584	[RDB] 585	[LDB] 586	[STAFF/WEIR] 587		

Site Comments

No string detected in well.

Channel Measurements

Staff Gauge Height (m):	0.432
Weir Head (m):	—
Water Temperature (°C):	7.6
Water Surface Slope (%):	
Average Width (m):	4.7
Average Depth (m):	0.157

Measurement Summary	Primary	Secondary
Meas. Type:	ADV	
Measurment ID (MID):		
Average Q (m^3/s):	0.2298	
Q Meas. Accuracy +/- [%]:	3.3	
Average Velocity (m/s):	0.311	
Cross-Sectional Area (m^2):	0.739	

Salt Tracer (N/A)

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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (:)	____ | ____				
2 (:)	____ | ____				
3 (:)	____ | ____				

		CF.T	Vol. Added (mL)	SPC (uS/cm)	Temp
V_1 for Sec. Mix (mL)			1		
Csec (g/L):	1 g/L		2		
Vol. Calib. Tank (L):	1 L		3		
SPC_0 Calib. Tank			4		
CF.T =			5		
Qsalt =			6		
			7		
			8		
			9		

Notes

Volumetric (N/A)

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

YES \| NO \| REASON:

Survey Time (HH:MM): (WATER) 10:35 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	4.440	1.440	3.000		BM1			3.000	Log'r Rod Length:	
BM2		1.414	3.026		BM2				Log'r Rod to Botm:	1.220
BM3		1.528	2.912		BM3					
TOS		2.103	2.337		TOS					
WATER		2.673	1.767		WATER					
LOG'R ROD:		1.883	2.557		LOG'R ROD:					
~~HWM~~					HWM					
~~BANKFULL~~	Control	2.860	1.580		BANKFULL					
BS (BM1)		1.440	3.000	✓	BS (BM1)					

Field Staff: DS MM JM
Data Entry By: Date:
Reviewed By: Date:

Project #: 0167
Project Name: NANSEN

EDI

Weather: Sun + 24° Calm

HID	H.BC	Date	26 06 13	Discharge Measurement Instruments + Methods	
Station Name	Back creek	Q Measurement Start Time:	11:54 PDT | PST	~~YSI~~ | ~~SWOFFER~~ | PYGMY | ADV	MID-SECT | POINT
		Q Measurement End Time:	12:13 PDT | PST	~~SALT TRACER~~ | WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time:	11:52 PDT | PST	Channel Conditions	
		Logger Reading (m)	~~downloaded~~	NONE | ICE | BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP. SED	

Logger:	Serial #	9896531	~~HOBO~~ | Solinst | N/A	GPS Waypoint		ZONE	EASTING NORTHING
Photo #	[U/S]	673	[D/S] 675	[RDB] 676	[LDB] 677	[STAFF/WEIR]	678

Site Comments

AG observed & photographed in Stream
74 fish Between 4-8" in Length

Channel Measurements

Staff Gauge Height (m):	0.198
Weir Head (m):	
Water Temperature (°C):	16.1
Water Surface Slope (%):	
Average Width (m):	
Average Depth (m):	

Measurement Summary	Primary	Secondary
Meas. Type:	SS	
Measurment ID (MID):		
Average Q (m^3/s):		
Q Meas. Accuracy +/- [%]:		
Average Velocity (m/s):		
Cross-Sectional Area (m^2):		

Salt Tracer

~~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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (11:54)	306.5 | 375.8	23	0.05	20	0.0025
2 (12:04)	306.4 |	23	0.05	20	0.0025
3 (:)	|				

V_1 for Sec. Mix (mL)	400 mL
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	1 L
SPC_0 Calib. Tank	312.0 / 17.1°C
CF.T =	
Qsalt =	

Notes:
Sec Sol = 200mL ss in 500mL crk w

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1	~~3~~ 10	325.6	17.1
2	10	341.1	17.1
3	10	355.3	17.1
4	10	369.9	17.2
5	10	383.2	17.2
6			
7			
8			
9			

Volum.

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

YES | NO | REASON: Survey Time (HH:MM): (WATER) 12:00 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	4.278	1.278	3.000		BM1			3.000	Log'r Rod Length:	
BM2		1.263	3.015		BM2				Log'r Rod to Botm:	1.270
BM3		1.228	3.050		BM3					
TOS		1.627	2.651		TOS					
WATER		2.429	1.849		WATER					
LOG'R ROD:		1.392	2.886		LOG'R ROD:					
~~HWM~~					HWM					
~~BANKFULL~~	Control	2.493	1.785		BANKFULL					
BS (BM1)		1.278	3.000	✓	BS (BM1)					

Field Staff: MM DS JM
Data Entry By: Date:
Reviewed By: Date:

Project #: 13-Y-0167
Project Name: Mount Nansen, AAM

EDI

Weather: Sun & cloud Calm +20's

HID	H- VC-UMN	Date	25 06 2013	Discharge Measurement Instruments + Methods	
Station Name	Victoria creek u/s of Minnesota	Q Measurement Start Time:	08:31 (HH:MM) PDT | PST	YSI | SWOFFER | PYGMY | ADV MID-SECT. | POINT	
		Q Measurement End Time:	09:20 (HH:MM) PDT | PST	SALT TRACER |WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time:	09:10 (HH:MM) PDT | PST	Channel Conditions	
		Logger Reading (m)	/ [ ] downloaded	NONE | ICE | BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP. SED.	
Logger:	Serial # 9896527	HOBO | Solinst | N/A		GPS Waypoint	ZONE EASTING NORTHING
Photo #	[U/S] 575	[D/S] 576	[RDB] 579	[LDB] 577	[STAFF/WEIR] 578

Site Comments

Low flow, Turbid

Channel Measurements

Staff Gauge Height (m):	0.634
Weir Head (m):	/
Water Temperature (°C):	7.7
Water Surface Slope (%):	/
Average Width (m):	5.30
Average Depth (m):	0.118

Measurement Summary	Primary	Secondary
Meas. Type:	ADV	
Measurment ID (MID):		
Average Q (m^3/s):	0.2467	
Q Meas. Accuracy +/- [%]:	8.5	
Average Velocity (m/s):	0.394	
Cross-Sectional Area (m^2):	0.627	

Salt Tracer (N/A)

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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (:)	____ | ____				
2 (:)	____ | ____				
3 (:)	____ | ____				

V_1 for Sec. Mix (mL)	=T / Css
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	1 L
SPC_0 Calib. Tank	
CF.T =	
Qsalt =	

Notes:

CF.T

Vol. Added (mL)	SPC (uS/cm)	Temp
1.		
2.		
3.		
4.		
5.		
6.		
7.		
8.		
9.		

Volum. (N/A)

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/s) =		

Hydrometric Levels - Survey

N/A (reason) Survey Time: 09:18 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	4.071	1.071	3.000		BM1			3.000	Log'r Rod Length:
BM2		1.064	3.007		BM2				Log'r Rod to Botm:
BM3		1.393	2.678		BM3				
TOS		2.087	1.984		TOS				
WATER		2.469	1.602		WATER				
LOG'R ROD:		1.868	2.203		LOG'R ROD:				
~~HWM~~					HWM				
~~BANKFULL~~					BANKFULL				
BS (BM1)		1.072	2.999	✓	BS (BM1)				

Field Staff: DS MM JH
Data Entry By: _____ **Date:** _____
Reviewed By: _____ **Date:** _____

Project #: 0167
Project Name: NANSEN

EDI ENVIRONMENTAL DYNAMICS INC.

Weather: Sun & cloud Calm +20°C

HID	H-MN	Date	25 06 13	Discharge Measurement Instruments + Methods	
Station Name	Minnesota	Q Measurement Start Time:	08:16 PDT | PST	YSI | SWOFFER | PYGMY | ADV	MID-SECT | POINT
		Q Measurement End Time:	08:28 PDT | PST	~~SALT TRACER~~ | WEIR | VOLUMETRIC | FLOAT | ROD	
		Logger Download/Inst Time:	08:13 PDT | PST	Channel Conditions	
		Logger Reading (m)	[downloaded]	~~NONE~~ | ICE | BACKWATER | > BANKFULL | ZERO FLOW | HIGH SUSP. SED	

Logger:	Serial #	9908128	~~HOBO~~ | Solinst | N/A	GPS Waypoint		ZONE	EASTING NORTHING
Photo #	[U/S]	567	[D/S] 568	[RDB] 569	[LDB] 570	[STAFF/WEIR]	571

Site Comments

Small shift in Logger, replaced wire with bolt for logger rod
Surveyed after shift & Measured station

Channel Measurements

Staff Gauge Height (m):	0.424
Weir Head (m):	
Water Temperature (°C):	4.5°C
Water Surface Slope (%):	
Average Width (m):	
Average Depth (m):	

Measurement Summary	Primary	Secondary
Meas. Type:	SS	
Measurment ID (MID):		
Average Q (m^3/s):		
Q Meas. Accuracy +/- [%]:		
Average Velocity (m/s):		
Cross-Sectional Area (m^2):		

Salt Tracer — ~~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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (08:16)	84.6 | >90	27	0.01	20	0.0005
2 (:)	84.6 |	27	0.01	20	0.0005
3 (:)	|				

V_1 for Sec. Mix (mL)	2L Rw
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	1 L
SPC_o Calib. Tank	85.1 / 4.8°C
CF.T =	
Qsalt =	

Notes: Sec Sol 500mL stir 250mL

CF.T

	Vol. Added (mL)	SPC (uS/cm)	Temp
1	10	94.5	4.8
2	10	104.3	4.8
3	10	108.2	4.9
4	10	115.2	4.9
5	10	121.9	4.9
6	10	128.8	4.9
7			
8			
9			

Volume (N/A)

Volume (L) =				
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =				
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/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	3.519	0.519	3.000		BM1	3.545	0.545	3.000	Log'r Rod Length:	1.489
BM2		1.191	2.328	2	BM2		1.219	2.326	Log'r Rod to Botm:	1.546
BM3		0.808	2.711	1	BM3		0.835	2.710		
TOS		1.971	1.548	2	TOS		1.999	1.546		
WATER		2.554	0.965	5	WATER		2.585	0.960		
LOG'R ROD:		1.451	2.068	1	LOG'R ROD:		1.478	2.067		
HWM					HWM					
~~BANKFULL~~	Control	2.646	0.873	∅	~~BANKFULL~~	Control	2.672	0.873		
BS (BM1)		0.519	3.000	✓	BS (BM1)		0.545	3.000		

Field Staff: MM DS JM
Data Entry By: Date:
Reviewed By: Date:

Project #: 0167
Project Name: NANSEN

Weather: Sun Calm +23°C

HID	H VC-R	Date	24 06 13	Discharge Measurement Instruments + Methods	
Station Name	Victoria Creek @ Road	Q Measurement Start Time:	12:08 EDT / PST	YSI / SWOFFER / PYGMY / ADV / MID-SECT / POINT	
		Q Measurement End Time:	12:40 PDT / PST	SALT TRACER / WEIR / VOLUMETRIC / FLOAT / ROD	
		Logger Download/Inst Time:	12:04 EDT / PST	Channel Conditions	
		Logger Reading (m)	0.0568 [ ] downloaded	NONE / ICE / BACKWATER / > BANKFULL / ZERO FLOW / HIGH SUSP. SED	
Logger:	Serial # 104103 Batt 99%	HOBO / Solinst / N/A		GPS Waypoint	ZONE EASTING NORTHING
Photo #	[U/S] 0517	[D/S] 0518	[RDB] 0520	[LDB] 0519	[STAFF/WEIR] 0521

Site Comments

flow level low in stream. High Turbidity D/S control surveyed.

Channel Measurements

Staff Gauge Height (m):	0.488
Weir Head (m):	/
Water Temperature (°C):	9.5°C
Water Surface Slope (%):	/
Average Width (m):	5.4
Average Depth (m):	0.194

Measurement Summary	Primary	Secondary
Meas. Type:	ADV	
Measurment ID (MID):		
Average Q (m^3/s):	0.2888	
Q Meas. Accuracy +/- [%]:	4.7	
Average Velocity (m/s):	0.275	
Cross-Sectional Area (m^2):	1.049	

Salt Tracer (N/A)

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_o(uS/cm) / EC_{pk}(uS/cm)	L_m (m)	Ms_a (kg)	Volume (L)	Css (kg/L)
1 (:)	____ / ____				
2 (:)	____ / ____				
3 (:)	____ / ____				

V_1 for Sec. Mix (mL)	
Csec (g/L):	1 g/L
Vol. Calib. Tank (L):	1 L
SPC_0 Calib. Tank	
CF.T =	
Qsalt =	

CF.T

Vol. Added (mL)	SPC (uS/cm)	Temp
1		
2		
3		
4		
5		
6		
7		
8		
9		

Notes

Volumetric (N/A)

Volume (L) =					
Time (sec)	[1]	[2]	[3]	[4]	[5]
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/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	4.088	1.088	3.000		BM1	4.084	1.084	3.000	Log'r Rod Length: no change
BM2		0.664	3.424	✓	BM2		0.661	3.423	Log'r Rod to Botm: 1.295 m
BM3		0.919	3.169	✓	BM3		0.915	3.169	
TOS		1.520	2.568	✓	TOS		1.516	2.568	
WATER		2.035	2.053	✓	WATER		2.032	2.052	
LOG'R ROD:		1.298	2.790	✓	LOG'R ROD:		1.293	2.791	
~~HWM~~					~~HWM~~				
~~BANKFULL~~					~~BANKFULL~~ Control		2.234	1.850	
BS (BM1)		1.088	3.000	✓	BS (BM1)		1.084	3.000	

Moved Survey to location for survey Control Point D/S

Field Staff: MM JM DS
Data Entry By: ____ Date: ____
Reviewed By: ____ Date: ____

Project #: 0167
Project Name: NANSEN

Weather: Sun & cloud Lite wind + 24

HID	H SEEP	Date	25 06 13	Discharge Measurement Instruments + Methods
Station Name		Q Measurement Start Time:	15:07 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	EASTING	NORTHING

Photo #	[U/S]	[D/S]	[RDB]	[LDB]	[STAFF/WEIR]

Site Comments

Photo 715 of Pipe.
Photo 7229 of flow meter (HH Cam)
Reading @ time of Vol measurment = 145.967 LPM
Flow reading in Field Notes was Durng power outage Fri

Channel Measurements

Staff Gauge Height (m):	
Weir Head (m):	
Water Temperature (°C):	
Water Surface Slope (%):	
Average Width (m):	
Average Depth (m):	

Measurement Summary	Primary	Secondary
Meas. Type:	Vol	
Measurment ID (MID):		
Average Q (m^3/s):		
Q Meas. Accuracy +/- [%]:		
Average Velocity (m/s):		
Cross-Sectional Area (m^2):		

N/A

Salt Tracer — gen maintenance. Vol was repeatedly taken after

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_o(uS/cm) | EC_{pk}(uS/cm) |	L_m (m)	Ms_e (kg)	Volume (L)	Css (kg/L)
1 (:)	____ | ____				
2 (:)	____ | ____				
3 (:)	____ | ____				

		CF.T	Vol. Added (mL)	SPC (uS/cm)	Temp
V_1 for Sec. Mix (mL)			1.		
Csec (g/L):	1 g/L		2		
Vol. Calib. Tank (L):	1 L		3		
SPC_0 Calib. Tank			4		
CF.T =			5		
Qsalt =			6		
Notes:			7		
			8		
			9		

Volum.

Volume (L) =	19	20	20	21	20
Time (sec)	[1] 7.36	[2] 7.88	[3] 7.89	[4] 8.02	[5] 7.90
Average Q (L/s) =					
Avg. Q_{vol} (L/s) =			Avg Q_{vol} (m^3/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					BM2				Log'r Rod to Botm:	
BM3					BM3					
TOS					TOS					
WATER					WATER					
LOG'R ROD:					LOG'R ROD:					
HWM					HWM					
BANKFULL					BANKFULL					
BS (BM1)					BS (BM1)					

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

Project #: 13-Y-0167
Project Name: Mount Nansen - Water Quality

Field Dates: APRIL 16-17, 2013

General Site Tasks/ Communications

Take care when working / sampling on ice.
Please do not move sites without AAM authorization (and mine). Do not sample snow/ice melt flowing through ice layers.
Pay special attention to new bottles and associated preservatives

	#	Complete	Lab Sample Identifier	WQ ID	Station Name	Site Tasks	Additional Materials Required	Date (yy.mm.dd)	Time (HH:MM)
*	1	[✓]	0167-130417 – 009	WQ-SEEP	Seepage	no LT50 in April		13.04.17	11:55
*	2	[✓]	0167-130417 – 008	WQ-TP	Tailings Pond	check ice conditions		13.04.17	12:46
*	3	[✓]	0167-130417 - 002	WQ-DC-DX+105	DX+200/105			13.04.17	11:30
*	4	[✓]	NO SAMPLE / FROZEN	WQ-DC-DX	Dome Creek at DX			—	—
*	5	[✓]	0167-130417 – 011	WQ-DC-U	Upper Dome			13.04.17	11:30
	6	[✓]	NO SAMPLE / FROZEN	WQ-DC-D1	Dome Creek D1			—	—
	7	[✓]	NO SAMPLE / FROZEN	WQ-DC-D1b	Dome Creek D1b			—	—
	8	[✓]	NO SAMPLE / FROZEN	WQ-DC-U1	Dome Creek 1			—	—
	9	[✓]	NO SAMPLE / FROZEN	WQ-DC-U2	Dome Creek 2			—	—
	10	[✓]	NO SAMPLE / FROZEN	WQ-DC-R	Dome Creek at Road			—	—
*	11	[✓]	NO SAMPLE / FROZEN	WQ-ADIT SEEP	Adit seep		van dorn	—	—
*	12	[✓]	0167-130417 -001	WQ-MS-S-03	Mill Seep 03		van dorn	13.04.17	11:14
*	13	[✓]	NO SAMPLE / FROZEN	WQ-MS-S-08	Mill Seep 08		van dorn	—	—
*	14	[✓]	0167-130417 -005	WQ-VC-U	Upper Victoria Creek			12.04.17	9:41

Field Staff: MM, CL, DS, JM

Project #: 13-Y-0167
Project Name: Mount Nansen - Water Quality

EDI ENVIRONMENTAL DYNAMICS INC.

Field Dates: April 16-17, 2013

#	Complete	Lab Sample Identifier	WQ ID	Station Name	Site Tasks	Additional Materials Required	Date yy.mm.dd	Time HH:MM
15	[✓]	0167-130417-006	WQ-VC-REF	Victoria Creek Reference			13.04.17	10:07
16	[✓]	0167 130417 - 023	WQ-VC-R	Victoria Creek at Road			13.04.17	09:12
17	[✓]	0167-130416-021	WQ-VC-DBC	Victoria Creek D/S Back Creek			13.04.16	14:47
18	[✓]	0167-130416-019	WQ-VC-UMN	Victoria Creek U/S Minnesota Creek			13.04.16	12:14
19	[✓]	NO SAMPLE / FROZEN	WQ-BC	Back Creek			—	—
20	[✓]	NO SAMPLE / FROZEN	WQ-MN	Minnesota Creek			—	—
21	[✓]	0167-130417-030	WQ-PW	Pumphouse Well	drinking water sample only (2 bottles) + YG microbiology (1 bottle)		13.04.17	14:00
22	[✓]	NO SAMPLE / FROZEN	WQ-PC-U	Pony Creek upstream			—	—
23	[✓]	NO SAMPLE / FROZEN	WQ-PC-D	Pony Creek downstream			—	—
24	[✓]	0167-130417-027	PIT1	top	check ice conditions, measure and record DO		13.04.17	09:31
25	[✓]	0167-130417-028	PIT2	middle	check ice conditions, measure and record DO		13.04.17	09:55
26	[✓]	0167-130417-029	PIT3	bottom	check ice conditions, measure and record DO		13.04.17	10:06
27	[✓]	0167-130416-020	Field Replicate 1		* VC-DBC		13.04.16	14:47
~~28~~	[ ]		~~Field Replicate 2~~					
29	[✓]	0167-130417-003	Field Blank			DI Water	13.04.17	11:41
30	[✓]	TRIP BLANK	Trip Blank				—	—

J:\Yukon\Projects\2013\13_Y_0167_Mount Nansen_Surface_Water\Data\Field Info\Data Sheets\WQ_Field Sheet_Mount Nansen_v.2.xlsx

Field Staff: MM, JM, CL, DJ

Project No.: 13-Y-0167

Project Name: Mount Nansen Water Quality

Page 1 of 4

YSI Calibration Performed? (Yes) / No

Weather: light wind -5°C overcast

Field Samplers: CL, MM

Date / Time: APR 16, 2013 7:45

Site Information	
Site Name:	WQ-VC-UMN
Sample Identifier:	0167-130416-019
Sample Date and Time:	APR 16, 2013 12:14
Replicate ID (if applicable)	N/A
Field Measured Parameters	
Temperature:	0.0
Specific Conductivity (SPC):	279.9
pH:	6.70
Turbidity:	0.37
Site Conditions	
flow level:	low
turbidity (clear, light, mod, high):	clear
ice thickness (if applicable)	0.30 m
Notes	
(if pit incl. DO and ice thickness)	
Photo Numbers	
Datasheet:	Downstream: 16670
Upstream: 16671	Overview:

Site Information	
Site Name:	WQ-MN
Sample Identifier:	NO SAMPLE
Sample Date and Time:	APR 16, 2013 11:11
Replicate ID (if applicable)	N/A
Field Measured Parameters	
Temperature:	
Specific Conductivity (SPC):	N/A
pH:	
Turbidity:	
Site Conditions	
flow level:	
turbidity (clear, light, mod, high):	N/A
ice thickness (if applicable)	
Notes	
(if pit incl. DO and ice thickness)	CONDITIONS OVERFLOWING BANKS. WELL COVERED IN ICE. NO SAMPLE.
Photo Numbers	
Datasheet:	Downstream: 16668
Upstream: 16669	Overview:

Site Information	
Site Name:	WQ-VC-DBC
Sample Identifier:	0167-130416-021
Sample Date and Time:	16-APR-2013 14:47
Replicate ID (if applicable)	0167-130416-020
Field Measured Parameters	
Temperature:	0.0
Specific Conductivity (SPC):	251.8
pH:	6.86
Turbidity:	0.68
Site Conditions	
flow level:	low
turbidity (clear, light, mod, high):	clear
ice thickness (if applicable)	0.01 - 0.05 m
Notes	
(if pit incl. DO and ice thickness)	Areas of thin ice
Photo Numbers	
Datasheet: 16677	Downstream: 16679
Upstream: 16678	Overview:

Site Information	
Site Name:	WQ-VC-R
Sample Identifier:	0167-130417-023
Sample Date and Time:	17 APR-2013 9:12
Replicate ID (if applicable)	N/A
Field Measured Parameters	
Temperature:	0.0
Specific Conductivity (SPC):	275
pH:	6.97
Turbidity:	0.18
Site Conditions	
flow level:	low
turbidity (clear, light, mod, high):	clear
ice thickness (if applicable)	10 cm
Notes	
(if pit incl. DO and ice thickness)	open water from MDV cross section location M-VC-R APR 15, 2013
Photo Numbers	
Datasheet: 16692	Downstream: 16691
Upstream: 16693	Overview:

Field Blank ID

Trip Blank ID

Project No.: 13-Y-0167

Project Name: Mount Nansen Water Quality

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YSI Calibration Performed? (Yes) No

Weather: light snow, -5°C

Field Samplers: NM, CL

Date / Time: APR 17, 2013 16+ 7:30

Site Information	
Site Name:	WQ-VC-U
Sample Identifier:	0167-130417-005
Sample Date and Time:	APR 17, 2013 9:41
Replicate ID (if applicable)	n/a
Field Measured Parameters	
Temperature:	0.0
Specific Conductivity (SPC):	245.2
pH:	6.76
Turbidity:	8.59
Site Conditions	
flow level:	low
turbidity (clear, light, mod, high):	clear
ice thickness (if applicable)	2cm to 10cm.
Notes	
(if pit incl. DO and ice thickness)	thin ice covered in snow
Photo Numbers	
Datasheet: Sign 6695	Downstream: 6697
Upstream: 6696	Overview:

Site Information	
Site Name:	WQ-VC-REF
Sample Identifier:	0167-130417-006
Sample Date and Time:	APR 17, 2013 10:07
Replicate ID (if applicable)	n/a
Field Measured Parameters	
Temperature:	0.0
Specific Conductivity (SPC):	251.4
pH:	6.97
Turbidity:	0.35
Site Conditions	
flow level:	low
turbidity (clear, light, mod, high):	clear
ice thickness (if applicable)	40cm
Notes	
(if pit incl. DO and ice thickness)	
Photo Numbers	
Datasheet: Sign 6707	Downstream: 6709
Upstream: 6708	Overview:

Site Information	
Site Name:	WQ-BC
Sample Identifier:	NO SAMPLE FROZEN + DRY
Sample Date and Time:	APR 17 2013
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	
Specific Conductivity (SPC):	N/A
pH:	
Turbidity:	
Site Conditions	
flow level:	
turbidity (clear, light, mod, high):	N/A
ice thickness (if applicable)	
Notes	
(if pit incl. DO and ice thickness)	NO WATER, NO SAMPLE TAKEN.
Photo Numbers	
Datasheet: Sign	Downstream: 6704
Upstream: 6703	Overview:

Site Information	
Site Name:	WQ-MS-5-03
Sample Identifier:	0167-130417-001
Sample Date and Time:	~~0167-130417~~ APR 17 2013 11:14
Replicate ID (if applicable)	n/a
Field Measured Parameters	
Temperature:	0.1
Specific Conductivity (SPC):	1183
pH:	6.80
Turbidity:	51.5
Site Conditions	
flow level:	low
turbidity (clear, light, mod, high):	high
ice thickness (if applicable)	5cm ice
Notes	
(if pit incl. DO and ice thickness)	under 100cm snow, slush ice over water, broke through with shovel.
Photo Numbers	
Datasheet: 6713	Downstream: 6715
Upstream: 6714	Overview:

Field Blank ID: _____

Trip Blank ID: _____

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Project No.: 13-Y-0167
Project Name: Mount Nansen Water Quality
Page 3 of 4
YSI Calibration Performed? (Yes) / No

Weather: -8°C, light wind
Date / Time: APR 16 07:20, Apr 17 0830

Field Samplers: DS, JM

Site Information	
Site Name:	WQ Pit 1 (surface)
Sample Identifier:	0167-130417-027
Sample Date and Time:	09:31
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	0.1°C
Specific Conductivity (SPC):	2093
pH:	7.22
Turbidity:	0.42
Site Conditions	
flow level:	—
turbidity (clear, light, mod, high):	clear
ice thickness (if applicable)	90cm
Notes	
(if pit incl. DO and ice thickness)	Ice Thickness 90cm, water@ Ice Lvl. Depth @ Hole 7.5m, (Sample @ surface.) DO. 36.7% DO @ 5.35 mg/L
Photo Numbers	
Datasheet:	Downstream:
Upstream:	Overview: 1733-35

Site Information	
Site Name:	WQ Pit 2 (3.5m)
Sample Identifier:	0167-130417-28
Sample Date and Time:	09:55
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	1.7
Specific Conductivity (SPC):	2103
pH:	7.31
Turbidity:	0.49
Site Conditions	
flow level:	—
turbidity (clear, light, mod, high):	clear
ice thickness (if applicable)	
Notes	
(if pit incl. DO and ice thickness)	DO 38.6% DO 4.62 mg/L
Photo Numbers	
Datasheet:	Downstream:
Upstream:	Overview:

Site Information	
Site Name:	WQ Pit 3 (7m)
Sample Identifier:	0167-130417-029
Sample Date and Time:	10:06
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	4.4°
Specific Conductivity (SPC):	2808
pH:	6.72
Turbidity:	0.66
Site Conditions	
flow level:	—
turbidity (clear, light, mod, high):	Clear
ice thickness (if applicable)	
Notes	
(if pit incl. DO and ice thickness)	DO 4.3% DO 0.54 mg/L
Photo Numbers	
Datasheet:	Downstream:
Upstream:	Overview:

Site Information	
Site Name:	WQ-DC-DX+105
Sample Identifier:	0167-130417-0002
Sample Date and Time:	APR 17, 2013 11:30
Replicate ID (if applicable)	n/a
Field Measured Parameters	
Temperature:	0.3
Specific Conductivity (SPC):	1178
pH:	6.86
Turbidity:	22.9
Site Conditions	
flow level:	low
turbidity (clear, light, mod, high):	low
ice thickness (if applicable)	2cm
Notes	
(if pit incl. DO and ice thickness)	Small area of open water, rest of stream is snow + ice covered
Photo Numbers	
Datasheet: 6717	Downstream: 6719
Upstream: 6718	Overview:

Field Blank ID 0167-130417-003 11:41 APR 17, 2013
Trip Blank ID ~~0167-130417-004~~ "TRIP BLANK"

Project No.: 13-Y-0167

Project Name: Mount Nansen Water Quality

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YSI Calibration Performed? Yes / No

Weather: Sun & cloud, Calm -5°C

Field Samplers: DS, JM

Date / Time: 0830 April 16th 17 2013

Site Information	
Site Name:	WQ - DC - U
Sample Identifier:	0167 130417 011
Sample Date and Time:	11:30 @ 130417
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	0.4°
Specific Conductivity (SPC):	1920
pH:	7.48
Turbidity:	38.4
Site Conditions	
flow level:	low
turbidity (clear, light, mod, high):	clear
ice thickness (if applicable)	47 cm
Notes	
(if pit incl. DO and ice thickness)	WQ Site located u/s at HI-DC-M spill input location clo to flow Throw layers @ rep Site Near well WP: WQ-DC-U (JM)
Photo Numbers	
Datasheet:	Downstream: 1740
Upstream: 1739	Overview: 1741

Site Information	
Site Name:	WQ SEEP
Sample Identifier:	0167 130417 - 009
Sample Date and Time:	11:55
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	1.1°c
Specific Conductivity (SPC):	1696
pH:	7.18
Turbidity:	24.8
Site Conditions	
flow level:	Med.
turbidity (clear, light, mod, high):	light
ice thickness (if applicable)	—
Notes	
(if pit incl. DO and ice thickness)	Pipe runs at side of culvert & flowing directly into Stream Not into deffuser
Photo Numbers	
Datasheet:	Downstream: 1744
Upstream: 1742	Overview: 1743

Site Information	
Site Name:	WQ TP
Sample Identifier:	0167 130417 0058
Sample Date and Time:	12:46 130417
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	1.2
Specific Conductivity (SPC):	2204
pH:	7.16
Turbidity:	26.1
Site Conditions	
flow level:	low
turbidity (clear, light, mod, high):	Med
ice thickness (if applicable)	63 cm
Notes	
(if pit incl. DO and ice thickness)	
Photo Numbers	
Datasheet:	Downstream:
Upstream:	Overview: 1749 - 51

Site Information	
Site Name:	WQ - PW
Sample Identifier:	0167 - 130417 - 030
Sample Date and Time:	14:00 APR 17, 2013
Replicate ID (if applicable)	n/a
Field Measured Parameters	
Temperature:	1.0
Specific Conductivity (SPC):	431.9
pH:	7.20
Turbidity:	0.00
Site Conditions	
flow level:	
turbidity (clear, light, mod, high):	
ice thickness (if applicable)	
Notes	
(if pit incl. DO and ice thickness)	
Photo Numbers	
Datasheet:	Downstream:
Upstream:	Overview: 1752

Field Blank ID: _____

Trip Blank ID: _____

Project #: 13-Y-0167
Project Name: Mount Nansen - Water Quality

Field Dates: May 7-8 2013

Take care when working / sampling on ice.

Please do not move sites without AAM authorization (and mine). Do not sample snow/ice melt flowing through ice layers.

Pay special attention to new bottles and associated preservatives (some changes with ALS)

General Site Tasks/ Communications

#	Complete	Lab Sample Identifier	WQ ID	Station Name	Site Tasks	Additional Materials Required	Date	Time
							yy.mm.dd	HH:MM
1	☑	0167-130507-013	WQ-SEEP	Seepage	not LT50 this trip		13.05.07	14:45
2	☑	0167-130507-012	WQ-TP	Tailings Pond	check ice conditions		13.05.07	17:20
3	☑	0167-130507-005	WQ-DC-DX+105	DX+200/105			13.05.08	08:40
4	☒	Frozen to substrate	WQ-DC-DX	Dome Creek at DX			—	
5	☑	0167-130507-010	WQ-DC-U	Upper Dome			13.05.07	14:10
6	☒	site no longer part of program	~~WQ-DC-D1~~	~~Dome Creek D1~~			—	—
7	☒	water seeping thru ice layers.	~~WQ-DC-D1b~~	Dome Creek ~~D1b~~			—	—
8	☒	Glaciated	WQ-DC-U1	Dome Creek 1			—	—
9	☒	Glaciated	WQ-DC-U2	Dome Creek 2			—	—
10	☒	No flow, site glaciated	WQ-DC-R	Dome Creek at Road			—	—
11	☒	No water	WQ-ADIT SEEP	Adit seep			—	—
12	☒	insufficient flow for sample	WQ-MS-S-03	Mill Seep 03			—	—
13	☒	Frozen to substrate	WQ-MS-S-08	Mill Seep 08			—	—
14	☑	0167-130607-002	WQ-VC-U	Upper Victoria Creek			13-05-07	13:40

Field Staff: MM, MK, DJ, BSm

Project #: 13-Y-0167
Project Name: Mount Nansen - Water Quality

Field Dates: May 7-8, 2013

#	Complete	Lab Sample Identifier	WQ ID	Station Name	Site Tasks	Additional Materials Required	Date (yy.mm.dd)	Time (HH:MM)
15	[✓]	0167-130507-007	WQ-VC-REF	Victoria Creek Reference			13-05-07	16:05
16	[✓]	0167-130508-016	WQ-VC-R	Victoria Creek at Road			13-05-08	08:50
17	[✓]	0167 130507-003	WQ-VC-DBC	Victoria Creek D/S Back Creek			13-05-07	13:20
18	[✓]	0167-130507-001	WQ-VC-UMN	Victoria Creek U/S Minnesota Creek			13-05-07	10:04
19	[X]	overflow with multiple ice layers.	WQ-BC	Back Creek			—	—
20	[X]	overflow with multiple ice layers.	WQ-MN	Minnesota Creek			—	—
21	[✓]	606091	WQ-PW	Pumphouse Well	drinking water sample only (2 bottles) + YG microbiology (1 bottle)		13.05.08	09:30
22	[✓]	0167-130507-008	WQ-PC-U	Pony Creek upstream			13-05-07	17:25
23	[X]	less than 5cm of free-flowing water	WQ-PC-D	Pony Creek downstream			—	—
24	[ ]							
25	[ ]							
26	[ ]							
27	[✓]	0167-130508-011	Field Replicate 1	DC-DK+105			13-05-08	08:40
28	[✓]	0167-130508-016	Field Replicate 2	VC-R			1305-08	08:50
29	[✓]	0167-130508-018	Field Blank			DI Water	13-05-08	— ~ 8:50
30	[✓]	ALS TRAVEL BLANK	Trip Blank				—	—

Field Staff: B.Sm. M.M., M.K. D.S.

Project No.: 13-Y-0167

Project Name: Mount Nansen Water Quality

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YSI Calibration Performed? (Yes) / No

Weather: ~~partly cloudy~~, 0°C, no wind

Field Samplers: B. Sm. M.M.

Date / Time: May 7, 8, 2013 7:45 am

Site Information	
Site Name:	WQ - VC - UMN
Sample Identifier:	0167 - 130507 - 001
Sample Date and Time:	13-05-07, 10:15
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	0.0°C
Specific Conductivity (SPC):	486.9
pH:	6.95
Turbidity:	2.46
Site Conditions	
flow level:	low
turbidity (clear, light, mod, high):	low
ice thickness (if applicable)	20cm @ edges
Notes	
(if pit incl. DO and ice thickness)	open water through channel in ice + snow on margins; ice jamming causing flooding NOT ICE
Photo Numbers	
Datasheet: 6778	Downstream: 6776
Upstream: 6775	Overview: 6777

Site Information	
Site Name:	WQ - VC - DBC
Sample Identifier:	0167 - 130507 - 003
Sample Date and Time:	13-05-07 13:20
Replicate ID (if applicable)	n/a
Field Measured Parameters	
Temperature:	0.0
Specific Conductivity (SPC):	211.5
pH:	7.22
Turbidity:	3.10
Site Conditions	
flow level:	low
turbidity (clear, light, mod, high):	low
ice thickness (if applicable)	2cm
Notes	
(if pit incl. DO and ice thickness)	open water @ sampling location snow + ice on margins
Photo Numbers	
Datasheet: 6805	Downstream: 6804
Upstream: 6803	Overview: n/a

Site Information	
Site Name:	WQ - VC - U
Sample Identifier:	0167 - 130507 - 002
Sample Date and Time:	13-05-07, 13:40
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	0.0°C
Specific Conductivity (SPC):	207.6
pH:	7.20
Turbidity:	1.63
Site Conditions	
flow level:	low
turbidity (clear, light, mod, high):	low
ice thickness (if applicable)	~5cm
Notes	
(if pit incl. DO and ice thickness)	large stretch of open water
Photo Numbers	
Datasheet: 6810	Downstream: 6808
Upstream: 6807	Overview: 6809

Site Information	
Site Name:	WQ - VC - REF
Sample Identifier:	0167 - 130507 - 007
Sample Date and Time:	13-05-07, 16:05
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	0.0°C
Specific Conductivity (SPC):	207.0
pH:	7.28
Turbidity:	1.52
Site Conditions	
flow level:	high
turbidity (clear, light, mod, high):	low
ice thickness (if applicable)	2m
Notes	
(if pit incl. DO and ice thickness)	water running on top of ice, lots of slush, water flow under ice!
Photo Numbers	
Datasheet: 6826	Downstream: 6824-23
Upstream: 6822	Overview: 6825

Field Blank ID _____

Trip Blank ID _____

Project No.: 13-Y-0167

Project Name: Mount Nansen Water Quality

Page 2 of 4

Weather: 0°C calm mostly sunny

Field Samplers: MK, MW DS, BSm.

YSI Calibration Performed? Yes / No

Date / Time: 07-08 May 7:45 AM

Site Information	
Site Name:	WQ-PC-D
Sample Identifier:	
Sample Date and Time:	
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	
Specific Conductivity (SPC):	NO SAMPLE
pH:	
Turbidity:	
Site Conditions	
flow level:	
turbidity (clear, light, mod, high):	
ice thickness (if applicable)	
Notes	
(if pit incl. DO and ice thickness)	Water flowing through 70cm of snow + slush. Not suitable for sampling
Photo Numbers	
Datasheet:	Downstream: 6836
Upstream: 6834	Overview: 6835

Site Information	
Site Name:	WQ-PC-U
Sample Identifier:	0167-130507-008
Sample Date and Time:	13-05-07, 17:25
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	0.0°C
Specific Conductivity (SPC):	265.9
pH:	7.27
Turbidity:	157
Site Conditions	
flow level:	high
turbidity (clear, light, mod, high):	moderate.
ice thickness (if applicable)	
Notes	
(if pit incl. DO and ice thickness)	slush/ice still in pond, flowing over edge veg. Sampled from small flowing channel into pond.
Photo Numbers	
Datasheet: 6840	Downstream: 6838
Upstream: 6837	Overview: 6839

Site Information	
Site Name:	WQ-DC-DX105
Sample Identifier:	0167-130508-005
Sample Date and Time:	May 8, 2013 8:40
Replicate ID (if applicable)	0167-130508-011
Field Measured Parameters	
Temperature:	0.3
Specific Conductivity (SPC):	870.1
pH:	6.72
Turbidity:	14.45
Site Conditions	
flow level:	low-mod
turbidity (clear, light, mod, high):	
ice thickness (if applicable)	5cm.
Notes	
(if pit incl. DO and ice thickness)	Site still has ice + snow cover, some open areas of thin ice.
Photo Numbers	
Datasheet: 6853	Downstream: 6851-52
Upstream: 6850	Overview: n/a

Site Information	
Site Name:	WQ-DC-R
Sample Identifier:	
Sample Date and Time:	
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	
Specific Conductivity (SPC):	NO SAMPLE
pH:	
Turbidity:	
Site Conditions	
flow level:	
turbidity (clear, light, mod, high):	
ice thickness (if applicable)	
Notes	
(if pit incl. DO and ice thickness)	Site is still under thick ice with water flowing between ice layers + then across road.
Photo Numbers	
Datasheet:	Downstream:
Upstream: 6748 → 51	Overview:

~~50~~ 51,

Field Blank ID

Trip Blank ID

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Project No.: 13-Y-0167
Project Name: Mount Nansen Water Quality
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YSI Calibration Performed? Yes / No
Weather: Sunny 1°C. in a.m.
Field Samplers: MK, DS
Date / Time: 08 May 2013 7:45 AM

Site Information		Site Information	
Site Name:	WQ-VC-R – DIS of RD (HWY)	Site Name:	WQ-MN
Sample Identifier:	0167-130508-016	Sample Identifier:	
Sample Date and Time:	08May2013 08:50	Sample Date and Time:	✓
Replicate ID (if applicable)	0167-130508-017	Replicate ID (if applicable)	
Field Measured Parameters		**Field Measured Parameters**	
Temperature:	0.0	Temperature:	
Specific Conductivity (SPC):	401.2	Specific Conductivity (SPC):	NO SAMPLE
pH:	7.22	pH:	
Turbidity:	1.86	Turbidity:	
Site Conditions		**Site Conditions**	
flow level:	low	flow level:	✓
turbidity (clear, light, mod, high):	clear	turbidity (clear, light, mod, high):	
ice thickness (if applicable)	n/a	ice thickness (if applicable)	
Notes		**Notes**	
(if pit incl. DO and ice thickness)		(if pit incl. DO and ice thickness)	Some water flowing on top of ice through slush. Not suitable for sample this trip.
Photo Numbers		**Photo Numbers**	
Datasheet:	✓	Datasheet:	
Downstream:	8971	Downstream:	6793
Upstream:	8970	Upstream:	6792
Overview:	8972	Overview:	

Site Information		Site Information	
Site Name:	WQ-BC	Site Name:	WQ-DS
Sample Identifier:		Sample Identifier:	
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):	NO SAMPLE	Specific Conductivity (SPC):	NO SAMPLE
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		**Notes**	
(if pit incl. DO and ice thickness)	Some flow on top of ice and between ice layers + slush. Not suitable for sample this trip.	(if pit incl. DO and ice thickness)	Site still frozen to bed. Very small amount of melt occurring between ice + substrate.
Photo Numbers		**Photo Numbers**	
Datasheet:		Datasheet:	
Downstream:	6818	Downstream:	
Upstream:	6817	Upstream:	6855
Overview:		Overview:	6854

Field Blank ID: 0167-130508-018
Trip Blank ID: TRAVEL BLANK
EDI

MS-S-04 – NO SAMPLE – observed some frozen surface water (frozen to substrate)
Photo – 6843-46

MS-S-03 – NO SAMPLE – insufficient flow beneath ice to sample.
Photo 6847-49

Project No.: 13-Y-0167
Project Name: Mount Nansen Water Quality
Page 4 of 4
YSI Calibration Performed? Yes / No
Weather: overcast 8°C
Field Samplers: MK DS
Date / Time: 07 May 2013 7:45 Am

Site Information	
Site Name:	WQ - DC - U
Sample Identifier:	0167-130507- ~~013~~ 010
Sample Date and Time:	07May13 1410
Replicate ID (if applicable)	/
Field Measured Parameters	
Temperature:	0.0
Specific Conductivity (SPC):	1594
pH:	8.00
Turbidity:	25.7
Site Conditions	
flow level:	low.
turbidity (clear, light, (mod), high):	
ice thickness (if applicable)	n/a
Notes	
(if pit incl. DO and ice thickness)	
Photo Numbers	
Datasheet: /	Downstream: 8959
Upstream: 8958	Overview: 8960

Site Information	
Site Name:	WQ - SEEP
Sample Identifier:	0167-130507 -013
Sample Date and Time:	07May13 1445
Replicate ID (if applicable)	/
Field Measured Parameters	
Temperature:	1.2
Specific Conductivity (SPC):	1647
pH:	6.75
Turbidity:	23.2
Site Conditions	
flow level:	low ?
turbidity (clear, light, (mod), high):	
ice thickness (if applicable)	n/a
Notes	
(if pit incl. DO and ice thickness)	
Photo Numbers	
Datasheet: /	Downstream: 8961
Upstream: /	Overview: 8962

Site Information	
Site Name:	WQ - TP
Sample Identifier:	0167-130507- 012
Sample Date and Time:	07May13 1720
Replicate ID (If applicable)	/
Field Measured Parameters	
Temperature:	0.5
Specific Conductivity (SPC):	2190
pH:	6.74
Turbidity:	26.1
Site Conditions	
flow level:	low
turbidity (clear, light, (mod), high):	
ice thickness (if applicable)	0.6m.
Notes	
(if pit incl. DO and ice thickness)	approx 10cm melt water on top of ice, mixed with snow / slush.
Photo Numbers	
Datasheet: /	Downstream: /
Upstream: /	Overview: 8967-68

Site Information	
Site Name:	WQ - PW
Sample Identifier:	
Sample Date and Time:	08May2013 08:25
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	0.8
Specific Conductivity (SPC):	452.1
pH:	6.80
Turbidity:	—
Site Conditions	
flow level:	
turbidity (clear), light, mod, high):	
ice thickness (if applicable)	n/a.
Notes	
(if pit incl. DO and ice thickness)	
Photo Numbers	
Datasheet: /	Downstream: 8969
Upstream: /	Overview: -

Field Blank ID _____
Trip Blank ID _____

Project #: 13-Y-0167

Project Name: Mount Nansen - Water Quality

ENVIRONMENTAL DYNAMICS INC.

Field Dates: May 16-17, 201

#	Complete	Lab Sample Identifier	WQ ID	Station Name	Site Tasks	Additional Materials Required	Date	Time
							yy.mm.dd	HH:MM
15	[✓]	0167-130516-017	WQ-VC-REF	Victoria Creek Reference			13.05.16	14:45
16	[✓]	0167-130516-014	WQ-VC-R	Victoria Creek at Road			13.05.16	8:03
17	[✓]	0167-130516-019	WQ-VC-DBC	Victoria Creek D/S Back Creek			13.05.16	12:19
18	[✓]	0167-130516-015	WQ-VC-UMN	Victoria Creek U/S Minnesota Creek			13.05.16	9:50
19	[✓]	0167-130516-003	WQ-BC	Back Creek			1305.16	13:52
20	[✓]	0167-130517-006	WQ-MN	Minnesota Creek			13.05.17	9:31
21	[✓]	SAMPLE COLLECTED BUT LAB NOT OPEN SO COULD NOT CHANGE HIT	0167-130517030 WQ-PW	Pumphouse Well	drinking water sample only (2 bottles) + YG microbiology (1 bottle)		13.05.17	9:03
22	[✓]	0167-130517-007	WQ-PC-U	Pony Creek upstream			13.05.17	10:32
23	[✓]	0167-130517-022	WQ-PC-D	Pony Creek downstream			13.05.17	10:21
24	[ ]		~~WQ-PW~~	~~Pond~~				
25	[ ]							
26	[ ]							
27	[✓]	0167-130516-015	Field Replicate 1	WQ-VC-DBC			13.05.16	12:19
28	[✓]	0167-130517-023	Field Replicate 2	WQ-SEEP			13.05.17	8:24
29	[✓]	0167-130517-013	Field Blank			DI Water	13.05.17	8:14
30	[✓]	TRAVEL BLANK	Trip Blank					

Field Staff: CL, SM, DS

20 SAMPLES.

Project #: 13-Y-0167
Project Name: Mount Nansen - Water Quality

ENVIRONMENTAL DYNAMICS INC.

Field Dates: May 16-17, 2017

Take care when working / sampling on ice.
Please do not move sites without AAM authorization (and mine). Do not sample snow/ice melt flowing through ice layers.
Pay special attention to new bottles and associated preservatives (some changes with ALS)

General Site Tasks/ Communications

#	Complete	Lab Sample Identifier	WQ ID	Station Name	Site Tasks	Additional Materials Required	Date	Time
							yy.mm.dd	HH:MM
1	[✓]	0167-130517-023	WQ-SEEP	Seepage	YLO [redacted] LT50 this trip		17 05.17	8:24
2	[✓]	0167-130517-005	WQ-TP	Tailings Pond	check ice conditions		13.05.17	8:45
3	[✓]	0167-130516-001	WQ-DC-DX+105	DX+200/105			13.05.16	16:40
4	[✓]	0167-130516-002	WQ-DC-DX	Dome Creek at DX			13.05.16	16:53
5	[✓]	0167-130517-026	WQ-DC-U	Upper Dome			13.05.17	7:59
6	[X]	Glaciated	WQ-DC-D1	Dome Creek D1			—	—
7	[X]	Frozen, Glaciated	WQ-DC-D1b	Dome Creek D1b			—	—
8	[X]	Glaciated, Frozen to Bed	WQ-DC-U1	Dome Creek 1			—	—
9	[X]	Glaciated " "	WQ-DC-U2	Dome Creek 2			—	—
10	[X]	Glaciated, Frozen to Bed	WQ-DC-R	Dome Creek at Road			—	—
11	[✓]	0167-130517-004	WQ-ADIT SEEP	Adit seep			13 05.17	10:16
12	[✓]	0167-130516-021	WQ-MS-S-03	Mill Seep 03			13.05.16	16:28
13	[X]	Standing Water	WQ-MS-S-08	Mill Seep 08			—	—
14	[✓]	0167-130516-020	WQ-VC-U	Upper Victoria Creek			13.05.16	12:43

Field Staff: CL, JM, DS

EDI
ENVIRONMENTAL DYNAMICS INC.

Project No.: 13-Y-0167
Project Name: Mount Nansen Water Quality
Page 1 of 5
YSI Calibration Performed? (Yes) / No
Weather: Sun, 2°c
Field Samplers: CC, JH, DS
Date / Time: 16 MAY 2013 07:00

Site Information	
✓ Site Name:	WQ-VC-R +100
Sample Identifier:	0167-130516-014
Sample Date and Time:	16-MAY 2013 @ 8:03
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	0.0°c
Specific Conductivity (SPC):	79.2
pH:	6.57
Turbidity:	~~14.75~~ 14.25
Site Conditions	
flow level:	HIGH < BANK Full
turbidity (clear, light, mod, high):	MOD-HIGH
ice thickness (if applicable)	0 — ice free
Notes	
(if pit incl. DO and ice thickness)	Sample collected from d/s of culvert due to persistent ice in d/s culvert where flow is over top of ice + through vegetation.
Photo Numbers	
Datasheet:	Downstream: 78
Upstream: 79	Overview: 80

Site Information	
✓ Site Name:	WQ-VC-UMN
Sample Identifier:	0167-130516-015
Sample Date and Time:	16-MAY-2013 9:50
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	0°C
Specific Conductivity (SPC):	91.2
pH:	6.86
Turbidity:	20.2
Site Conditions	
flow level:	HIGH < BANK FULL
turbidity (clear, light, mod, high):	MOD
ice thickness (if applicable)	— NONE —
Notes	
(if pit incl. DO and ice thickness)	Channel open. staff gage = 0.85
Photo Numbers	
Datasheet:	Downstream:
Upstream:	Overview:

Site Information	
✓ Site Name:	WQ-VC-DBC
Sample Identifier:	0167-130516-019
Sample Date and Time:	130516 — 12:19
Replicate ID (if applicable)	0167-130516-018
Field Measured Parameters	
Temperature:	0.9°c
Specific Conductivity (SPC):	63.9
pH:	6.84
Turbidity:	102
Site Conditions	
flow level:	High
turbidity (clear, light, mod, high):	Mod-High
ice thickness (if applicable)	N/A
Notes	
(if pit incl. DO and ice thickness)	water lvl High, small side channel RDB flowing. Channel open + ice free. High turbidity from Back Ck.
Photo Numbers	
Datasheet: 0096	Downstream: 0097
Upstream:	Overview: 0098

Site Information	
Site Name:	WQ-VC-U
Sample Identifier:	0167-130516-020
Sample Date and Time:	12:49 130516
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	0.9°c
Specific Conductivity (SPC):	60.0
pH:	6.79
Turbidity:	27.4
Site Conditions	
flow level:	High < BANK FULL
turbidity (clear, light, mod, high):	Mod
ice thickness (if applicable)	N/A
Notes	
(if pit incl. DO and ice thickness)	Channel open. Ice free. Flow high + mod. turbid
Photo Numbers	
Datasheet: 0099	Downstream: 0100
Upstream:	Overview: 0101

Field Blank ID
Trip Blank ID

Project No.: 13-Y-0167

Project Name: Mount Nansen Water Quality

Page 2 of 5

Weather: Sun/clear 12°C

Field Samplers: CL/JH/DS

YSI Calibration Performed? (Yes) / No

Date / Time: 16 MAY 2013 7:00 AM

Site Information	
Site Name:	WQ BC
Sample Identifier:	0167 130516 - 003
Sample Date and Time:	~~13 05 16~~ 13:52 16 MAY 2013
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	2.8°
Specific Conductivity (SPC):	64.6
pH:	7.06
Turbidity:	783
Site Conditions	
flow level:	High
turbidity (clear, light, mod, high):	High
ice thickness (if applicable)	—
Notes	
(if pit incl. DO and ice thickness)	High ~~Bad~~ Good Channel open, ice free.
Photo Numbers	
Datasheet:	Downstream: 0108
Upstream: 0107	Overview: ~~0108~~ 0109

Site Information	
✓ Site Name:	WQ-VC-REF
Sample Identifier:	0167-130516-017
Sample Date and Time:	16 MAY 2013 14:45
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	1.1°C
Specific Conductivity (SPC):	50.8
pH:	6.84
Turbidity:	28.9
Site Conditions	
flow level:	
turbidity (clear, light, mod, high):	high
ice thickness (if applicable)	— none —
Notes	
(if pit incl. DO and ice thickness)	Channel open + mostly ice free
Photo Numbers	
Datasheet:	Downstream: 104-0209
Upstream: 104-0208	Overview: 104-0207

*REST IN CL's NOTE BOOK

Site Information	
Site Name:	WQ-MS-S-03
Sample Identifier:	0167-130516-021
Sample Date and Time:	May 16, 2013 16:28
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	0.6
Specific Conductivity (SPC):	1089 µs/cm
pH:	6.78
Turbidity:	64.4
Site Conditions	
flow level:	high
turbidity (clear, light, mod, high):	mod.
ice thickness (if applicable)	n/a
Notes	
(if pit incl. DO and ice thickness)	Some snow + ice still on banks.
Photo Numbers	
Datasheet:	Downstream: 114
Upstream: 115	Overview: 116

Site Information	
Site Name:	WQ-DC-DX+105
Sample Identifier:	0167-130516-001
Sample Date and Time:	16 May '13 16:40
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	0.6
Specific Conductivity (SPC):	201.6
pH:	6.81
Turbidity:	46.8
Site Conditions	
flow level:	high
turbidity (clear, light, mod, high):	mod.
ice thickness (if applicable)	
Notes	
(if pit incl. DO and ice thickness)	Some snow + ice still on banks.
Photo Numbers	
Datasheet:	Downstream: 117
Upstream: 118	Overview: 119

Field Blank ID _____

Trip Blank ID _____

Project No.: 13-Y-0167 Weather: _____ Field Samplers: _____

Project Name: Mount Nansen Water Quality _____ _____

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YSI Calibration Performed? (Yes) / No Date / Time: May 17, 2013 6:30

Site Information	
Site Name:	WQ-DC-DX
Sample Identifier:	0167-130516-002
Sample Date and Time:	16 May 13 16:53
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	0.1
Specific Conductivity (SPC):	395
pH:	6.95
Turbidity:	0.90
Site Conditions	
flow level:	~~High~~ mod - high
turbidity (clear, light, mod, high):	clear
ice thickness (if applicable)	some ice still remaining
Notes	
(if pit incl. DO and ice thickness)	some snow + ice still remaining
Photo Numbers	
Datasheet:	Downstream: 0121
Upstream: 0120	Overview: 0122

Site Information	
Site Name:	WQ-DC-U
Sample Identifier:	0167-130517-026
Sample Date and Time:	17 MAY 13 7:59:00
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	0.0
Specific Conductivity (SPC):	393.6
pH:	7.00
Turbidity:	8.49
Site Conditions	
flow level:	High
turbidity (clear, light, mod, high):	mod
ice thickness (if applicable)	
Notes	
(if pit incl. DO and ice thickness)	ice still
Photo Numbers	
Datasheet:	Downstream: 124
Upstream: 123	Overview: 125

Site Information	
Site Name:	WQ-SEEP
Sample Identifier:	0167-130517-013
Sample Date and Time:	MAY 17, 2013 8:24:00
Replicate ID (if applicable)	0167-130517-012
Field Measured Parameters	
Temperature:	1.0
Specific Conductivity (SPC):	1200
pH:	6.8
Turbidity:	18.23
Site Conditions	
flow level:	
turbidity (clear, light, mod, high):	
ice thickness (if applicable)	
Notes	
(if pit incl. DO and ice thickness)	LT50 collected.
Photo Numbers	
Datasheet:	Downstream:
Upstream:	Overview: 0126

Site Information	
Site Name:	WQ-TP
Sample Identifier:	0167-130517-005
Sample Date and Time:	May 17, 2013 8:45
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	0.3
Specific Conductivity (SPC):	333
pH:	7.55
Turbidity:	7.03
Site Conditions	
flow level:	
turbidity (clear, light, mod, high):	
ice thickness (if applicable)	
Notes	
(if pit incl. DO and ice thickness)	
Photo Numbers	
Datasheet:	Downstream:
Upstream:	Overview: 0129

Field Blank ID 0167-130517-013 8:14:00

Trip Blank ID Travel Blank

Project No.: 13-Y-0167 Weather: _____ Field Samplers: _____

Project Name: Mount Nansen Water Quality _____ _____

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YSI Calibration Performed? (Yes) / No Date / Time: May 17. 6:20

Site Information	
Site Name:	WQ - PW
Sample Identifier:	0167-130517-003 ~~003~~
Sample Date and Time:	May 17, 2013 3
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	0.6
Specific Conductivity (SPC):	385.1
pH:	7.33
Turbidity:	0.00
Site Conditions	
flow level:	
turbidity (clear, light, mod, high):	
ice thickness (if applicable)	
Notes	
(if pit incl. DO and ice thickness)	Bid. sample collected but will not make sample holding time, no lab closed Fridays. ALS samples submit
Photo Numbers	
Datasheet:	Downstream:
Upstream:	Overview: 0130

Site Information	
Site Name:	WQ - MN
Sample Identifier:	0167-130517-006
Sample Date and Time:	May 17, 2013 9:31
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	0.0
Specific Conductivity (SPC):	~~0.2~~ 25.4
pH:	6.32
Turbidity:	11.98
Site Conditions	
flow level:	high
turbidity (clear, light, mod, high):	mod - low (Stained)
ice thickness (if applicable)	
Notes	
(if pit incl. DO and ice thickness)	channel flowing over ice which channel still in ice for level.
Photo Numbers	
Datasheet:	Downstream: 132
Upstream: 133	Overview: 131

Site Information	
Site Name:	WQ - ADIT - SEEP
Sample Identifier:	0167-130517-004
Sample Date and Time:	May 17, 2013 10:16
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	0.1
Specific Conductivity (SPC):	66.8
pH:	6.89
Turbidity:	1.0
Site Conditions	
flow level:	
turbidity (clear, light, mod, high):	
ice thickness (if applicable)	
Notes	
(if pit incl. DO and ice thickness)	
Photo Numbers	
Datasheet:	Downstream: 136
Upstream: 135	Overview: 137-1 134

Site Information	
Site Name:	WQ - DC - D
Sample Identifier:	0167-130517-002
Sample Date and Time:	May 17, 2013 10:21
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	0.0
Specific Conductivity (SPC):	74.5
pH:	6.80
Turbidity:	2.34
Site Conditions	
flow level:	
turbidity (clear, light, mod, high):	
ice thickness (if applicable)	
Notes	
(if pit incl. DO and ice thickness)	
Photo Numbers	
Datasheet:	Downstream: 139
Upstream: 138	Overview: 140

Field Blank ID _____

Trip Blank ID _____

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ENVIRONMENTAL DYNAMICS INC.

Project No.: 13-Y-0167 **Weather:** _____ **Field Samplers:** _____

Project Name: Mount Nansen Water Quality _____ _____

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YSI Calibration Performed? Yes / No **Date / Time:** MAY 17, 6:30 AM

Site Information		Site Information	
Site Name:	WQ-PC-U	Site Name:	
Sample Identifier:	0167-BOS17-0007	Sample Identifier:	
Sample Date and Time:	MAY 17, 2013 10:32	Sample Date and Time:	
Replicate ID (if applicable)		Replicate ID (if applicable)	
Field Measured Parameters		**Field Measured Parameters**	
Temperature:	0.0	Temperature:	
Specific Conductivity (SPC):	64.8	Specific Conductivity (SPC):	
pH:	6.67	pH:	
Turbidity:	16.69	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		**Notes**	
(if pit incl. DO and ice thickness)		(if pit incl. DO and ice thickness)	
Photo Numbers		**Photo Numbers**	
Datasheet:	Downstream: 142	Datasheet:	Downstream:
Upstream: 141	Overview: 143	Upstream:	Overview:

Site Information		Site Information	
Site Name:		Site Name:	
Sample Identifier:		Sample Identifier:	
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		**Notes**	
(if pit incl. DO and ice thickness)		(if pit incl. DO and ice thickness)	
Photo Numbers		**Photo Numbers**	
Datasheet:	Downstream:	Datasheet:	Downstream:
Upstream:	Overview:	Upstream:	Overview:

Field Blank ID _____

Trip Blank ID _____

MS-1-04 - Standing water in a hole, not suitable for sampling
photos - 0113, 0112

Project No.: 13-Y-0167 Weather: Sun, 12°C Field Samplers: CL/JM/DS

Project Name: Mount Nansen Water Quality

Page 1 of 6

YSI Calibration Performed? (Yes) / No Date / Time: 22 MAY 2013 @ 7:00 AM

Site Information	
Site Name:	WQ-VC-R
Sample Identifier:	0167-130522-020
Sample Date and Time:	8:11 22 MAY 2013
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	0.0°C
Specific Conductivity (SPC):	148.3 uS/cm
pH:	6.66
Turbidity:	9.73 NTU
Site Conditions	
flow level:	Low
turbidity (clear, light, mod, high):	
ice thickness (if applicable)	1-2 m upstream (see photos
Notes	
(if pit incl. DO and ice thickness)	0.5 m space above ice water. up to 2 m thick. Sampled upstream of culvert @ Summer Site.
Photo Numbers	
Datasheet: —	Downstream: 103
Upstream: 102	Overview: 104

Site Information	
Site Name:	WQ-MN
Sample Identifier:	0167-130522-088
Sample Date and Time:	22 MAY 2013
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	0.0°C
Specific Conductivity (SPC):	47.0 uS/cm
pH:	6.48
Turbidity:	7.26 NTU
Site Conditions	
flow level:	moderate
turbidity (clear, light, mod, high):	
ice thickness (if applicable)	
Notes	
(if pit incl. DO and ice thickness)	none.
Photo Numbers	
Datasheet: —	Downstream: 0221
Upstream: 0219	Overview: 0220

Site Information	
Site Name:	WQ-VC-UMN
Sample Identifier:	0167-130522-019
Sample Date and Time:	22-MAY-2013 9:05
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	0.0°C
Specific Conductivity (SPC):	165.7
pH:	7.53
Turbidity:	10.83 (Sorry, Rook
Site Conditions	
flow level:	Moderate
turbidity (clear, light, mod, high):	
ice thickness (if applicable)	
Notes	
(if pit incl. DO and ice thickness)	
Photo Numbers	
Datasheet: —	Downstream: 111
Upstream: 110	Overview: 112

Site Information	
Site Name:	WQ-DC-R
Sample Identifier:	0167-130522-018
Sample Date and Time:	22 MAY 2013 10:15
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	0.0°C
Specific Conductivity (SPC):	736.0 uS/cm
pH:	8.01
Turbidity:	19.84
Site Conditions	
flow level:	Moderate
turbidity (clear, light, mod, high):	light, fairly some muddy in ice
ice thickness (if applicable)	~metre? flowing on surface
Notes	
(if pit incl. DO and ice thickness)	Water flowing on channel on ice, to culvert. Sampled upstream of culvert, closer to road than usual
Photo Numbers	
Datasheet: —	Downstream: 0113
Upstream: 0114	Overview: 0115

Field Blank ID _____

Trip Blank ID _____

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Project No.: 13-Y-0167 Weather: Sun, 15°C Field Samplers: CL/JM/DS

Project Name: Mount Nansen Water Quality

Page 2 of 6

YSI Calibration Performed? Yes / No Date / Time: 22 MAY 2013 7:00am

Site Information	
Site Name:	~~MW~~ WQ-VC-REF
Sample Identifier:	0167-130522-007
Sample Date and Time:	22-05-2013 13:30
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	2.4°C
Specific Conductivity (SPC):	106.7
pH:	7.42
Turbidity:	13.29
Site Conditions	
flow level:	Moderate
turbidity (clear, light, mod, high):	
ice thickness (if applicable)	none
Notes	
(if pit incl. DO and ice thickness)	None.
Photo Numbers	
Datasheet: —	Downstream: 0225
Upstream: 0224	Overview: 0223

Site Information	
Site Name:	WQ-DC
Sample Identifier:	0167-130522-022
Sample Date and Time:	22 MAY 2013 14:18
Replicate ID (if applicable)	~~0167-130522-005~~
Field Measured Parameters	
Temperature:	0.5°C
Specific Conductivity (SPC):	633.5
pH:	7.86
Turbidity:	120
Site Conditions	
flow level:	Moderate
turbidity (clear, light, mod, high):	High
ice thickness (if applicable)	0
Notes	
(if pit incl. DO and ice thickness)	~~None~~
	~~Sample replicate taken~~
Photo Numbers	
Datasheet:	Downstream:
Upstream: 14	Overview: 144

Site Information	
Site Name:	~~MW~~ WQ-SEEP
Sample Identifier:	0167-130522-001
Sample Date and Time:	22-MAY-2013 14:40
Replicate ID (if applicable)	0167-130522-002
Field Measured Parameters	
Temperature:	2.4°C
Specific Conductivity (SPC):	1412 us/cm
pH:	7.13
Turbidity:	39.0 NTU.
Site Conditions	
flow level:	
turbidity (clear, light, mod, high):	
ice thickness (if applicable)	
Notes	
(if pit incl. DO and ice thickness)	
Photo Numbers	
Datasheet:	Downstream:
Upstream:	Overview:

Site Information	
Site Name:	~~MW~~ WQ-VC-DBL
Sample Identifier:	0167-130522-017
Sample Date and Time:	22 MAY 2013 11:12
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	0.2°C
Specific Conductivity (SPC):	119.0 us/cm
pH:	7.45
Turbidity:	37.9
Site Conditions	
flow level:	moderate flow
turbidity (clear, light, mod, high):	mod-high
ice thickness (if applicable)	none
Notes	
(if pit incl. DO and ice thickness)	Sampled @ regular site.
Photo Numbers	
Datasheet: —	Downstream: 0122
Upstream: 0121	Overview: 0123

Field Blank ID _____

Trip Blank ID _____

Project No.: 13-Y-0167 Weather: Sun. 15°C Field Samplers: CC/SM/JS

Project Name: Mount Nansen Water Quality

Page 3 of ____

YSI Calibration Performed? Yes / No Date / Time: 22 MAY 2013 7:00 AM

Site Information	
Site Name:	WQ - TP
Sample Identifier:	0167 - 130522 - 005
Sample Date and Time:	22-MAY 2013 15:08
Replicate ID (if applicable)	———
Field Measured Parameters	
Temperature:	3.2°C
Specific Conductivity (SPC):	492.4
pH:	7.65
Turbidity:	5.59
Site Conditions	
flow level:	low
turbidity (clear, light, mod, high):	clear
ice thickness (if applicable)	2 cm, rotten
Notes	
(if pit incl. DO and ice thickness)	Ice thickness = 2 cm ? Rotten
Photo Numbers	
Datasheet:	Downstream:
Upstream: 0147, 0148	Overview: 0149

Site Information	
Site Name:	WQ - DC-U2
Sample Identifier:	0167 - 130522 - 025
Sample Date and Time:	22 MAY 2013 15:30
Replicate ID (if applicable)	———
Field Measured Parameters	
Temperature:	0.0°C
Specific Conductivity (SPC):	601.2
pH:	7.89
Turbidity:	51.1
Site Conditions	
flow level:	mod - HIGH
turbidity (clear, light, mod, high):	clear
ice thickness (if applicable)	~ ? - ~ 60 cm - 100 cm
Notes	
(if pit incl. DO and ice thickness)	WATER FLOWING ON ICE, NO VISIBLE SUBSTRATE.
Photo Numbers	
Datasheet: ———	Downstream: 151
Upstream: 150	Overview: 152

Site Information	
Site Name:	WQ - ADIT SEEP
Sample Identifier:	0167 - 130522 - 024
Sample Date and Time:	22 MAY 2013 16:03
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	1.8°C
Specific Conductivity (SPC):	112.2 uS/cm
pH:	7.80
Turbidity:	2.38 NTU
Site Conditions	
flow level:	Moderate
turbidity (clear, light, mod, high):	clear
ice thickness (if applicable)	—
Notes	
(if pit incl. DO and ice thickness)	"Seep" was likely at confluence with adit
Photo Numbers	
Datasheet:	Downstream: 0154
Upstream: 0153	Overview: 0155

Site Information	
Site Name:	WQ - PC - D
Sample Identifier:	0167 - 130522 - 021
Sample Date and Time:	22 MAY 2013 16:10
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	1.7°C
Specific Conductivity (SPC):	105.3 uS/cm
pH:	7.25
Turbidity:	13.92 NTU
Site Conditions	
flow level:	Moderate
turbidity (clear, light, mod, high):	clear
ice thickness (if applicable)	—
Notes	
(if pit incl. DO and ice thickness)	
Photo Numbers	
Datasheet:	Downstream: 0228
Upstream: 0227	Overview: 0226

Field Blank ID _____

Trip Blank ID _____

Project No.: 13-Y-0167 Weather: Sun, 15°C Field Samplers: CL/JM/DS

Project Name: Mount Nansen Water Quality

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YSI Calibration Performed? (Yes) / No Date / Time: May 22 2013 7:00AM

Site Information	
Site Name:	~~Pony~~ WQ-PCU
Sample Identifier:	0167-130522-~~005~~ ~~MS~~ ~~DUP~~
Sample Date and Time:	22 MAY 2013 16:15
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	0.9°C
Specific Conductivity (SPC):	100.5 us/cm
pH:	7.18
Turbidity:	1.39
Site Conditions	
flow level:	Moderate
turbidity (clear, light, mod, high):	moderate
ice thickness (if applicable)	—
Notes	
(if pit incl. DO and ice thickness)	n/a
Photo Numbers	
Datasheet: —	Downstream: 0231
Upstream: 0230	Overview: 0229

Site Information	
Site Name:	WQ-MILL SEEP 08
Sample Identifier:	0167-130522-~~006~~
Sample Date and Time:	22 MAY 2013 16:30
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	X
Specific Conductivity (SPC):	X
pH:	X
Turbidity:	X
Site Conditions	
flow level:	NONE
turbidity (clear, light, mod, high):	
ice thickness (if applicable)	
Notes	
(if pit incl. DO and ice thickness)	NOT SAMPLED B/C DRY
Photo Numbers	
Datasheet:	Downstream:
Upstream: 0156	Overview: 0157

Site Information	
Site Name:	WQ-MS-03
Sample Identifier:	0167-130522-003
Sample Date and Time:	22-MAY-2013 16:40
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	0.7°C
Specific Conductivity (SPC):	1160 us/cm
pH:	6.93
Turbidity:	29.2 NTU
Site Conditions	
flow level:	moderate
turbidity (clear, light, mod, high):	clear
ice thickness (if applicable)	—
Notes	
(if pit incl. DO and ice thickness)	
10 m downstream of normal sample spot b/c flow is sub-surface & ice cover.	
Photo Numbers	
Datasheet:	Downstream: 0160
Upstream: 0159	Overview: 0161

Site Information	
Site Name:	WQ-DC-DXN05
Sample Identifier:	0167-130522-004
Sample Date and Time:	22 MAY 2013 16:48
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	1.8°C
Specific Conductivity (SPC):	273.7 us/cm
pH:	7.09
Turbidity:	29.1 NTU
Site Conditions	
flow level:	moderate
turbidity (clear, light, mod, high):	low
ice thickness (if applicable)	—
Notes	
(if pit incl. DO and ice thickness)	
Photo Numbers	
Datasheet: —	Downstream: 0163
Upstream: 0162	Overview: 0164

Field Blank ID _____

Trip Blank ID _____

EDI
ENVIRONMENTAL DYNAMICS INC.

Project No.: 13-Y-0167 Weather: Sun 15°C Field Samplers: CL / SM / DS

Project Name: Mount Nansen Water Quality

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YSI Calibration Performed? Yes / No Date / Time: 22 MAY 2013 7:00 AM

Site Information	
Site Name:	WQ - DX
Sample Identifier:	014
Sample Date and Time:	22 MAY 2013 17:00
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	0.1 °C
Specific Conductivity (SPC):	87.1 uS/cm
pH:	7.03
Turbidity:	1.82 NTU
Site Conditions	
flow level:	moderate
turbidity (clear, light, mod, high):	clear
ice thickness (if applicable)	4-5 cm on edge
Notes	
(if pit incl. DO and ice thickness)	ice present on perimeter / margins blotchy snow remains
Photo Numbers	
Datasheet: —	Downstream: 0234
Upstream: 0235	Overview: 0233

Site Information	
Site Name:	~~TRIP BLANK~~ Field Blank
Sample Identifier:	0167-130523-13
Sample Date and Time:	23 MAY 2013 8:00 AM
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	—
Specific Conductivity (SPC):	—
pH:	—
Turbidity:	—
Site Conditions	
flow level:	—
turbidity (clear, light, mod, high):	—
ice thickness (if applicable)	—
Notes	
(if pit incl. DO and ice thickness)	TRIP BLANK
Photo Numbers	
Datasheet:	Downstream:
Upstream:	Overview:

Site Information	
Site Name:	WQ PW
Sample Identifier:	0167 130523-015
Sample Date and Time:	08:38
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	1.1
Specific Conductivity (SPC):	~~408~~ 406.3
pH:	~~6.85~~ 7.02
Turbidity:	0.72
Site Conditions	
flow level:	Normal
turbidity (clear, light, mod, high):	clear
ice thickness (if applicable)	N/A
Notes	
(if pit incl. DO and ice thickness)	
Photo Numbers	
Datasheet:	Downstream:
Upstream:	Overview: 0165

Site Information	
Site Name:	WQ-VL-U
Sample Identifier:	0167-130522-~~005~~ 016 (Incorrect in field notes)
Sample Date and Time:	22 MAY 2013
Replicate ID (if applicable)	0167-130522-009
Field Measured Parameters	
Temperature:	0.1°C
Specific Conductivity (SPC):	114.1 uS/cm
pH:	7.49
Turbidity:	~~17~~ 7.73
Site Conditions	
flow level:	moderate
turbidity (clear, light, mod, high):	medium
ice thickness (if applicable)	none
Notes	
(if pit incl. DO and ice thickness)	Sampled @ regular site
Photo Numbers	
Datasheet: —	Downstream: 0125
Upstream: 0124	Overview: 0126

Field Blank ID 0167-130523-13

Trip Blank ID TRAVEL BLANK

Project No.: 13-Y-0167

Project Name: Mount Nansen Water Quality

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YSI Calibration Performed? Yes / No

Weather: Sun, 12°C

Field Samplers: CL/JM/DS

Date / Time: 23 MAY 2013 @ 7:00 am; + 22 MAY 2013 @ 7:00 pm

Site Information		Site Information	
Site Name:	NR-BC	Site Name:	
Sample Identifier:	0167-1305-22-010	Sample Identifier:	
Sample Date and Time:	22 MAY 2013 11:51	Sample Date and Time:	
Replicate ID (if applicable)	—	Replicate ID (if applicable)	
Field Measured Parameters		**Field Measured Parameters**	
Temperature:	3.4°C	Temperature:	
Specific Conductivity (SPC):	144.6	Specific Conductivity (SPC):	
pH:	7.60	pH:	
Turbidity:	198	Turbidity:	
Site Conditions		**Site Conditions**	
flow level:	medium	flow level:	
turbidity (clear, light, mod, high):	high	turbidity (clear, light, mod, high):	
ice thickness (if applicable)	none	ice thickness (if applicable)	
Notes		**Notes**	
(if pit incl. DO and ice thickness)	Sampled @ regular site.	(if pit incl. DO and ice thickness)	
Photo Numbers		**Photo Numbers**	
Datasheet:	Downstream:	Datasheet:	Downstream:
Upstream:	Overview:	Upstream:	Overview:

Site Information		Site Information	
Site Name:		Site Name:	
Sample Identifier:		Sample Identifier:	
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		**Notes**	
(if pit incl. DO and ice thickness)		(if pit incl. DO and ice thickness)	
Photo Numbers		**Photo Numbers**	
Datasheet:	Downstream:	Datasheet:	Downstream:
Upstream:	Overview:	Upstream:	Overview:

Field Blank ID _____

Trip Blank ID _____

Project #: 13-Y-0167
Project Name: Mount Nansen - Water Quality

ENVIRONMENTAL DYNAMICS INC.

Field Dates: 130528 - 29

General Site Tasks/ Communications

Take care when working / sampling on ice.
Please do not move sites without AAM authorization (and mine). Do not sample snow/ice melt flowing through ice layers.
Pay special attention to new bottles and associated preservatives (some changes with ALS)

#	Complete	Lab Sample Identifier	WQ ID	Station Name	Site Tasks	Additional Materials Required	Date	Time
							yy.mm.dd	HH:MM
1	[Y]	0167 130529 019	WQ-SEEP	Seepage	not LT50 this trip		13.05.29	0853
2	[Y]	0167 130529 020	WQ-TP	Tailings Pond	check ice conditions		13.05.29	09:20
3	[Y]	0167 130529-002	WQ-DC-DX+105	DX+200/105			13.05.29	12:43
4	[Y]	0167 130529-013	WQ-DC-DX	Dome Creek at DX			13.05.29	13:30
5	[Y]	0167 130529-017	WQ-DC-U	Upper Dome			13.05.29	08:32
6	[Y]	0167 130529-008	WQ-DC-D1	Dome Creek D1			13.05.29	11:38
7	[Y]	0167 130529 022	WQ-DC-D1b	Dome Creek D1b			13.05.29	10:56
8	[Y]	0167 130529 014	WQ-DC-U1	Dome Creek 1			13.05.29	09:40
9	[Y]	0167 130529 016	WQ-DC-U2	Dome Creek 2			13.05.__	09:54
10	[Y]	0167 130528 003	WQ-DC-R	Dome Creek at Road			13.05.28	12:20
11	[Y]	0167 130528-010	WQ-ADIT SEEP	Adit seep			13.05.28	18:18
12	[Y]	0167 130529-015	WQ-MS-S-03	Mill Seep 03			13.05.29	12:28
~~13~~	[ ]		WQ-MS-S-08	Mill Seep 08	DRY		~~13.05.__~~	
14	[Y]	0167 130528 026	WQ-VC-U	Upper Victoria Creek			13.05.28	15:00

26 samples total

Field Staff: CB JM BSm

Project #: 13-Y-0167
Project Name: Mount Nansen - Water Quality

Field Dates: 130528-29

#	Complete	Lab Sample Identifier	WQ ID	Station Name	Site Tasks	Additional Materials Required	Date yy.mm.dd	Time HH:MM
15	[✓]	0167 130528 006	WQ-VC-REF	Victoria Creek Reference			13.05.28	16:40
16	[✓]	0167 130528 021	WQ-VC-R	Victoria Creek at Road			13.05.28	08:43
17	[✓]	0167-130528-009	WQ-VC-DBC	Victoria Creek D/S Back Creek			13.05.28	14:40
18	[ ]	0167 130528 023	WQ-VC-UMN	Victoria Creek U/S Minnesota Creek			13.05.28	10:31
19	[✓]	0167-130528-024	WQ-BC	Back Creek			13.05.28	16:19
20	[✓]	0167 130528 025	WQ-MN	Minnesota Creek			13.05.28	09:20
21	[✓]	0167 130529 030	WQ-PW	Pumphouse Well	drinking water sample only (2 bottles) + YG microbiology (1 bottle)		13.05.29	15:36
22	[✓]	0167-130528-001	WQ-PC-U	Pony Creek upstream			13.05.28	19:34
23	[✓]	0167 130528-007	WQ-PC-D	Pony Creek downstream			13.05.28	18:04
24	[ ]						13.05.___	
25	[ ]						13.05.___	
26	[ ]						13.05.___	
27	[✓]	0167 130528-012	Field Replicate 1	WQ-PC-D			13.05.28	18:04
28	[✓]	0167 130529-018	Field Replicate 2	WQ-DC-U			13.05.29	08:32
29	[✓]	0167 130528 026 031	Field Blank			DI Water	13.05.28	
30	[ ]	TRAVEL BLANK	Trip Blank				13.05.28/29	

14 Sample Sets on 130528. 12 Samples on 130529

Field Staff: CB BSn JM

Project No.: 13-Y-0167

Project Name: Mount Nansen Water Quality

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YSI Calibration Performed? Yes / No

Weather: Sun & cloud 17c

Field Samplers: BSn CB JT

Date / Time: 130529 07:30

Site Information	
Site Name:	WQ DC D1B
Sample Identifier:	0167-130529-002
Sample Date and Time:	10:56 130529
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	0.1 c
Specific Conductivity (SPC):	1053.0
pH:	7.70
Turbidity:	16.35
Site Conditions	
flow level:	Med - High
turbidity (clear, light, mod, high):	clear - Light
ice thickness (if applicable)	+- 1m
Notes	
(if pit incl. DO and ice thickness)	Stream flowing through channel in Ice
Photo Numbers	
Datasheet:	BSn camera Downstream: 101
Upstream:	100 Overview: 102

Site Information	
Site Name:	WQ DC D1
Sample Identifier:	0167-130529-008
Sample Date and Time:	11:38 130529
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	2.0°c
Specific Conductivity (SPC):	501.1
pH:	7.62
Turbidity:	14.15
Site Conditions	
flow level:	Mod - High
turbidity (clear, light, mod, high):	Light
ice thickness (if applicable)	N up to 30cm
Notes	
(if pit incl. DO and ice thickness)	channel flowing under & around Ice but in a consolidated Stream
Photo Numbers	
Datasheet:	Downstream: 290
Upstream: 289	Overview: 291

Site Information	
Site Name:	WQ MS 03
Sample Identifier:	0167 130529 015
Sample Date and Time:	12:28 130529
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	1.4°c
Specific Conductivity (SPC):	1229
pH:	6.83
Turbidity:	2.66
Site Conditions	
flow level:	Med
turbidity (clear, light, mod, high):	clear
ice thickness (if applicable)	N/A
Notes	
(if pit incl. DO and ice thickness)	Silt No longer flowing Parallel to Road
Photo Numbers	
Datasheet:	Downstream: 297
Upstream: 296	Overview: 298

Site Information	
Site Name:	WQ DC DX+105
Sample Identifier:	0167 130529 003
Sample Date and Time:	12:43 130529
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	7.3
Specific Conductivity (SPC):	296.2
pH:	6.99
Turbidity:	266
Site Conditions	
flow level:	Mod
turbidity (clear, light, mod, high):	Mod - High
ice thickness (if applicable)	N/A
Notes	
(if pit incl. DO and ice thickness)	
Photo Numbers	
Datasheet:	Downstream: 300
Upstream: 299	Overview: 302

Field Blank ID

Trip Blank ID

Project No.: 13-Y-0167

Project Name: Mount Nansen Water Quality

Page 2 of 6

YSI Calibration Performed? Yes / No

Weather: Cloud Rain + 2°C Cold

Field Samplers: DSn CS JM

Date / Time: 07:30 130529

Site Information	
Site Name:	WQ DX
Sample Identifier:	0167 130529 013
Sample Date and Time:	13:30 130529
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	1.5
Specific Conductivity (SPC):	143.2
pH:	7.25
Turbidity:	45.1
Site Conditions	
flow level:	Med - High
turbidity (clear, light, mod, high):	Light - Med
ice thickness (if applicable)	N/A
Notes	
(if pit incl. DO and ice thickness)	
Photo Numbers	
Datasheet:	Downstream:
Upstream:	Overview:

Site Information	
Site Name:	WQ-DC-U
Sample Identifier:	0167-130529-017
Sample Date and Time:	08:32 MAY 29 2013
Replicate ID (if applicable)	0167-130529-018
Field Measured Parameters	
Temperature:	1.1°C
Specific Conductivity (SPC):	838.1 us/cm
pH:	7.29
Turbidity:	13.34 NTU
Site Conditions	
flow level:	moderate to high
turbidity (clear, light, mod, high):	clear
ice thickness (if applicable)	none.
Notes	
(if pit incl. DO and ice thickness)	
Photo Numbers	
Datasheet:	Downstream: 267
Upstream: 266	Overview: 268

Site Information	
Site Name:	WQ-SEEP
Sample Identifier:	0167-130529-019
Sample Date and Time:	08:53 MAY 29 2013
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	2.9°C
Specific Conductivity (SPC):	1384 us/cm
pH:	6.65
Turbidity:	25.9 NTU
Site Conditions	
flow level:	normal
turbidity (clear, light, mod, high):	high
ice thickness (if applicable)	—
Notes	
(if pit incl. DO and ice thickness)	
Photo Numbers	
Datasheet:	Downstream:
Upstream:	Overview: 269

Site Information	
Site Name:	WQ-TP
Sample Identifier:	0617-130529-020
Sample Date and Time:	09:20 130529
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	10.3°C
Specific Conductivity (SPC):	695 us/cm
pH:	7.30
Turbidity:	—
Site Conditions	
flow level:	n/a
turbidity (clear, light, mod, high):	normal
ice thickness (if applicable)	—
Notes	
(if pit incl. DO and ice thickness)	No staff gauge present on vertical pipe
Photo Numbers	
Datasheet:	Downstream: 275
Upstream: 274	Overview: 276

Field Blank ID: _____

Trip Blank ID: _____

Project No.: 13-Y-0167

Project Name: Mount Nansen Water Quality

Page 3 of 6

Weather: Sun & Cloud 17°C

Field Samplers: BSn, CB, DM

YSI Calibration Performed? Yes / No

Date / Time:

Site Information	
Site Name:	WQ-DC-U1
Sample Identifier:	0617-130529-014
Sample Date and Time:	09:42 MAY 29 2013
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	0.0°C
Specific Conductivity (SPC):	463. us/cm
pH:	7.37
Turbidity:	0.99 NTU
Site Conditions	
flow level:	Flowing in two channels, moderate
turbidity (clear, light, mod, high):	clear
ice thickness (if applicable)	—
Notes	
(if pit incl. DO and ice thickness)	Channel flowing in 2 areas, over the overflow incl.
Photo Numbers	
Datasheet:	Downstream: 281
Upstream: 280	Overview: 282.

Site Information	
Site Name:	WQ-DC-~~U2~~
Sample Identifier:	0167-130529-016
Sample Date and Time:	09:54 May 29 2013
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	0.7°C
Specific Conductivity (SPC):	809.9 us/cm
pH:	7.66
Turbidity:	13.35
Site Conditions	
flow level:	moderate
turbidity (clear, light, mod, high):	Clear/light
ice thickness (if applicable)	—
Notes	
(if pit incl. DO and ice thickness)	
Photo Numbers	
Datasheet:	Downstream: 278
Upstream: 277	Overview: 279

Site Information	
Site Name:	WQ-MS-08
Sample Identifier:	no water
Sample Date and Time:	
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	
Specific Conductivity (SPC):	
pH:	
Turbidity:	
Site Conditions	
flow level:	
turbidity (clear, light, mod, high):	
ice thickness (if applicable)	
Notes	
(if pit incl. DO and ice thickness)	No water in mill seep.
Photo Numbers	
sheet:	Downstream:
ream:	Overview:

Site Information	
Site Name:	~~H-DC-DX/DX105~~
Sample Identifier:	
Sample Date and Time:	
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	
Specific Conductivity (SPC):	
pH:	
Turbidity:	
Site Conditions	
flow level:	
turbidity (clear, light, mod, high):	
ice thickness (if applicable)	
Notes	
(if pit incl. DO and ice thickness)	
Photo Numbers	
Datasheet:	Downstream:
Upstream:	Overview:

Field Blank ID

Trip Blank ID

Project No.: 13-Y-0167

Project Name: Mount Nansen Water Quality

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YSI Calibration Performed? (Yes) / No

Weather: overcast, light rain + wind, 13°C

Field Samplers: BSm, JM, CB.

Date / Time: 130528 07:00

Site Information	
Site Name:	WQ-PCD
Sample Identifier:	0167-130528-007
Sample Date and Time:	28-May-13, 18:04
Replicate ID (if applicable)	0167-130528-012
Field Measured Parameters	
Temperature:	3.1
Specific Conductivity (SPC):	90.8
pH:	7.08
Turbidity:	1.82
Site Conditions	
flow level:	Moderate
turbidity (clear, light, mod, high):	low
ice thickness (if applicable)	N/A
Notes	
(if pit incl. DO and ice thickness)	
Photo Numbers	
Datasheet:	Downstream: 0090
Upstream: 0091	Overview: 0089

Site Information	
Site Name:	WQ-ADIT SEEP
Sample Identifier:	0167-130528-010
Sample Date and Time:	28-May-13, 18:18
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	2.5
Specific Conductivity (SPC):	88.0
pH:	7.03
Turbidity:	1.91
Site Conditions	
flow level:	high
turbidity (clear, light, mod, high):	low
ice thickness (if applicable)	N/A
Notes	
(if pit incl. DO and ice thickness)	
Photo Numbers	
Datasheet:	Downstream: 0095
Upstream: 0096	Overview: 0094

Site Information	
Site Name:	WQ-PCD
Sample Identifier:	0167-130528-001
Sample Date and Time:	28-May-13, 19:34
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	1.0 °C
Specific Conductivity (SPC):	89.6
pH:	7.08
Turbidity:	2.34
Site Conditions	
flow level:	High
turbidity (clear, light, mod, high):	clear
ice thickness (if applicable)	N/A
Notes	
(if pit incl. DO and ice thickness)	
Photo Numbers	
Datasheet:	Downstream:
Upstream:	Overview:

Site Information	
Site Name:	0167 130529 030
Sample Identifier:	WQ-PW
Sample Date and Time:	15:35 130529
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	2.0
Specific Conductivity (SPC):	433.2
pH:	6.42
Turbidity:	0.31
Site Conditions	
flow level:	Normal
turbidity (clear, light, mod, high):	
ice thickness (if applicable)	
Notes	
(if pit incl. DO and ice thickness)	
	Pipe has extention attached &
	is ~6m from Pump house
Photo Numbers	
Datasheet:	Downstream:
Upstream:	Overview: 307 - 308

Field Blank ID

Trip Blank ID

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Project No.: 13-Y-0167

Project Name: Mount Nansen Water Quality

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YSI Calibration Performed? Yes / No

Weather: Over Cast, Light Rain, Calm, Heard Thunder

Field Samplers: CD, BSM, JV

Date / Time: 130528 07:00

Site Information	
Site Name:	WQ - VC - DBC
Sample Identifier:	0167-130528-009
Sample Date and Time:	28-May-13, 14:40
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	6.1
Specific Conductivity (SPC):	50.7
pH:	7.06
Turbidity:	56.5
Site Conditions	
flow level:	high
turbidity (clear, light, mod, high):	mod
ice thickness (if applicable)	
Notes	
(if pit incl. DO and ice thickness)	
Photo Numbers	
Datasheet:	58m. Camera.
Downstream:	0077
Upstream:	0076
Overview:	0079

Site Information	
Site Name:	WQ - VC - U
Sample Identifier:	0167-130528-026
Sample Date and Time:	28-May-13, 15:00
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	6.1
Specific Conductivity (SPC):	47.5
pH:	7.02
Turbidity:	39.9
Site Conditions	
flow level:	high
turbidity (clear, light, mod, high):	mod
ice thickness (if applicable)	
Notes	
(if pit incl. DO and ice thickness)	
Photo Numbers	
Datasheet:	
Downstream:	0080
Upstream:	0081
Overview:	0082

Site Information	
Site Name:	WQ - BC
Sample Identifier:	0167-130528-024
Sample Date and Time:	28-May-13, 16:19
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	7.0
Specific Conductivity (SPC):	86.5
pH:	7.28
Turbidity:	3.46
Site Conditions	
flow level:	High
turbidity (clear, light, mod, high):	high
ice thickness (if applicable)	N/A
Notes	
(if pit incl. DO and ice thickness)	
Photo Numbers	
Datasheet:	
Downstream:	0084
Upstream:	0083
Overview:	0085

Site Information	
Site Name:	WQ - VC - RET
Sample Identifier:	0167-130528-025
Sample Date and Time:	28-May-13, 16:40
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	5.9
Specific Conductivity (SPC):	47.0
pH:	7.05
Turbidity:	46.4
Site Conditions	
flow level:	high
turbidity (clear, light, mod, high):	mod
ice thickness (if applicable)	
Notes	
(if pit incl. DO and ice thickness)	
Photo Numbers	
Datasheet:	
Downstream:	0087
Upstream:	0086
Overview:	0088

Field Blank ID _____

Trip Blank ID _____

EDI
ENVIRONMENTAL DYNAMICS INC.

Project No.: 13-Y-0167

Project Name: Mount Nansen Water Quality

Page 6 of 6

YSI Calibration Performed? (Yes) / No

Weather: Ovc Cool

Field Samplers: JM BSn CB

Date / Time: 130528 0700

Site Information	
Site Name:	WQ - VC - R
Sample Identifier:	0167 130528 021
Sample Date and Time:	08:46 130528
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	2.4
Specific Conductivity (SPC):	64.3
pH:	6.06
Turbidity:	61.7
Site Conditions	
flow level:	High - Med
turbidity (clear, light, mod, high):	High
ice thickness (if applicable)	N/A
Notes	
(if pit incl. DO and ice thickness)	Sheet Ice in Some areas still remains.
Photo Numbers	
Datasheet:	Downstream: 215
Upstream: 214	Overview: 216

Site Information	
Site Name:	WQ MN
Sample Identifier:	0167 130528 025
Sample Date and Time:	09:20 130528
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	0.6
Specific Conductivity (SPC):	45.8
pH:	6.38
Turbidity:	26.3
Site Conditions	
flow level:	Med - High
turbidity (clear, light, mod, high):	Mod
ice thickness (if applicable)	N/A
Notes	
(if pit incl. DO and ice thickness)	Small amounts of sheet Ice still remain
Photo Numbers	
Datasheet:	Downstream: 218
Upstream: 217	Overview: 219

Site Information	
Site Name:	WQ VC UMN
Sample Identifier:	0167 130528 023
Sample Date and Time:	130528 10:31
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	3.1
Specific Conductivity (SPC):	72.2
pH:	6.83
Turbidity:	60.5
Site Conditions	
flow level:	High
turbidity (clear, light, mod, high):	High
ice thickness (if applicable)	N/A
Notes	
(if pit incl. DO and ice thickness)	
Photo Numbers	
Datasheet:	Downstream: 226
Upstream: 225	Overview: 227

Site Information	
Site Name:	WQ - DC - R
Sample Identifier:	0167 130528 003
Sample Date and Time:	12:20 130528
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	0.9
Specific Conductivity (SPC):	602.8
pH:	7.46
Turbidity:	44.5
Site Conditions	
flow level:	~~Med~~ Med - High
turbidity (clear, light, mod, high):	Mod
ice thickness (if applicable)	Ice in creek valley ~ 0-1m
Notes	
(if pit incl. DO and ice thickness)	Channel flow over Ice & Mostly CDB
Photo Numbers	
Datasheet:	Downstream: 234
Upstream: 233	Overview: 235

Field Blank ID 0167-130528-~~026~~ 031

Trip Blank ID

Project #: 13-Y-0167
Project Name: Mount Nansen - Water Quality

Field Dates: June 11-12 / 13

General Site Tasks/ Communications

Take care when working / sampling on ice.
Please do not move sites without AAM authorization (and mine). Do not sample snow/ice melt flowing through ice layers.
Pay special attention to new bottles and associated preservatives (some changes with ALS)

all June

#	Complete	Lab Sample Identifier	WQ ID	Station Name	Site Tasks	Additional Materials Required	Date yy.mm.dd	Time HH:MM
1	[Y]	0167-130611-026	WQ-SEEP	Seepage	~~no LT50~~ this trip		13.05.11	16:57
2	[Y]	0167-130611-022	WQ-TP	Tailings Pond	survey staff gauge, anchor if necessary		13.05.11	18:27
3	[Y]	0167-130611-031	WQ-DC-DX+105	DX+200/105			13.05.11	19:07
4	[Y]	0167-130612-011	WQ-DC-DX	Dome Creek at DX			13.05.12	11.44
5	[Y]	0167-130612-007	WQ-DC-U	Upper Dome			13.05.12	8:32
6	[X]	0167-130612-003	WQ-DC-D1b	Dome Creek D1b	D1 is discontinued. Do not sample.		13.05.12	11:50
7	[Y]	0167-130612-001	WQ-DC-U1	Dome Creek 1			13.05.12	8:49
8	[Y]	0167-130612-005	WQ-DC-U2	Dome Creek 2			13.05.12	8:50
9	[Y]	0167-130612-004	WQ-DC-R	Dome Creek at Road			13.05.12	8:12
10	[Y]	0167-130612-002	WQ-ADIT SEEP	Adit seep			13.05.12	9:17
11	[Y]	0167-130611-014	WQ-MS-S-03	Mill Seep 03			13.05.11	19:38
12	[Y]	N/A	WQ-MS-S-08	Mill Seep 08	photos 0434 - 0431 dry, did not sample		13.05.11	18:58 N/A
13	[Y]	0167-130611-019	WQ-VC-U	Upper Victoria Creek			13.05.11	11 50
14	[Y]	0167-130611-025	WQ-VC-REF	Victoria Creek Reference			13.05.11	12:53

Field Staff: RSm, JM, DS

Project #: 13-Y-0167

Project Name: Mount Nansen - Water Quality

ENVIRONMENTAL DYNAMICS INC.

Field Dates: June 11-12/13

#	Complete	Lab Sample Identifier	WQ ID	Station Name	Site Tasks	Additional Materials Required	Date (yy.mm.dd)	Time (HH:MM)
15	[✓]	0167-130611-015	WQ-VC-R	Victoria Creek at Road			13.05.11	8:50
16	[✓]	0167-130611-018	WQ-VC-DBC	Victoria Creek D/S Back Creek			13.05.11	11:30
17	[✓]	0167-130611-021	WQ-VC-UMN	Victoria Creek U/S Minnesota Creek			13.05.11	10:20
18	[✓]	0167-130611-020	WQ-BC	Back Creek			13.05.11	12:27
19	[✓]	0167-130611-016	WQ-MN	Minnesota Creek			13.05.11	9:22
20	[ ]	0167-130612-030	WQ-PW	Pumphouse Well	drinking water sample only (2 bottles) + YG microbiology (1 bottle)		13.05.12	9:30
21	[ ]	0167-130612-009	WQ-PC-U	Pony Creek upstream			13.05.12	9:30
22	[✓]	0167-130612-006	WQ-PC-D	Pony Creek downstream			13.05.12	9:20
23	[✓]	0167-130611-027	WQ-PIT1	pit top	please also collect DO		13.05.11	15:30
24	[✓]	0167-130611-028	WQ-PIT2	pit middle	please also collect DO		13.05.11	15:38
25	[✓]	0167-130611-029	WQ-PIT3	pit bottom	please also collect DO		13.05.11	15:52
26	[✓]	0167-130611-024 0167-130611-023	WQ-SP-1 -2	seepage pond	please conduct a temp/DO profile, every 25 cm?, and collect sample from top and bottom		13.05.11	16:44 17:41
27	[✓]	0167-130611-017	Field Replicate 1	VC-UMN			13.05.11	10:20
28	[ ]	0167-130612-010	Field Replicate 2	WQ-DX			13.05.12	11:57
29	[ ]		Field Blank			DI Water	13.05.12	13:21
30	[ ]		Trip Blank				13.05.12	
31	☐	0167-130612-012	DRY	WQ DRY			13:0612	14:14

J:\Yukon\Projects\2013\13_Y_0167_Mount Nansen_Surface_Water\Data\Field Info\Data Sheets\WQ_Field Sheet_Mount Nansen_v.2

Field Staff: BS, JH, DS

Project No.: 13-Y-0167
Project Name: Mount Nansen Water Quality
Page ____ of ____
YSI Calibration Performed? Yes / No
Weather: Sun & cloud, Calm, +8
Field Samplers: BSn DS, JM
Date / Time: 130612 07:30

Site Information	
Site Name:	WQ-SP-2 (2m)
Sample Identifier:	0167-1306 11 - 023
Sample Date and Time:	11 June 13 17:41
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	3.4
Specific Conductivity (SPC):	162.1
pH:	6.77
Turbidity:	78.4
Site Conditions	
flow level:	N/A
turbidity (clear, light, mod, high):	mod.
ice thickness (if applicable)	N/A

Notes	Photo Numbers
(if pit incl. DO and ice thickness)	Upstream:
Sample taken @ 2m from surface	Downstream: N/A
	Overview:
	Datasheet:
DO: 3.0%, 0.40 mg/L	

Site Information	
Site Name:	WQ-DC-R
Sample Identifier:	0167-1306 12 - 004
Sample Date and Time:	12 June 13 8:12
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	1.2°C
Specific Conductivity (SPC):	500.5
pH:	6.93
Turbidity:	31.1
Site Conditions	
flow level:	moderate to high
turbidity (clear, light, mod, high):	moderate
ice thickness (if applicable)	~10cm

Notes	Photo Numbers
(if pit incl. DO and ice thickness)	Upstream: 443
some portions of ice @ sampling site. Sampled ~4 m d/s. Stream flowing under ice	Downstream: 444
	Overview: 445
	Datasheet:

Site Information	
Site Name:	WQ-DC-U
Sample Identifier:	0167-1306 12 - 007
Sample Date and Time:	12 June 13 8:32
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	2.5
Specific Conductivity (SPC):	611.2
pH:	7.51
Turbidity:	24.0
Site Conditions	
flow level:	moderate
turbidity (clear, light, mod, high):	light to moderate
ice thickness (if applicable)	N/A

Notes	Photo Numbers
(if pit incl. DO and ice thickness)	Upstream:
	Downstream: 447
	Overview: 448
	Datasheet:

Site Information	
Site Name:	WQ-DC U2
Sample Identifier:	0167-1306 12 - 005
Sample Date and Time:	08:50 130612
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	1.3
Specific Conductivity (SPC):	662.2
pH:	7.21
Turbidity:	7.49
Site Conditions	
flow level:	Low
turbidity (clear, light, mod, high):	Clear
ice thickness (if applicable)	50cm or less in spots

Notes	Photo Numbers
(if pit incl. DO and ice thickness)	Upstream: 449
Ice covered portions of stream u/s & d/s	Downstream: 450
	Overview: 451
creek flows below ~ 50cm & >0	Datasheet:

Field Blank ID: FIELD BLANK
Trip Blank ID: TRAVEL BLANK

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Project No.: 13-Y-0167
Project Name: Mount Nansen Water Quality
Page ____ of ____
YSI Calibration Performed? ~~Yes~~ / No
Weather: Sun & cloud / Calm / +10°C / clearing up
Field Samplers: BSM JM / DS
Date / Time: 130612 07:30

Site Information	
Site Name:	WQ DC 01
Sample Identifier:	0167-1306 12 - 001
Sample Date and Time:	08:49 130612
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	0.4°c
Specific Conductivity (SPC):	681.7
pH:	7.36
Turbidity:	2.75
Site Conditions	
flow level:	Mod
turbidity (clear, light, mod, high):	clear
ice thickness (if applicable)	35cm or less in spots

Notes	Photo Numbers	
(if pit incl. DO and ice thickness) Sheer flowing under & Through Ice in channel. Through Weed & Braided channel. Sampled 2m D/S of weed s.t.	Upstream:	452
	Downstream:	453
	Overview:	454
	Datasheet:	

Site Information	
Site Name:	WQ ADIT SEEP
Sample Identifier:	0167-1306 12 - 002
Sample Date and Time:	09:17 130612
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	~~2.1~~ 2.1
Specific Conductivity (SPC):	~~196.5~~ 196.5
pH:	7.51
Turbidity:	1.11
Site Conditions	
flow level:	Mod
turbidity (clear, light, mod, high):	clear
ice thickness (if applicable)	N/A

Notes	Photo Numbers	
(if pit incl. DO and ice thickness)	Upstream:	455
	Downstream:	456
	Overview:	457
	Datasheet:	

Site Information	
Site Name:	WQ - DC - D
Sample Identifier:	0167-1306 12 - 006
Sample Date and Time:	130612 09:20
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	2.8
Specific Conductivity (SPC):	~~195.~~ 207.0
pH:	7.27
Turbidity:	2.23
Site Conditions	
flow level:	Mod
turbidity (clear, light, mod, high):	clear
ice thickness (if applicable)	N/A

Notes	Photo Numbers	
(if pit incl. DO and ice thickness)	Upstream:	458
	Downstream:	459
	Overview:	460
	Datasheet:	

Site Information	
Site Name:	WQ - DC - D
Sample Identifier:	0167-1306 12 - 009
Sample Date and Time:	12 June 13 9:30
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	1.6°C
Specific Conductivity (SPC):	190.8
pH:	7.24
Turbidity:	1.26
Site Conditions	
flow level:	moderate (average)
turbidity (clear, light, mod, high):	clear
ice thickness (if applicable)	N/A

Notes	Photo Numbers	
(if pit incl. DO and ice thickness)	Upstream:	461
	Downstream:	462
	Overview:	463
	Datasheet:	

Field Blank ID _____
Trip Blank ID _____

Project No.: 13-Y-0167 Weather: _____ Field Samplers: _____

Project Name: Mount Nansen Water Quality _____ _____

Page ____ of ____

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

Site Information	
Site Name:	WQ - TR
Sample Identifier:	0167-1306 11 - 022
Sample Date and Time:	11 June 13 19:27
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	13.5°C
Specific Conductivity (SPC):	853
pH:	7.76
Turbidity:	22.2
Site Conditions	
flow level:	N/A
turbidity (clear, light, mod, high):	moderate
ice thickness (if applicable)	N/A

Notes	Photo Numbers
(if pit incl. DO and ice thickness)	Upstream: 0281
lots of pollen	Downstream: ~0282
	Overview:
	Datasheet:

Site Information	
Site Name:	WQ-DX-105
Sample Identifier:	0167-1306 -
Sample Date and Time:	11 June 13 19:07
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	2.3°C
Specific Conductivity (SPC):	805.8
pH:	6.77
Turbidity:	35.9
Site Conditions	
flow level:	moderate
turbidity (clear, light, mod, high):	light - moderate
ice thickness (if applicable)	N/A

Notes	Photo Numbers
(if pit incl. DO and ice thickness)	Upstream: 0285
	Downstream: 0286
	Overview: 0287
	Datasheet:
	BSm Camera

Site Information	
Site Name:	WQ-MS03
Sample Identifier:	0167-1306 11 - 014
Sample Date and Time:	11 June 13 19:38
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	1.1°C
Specific Conductivity (SPC):	1247
pH:	6.64
Turbidity:	1.97
Site Conditions	
flow level:	mod
turbidity (clear, light, mod, high):	clear
ice thickness (if applicable)	N/A

Notes	Photo Numbers
(if pit incl. DO and ice thickness)	Upstream: 435
ditch + ground seep flowing. Previous trip snow only & seep flowing. Sampled @ 6 seep location ~7m d/s from previous summer sampling site	Downstream: 436
	Overview: 437
	Datasheet:

Site Information	
Site Name:	WQ - SP-1 (surface)
Sample Identifier:	0167-1306 11 - 024
Sample Date and Time:	11 June 13 16:54
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	9.3
Specific Conductivity (SPC):	959
pH:	7.22
Turbidity:	25.0
Site Conditions	
flow level:	N/a
turbidity (clear, light, mod, high):	mod.
ice thickness (if applicable)	N/A

Notes	Photo Numbers
(if pit incl. DO and ice thickness)	Upstream: BSm 0417
depth = 2.33 m of pond	Downstream: ~0427
	Overview:
	Datasheet:
DO: 78.3%, 9.00 mg/L	

Field Blank ID _____

Trip Blank ID _____

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Project No.: 13-Y-0167
Project Name: Mount Nansen Water Quality
Page ____ of _____
YSI Calibration Performed? Yes / No

Weather: overcast, drizzle, 12°C
Field Samplers: BSm, JTC, DS
Date / Time: _____

Site Information	
Site Name:	WQ - PIT - surface
Sample Identifier:	0167-1306 11 - 27
Sample Date and Time:	11 June 13
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	8.7°C
Specific Conductivity (SPC):	1167
pH:	7.82
Turbidity:	2.31
Site Conditions	
flow level:	N/A
turbidity (clear, light, mod, high):	~~light~~ clear
ice thickness (if applicable)	N/A

Notes (if pit incl. DO and ice thickness)	Photo Numbers
	Upstream:
DO 11.62 mg/L	Downstream:
99.0 %	Overview:
pit level quite low.	Datasheet:

Site Information	
Site Name:	WQ - PIT - middle
Sample Identifier:	0167-1306 11 - 028
Sample Date and Time:	11 June 13 15:38
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	8.3°C
Specific Conductivity (SPC):	1580
pH:	7.36
Turbidity:	2.57
Site Conditions	
flow level:	N/A
turbidity (clear, light, mod, high):	light
ice thickness (if applicable)	N/A

Notes (if pit incl. DO and ice thickness)	Photo Numbers
	Upstream:
DO 91.1%	Downstream:
10.71 mg/L	Overview:
	Datasheet:
overview photos	
421 - 429	

Site Information	
Site Name:	WQ - PIT - bottom
Sample Identifier:	0167-1306 11 - 029
Sample Date and Time:	11 June 13 15:52
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	4.5
Specific Conductivity (SPC):	2071
pH:	7.14
Turbidity:	3.64
Site Conditions	
flow level:	N/A
turbidity (clear, light, mod, high):	light
ice thickness (if applicable)	N/A

Notes (if pit incl. DO and ice thickness)	Photo Numbers
	Upstream:
total depth = 4m	Downstream:
DO 67.9 %	Overview:
8.76 mg/L	Datasheet:

Site Information	
Site Name:	WQ - SEEP
Sample Identifier:	0167-1306 11 - 026
Sample Date and Time:	11 June 13 16:57
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	6.2
Specific Conductivity (SPC):	1470
pH:	6.77
Turbidity:	47.6
Site Conditions	
flow level:	moderate
turbidity (clear, light, mod, high):	moderate
ice thickness (if applicable)	N/A

Notes (if pit incl. DO and ice thickness)	Photo Numbers
	Upstream: 0276
	Downstream: 0275
	Overview: 0274
	Datasheet:
	BSm Camera

Field Blank ID _____
Trip Blank ID _____

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Project No.: 13-Y-0167
Project Name: Mount Nansen Water Quality
Page ___ of ___
YSI Calibration Performed? (Yes) / No
Weather: Overcast / Rain / Calm + 10
Field Samplers: D S BSm / JM
Date / Time: 130611 07:30

Site Information	
Site Name:	WQ VC R
Sample Identifier:	0167-1306 11 - 015
Sample Date and Time:	1303 11 08:52
Replicate ID (if applicable)	✓
Field Measured Parameters	
Temperature:	4.0
Specific Conductivity (SPC):	162.0
pH:	7.44
Turbidity:	8.79
Site Conditions	
flow level:	Mod
turbidity (clear, light, mod, high):	clear - light
ice thickness (if applicable)	N/A

Notes	Photo Numbers	
(if pit incl. DO and ice thickness)	Upstream:	377
	Downstream:	378
	Overview:	379
	Datasheet:	

Site Information	
Site Name:	WQ - MN
Sample Identifier:	0167-1306 11 - 016
Sample Date and Time:	11 June 13, 9 22
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	2.0°C
Specific Conductivity (SPC):	41.6
pH:	6.88
Turbidity:	23.1
Site Conditions	
flow level:	moderate
turbidity (clear, light, mod, high):	moderate
ice thickness (if applicable)	N/A

Notes	Photo Numbers	
(if pit incl. DO and ice thickness)	Upstream:	380
	Downstream:	381
	Overview:	382
	Datasheet:	

Site Information	
Site Name:	WQ - VC - UMN
Sample Identifier:	0167-1306 11 - 021
Sample Date and Time:	11 June 15, 10 20
Replicate ID (if applicable)	0167 - 130611 - 017
Field Measured Parameters	
Temperature:	4.5
Specific Conductivity (SPC):	185.1
pH:	7.46
Turbidity:	5.82
Site Conditions	
flow level:	moderate
turbidity (clear, light, mod, high):	light - moderate
ice thickness (if applicable)	N/A

Notes	Photo Numbers	
(if pit incl. DO and ice thickness)	Upstream:	388
	Downstream:	389
	Overview:	390
	Datasheet:	

Site Information	
Site Name:	WQ - VC - DBC
Sample Identifier:	0167-1306 11 - - 018
Sample Date and Time:	11 June 13 11 36
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	4.6°C
Specific Conductivity (SPC):	138.5
pH:	7.46
Turbidity:	6.93
Site Conditions	
flow level:	moderate
turbidity (clear, light, mod, high):	light ~~moderate~~
ice thickness (if applicable)	N/A

Notes	Photo Numbers	
(if pit incl. DO and ice thickness)	Upstream:	246
	Downstream:	0247
	Overview:	0248
	Datasheet:	249
		BSm camera

Field Blank ID _____
Trip Blank ID _____

Project No.: 13-Y-0167 **Weather:** _____ **Field Samplers:** _____

Project Name: Mount Nansen Water Quality _____ _____

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

Site Information	
Site Name:	WQ - VC-U
Sample Identifier:	0167-1306 11 - 019
Sample Date and Time:	11 June 13 11 50
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	4.5 °C
Specific Conductivity (SPC):	128.5
pH:	7.47
Turbidity:	6.20
Site Conditions	
flow level:	moderate
turbidity (clear, light, mod, high):	light
ice thickness (if applicable)	N/A

Notes	Photo Numbers	
(if pit incl. DO and ice thickness)	Upstream:	0251
	Downstream:	0250
	Overview:	0252
	Datasheet:	0253
	35m camera	

Site Information	
Site Name:	WQ - BC
Sample Identifier:	0167-1306 11 - 020
Sample Date and Time:	11 June 13 12:27
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	6.7
Specific Conductivity (SPC):	206.8
pH:	7.77
Turbidity:	53.3
Site Conditions	
flow level:	moderate
turbidity (clear, light, mod, high):	moderate
ice thickness (if applicable)	N/A

Notes	Photo Numbers	
(if pit incl. DO and ice thickness)	Upstream:	0254
creek	Downstream:	0255
clearer than	Overview:	0256
usual	Datasheet:	0257

Site Information	
Site Name:	WQ - VC REF
Sample Identifier:	0167-1306 11 - 025
Sample Date and Time:	11 June 13 12:53
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	5.1 °C
Specific Conductivity (SPC):	129.0
pH:	7.57
Turbidity:	4.06
Site Conditions	
flow level:	moderate
turbidity (clear, light, mod, high):	light
ice thickness (if applicable)	N/A

Notes	Photo Numbers	
(if pit incl. DO and ice thickness)	Upstream:	0258
	Downstream:	0259
	Overview:	0260
	Datasheet:	0261
	35m Camera	

Site Information	
Site Name:	
Sample Identifier:	0167-1306 -
Sample Date and Time:	
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	
Specific Conductivity (SPC):	
pH:	
Turbidity:	
Site Conditions	
flow level:	
turbidity (clear, light, mod, high):	
ice thickness (if applicable)	

Notes	Photo Numbers	
(if pit incl. DO and ice thickness)	Upstream:	
	Downstream:	
	Overview:	
	Datasheet:	

Field Blank ID _____

Trip Blank ID _____

Project No.: 13-Y-0167

Project Name: Mount Nansen Water Quality

Page ___ of ___

YSI Calibration Performed? Yes / No

Weather: overcast Thunder + 10 Little wind

Field Samplers: BSm DS JM

Date / Time:

Site Information	
Site Name:	WQ - DX
Sample Identifier:	0167-1306 12 - 011
Sample Date and Time:	12 June 13 11:44
Replicate ID (if applicable)	0167-130612-011
Field Measured Parameters	
Temperature:	1.6
Specific Conductivity (SPC):	310.5
pH:	7.40
Turbidity:	92.3
Site Conditions	
flow level:	moderate
turbidity (clear, light, mod, high):	mod to high
ice thickness (if applicable)	N/A

Notes (if pit incl. DO and ice thickness)	Photo Numbers
	Upstream: 0294
	Downstream: 0292
	Overview: 0296
	Datasheet:
	BSm camera

Site Information	
Site Name:	WQ PW
Sample Identifier:	0167-1306 12 - 030
Sample Date and Time:	14:47 - 130612
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	1.7 °C
Specific Conductivity (SPC):	420.8
pH:	7.35
Turbidity:	0.39
Site Conditions	
flow level:	Normal
turbidity (clear, light, mod, high):	clear
ice thickness (if applicable)	N/A

Notes (if pit incl. DO and ice thickness)	Photo Numbers
	Upstream: ~~0294~~
Flow stopped after	Downstream: ~~0292~~
Sample @ 14:50	Overview: ~~0296~~
	Datasheet:
	~~BSm Camera~~
	0297 BSm

Site Information	
Site Name:	WQ DRY
Sample Identifier:	0167-1306 12 - 012
Sample Date and Time:	1415 / 130612
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	0.9°
Specific Conductivity (SPC):	322.8
pH:	7.53
Turbidity:	0.50
Site Conditions	
flow level:	High
turbidity (clear, light, mod, high):	clear
ice thickness (if applicable)	N/A

Notes (if pit incl. DO and ice thickness)	Photo Numbers
	Upstream: 485
	Downstream: 484
	Overview: 483 - 486
	Datasheet:

Site Information	
Site Name:	
Sample Identifier:	0167-1306 -
Sample Date and Time:	
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	
Specific Conductivity (SPC):	
pH:	
Turbidity:	
Site Conditions	
flow level:	
turbidity (clear, light, mod, high):	
ice thickness (if applicable)	

Notes (if pit incl. DO and ice thickness)	Photo Numbers
	Upstream: ~~485~~
	Downstream: ~~484~~
	Overview: ~~483 - 486~~
	Datasheet:

Field Blank ID

Trip Blank ID

Project No.: 13-Y-0167 Weather: _____ Field Samplers: _____

Project Name: Mount Nansen Water Quality _____ _____

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

Site Information		Site Information	
Site Name:		Site Name:	
Sample Identifier:	0167-1306 -	Sample Identifier:	0167-1306 -
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:

Site Information		Site Information	
Site Name:		Site Name:	
Sample Identifier:	0167-1306 -	Sample Identifier:	0167-1306 -
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 #: 13-Y-0167
Project Name: Mount Nansen - Water Quality

EDI ENVIRONMENTAL DYNAMICS INC.

Field Dates: 130625 - 26

#	Complete	Lab Sample Identifier	WQ ID	Station Name	Site Tasks	Date	Time
						yy.mm.dd	HH:MM
15	[✓]	0167-130625 - 005	WQ-VC-R	Victoria Creek at Road		13.06.25	07:30
16	[✓]	0167-130625 - 010	WQ-VC-DBC	Victoria Creek D/S Back Creek		13.06.25	10:51
17	[✓]	0167-130625 - 007	WQ-VC-UMN	Victoria Creek U/S Minnesota Creek		13.06.25	08:48
18	[✓]	0167-130625 - 001	WQ-BC	Back Creek		13.06.25	11:40
19	[✓]	0167-130625 - 008	WQ-MN	Minnesota Creek		13.06.25	07:49
20	[ ]	0167-130626 - ~~000~~ 30	WQ-PW	Pumphouse Well	YG microbiology (1 bottle)	13.06.26	08:20
21	[✓]	0167-130625- 013	WQ-PC-U	Pony Creek upstream		13.06.~~25~~ 26	18:35
22	[✓]	0167-130625- 014	WQ-PC-D	Pony Creek downstream		13.06.25	18:20
23	[ ]		WQ-DRY	Dry Creek Reference	NOT REQUIRED THIS TRIP	-	-
24	[ ]		WQ-PIT1	pit top	NOT REQUIRED THIS TRIP	-	-
25	[ ]		WQ-PIT2	pit middle	NOT REQUIRED THIS TRIP	-	-
26	[ ]		WQ-PIT3	pit bottom	NOT REQUIRED THIS TRIP	-	-
27	[ ]		WQ-SP	seepage pond	NOT REQUIRED THIS TRIP	-	-
28	[✓]	0167-1306 ~~25~~ 012	Field Replicate 1	VC-UMN		13.06.25	08:48
29	[✓]	0167-130625- 015	Field Replicate 2	PC-U		13.06.25	18:35
30	[✓]	0167-130625- 021	Field Blank			13.06.25	19:00
31	[ ]	TRAVEL BLANK	Travel Blank			-	-

Field Staff: JM MM DS

Project #: 13-Y-0167
Project Name: Mount Nansen - Water Quality

Field Dates: 130625-26

General Site Tasks/ Communications

Pay special attention to new bottles and associated preservatives (some changes with ALS)

#	Complete	Lab Sample Identifier	WQ ID	Station Name	Site Tasks	Date	Time
						yy.mm.dd	HH:MM
1	[ ]	0167-130625-004	WQ-SEEP	Seepage	No LT50 this trip	13.06.25	14:35
2	[ ]	0167-130625-003	WQ-TP	Tailings Pond		13.06.25	14:50
3	[ ]	0167-130625-017	WQ-DC-DX+105	DX+200/105		13.06.25	17:00
4	[ ]	0167-130625-016	WQ-DC-DX	Dome Creek at DX		13.06.25	17:55
5	[ ]	0167-130625-002	WQ-DC-U	Upper Dome		13.06.25	14:20
6	[ ]	0167-130625-018	WQ-DC-D1b	Dome Creek D1b		13.06.25	16:08
7	[ ]	0167-130625-020	WQ-DC-U1	Dome Creek 1		13.06.25	15:30
8	[ ]	0167-130625-024	WQ-DC-U2	Dome Creek 2		13.06.25	15:30
9	[✓]	0167-130625-011	WQ-DC-R	Dome Creek at Road		13.06.25	09:54
10	[ ]	~~0167-1306~~	WQ-ADIT SEEP	Adit seep	Dry See Notes & Pic's	13.06.25	18:22
11	[ ]	0167-130625-019	WQ-MS-S-03	Mill Seep 03		13.06.25	17:03
12	[ ]	~~0167-1306~~ -	WQ-MS-S-08	Mill Seep 08	Dry See Notes & Pic's Pic 557-560	13.06.24	18:52
13	[✓]	0167-130625-009	WQ-VC-U	Upper Victoria Creek		13.06.25	10:55
14	[✓]	0167-130625-006	WQ-VC-REF	Victoria Creek Reference		13.06.25	12:00

Field Staff: MM DS JH

Project No.: 13-Y-0167

Project Name: Mount Nansen Water Quality

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YSI Calibrated ? Yes / No

Weather: Sun Calm +23

Field Samplers: DS JA

Date / Time: 130626 07:30

Site Information	
Site Name:	WQ PW
Sample Identifier:	0167-1306 26 - 030
Sample Date and Time:	130626 08:20
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	1.5°C
Specific Conductivity (SPC):	411.8
pH:	7.07
Turbidity:	0.19
Site Conditions	
flow level:	—
turbidity (clear, light, mod, high):	
ice thickness (if applicable)	—

Notes	Photo Numbers
(if pit incl. DO and ice thickness)	Upstream:
	Downstream:
	Overview: 0734
	Datasheet:

Site Information	
Site Name:	
Sample Identifier:	0167-1306 -
Sample Date and Time:	
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	
Specific Conductivity (SPC):	
pH:	
Turbidity:	
Site Conditions	
flow level:	
turbidity (clear, light, mod, high):	
ice thickness (if applicable)	

Notes	Photo Numbers
(if pit incl. DO and ice thickness)	Upstream:
	Downstream:
	Overview:
	Datasheet:

Site Information	
Site Name:	
Sample Identifier:	0167-1306 -
Sample Date and Time:	
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	
Specific Conductivity (SPC):	
pH:	
Turbidity:	
Site Conditions	
flow level:	
turbidity (clear, light, mod, high):	
ice thickness (if applicable)	

Notes	Photo Numbers
(if pit incl. DO and ice thickness)	Upstream:
	Downstream:
	Overview:
	Datasheet:

Site Information	
Site Name:	
Sample Identifier:	0167-1306 -
Sample Date and Time:	
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	
Specific Conductivity (SPC):	
pH:	
Turbidity:	
Site Conditions	
flow level:	
turbidity (clear, light, mod, high):	
ice thickness (if applicable)	

Notes	Photo Numbers
(if pit incl. DO and ice thickness)	Upstream:
	Downstream:
	Overview:
	Datasheet:

Field Blank ID _____

Trip Blank ID _____

Project No.: 13-Y-0167 Weather: Haze Calm +22 Field Samplers: JR MM DS

Project Name: Mount Nansen Water Quality

Page ___ of ___

YSI Calibrated? Yes / No Date / Time: 130625 07:00

Site Information	
Site Name:	WQ DC DX
Sample Identifier:	0167-1306 25 - 016
Sample Date and Time:	130625 17:55
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	4.9
Specific Conductivity (SPC):	653.5
pH:	7.29
Turbidity:	33.8
Site Conditions	
flow level:	Mod
turbidity (clear, light, mod, high):	
ice thickness (if applicable)	

Notes	Photo Numbers	
(if pit incl. DO and ice thickness)	Upstream:	763
	Downstream:	764
	Overview:	765
	Datasheet:	

Site Information	
Site Name:	WQ ADIT SEEP
Sample Identifier:	0167-1306 25 -
Sample Date and Time:	130625 18:22
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	
Specific Conductivity (SPC):	
pH:	
Turbidity:	
Site Conditions	
flow level:	
turbidity (clear, light, mod, high):	
ice thickness (if applicable)	

Notes	Photo Numbers	
(if pit incl. DO and ice thickness)	Upstream:	767
DRY	Downstream:	768
Small Trickle from c/s culvert & No surface water @ PC or ADIT SEEP	Overview:	769
	Datasheet:	

Site Information	
Site Name:	WQ PC DS
Sample Identifier:	0167-1306 25 - 014
Sample Date and Time:	130625 18:20
Replicate ID (if applicable)	
Field Measured Parameters	
Temperature:	6.0
Specific Conductivity (SPC):	411.1
pH:	6.89
Turbidity:	4.57
Site Conditions	
flow level:	Low - Dry
turbidity (clear, light, mod, high):	
ice thickness (if applicable)	

Notes	Photo Numbers	
(if pit incl. DO and ice thickness)	Upstream:	770
Upper Section goes to Ground	Downstream:	771
above ground flow starts	Overview:	772
~ 2m u/s of Sign	Datasheet:	
@ Sampling location		

Site Information	
Site Name:	WQ PC U
Sample Identifier:	0167-1306 25 - 013
Sample Date and Time:	130625 18:35
Replicate ID (if applicable)	0167130625 015
Field Measured Parameters	
Temperature:	8.6
Specific Conductivity (SPC):	391.8
pH:	7.01
Turbidity:	2.35
Site Conditions	
flow level:	Low
turbidity (clear, light, mod, high):	
ice thickness (if applicable)	

Notes	Photo Numbers	
(if pit incl. DO and ice thickness)	Upstream:	785
	Downstream:	783
	Overview:	784
	Datasheet:	

Field Blank ID _____

Trip Blank ID _____

Project No.: 13-Y-0167

Project Name: Mount Nansen Water Quality

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YSI Calibrated ? (Yes) / No

Weather: Hazy cloud +24°C Calm

Field Samplers: JH MM DS

Date / Time: 130625 07:00

Site Information	
Site Name:	WQ DC U2
Sample Identifier:	0167-1306 25 - 024
Sample Date and Time:	130625 15:30
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	7.8°C
Specific Conductivity (SPC):	991
pH:	7.33
Turbidity:	79.7
Site Conditions	
flow level:	Mod - Low
turbidity (clear, light, mod, high):	
ice thickness (if applicable)	

Notes	Photo Numbers	
(if pit incl. DO and ice thickness)	Upstream:	719
	Downstream:	720
	Overview:	721
	Datasheet:	

Site Information	
Site Name:	WQ DC DIB
Sample Identifier:	0167-1306 25 - 018
Sample Date and Time:	16:08 130625
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	7.6°C
Specific Conductivity (SPC):	1250
pH:	7.71
Turbidity:	1.54
Site Conditions	
flow level:	Mod
turbidity (clear, light, mod, high):	
ice thickness (if applicable)	

Notes	Photo Numbers	
(if pit incl. DO and ice thickness)	Upstream:	747
	Downstream:	748
	Overview:	749
	Datasheet:	

Site Information	
Site Name:	WQ MS-S-03
Sample Identifier:	0167-1306 25 -019
Sample Date and Time:	130625 17:03
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	10.4
Specific Conductivity (SPC):	1207
pH:	7.16
Turbidity:	13.99
Site Conditions	
flow level:	low - Mod
turbidity (clear, light, mod, high):	orange Tint
ice thickness (if applicable)	—

Notes	Photo Numbers	
(if pit incl. DO and ice thickness)	Upstream:	754
Extensive Algae growth	Downstream:	755
Photo 757	Overview:	756
	Datasheet:	

Site Information	
Site Name:	WQ DC DX 1105
Sample Identifier:	0167-1306 25 - 017
Sample Date and Time:	130625 17:00
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	1.7°C
Specific Conductivity (SPC):	1184
pH:	6.99
Turbidity:	13.29
Site Conditions	
flow level:	Low-Mod
turbidity (clear, light, mod, high):	
ice thickness (if applicable)	—

Notes	Photo Numbers	
(if pit incl. DO and ice thickness)	Upstream:	758
	Downstream:	759
	Overview:	760
	Datasheet:	

Field Blank ID _____

Trip Blank ID _____

Project No.: 13-Y-0167 Weather: Sun Calm wind + 22°C Field Samplers: DS MM JM

Project Name: Mount Nansen Water Quality

Page ____ of ____

YSI Calibrated? Yes / No Date / Time: 130625 07:00

Site Information	
Site Name:	WQ DC U
Sample Identifier:	0167-1306 25 - 002
Sample Date and Time:	130625 14:20
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	19.5
Specific Conductivity (SPC):	1240
pH:	7.78
Turbidity:	24.6
Site Conditions	
flow level:	Mod
turbidity (clear, light, mod, high):	
ice thickness (if applicable)	

Notes	Photo Numbers	
(if pit incl. DO and ice thickness)	Upstream:	702
	Downstream:	703
	Overview:	704
	Datasheet:	

Site Information	
Site Name:	WQ SEEP
Sample Identifier:	0167-1306 25 - 004
Sample Date and Time:	130625 14:35
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	11.1 °C
Specific Conductivity (SPC):	1708
pH:	6.75
Turbidity:	24.8
Site Conditions	
flow level:	Low
turbidity (clear, light, mod, high):	
ice thickness (if applicable)	

Notes	Photo Numbers	
(if pit incl. DO and ice thickness)	Upstream:	
Power & Pump were off	Downstream:	
@ Time of Sample.	Overview:	705-706
- water was more clear	Datasheet:	
after power on ~ 20 min later		
did not re sample		

Site Information	
Site Name:	WQ Tailings Pond
Sample Identifier:	0167-1306 25 - 003
Sample Date and Time:	130625 14:50
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	19.7
Specific Conductivity (SPC):	1142
pH:	8.02
Turbidity:	8.08
Site Conditions	
flow level:	High
turbidity (clear, light, mod, high):	
ice thickness (if applicable)	

Notes	Photo Numbers	
(if pit incl. DO and ice thickness)	Upstream:	712
711 @ Staff gauge.	Downstream:	713
Submerged	Overview:	714
	Datasheet:	

Site Information	
Site Name:	WQ DC U1
Sample Identifier:	0167-1306 25 - 020
Sample Date and Time:	130625 15:30
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	7.5
Specific Conductivity (SPC):	1122
pH:	7.63
Turbidity:	8.16
Site Conditions	
flow level:	Low
turbidity (clear, light, mod, high):	
ice thickness (if applicable)	

Notes	Photo Numbers	
(if pit incl. DO and ice thickness)	Upstream:	716
	Downstream:	717
	Overview:	718
	Datasheet:	

Field Blank ID _____

Trip Blank ID _____

Project No.: 13-Y-0167

Project Name: Mount Nansen Water Quality

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YSI Calibrated? (Yes) / No

Weather: Sun clear Calm +20

Field Samplers: MM DS JM

Date / Time: 13 06 25 7:00

Site Information	
Site Name:	WQ VC R
Sample Identifier:	0167-1306 25 - 005
Sample Date and Time:	07:30
Replicate ID (if applicable)	/
Field Measured Parameters	
Temperature:	8.0 °C
Specific Conductivity (SPC):	235.7
pH:	7.25
Turbidity:	52.2
Site Conditions	
flow level:	Low
turbidity (clear, light, mod, high):	
ice thickness (if applicable)	N/A

Notes	Photo Numbers	
(if pit incl. DO and ice thickness)	Upstream:	561
Creek is More Turbid	Downstream:	562
Than usual	Overview:	563
	Datasheet:	

Site Information	
Site Name:	WQ MN
Sample Identifier:	0167-1306 25 - 008
Sample Date and Time:	130625 07:59
Replicate ID (if applicable)	/
Field Measured Parameters	
Temperature:	4.5
Specific Conductivity (SPC):	84.5
pH:	6.32
Turbidity:	11.08
Site Conditions	
flow level:	Low
turbidity (clear, light, mod, high):	
ice thickness (if applicable)	/

Notes	Photo Numbers	
(if pit incl. DO and ice thickness)	Upstream:	564
	Downstream:	565
	Overview:	566
	Datasheet:	

Site Information	
Site Name:	WQ VC UMN
Sample Identifier:	0167-1306 25 - 007
Sample Date and Time:	130625 08:48
Replicate ID (if applicable)	0167 130625-012
Field Measured Parameters	
Temperature:	7.8
Specific Conductivity (SPC):	252.0
pH:	7.67
Turbidity:	30.4
Site Conditions	
flow level:	Low
turbidity (clear, light, mod, high):	
ice thickness (if applicable)	/

Notes	Photo Numbers	
(if pit incl. DO and ice thickness)	Upstream:	572
Creek More Turbid	Downstream:	573
Than usual	Overview:	574
	Datasheet:	

Site Information	
Site Name:	WQ DC R
Sample Identifier:	0167-1306 25 - 011
Sample Date and Time:	130625 09:54
Replicate ID (if applicable)	/
Field Measured Parameters	
Temperature:	7.3
Specific Conductivity (SPC):	1069
pH:	7.59
Turbidity:	50.0
Site Conditions	
flow level:	Med.
turbidity (clear, light, mod, high):	
ice thickness (if applicable)	

Notes	Photo Numbers	
(if pit incl. DO and ice thickness)	Upstream:	580
	Downstream:	581
	Overview:	0582
	Datasheet:	

Field Blank ID _____

Trip Blank ID _____

Project No.: 13-Y-0167 | Weather: Sun & cloud Cold +20°C | Field Samplers: JM DS MH

Project Name: Mount Nansen Water Quality

Page ____ of ____

YSI Calibrated ? (Yes) / No | Date / Time: 130625 7:00

Site Information	
Site Name:	WQ VC ~~BC~~
Sample Identifier:	0167-1306 25 - 010
Sample Date and Time:	130625 10:51
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	7.9
Specific Conductivity (SPC):	189.1
pH:	7.41
Turbidity:	27.9
Site Conditions	
flow level:	Mod - low
turbidity (clear, light, (mod), high):	
ice thickness (if applicable)	—

Notes	Photo Numbers	
(if pit incl. DO and ice thickness)	Upstream:	620
Time on Bottle Set	Downstream:	621
was Written as 10:17	Overview:	622
Actual Sample Time was	Datasheet:	
10:51		

Site Information	
Site Name:	WQ VC U
Sample Identifier:	0167-1306 25 - 009
Sample Date and Time:	130625 10:55
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	7.9
Specific Conductivity (SPC):	177.5
pH:	7.37
Turbidity:	24.1
Site Conditions	
flow level:	
turbidity (clear, light, mod, high):	
ice thickness (if applicable)	

Notes	Photo Numbers	
(if pit incl. DO and ice thickness)	Upstream:	630
Small water shrew like	Downstream:	631
mammal observed @ SiL	Overview:	632
~8" long fish observed @	Datasheet:	
BC/VC confluence		

Site Information	
Site Name:	WQ BC
Sample Identifier:	0167-1306 25 - 001
Sample Date and Time:	11:40 130625
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	14.9
Specific Conductivity (SPC):	310.4
pH:	8.02
Turbidity:	1.08
Site Conditions	
flow level:	Low - Med
turbidity (clear), light, mod, high):	
ice thickness (if applicable)	—

Notes	Photo Numbers	
(if pit incl. DO and ice thickness)	Upstream:	653
Fish observed in creek	Downstream:	654
AG ~5-8" long	Overview:	655
	Datasheet:	

Site Information	
Site Name:	WQ VC REF
Sample Identifier:	0167-1306 25 - 006
Sample Date and Time:	13065 12:00
Replicate ID (if applicable)	—
Field Measured Parameters	
Temperature:	10.9
Specific Conductivity (SPC):	178.5
pH:	7.59
Turbidity:	23.3
Site Conditions	
flow level:	Low - Med
turbidity (clear, light, (mod), high):	
ice thickness (if applicable)	

Notes	Photo Numbers	
(if pit incl. DO and ice thickness)	Upstream:	690
creek More turbid than used	Downstream:	691
	Overview:	0692
	Datasheet:	

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 ^{0}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 ^{0}C (-10 to +40 C Comp. Range)
Graduated Bucket	± .5 L
Lab Scale	± .00005 kg

Table D-2. Hydrometric station monitoring record from April 1st to June 30th, 2013.

HID	Monitoring Start	# of Discharge Measurements in Q1	# Rating Measurements in Q1	Logger Type	Rating Curve Status[2]	Hydrometric Survey	Method
ATM-DC-2	N/A	N/A	N/A	HOBO	N/A	No	N/A
ATM-DC-3	N/A	N/A	N/A	HOBO	N/A	No	N/A
ATM-DC-4	N/A	N/A	N/A	Solinst	N/A	No	N/A
H-PC-U	01-May-12	7	5	Solinst	Preliminary	Yes	SS,V
H-PC-DSP	07-Jun-11	6	5	HOBO	Preliminary	Yes	SS, V
H-DC-DX	01-May-12	5	N/A	HOBO	N/A	No	SS, V
H-DX+105	01-May-12	8	N/A	HOBO	N/A	No	SS, V
H-TP	21-Aug-12	N/A	N/A	HOBO	N/A	No	SG
H-SEEP	17-Apr-12	5	N/A	HOBO	N/A	No	V, Flow Meter
H-DC-B	17-Apr-12	6	3	Solinst	Preliminary	Yes	SS
H-DC-M	17-Apr-12	7	5	Solinst	Preliminary	Yes	SS
H-DC-R	01-May-12	3	2	Solinst	Preliminary	Yes	ADV, SS, V
H-BC	30-Apr-12	6	6	HOBO	Preliminary	Yes	ADV, SS
H-MN	17-Apr-12	7	6	HOBO	Preliminary	Yes	ADV, SS
H-VC-REF	17-Nov-11	6	6	HOBO	Preliminary	Yes	ADV, SS
H-VC-U	16-Apr-12	8	6	Solinst	Preliminary	Yes	ADV, SS
H-VC-DBC	17-Apr-12	9	7	HOBO	Preliminary	Yes	ADV, SS
H-VC-DBC	11-Dec-12	9	7	Solinst	Preliminary	Yes	ADV, SS
H-VC-UMN	14-Apr-12	9	6	HOBO	Preliminary	Yes	ADV, SS
H-VC-R	02-May-12	8	6	Solinst	Preliminary	Yes	ADV, SS

Table D-3 Hydrometric data summary for station visits between April 1st and June 30th, 2013.

Mid	HID	Measurement		Measurement Type	Staff Gauge (m, ± 2 mm)	Discharge (m^3/s)	Water Surface Elevation (m L.D., ± 5 mm)	Data Flag
		Date (DD/MM/YYYY)	Time (HH:MM)					
741	H-BC	16/05/2013	13:20	ADV	0.445	0.340	2.082	B/E
742	H-BC	16/05/2013	13:20	SS	0.180	0.180	2.082	B/E
760	H-BC	22/05/2013	12:25	SS	0.298	0.616	1.926	
770	H-BC	28/05/2013	15:33	ADV	0.380	0.292	2.009	
789	H-BC	11/06/2013	12:42	SS	0.260	0.110	1.925	
810	H-BC	25/06/2013	11:54	SS	0.198	0.017	1.849	
719	H-DC-B	06/05/2013	17:00	SS	-	0.022	-	
732	H-DC-B	15/05/2013	11:20	SS	-	0.119	-	B
750	H-DC-B	21/05/2013	14:44	SS	-	0.107	-	
766	H-DC-B	27/05/2013	15:40	SS	0.210	0.304	1.571	
784	H-DC-B	10/06/2013	16:31	SS	0.159	0.427	1.520	
804	H-DC-B	24/06/2013	14:36	SS	0.108	0.021	1.460	
761	H-DC-D1	29/05/2013	11:52	SS	-	0.012	-	B
764	H-DC-D1B	29/05/2013	11:11	SS	-	0.010	-	B
782	H-DC-D1B	10/06/2013	19:02	SS	-	0.003	-	
801	H-DC-D1B	25/06/2013	16:20	SS	-	0.007	-	
758	H-DC-DX	21/05/2013	18:25	SS	-	0.003	-	
762	H-DC-DX	29/05/2013	13:44	SS	-	0.002	-	
779	H-DC-DX	12/06/2013	12:31	SS	-	0.002	-	
780	H-DC-DX	12/06/2013	12:31	V	-	0.002	-	
799	H-DC-DX	25/06/2013	17:40	V	-	0.000	-	
717	H-DC-DX+105	06/05/2013	17:42	SS	-	0.002	-	
729	H-DC-DX+105	15/05/2013	15:06	SS	-	0.015	-	B
730	H-DC-DX+105	15/05/2013	15:06	V	-	0.007	-	B
747	H-DC-DX+105	21/05/2013	17:41	SS	-	0.011	-	B
748	H-DC-DX+105	21/05/2013	17:41	V	-	0.002	-	B

Mid	HID	Measurement		Measurement Type	Staff Gauge (m, ± 2 mm)	Discharge (m^3/s)	Water Surface Elevation (m L.D., ± 5 mm)	Data Flag
		Date (DD/MM/YYYY)	Time (HH:MM)					
763	H-DC-DX+105	29/05/2013	12:57	SS	-	0.025	-	
781	H-DC-DX+105	11/06/2013	19:17	SS	-	0.005	-	
800	H-DC-DX+105	25/06/2013	17:17	SS	-	0.002	-	
706	H-DC-M	15/04/2013	16:18	SS	-	0.000	-	B/E
720	H-DC-M	06/05/2013	15:53	NONE	-	-	-	B
731	H-DC-M	15/05/2013	10:58	SS	0.131	0.131	1.172	B
749	H-DC-M	21/05/2013	13:55	SS	0.240	0.456	1.707	
767	H-DC-M	27/05/2013	14:30	SS	0.332	0.210	1.792	
785	H-DC-M	10/06/2013	15:48	SS	0.208	0.104	1.667	
805	H-DC-M	24/06/2013	14:00	SS	0.181	0.019	1.620	
721	H-DC-R	06/05/2013	14:58	NONE	-	-	-	B
786	H-DC-R	10/06/2013	14:41	SS	0.350	0.064	0.696	B/E
806	H-DC-R	24/06/2013	13:10	SS	0.146	0.024	0.440	
802	H-DC-U1	24/06/2013	15:23	SS	-	0.004	-	
765	H-DC-U2	27/05/2013	16:24	SS	-	0.060	-	B
783	H-DC-U2	10/06/2013	17:45	SS	-	0.025	-	
803	H-DC-U2	24/06/2013	15:55	SS	-	0.016	-	
740	H-MN	16/05/2013	08:37	ADV	-	0.353	-	B
739	H-MN	16/05/2013	08:37	SS	-	0.076	-	B
759	H-MN	22/05/2013	08:44	SS	0.918	0.010	1.474	
773	H-MN	28/05/2013	09:56	ADV	0.526	0.087	1.061	
774	H-MN	28/05/2013	09:56	SS	0.526	0.048	1.061	
792	H-MN	11/06/2013	09:37	SS	0.552	0.156	1.087	
812	H-MN	25/06/2013	08:16	SS	0.424	0.030	0.965	
722	H-PC-DSP	08/05/2013	09:35	V	-	0.000	-	
736	H-PC-DSP	15/05/2013	12:41	SS	0.328	0.019	2.524	
752	H-PC-DSP	21/05/2013	15:31	SS	0.280	0.004	2.472	

Mid	HID	Measurement		Measurement Type	Staff Gauge (m, ± 2 mm)	Discharge (m^3/s)	Water Surface Elevation (m L.D., ± 5 mm)	Data Flag
		Date (DD/MM/YYYY)	Time (HH:MM)					
778	H-PC-DSP	28/05/2013	18:50	SS	0.304	0.016	2.499	
796	H-PC-DSP	12/06/2013	09:46	SS	0.234	0.008	2.405	
798	H-PC-DSP	24/06/2013	17:45	V	0.165	0.680	2.351	
734	H-PC-U	15/05/2013	13:33	SS	-	0.019	-	B
735	H-PC-U	15/05/2013	13:33	V	-	0.003	-	B
751	H-PC-U	21/05/2013	16:20	SS	0.292	0.011	2.465	
776	H-PC-U	27/05/2013	18:26	SS	0.355	0.023	2.526	
777	H-PC-U	27/05/2013	18:26	V	0.355	0.001	2.526	
795	H-PC-U	12/06/2013	10:48	SS	0.239	0.008	2.577	
797	H-PC-U	24/06/2013	18:07	SS	0.173	0.001	2.432	
712	H-SEEP	17/04/2013	12:04	V	-	0.003	-	B/E
718	H-SEEP	08/05/2013	09:47	V	-	0.003	-	
733	H-SEEP	15/05/2013	11:00	V	-	0.003	-	
794	H-SEEP	11/06/2013	16:53	V	-	0.002	-	
814	H-SEEP	25/06/2013	15:07	V	-	0.003	-	
714	H-VC-DBC	16/04/2013	13:45	ADV	-	0.061	-	B/E
709	H-VC-DBC	16/04/2013	13:45	SS	-	0.030	-	B/E
725	H-VC-DBC	07/05/2013	12:18	ADV	0.462	0.210	1.815	
726	H-VC-DBC	07/05/2013	12:18	SS	0.426	0.150	1.815	
746	H-VC-DBC	16/05/2013	11:50	ADV	0.725	2.612	2.085	
757	H-VC-DBC	22/05/2013	10:40	ADV	0.564	0.801	1.885	
771	H-VC-DBC	28/05/2013	14:05	ADV	0.790	2.080	2.155	
790	H-VC-DBC	11/06/2013	11:10	ADV	0.528	0.565	1.878	
809	H-VC-DBC	25/06/2013	10:30	ADV	0.432	0.230	1.767	
716	H-VC-R	15/04/2013	13:00	ADV	-	0.034	-	B/E
711	H-VC-R	15/04/2013	13:00	SS	-	0.040	-	B/E
727	H-VC-R	06/05/2013	13:05	ADV	0.362	0.122	1.928	

Mid	HID	Measurement		Measurement Type	Staff Gauge (m, ± 2 mm)	Discharge (m^3/s)	Water Surface Elevation (m L.D., ± 5 mm)	Data Flag
		Date (DD/MM/YYYY)	Time (HH:MM)					
728	H-VC-R	06/05/2013	13:05	SS	0.362	0.100	1.928	
745	H-VC-R	15/05/2013	08:15	ADV	0.674	3.208	2.314	
754	H-VC-R	21/05/2013	12:23	ADV	0.656	1.221	2.222	
775	H-VC-R	27/05/2013	12:53	ADV	0.710	3.597	2.303	
793	H-VC-R	10/06/2013	13:23	ADV	0.550	0.735	2.114	
813	H-VC-R	24/06/2013	12:02	ADV	0.488	0.289	2.053	
707	H-VC-REF	16/04/2013	18:02	SS	-	0.080	-	B/E
744	H-VC-REF	16/05/2013	14:30	ADV	0.801	2.074	2.096	
755	H-VC-REF	22/05/2013	13:43	ADV	0.539	0.679	1.848	
768	H-VC-REF	28/05/2013	16:33	ADV	0.870	2.026	2.208	
787	H-VC-REF	11/06/2013	13:11	ADV	0.550	0.540	1.846	
807	H-VC-REF	25/06/2013	12:01	ADV	0.395	0.186	1.696	
713	H-VC-U	16/04/2013	15:59	ADV	-	0.062	-	B/E
708	H-VC-U	16/04/2013	15:59	SS	-	0.020	-	B/E
724	H-VC-U	07/05/2013	14:12	ADV	0.145	0.125	2.036	
743	H-VC-U	16/05/2013	12:33	ADV	0.448	2.136	2.329	
756	H-VC-U	22/05/2013	11:30	ADV	0.300	0.727	2.174	
769	H-VC-U	28/05/2013	14:51	ADV	0.495	2.701	2.354	
788	H-VC-U	11/06/2013	11:43	ADV	0.238	0.488	2.134	
808	H-VC-U	25/06/2013	11:11	ADV	0.169	0.208	2.066	
715	H-VC-UMN	16/04/2013	10:44	ADV	-	0.059	-	B/E
710	H-VC-UMN	16/04/2013	10:44	SS	-	0.120	-	B/E
723	H-VC-UMN	07/05/2013	10:11	ADV	-	0.162	-	
738	H-VC-UMN	16/05/2013	10:06	ADV	0.885	2.062	1.877	
737	H-VC-UMN	16/05/2013	10:06	SS	0.885	1.970	1.877	
753	H-VC-UMN	22/05/2013	09:15	ADV	0.685	0.448	0.941	
772	H-VC-UMN	28/05/2013	10:45	ADV	0.965	3.283	1.931	

Mid	HID	Measurement		Measurement Type	Staff Gauge (m, ± 2 mm)	Discharge (m^3/s)	Water Surface Elevation (m L.D., ± 5 mm)	Data Flag
		Date (DD/MM/YYYY)	Time (HH:MM)					
791	H-VC-UMN	11/06/2013	09:56	ADV	0.711	0.662	1.692	
811	H-VC-UMN	25/06/2013	08:31	ADV	0.634	0.247	1.602	

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 volocimeter; SS – salt dilution, slug injection; V – volumetric; CM – current meter; W – weir; N – no measurement obtained.

Table D-4. Hydrometric survey data summary from April 1st to June 30th, 2013.

Station	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.)	Zero Flow** (m L.D.)
H-BC	16/05/2013	13:50	3.000	3.002	3.036	2.879	2.644	2.082	1.585
H-BC	22/05/2013	13:05		3.002	3.037	2.880	2.644	1.924	
H-BC	28/05/2013	16:00		3.004	3.037	2.881	2.645	2.009	
H-BC	11/06/2013	13:03		2.947	3.038	2.879	2.644	1.925	
H-BC	25/06/2013	12:00		3.015	3.050	2.886	2.651	1.849	
H-DC-B	27/05/2013	17:45	3.000	3.358	2.996	2.526	2.349	1.577	
H-DC-B	10/06/2013	16:41		3.357	2.996	2.525	1.773	1.520	
H-DC-B	24/06/2013	14:40		3.356	2.994	2.934	2.344	1.460	
H-DC-M	06/05/2013	16:10	3.000	2.313		-	2.463	1.631	1.422
H-DC-M	15/05/2013	10:18		2.314		-	2.462	1.762	
H-DC-M	21/05/2013	14:20		2.313	2.714	2.688	2.463	1.707	
H-DC-M	10/06/2013	16:00		2.311	2.712	2.686	2.460	1.667	
H-DC-M	24/06/2013	14:13		2.312	2.712	2.678	2.454	1.620	
H-DC-R	10/06/2013	14:55	3.000	2.936	2.323	1.693	1.296	0.696	
H-DC-R	24/06/2013	13:26		2.939	2.322	2.061	1.284	0.440	
H-MN	22/05/2013	09:15	3.000	2.322	2.726	-	1.548	1.474	0.533
H-MN	28/05/2013	09:30		2.331	2.725	2.088	1.546	1.061	
H-MN	11/06/2013	10:05		2.332	2.717	2.064	1.550	1.087	
H-MN	25/06/2013	08:30		2.328	2.711	2.068	1.548	0.965	
H-PC-DSP	15/05/2013	12:41	3.000	3.216	3.686	3.449	3.200	2.524	2.202
H-PC-DSP	21/05/2013	16:06		3.247	3.686	3.448	3.200	2.472	
H-PC-DSP	28/05/2013	19:02		3.217	3.675	3.451	3.202	2.499	
H-PC-DSP	12/06/2013	10:06		3.216	3.643	3.436	3.186	2.405	
H-PC-DSP	24/06/2013	17:56		3.218	3.650	3.430	3.180	2.351	
H-PC-U	21/05/2013	17:00	3.000	3.560	3.860	3.477		2.465	2.133
H-PC-U	21/05/2013	17:30		3.559	3.860	3.421		2.471	
H-PC-U	27/05/2013	18:26		3.565	3.866	3.428	3.188	2.526	

Station	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.)	Zero Flow** (m L.D.)
H-PC-U	12/06/2013	11:05		3.560	3.910	3.479	3.239	2.477	
H-PC-U	24/06/2013	18:30		3.574	3.923	3.499	3.257	2.988	
H-VC-DBC	16/04/2013	14:00	3.000	3.027	2.919	-	2.352		1.316
H-VC-DBC	07/05/2013	13:10		3.027	2.918	-	2.351	1.813	
H-VC-DBC	22/05/2013	11:00		3.027	2.917	2.561	2.343	1.885	
H-VC-DBC	28/05/2013	14:05		3.027	2.911	2.855	2.335	2.146	
H-VC-DBC	11/06/2013	11:13		3.027	2.916	2.556	2.338	1.878	
H-VC-DBC	25/06/2013	10:35		3.026	2.912	2.557	2.337	1.767	
H-VC-R	15/04/2013	12:00	3.000	3.422	3.168	-	2.560		1.515
H-VC-R	06/05/2013	14:20		3.427	3.171	-	2.561	1.931	
H-VC-R	15/05/2013	14:30		3.422	3.169	-	2.624	2.314	
H-VC-R	16/05/2013	11:50		3.027	2.918	-	2.345	2.085	
H-VC-R	21/05/2013	12:53		3.422	3.168	-	2.625	2.222	
H-VC-R	21/05/2013	13:20		3.422	3.168	2.779	2.559	2.221	
H-VC-R	27/05/2013	13:00		3.423	3.171	2.785	2.565	2.303	
H-VC-R	10/06/2013	13:20		3.423	3.170	2.790	2.568	2.114	
H-VC-R	24/06/2013	12:40		3.424	3.169	2.790	2.568	2.053	
H-VC-REF	16/05/2013	14:30	3.000	2.968	3.047	2.504	2.310	2.096	1.209
H-VC-REF	22/05/2013	13:30		2.967	3.046	2.502	2.308	1.848	
H-VC-REF	28/05/2013	16:50		2.967	3.048	2.535	2.303	2.208	
H-VC-REF	11/06/2013	13:25		2.966	3.043	1.829	2.303	2.258	
H-VC-REF	25/06/2013	12:40		2.964	3.041	2.573	2.302	1.696	
H-VC-U	16/04/2013	17:00	3.000	3.362	3.244	-	2.888	-	1.839
H-VC-U	07/05/2013	15:05		3.364	3.244	-	2.888	2.036	
H-VC-U	16/05/2013	12:33		3.363	3.244	-	2.889	2.329	
H-VC-U	22/05/2013	12:20		3.362	3.244	3.135	2.889	2.174	
H-VC-U	28/05/2013	15:28		3.363	3.240	3.134	2.889	2.304	
H-VC-U	11/06/2013	12:41		3.160	3.243	3.137	2.892	2.134	

Station	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.)	Zero Flow** (m L.D.)
H-VC-U	25/06/2013	11:20		3.361	3.247	3.144	2.897	2.066	
H-VC-UMN	16/05/2013	10:06	3.000	3.007	2.678	2.199	1.983	1.877	0.973
H-VC-UMN	21/05/2013	09:51		3.006	2.679	2.198	1.990	1.941	
H-VC-UMN	28/05/2013	11:45		3.006	2.677	2.201	1.986	1.931	
H-VC-UMN	11/06/2013	10:30		3.007	2.678	2.203	1.983	1.692	
H-VC-UMN	25/06/2013	09:18		3.007	2.678	2.203	1.984	1.602	

Notes:
L.D. = Local datum.
TOS = Top of Staff Guage
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 1st to June 30th, 2013.

Measurement Date				Discharge	
HID	Date	Time	Method	m^3/s	L/s
H-SEEP	17/04/2013	12:04	V	0.00300	3
H-SEEP	08/05/2013	09:47	V	0.00290	2.9
H-SEEP	15/05/2013	11:00	V	0.00260	2.6
H-SEEP	11/06/2013	16:53	V	0.00240	2.4
H-SEEP	25/06/2013	15:07	V	0.00256	2.56

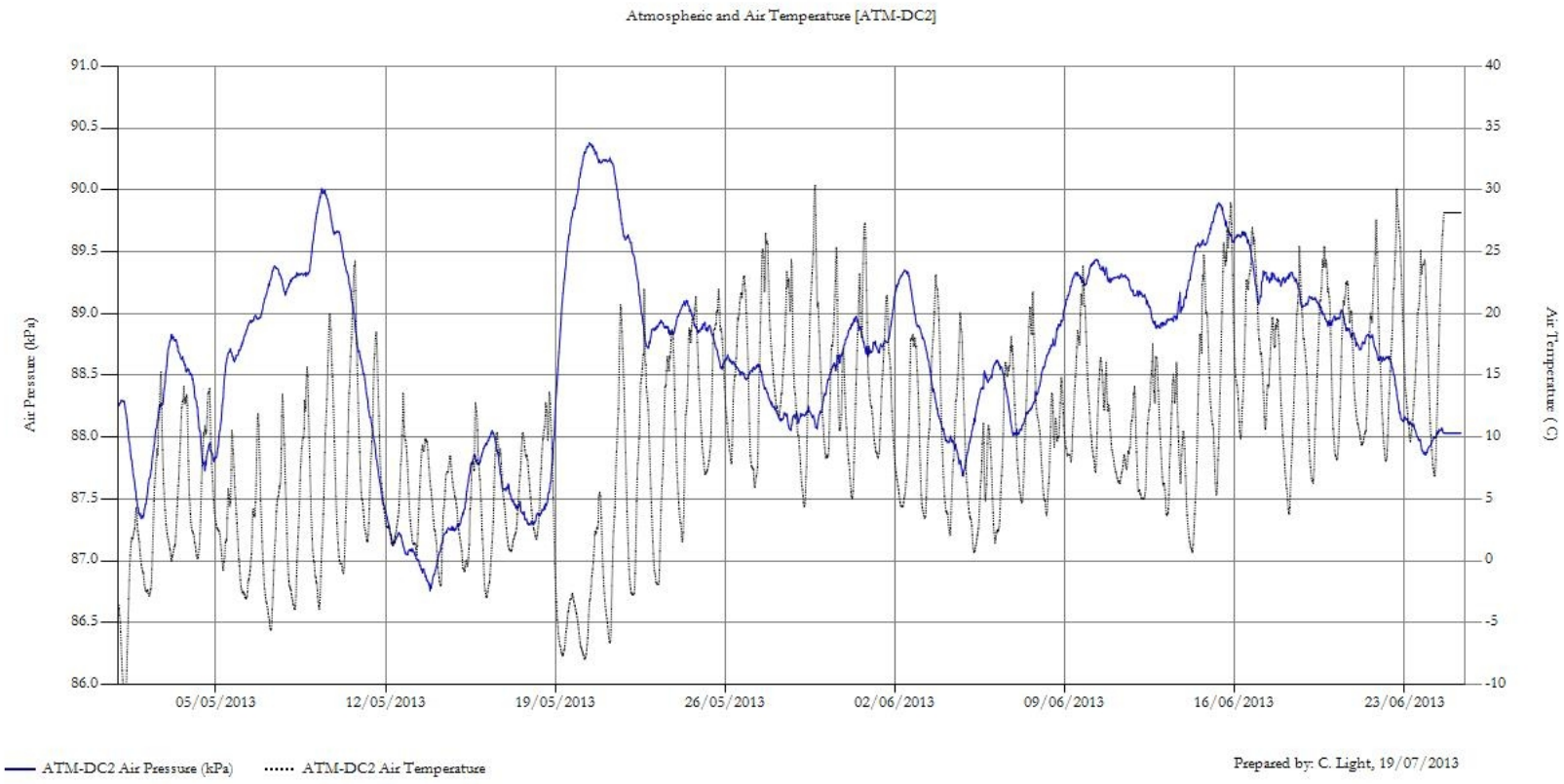

Figure D-1 ATM-DC2 atmospheric pressure and air temperature.

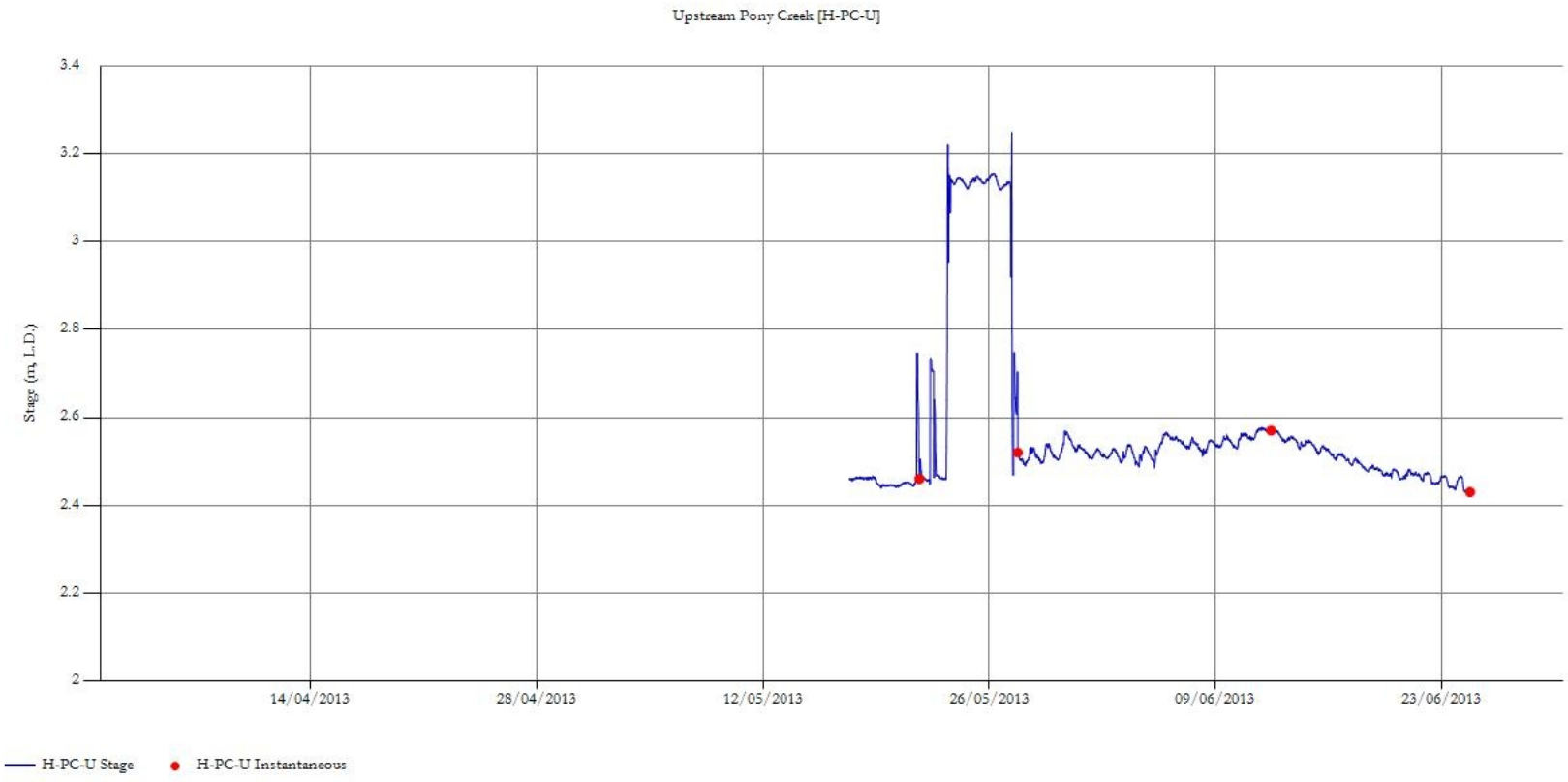

Figure D-2 H-PC-U Stage.

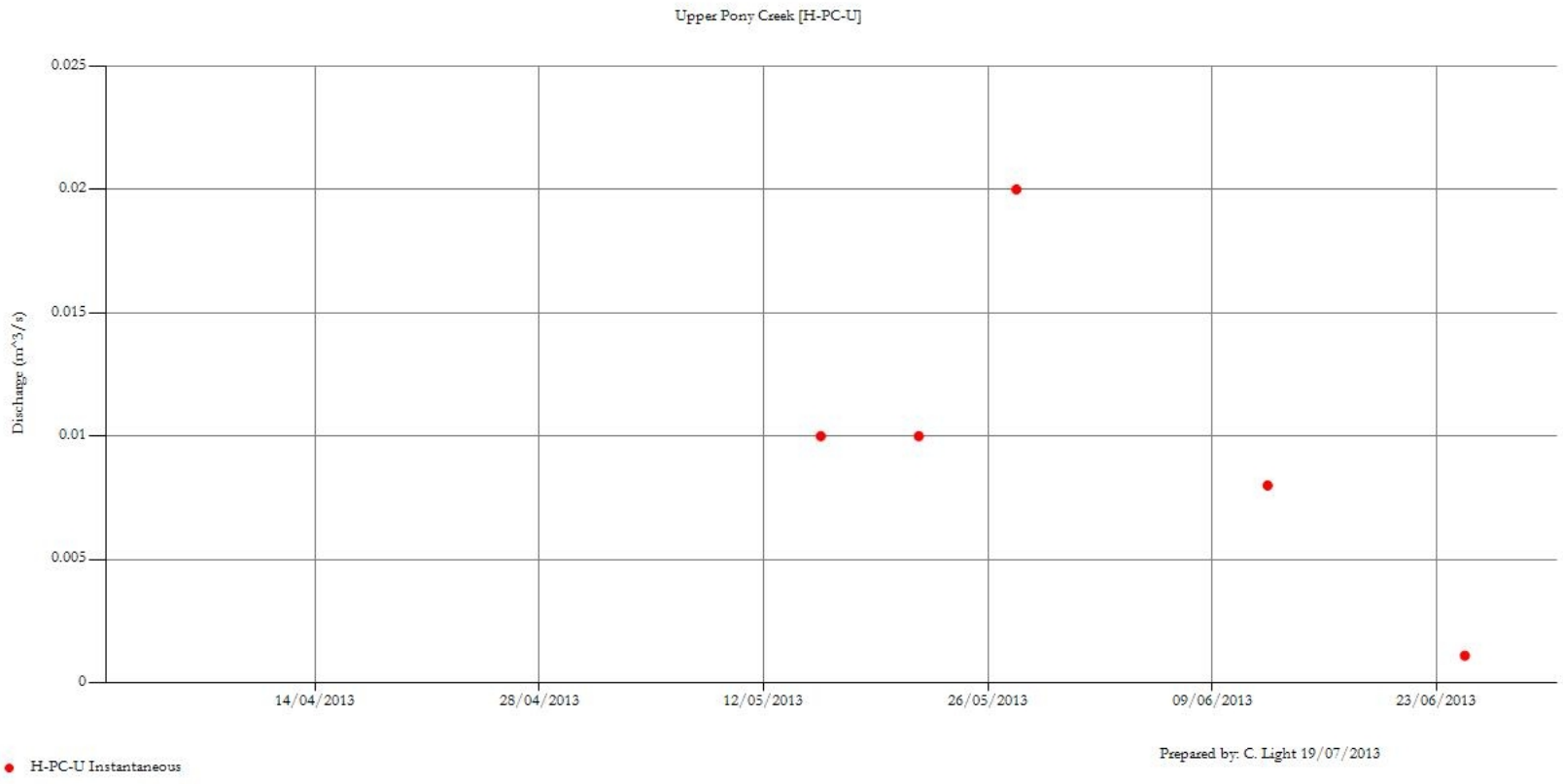

Figure D-3 H-PC-U Hydrograph.

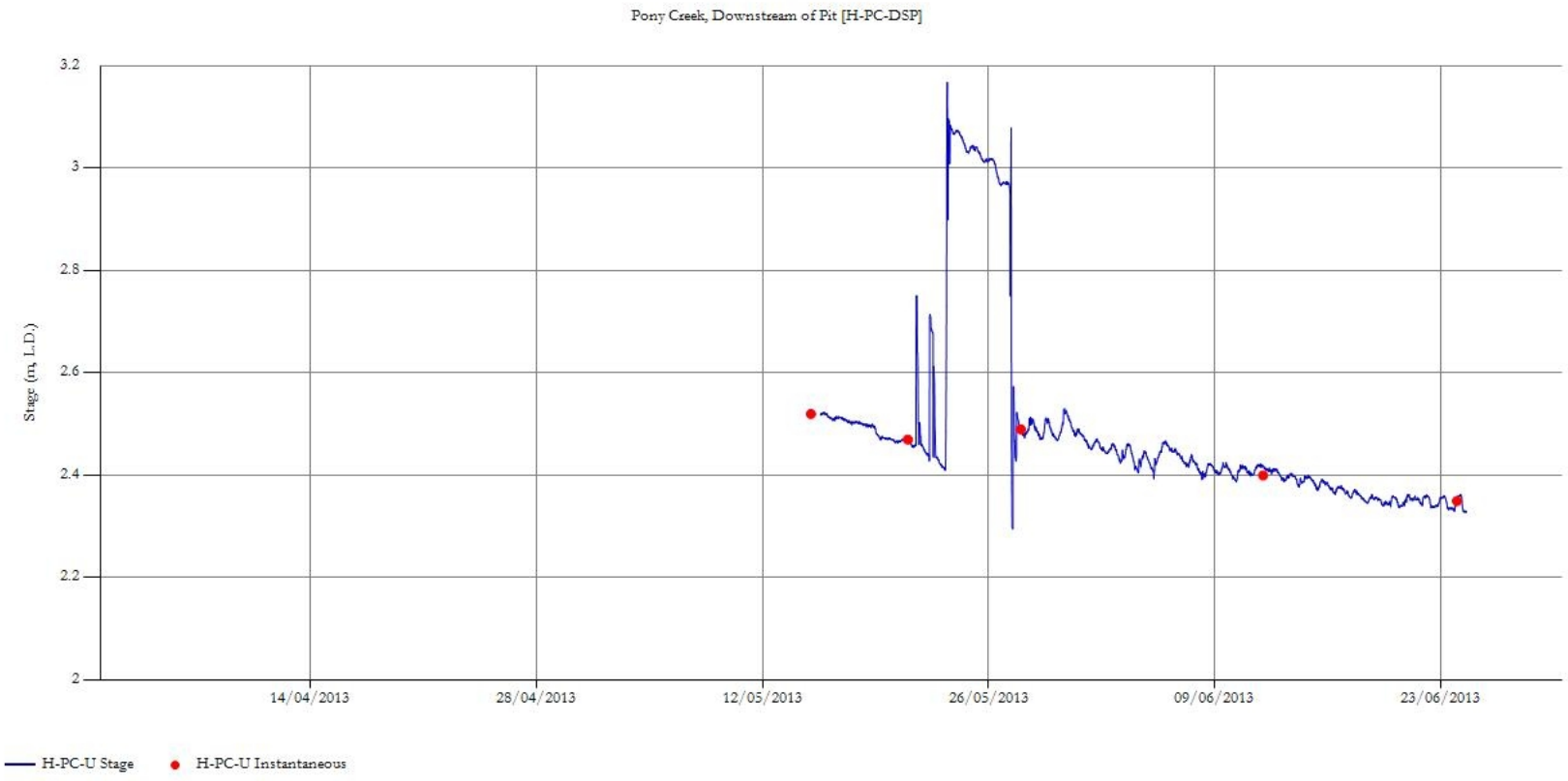

Figure D-4 H-PC-DSP Stage.

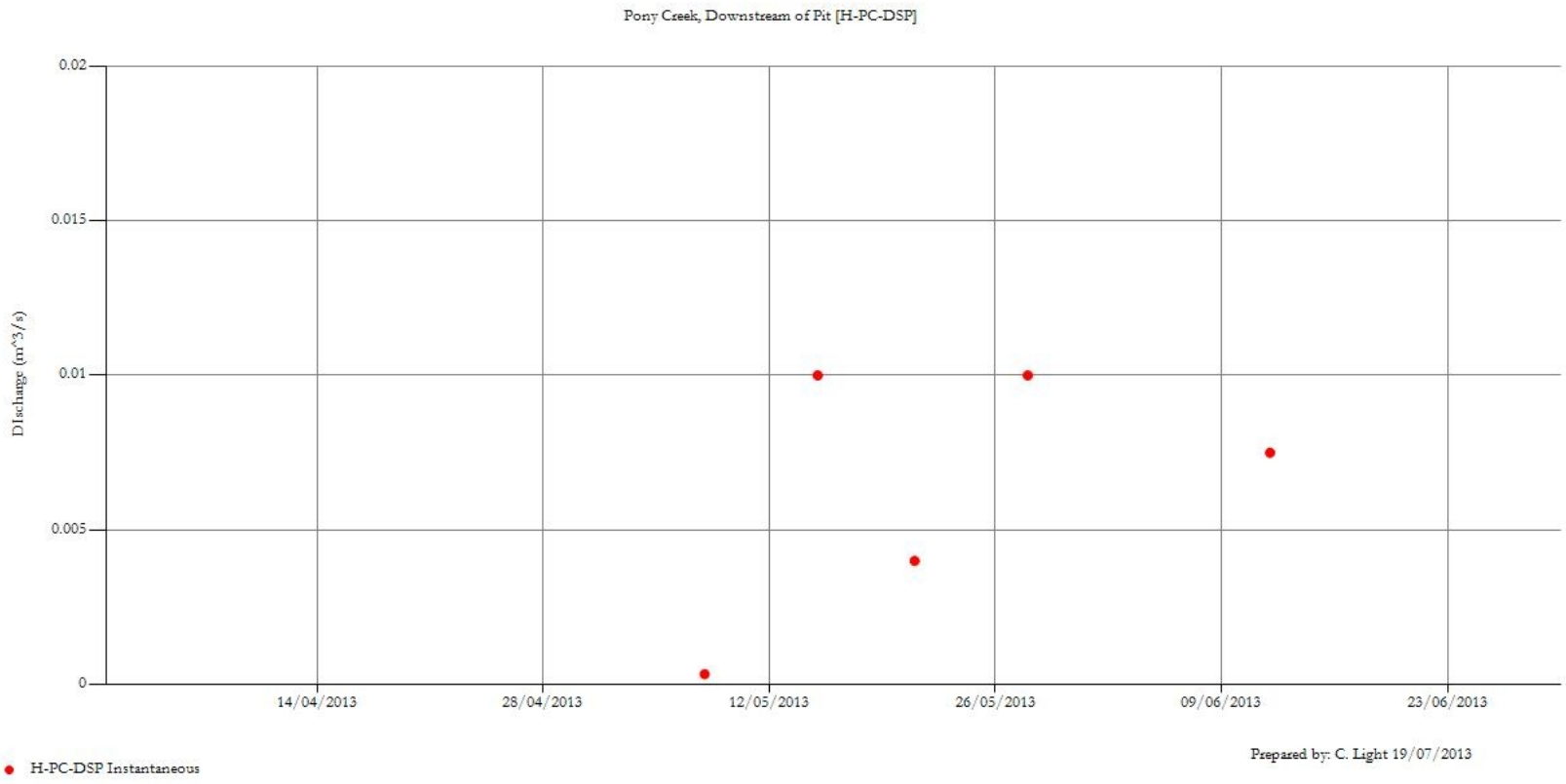

Figure D-5 H-PC-DSP Hydrograph.

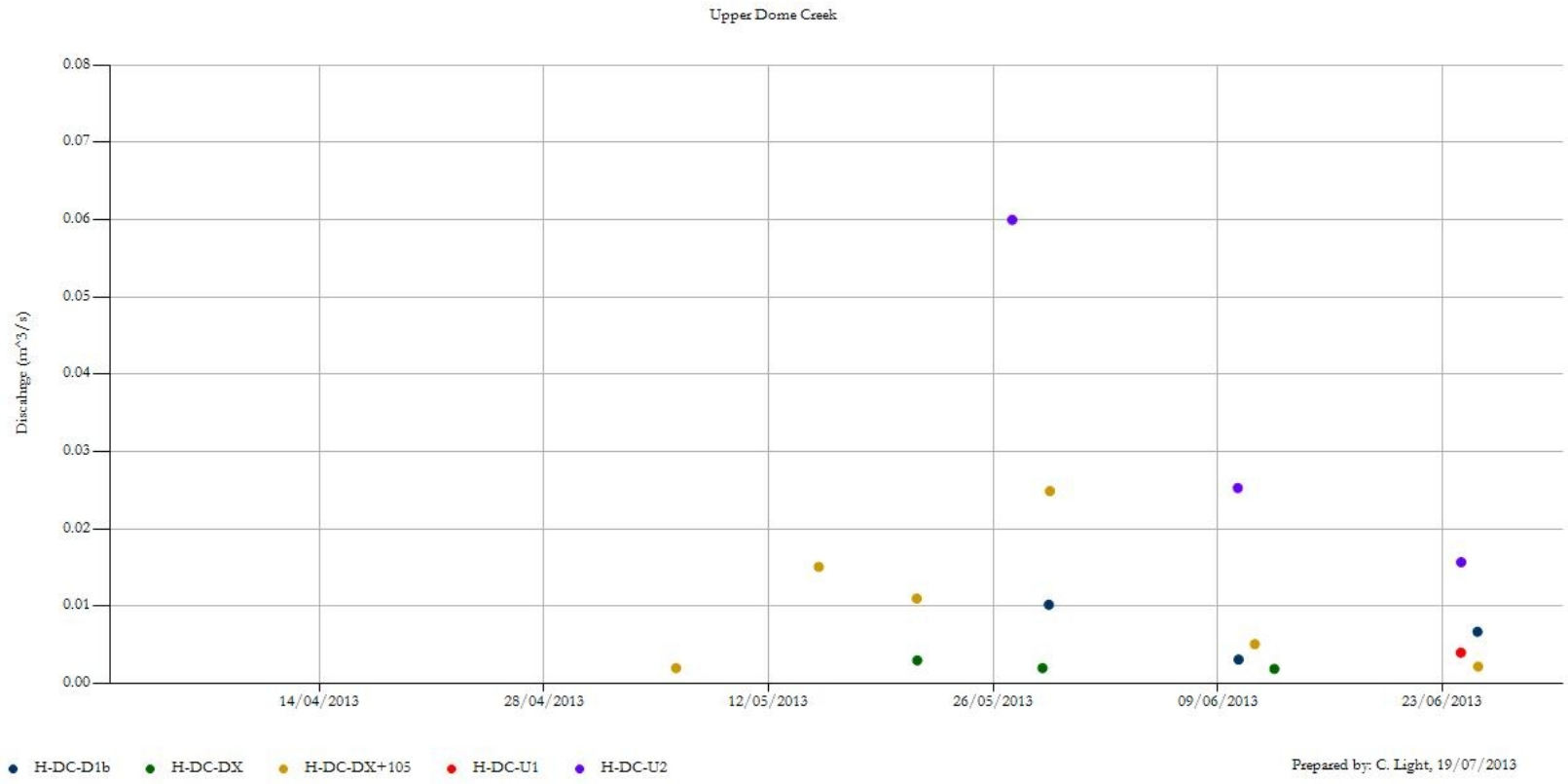

Figure D-6 Upper Dome Creek Instantaneous discharge.

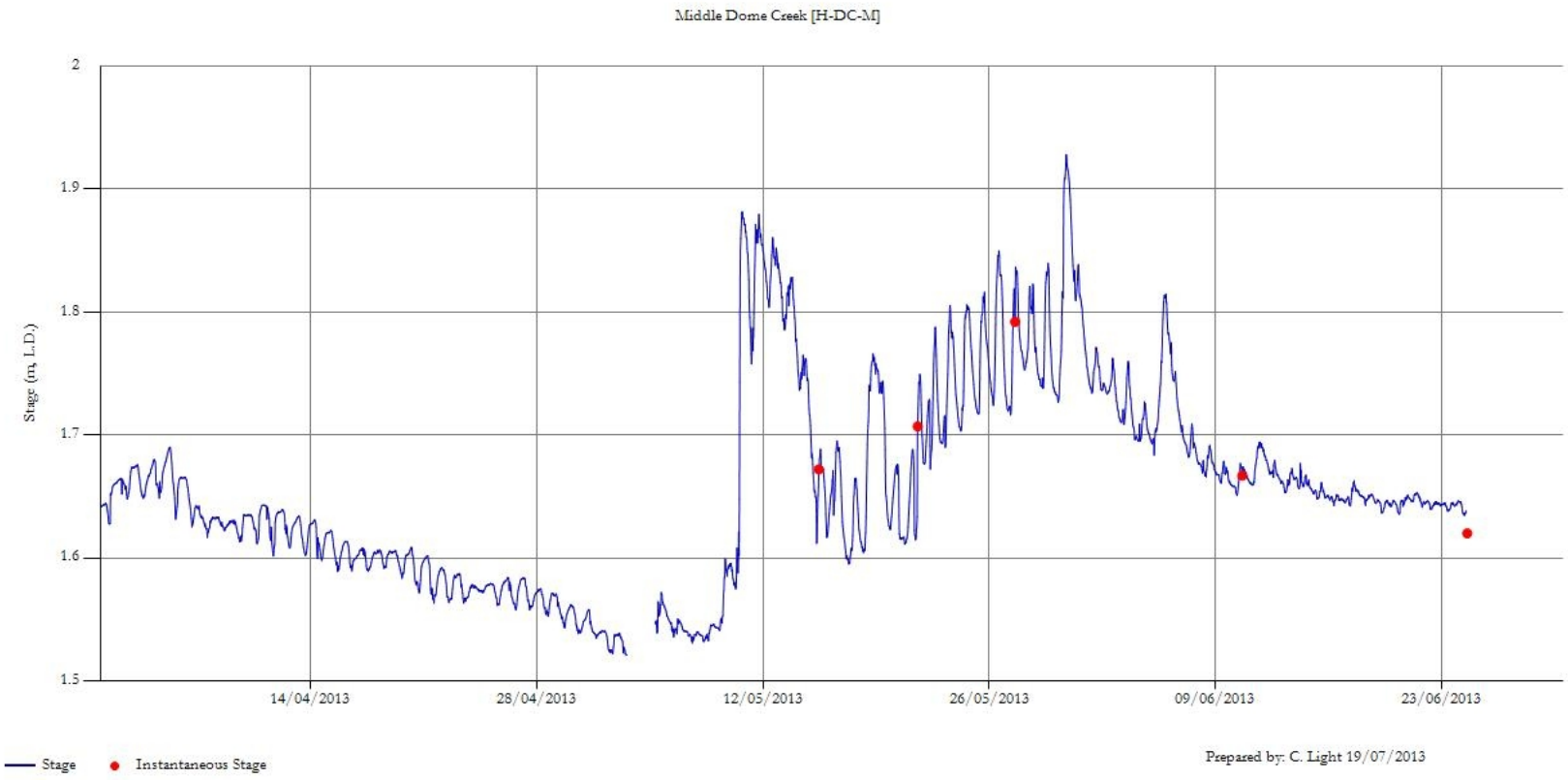

Figure D-7 H-DC-M Stage.

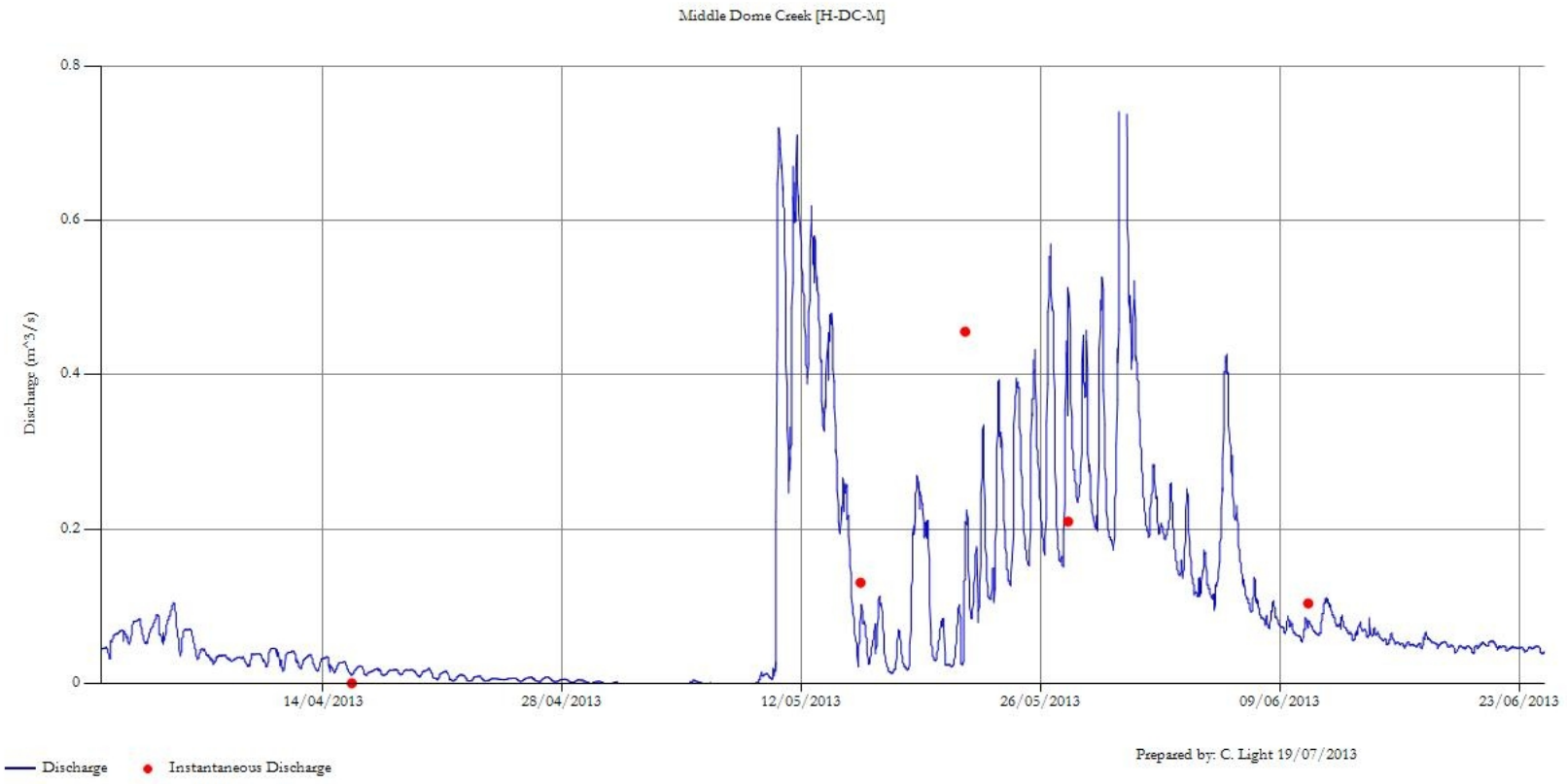

Figure D-8 H-DC-M Hydrograph.

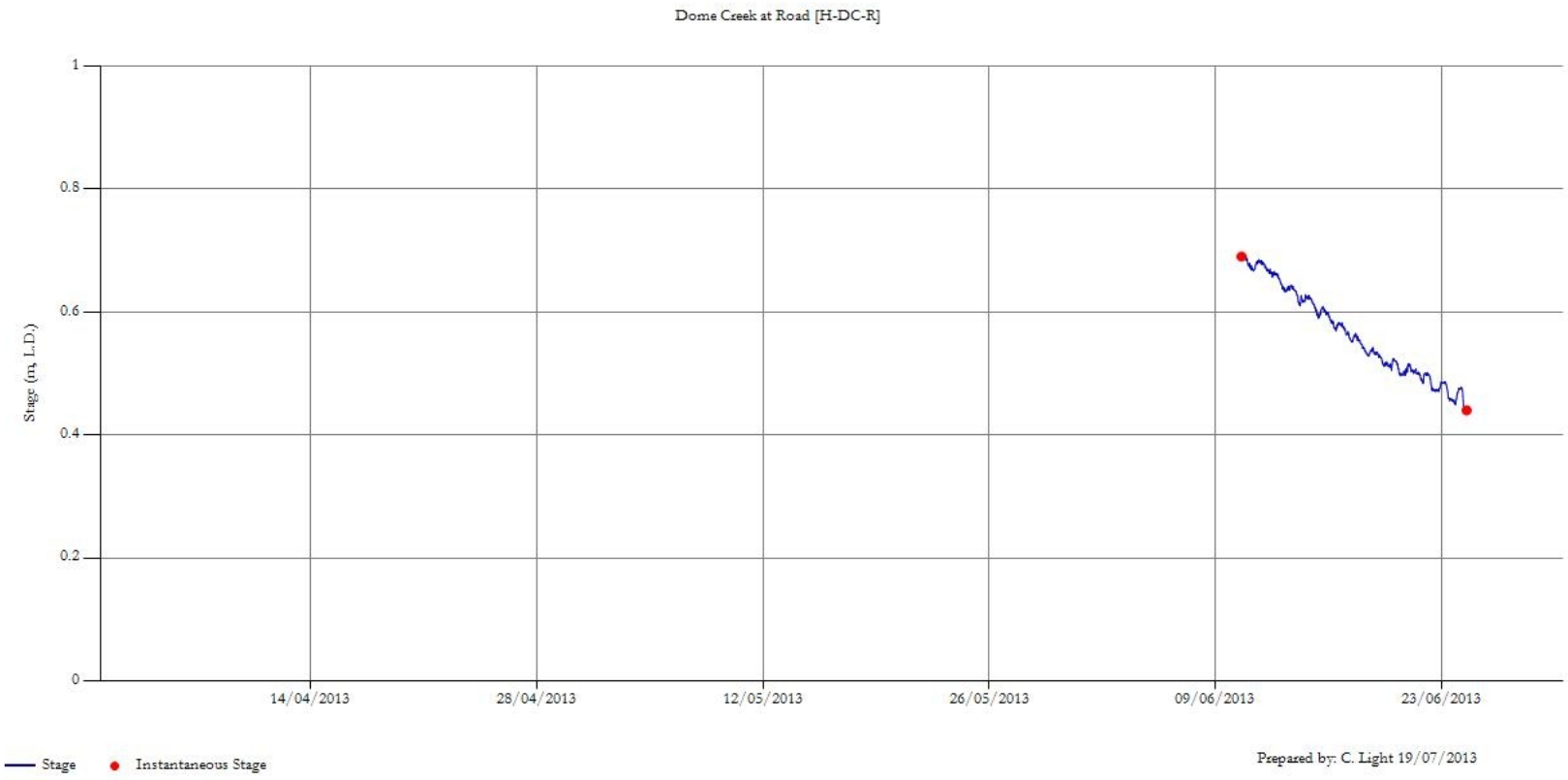

Figure D-9 H-DC-R Stage.

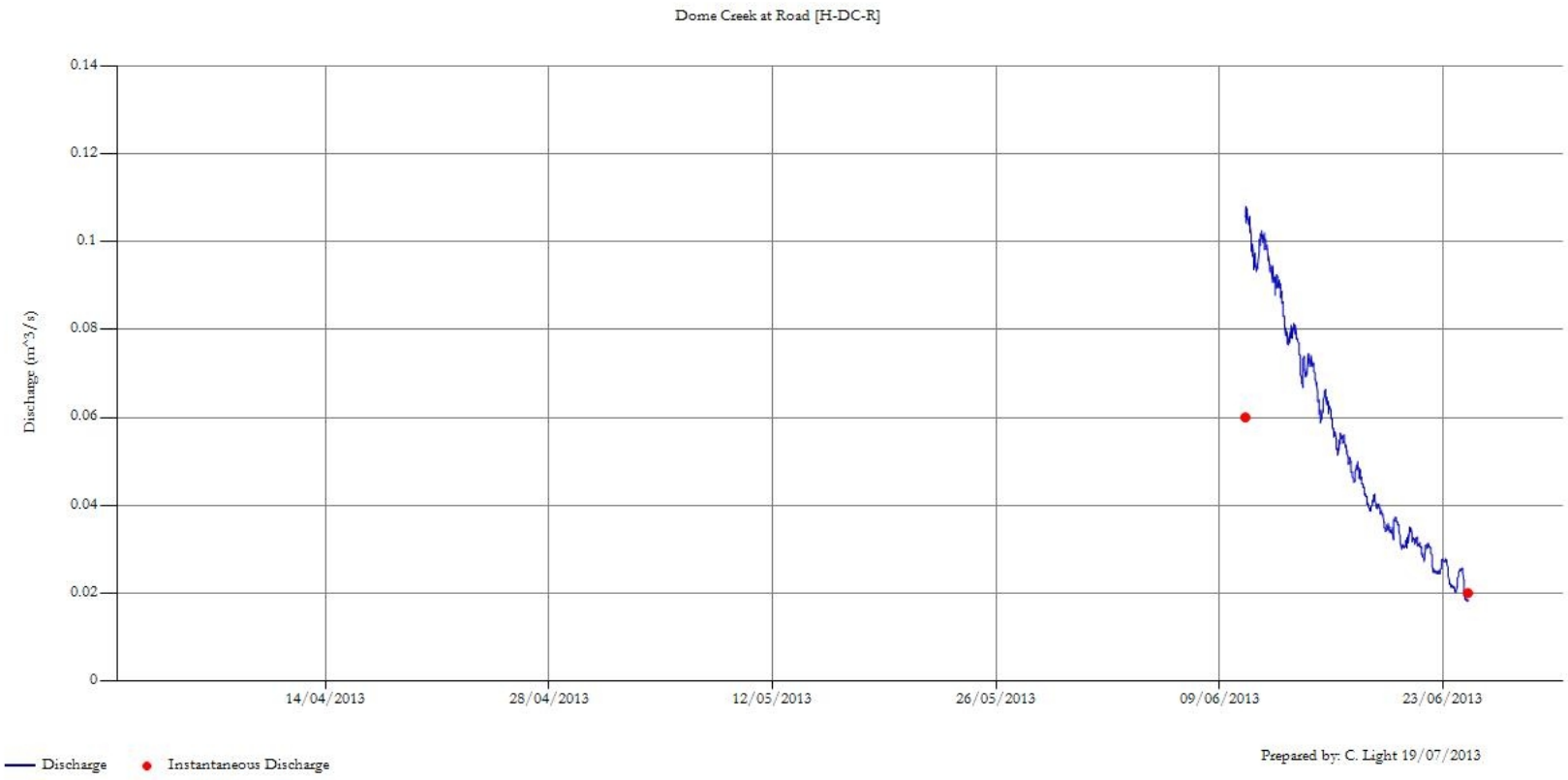

Figure D-10 H-DC-R Hydrograph.

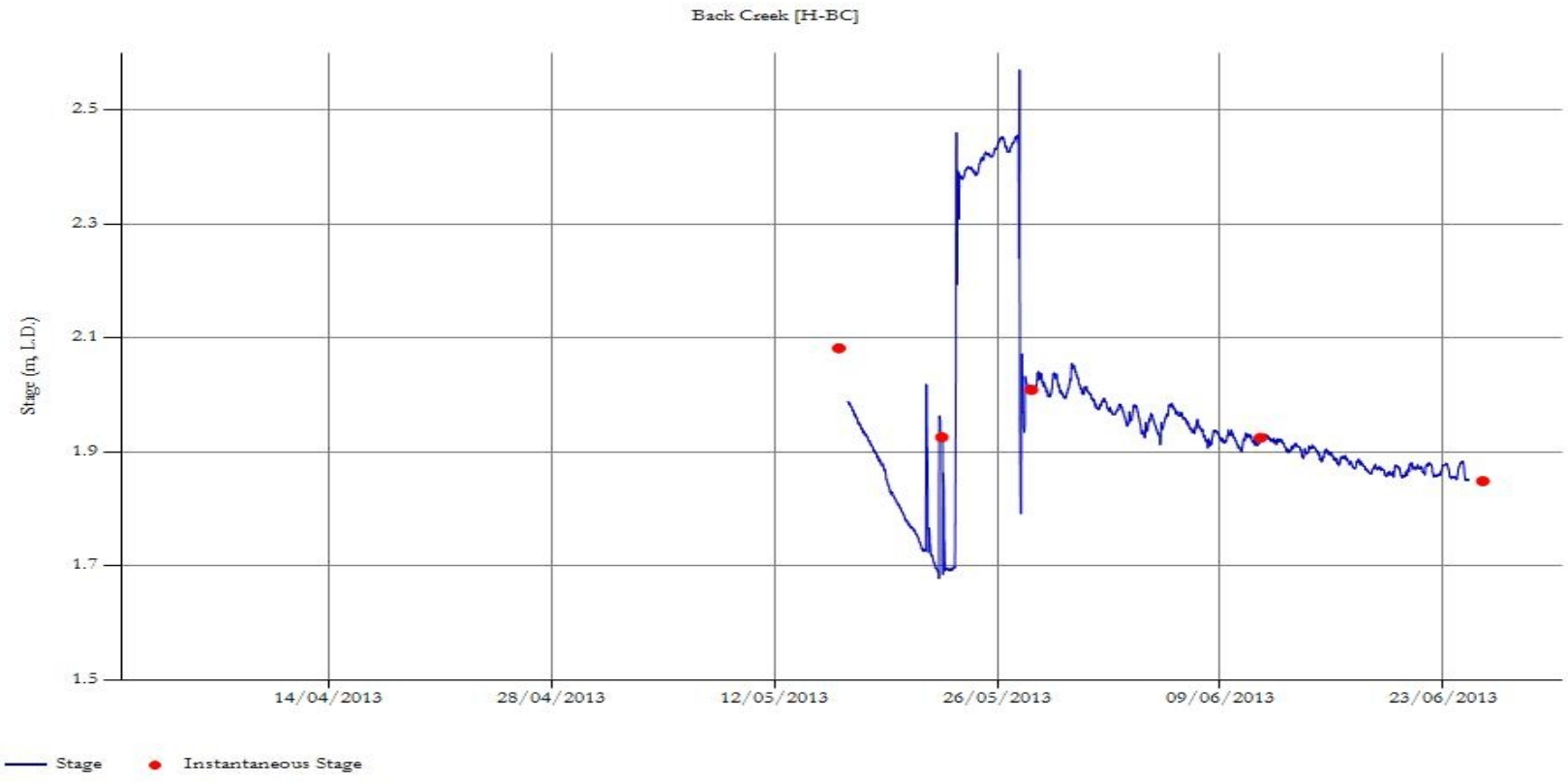

Figure D-11 H-DC-B Stage.

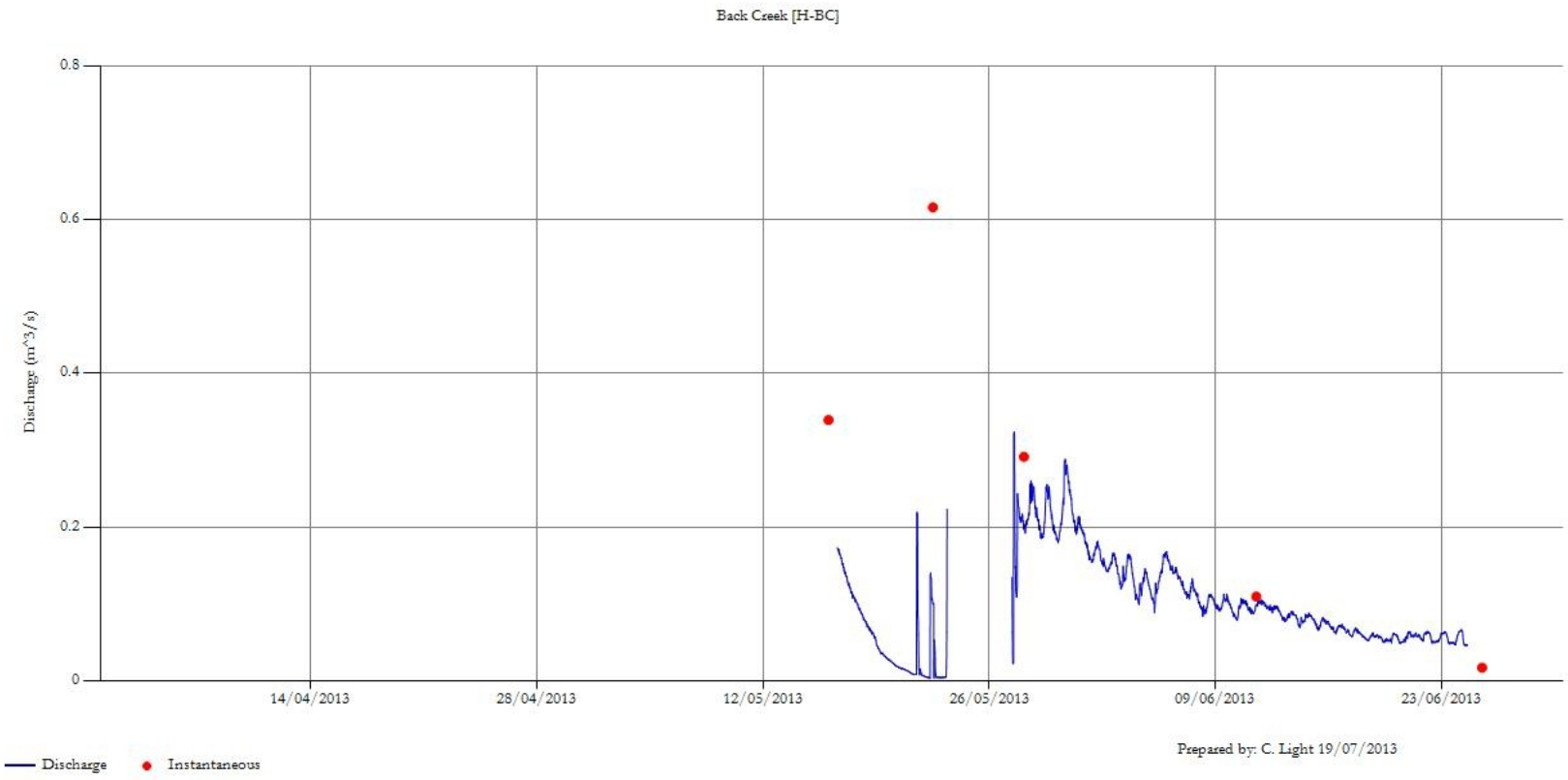

Figure D-12 H-DC-B Hydrograph.

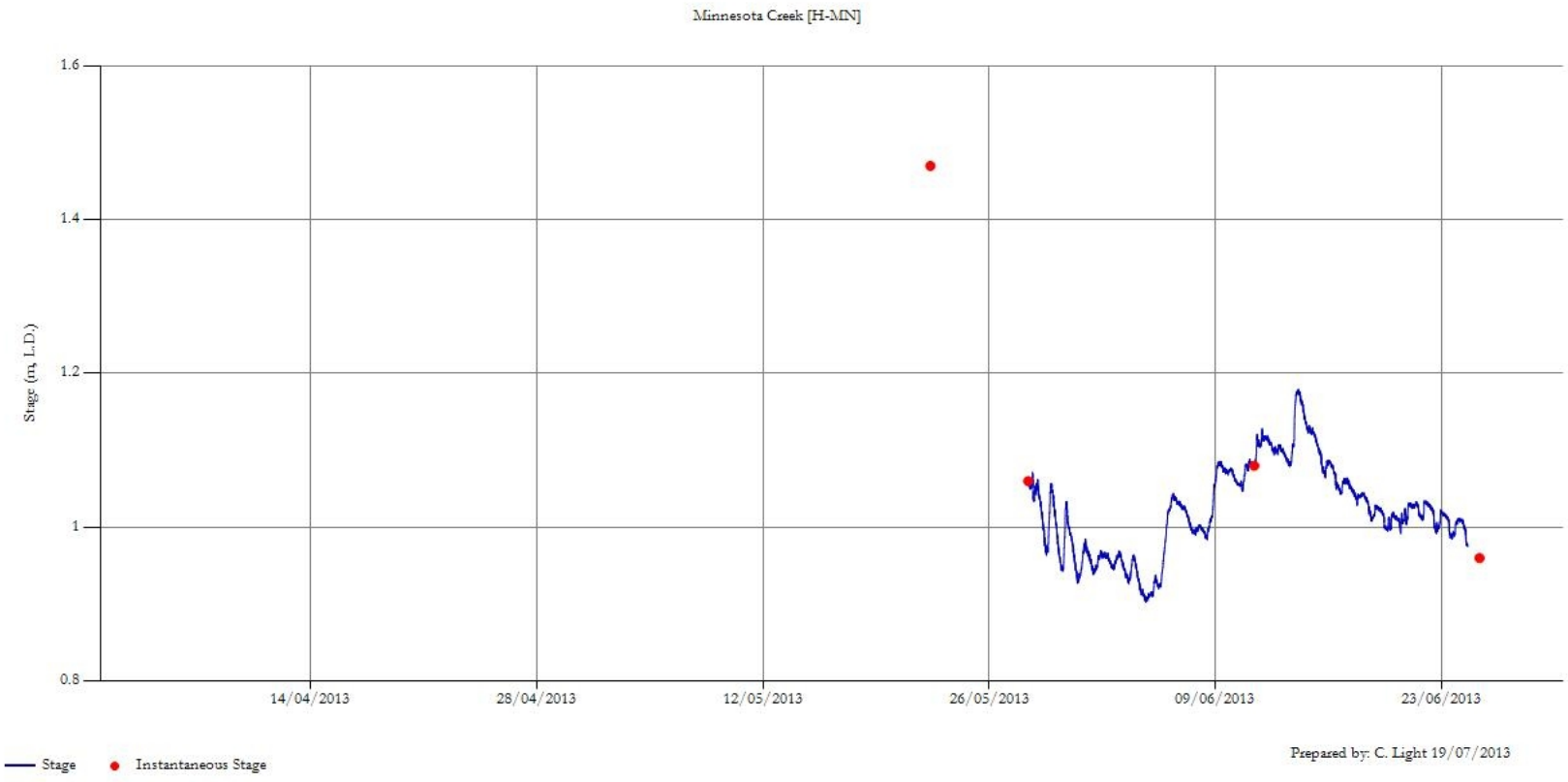

Figure D-13 H-MN Stage.

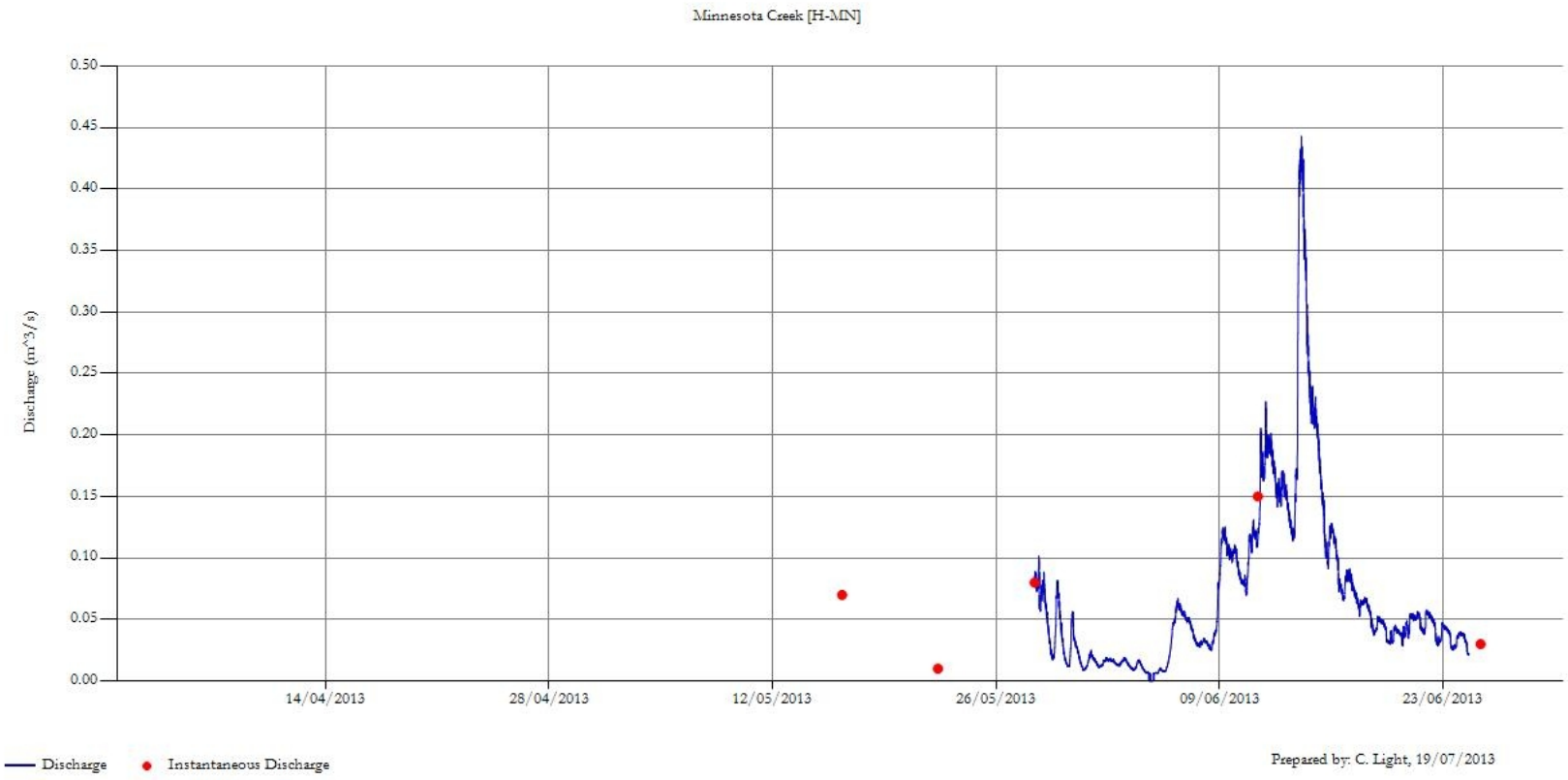

Figure D-14 H-MN Hydrograph.

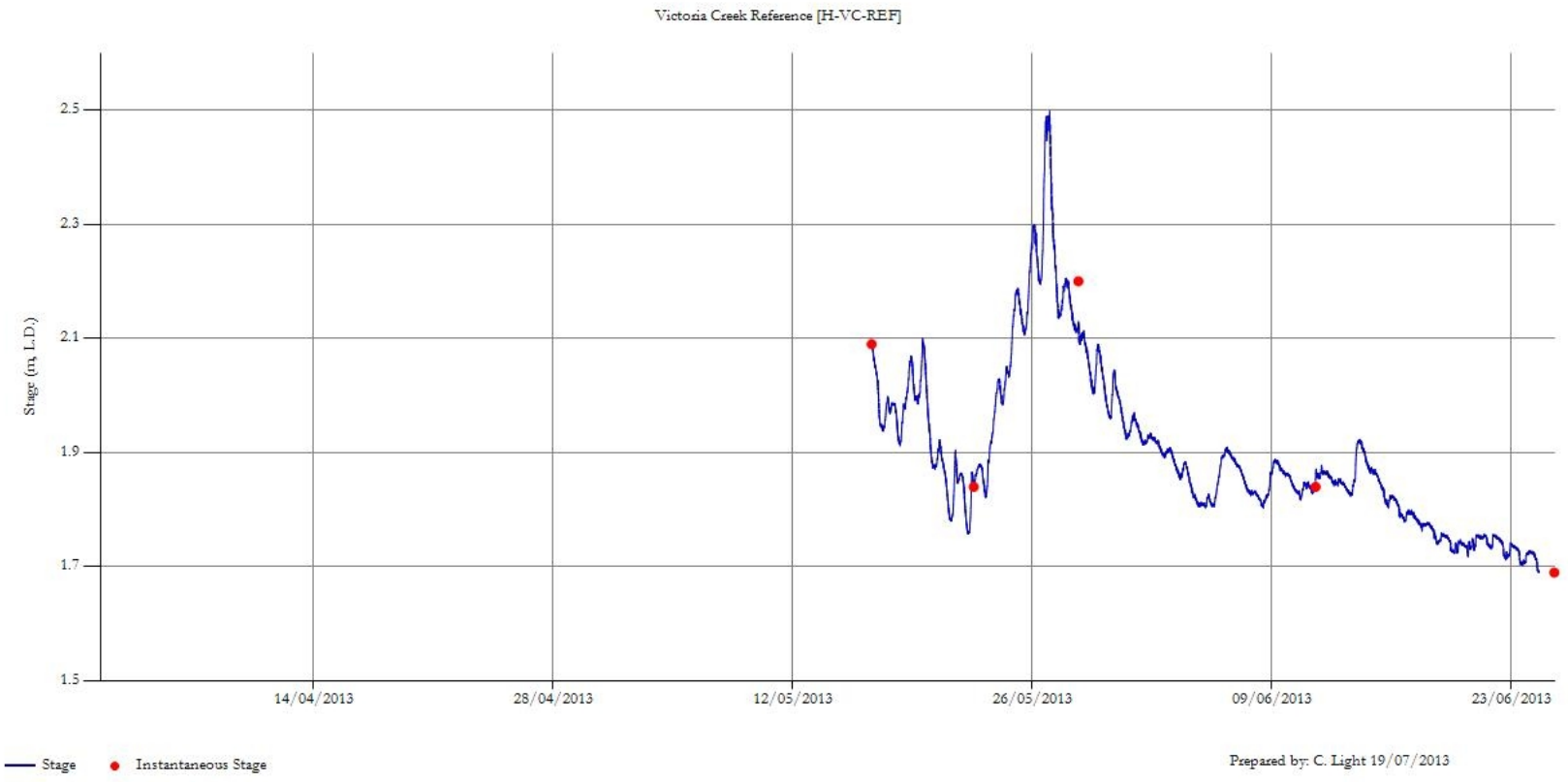

Figure D-15 H-VC-REF Stage

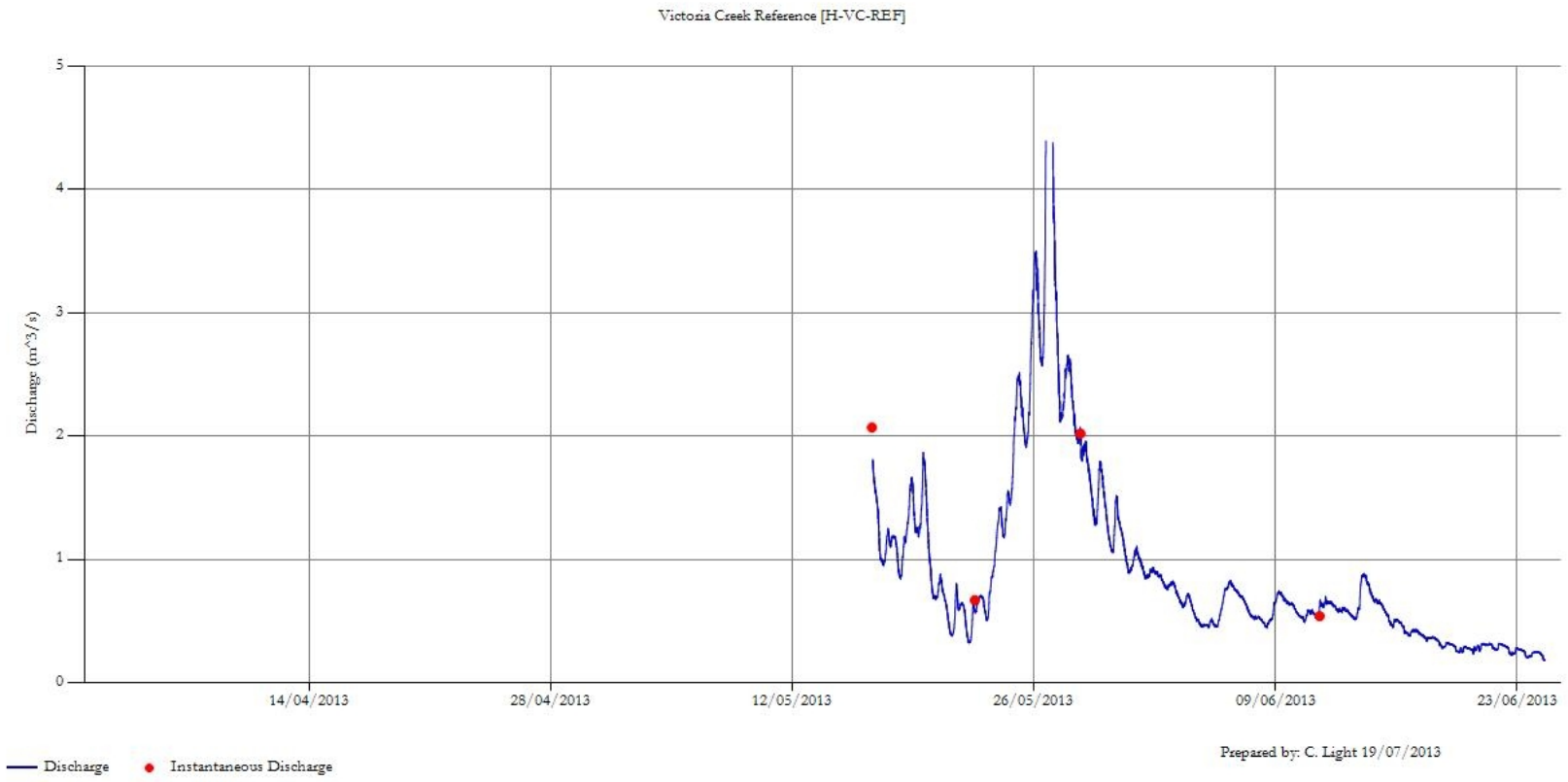

Figure D-16 H-VC-REF Hydrograph.

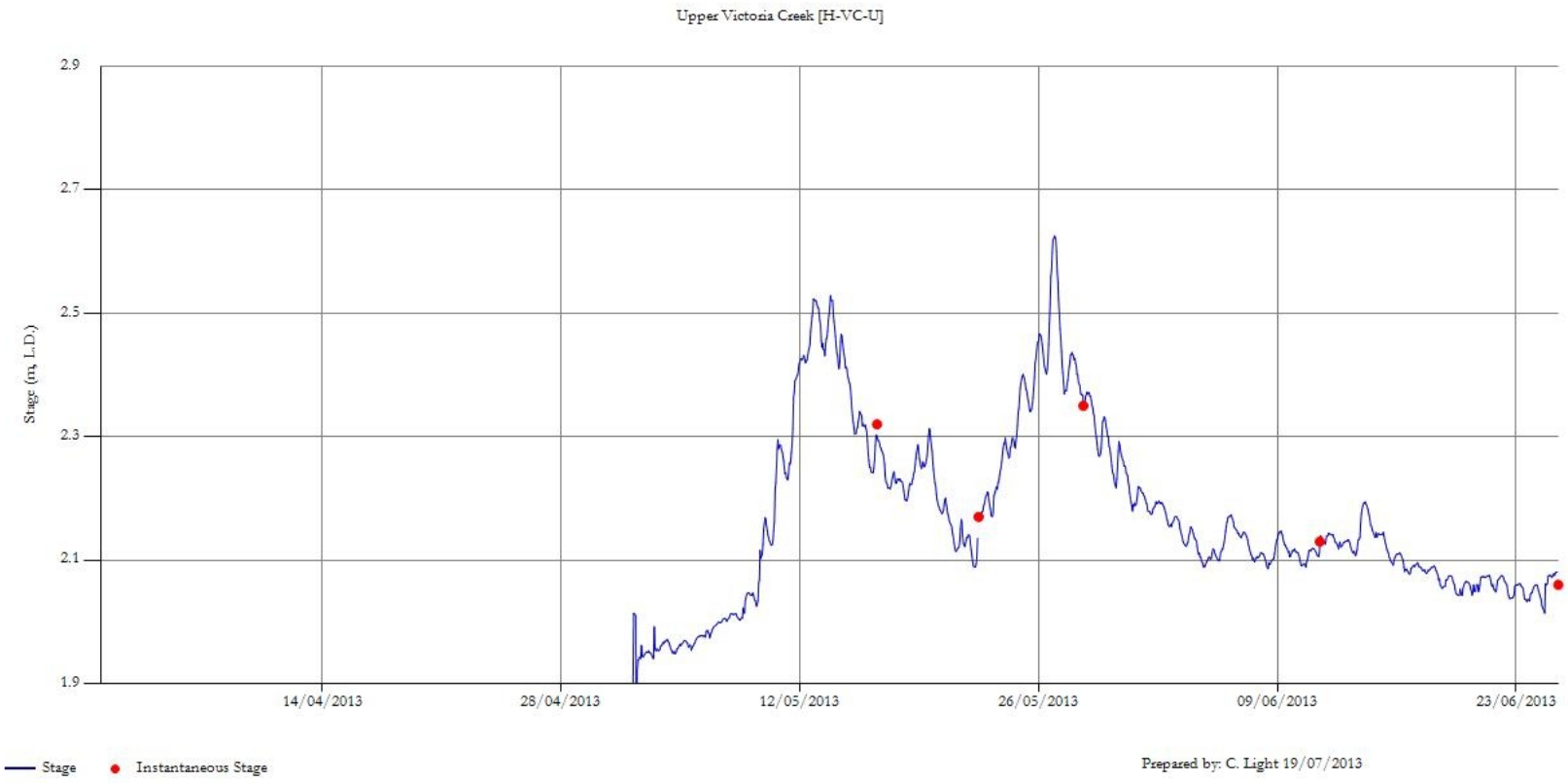

Figure D-17 H-VC-U Stage.

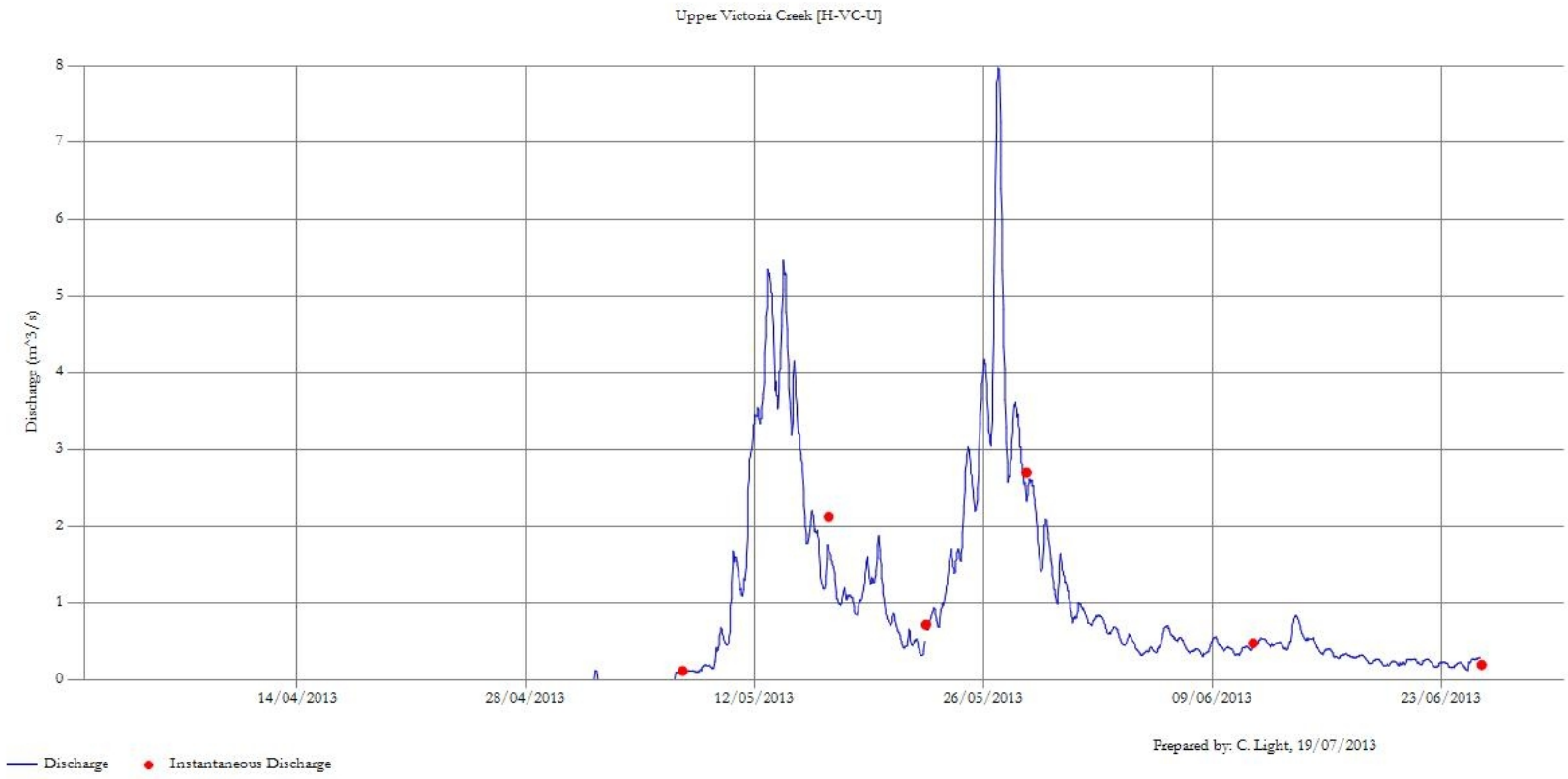

Figure D-18 H-VC-U Hydrograph.

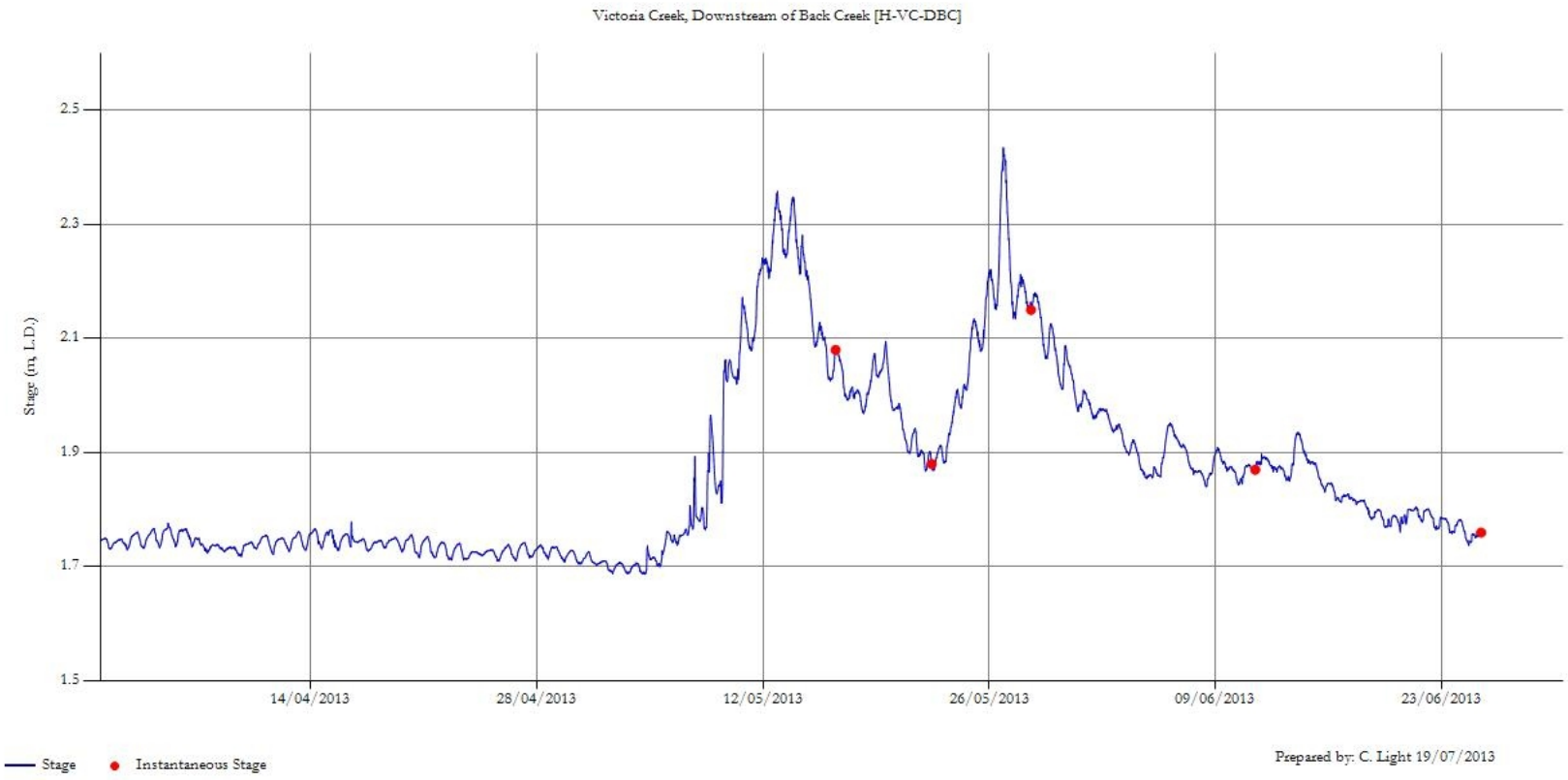

Figure D-19 H-VC-DBC Stage.

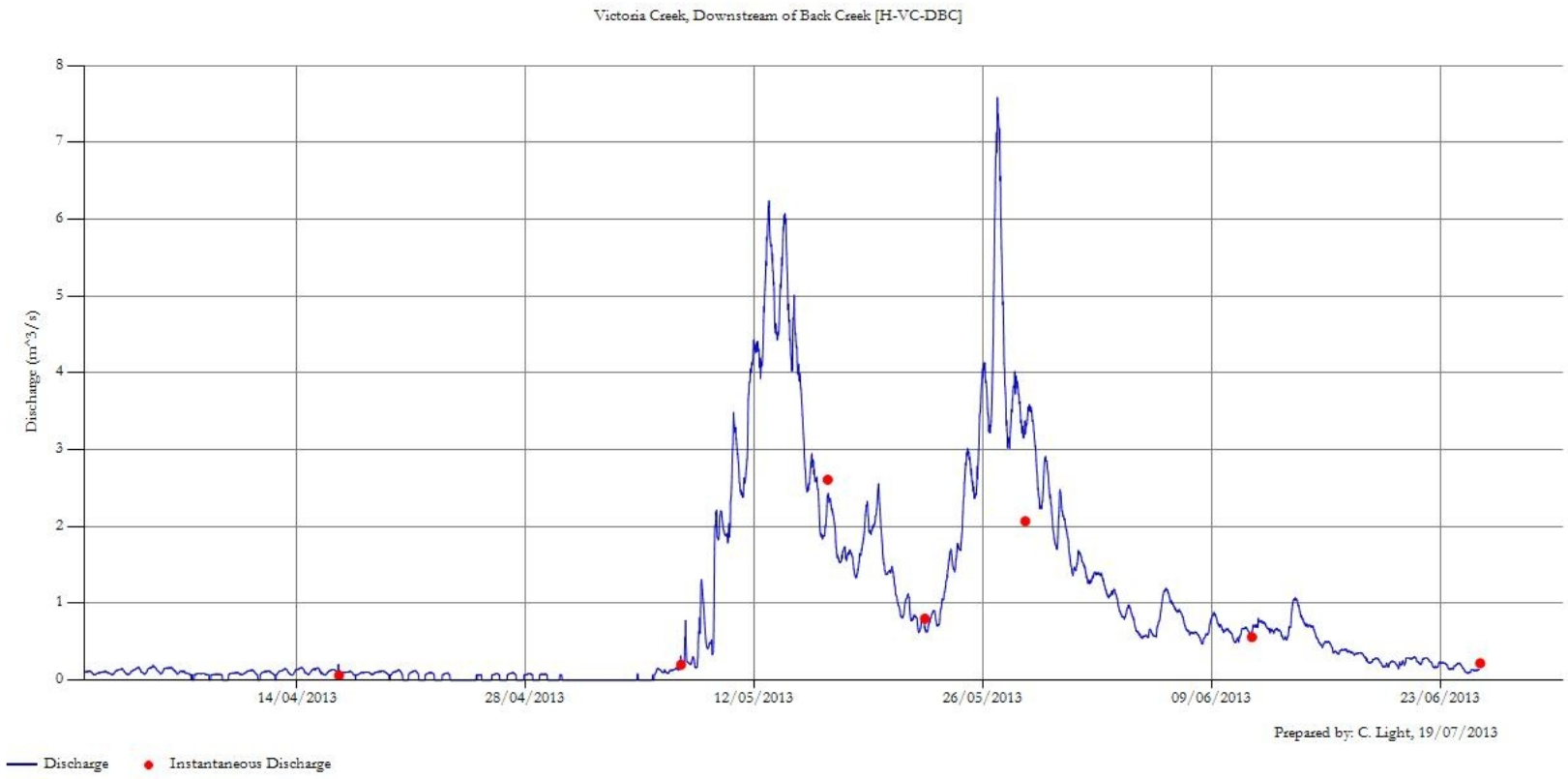

Figure D-20 H-VC-DBC Hydrograph.

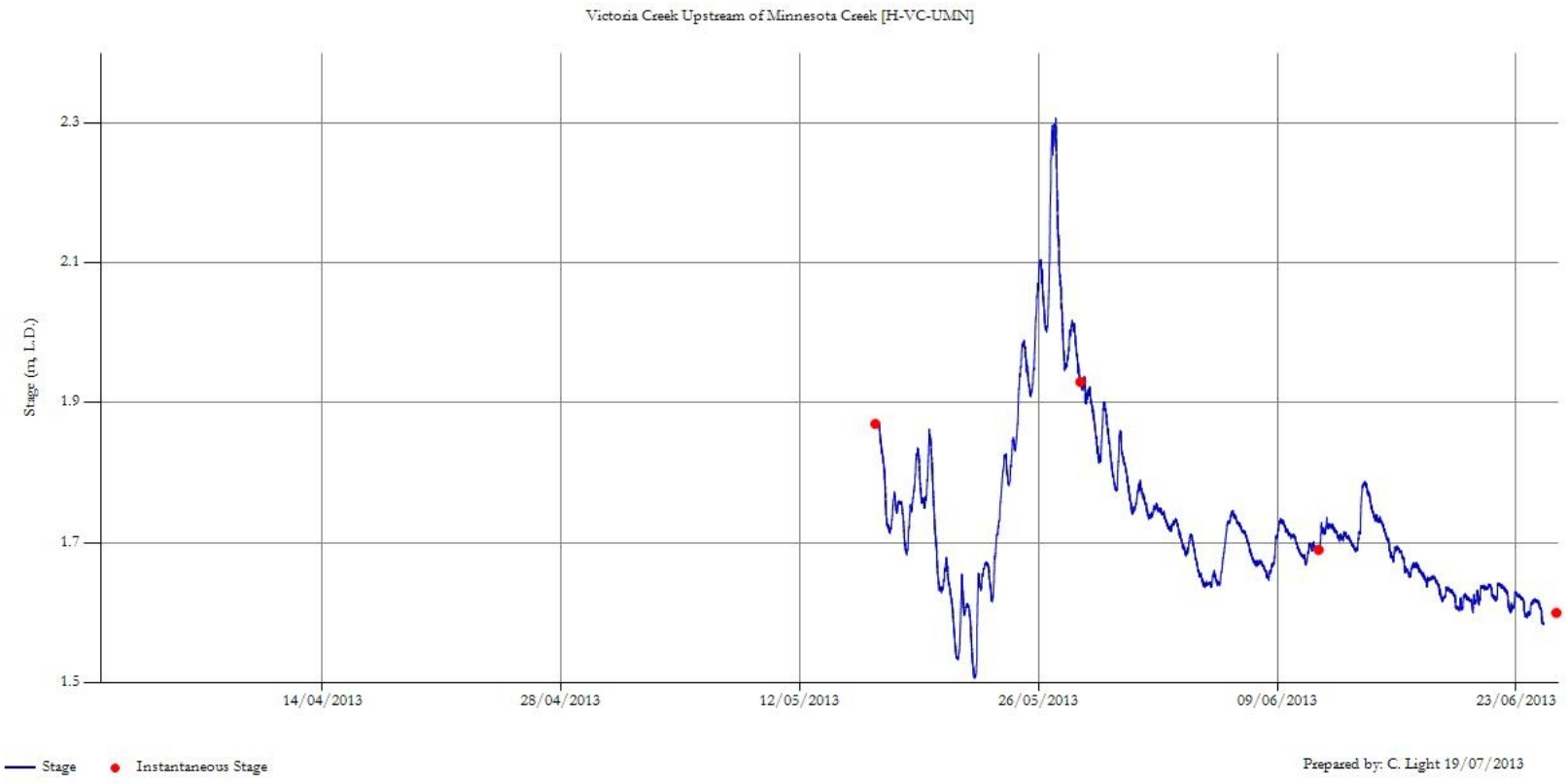

Figure D-21 H-VC-UMN Stage.

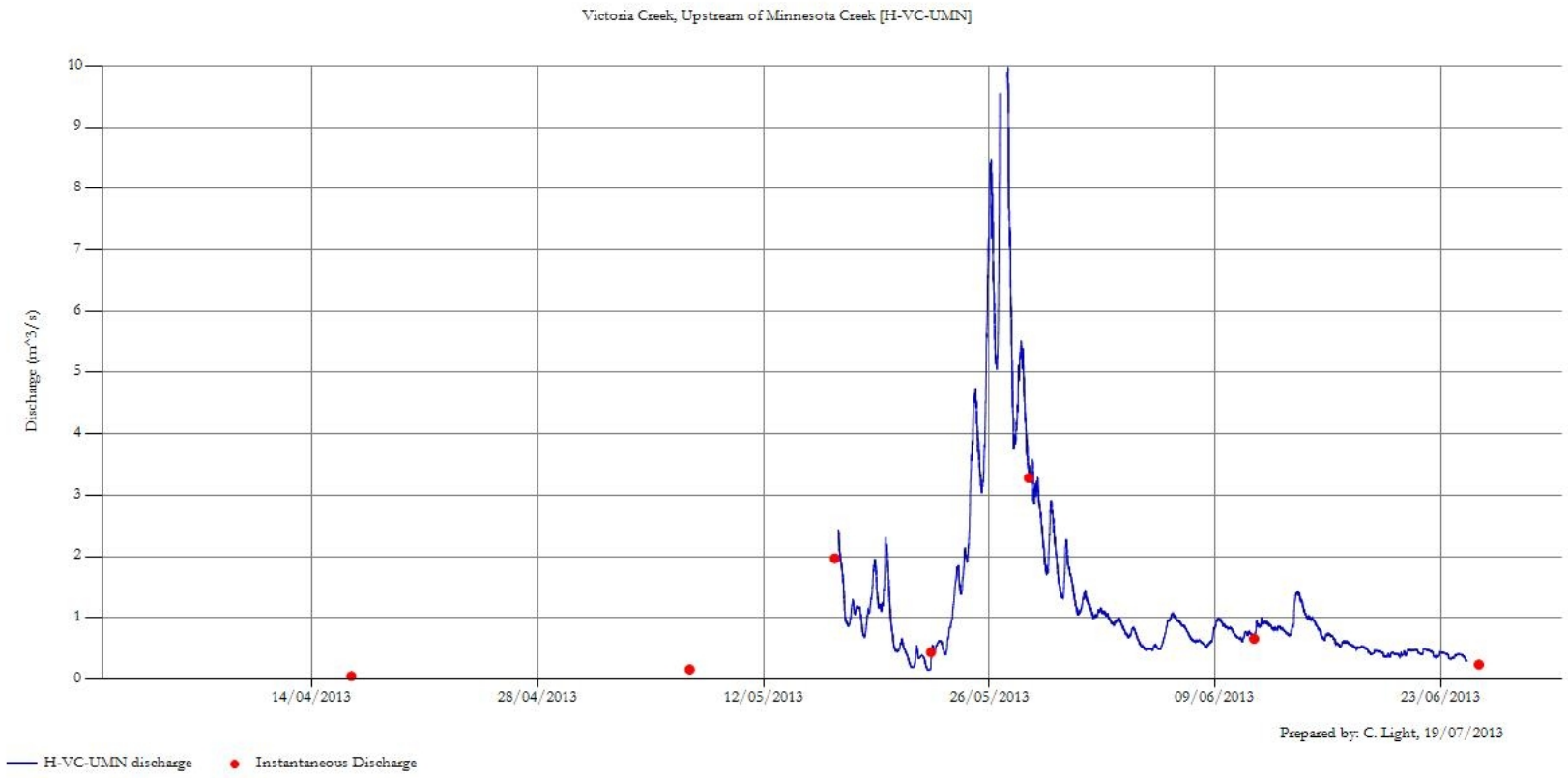

Figure D-22 H-VC-UMN Hydrograph.

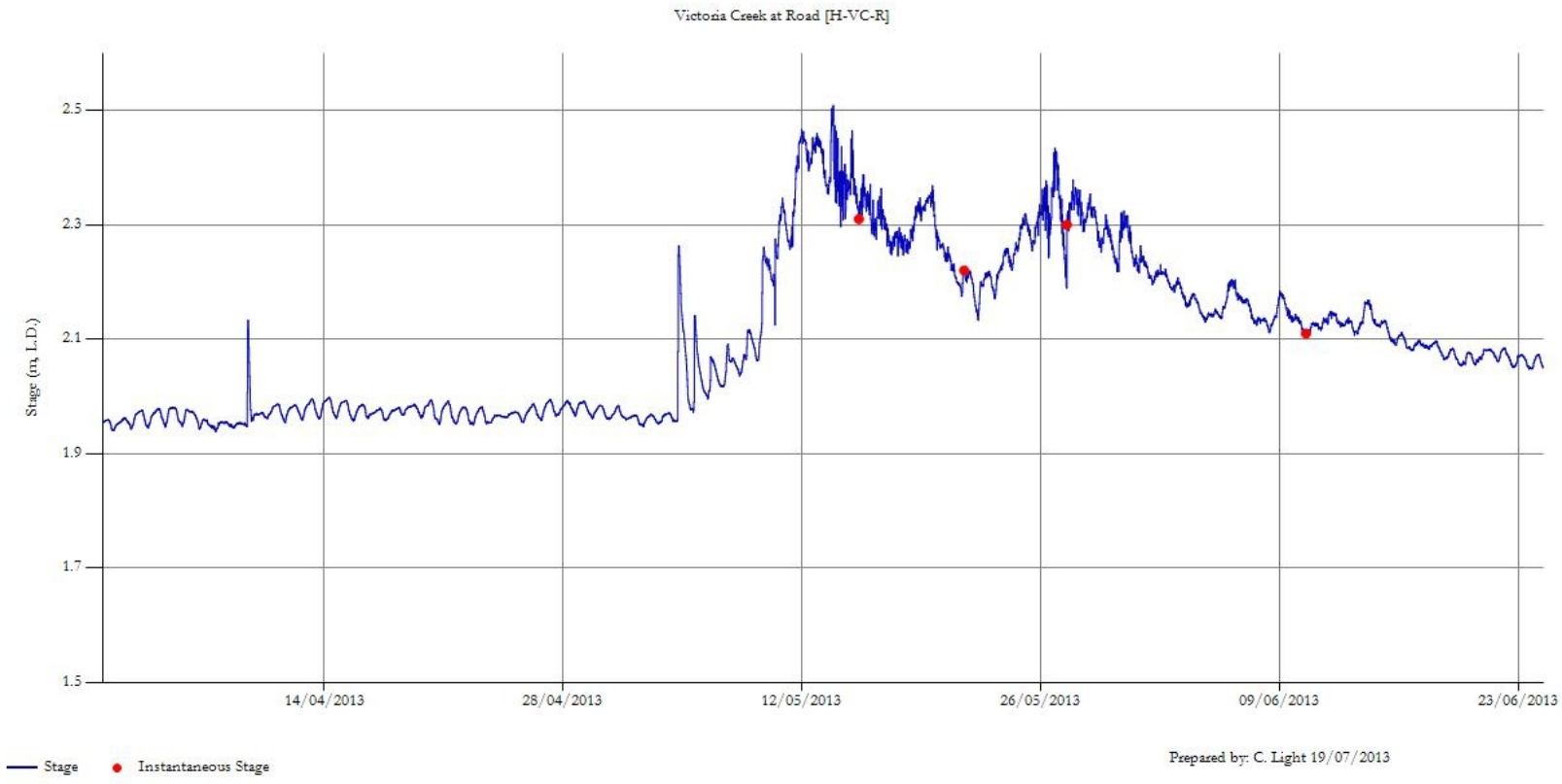

Figure D-23 H-VC-R Stage.

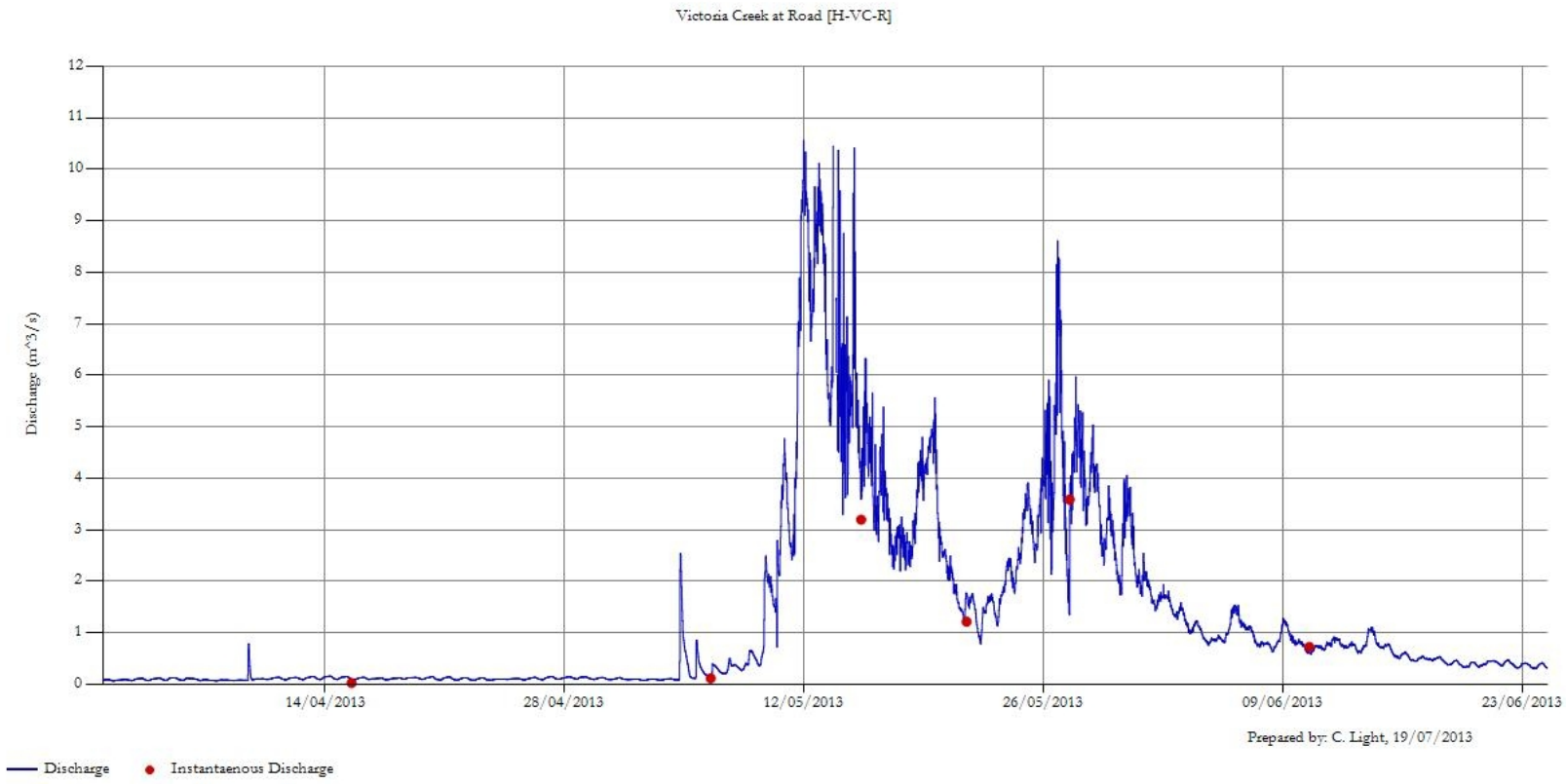

Figure D-24 H-VC-R Hydrograph.

APPENDIX E SURFACE WATER QUALITY DATA

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Table E-1. Water Quality Results for *in situ* data, lab analysis, and QA/QC program; April 15-17, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-130417-001 WQ-MS-S-03 4/17/2013 11:14:00 AM	0167-130417-002 WQ-DC-DX+105 4/17/2013 11:30:00 AM	0167-130417-003 Field Blank 4/17/2013 11:41:00 AM	0167-130417-005 WQ-VC-U 4/17/2013 9:41:00 AM	0167-130417-006 WQ-VC-REF 4/17/2013 10:07:00 AM	0167-130417-008 WQ-TP 4/17/2013 12:46:00 PM	0167-130417-009 WQ-SEEP 4/17/2013 11:55:00 AM
Temperature (in-situ)	°C	-	-	-	0.1	0.3	-	0	0	1.2	1.1
Specific Conductivity (in-situ)	µS/cm	-	-	-	1183	1178	-	245.2	251.4	2204	1696
pH (in-situ)	-	6.5 - 9.0	6.0 - 8.5	-	6.8	6.86	-	6.76	6.97	7.18	7.18
Turbidity (in-situ)	NTU	-	-	-	51.5	22.9	-	0.59	0.35	26.1	24.8
Colour, True	CU	15	-	5	-	-	-	-	-	-	-
Conductivity	µS/cm	-	-	2	1120	1150	<2.0	242	250	2130	1620
Hardness (as CaCO3)	mg/L	-	-	0.5	685	716	<0.50	128	135	1330	906
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1	7.61	7.91	***5.66***	7.85	7.97	7.81	7.44
Total Suspended Solids	mg/L	-	50	3	***123***	10.2	<3.0	<3.0	<3.0	6	35.5
Total Dissolved Solids	mg/L	-	-	10	736	920	<10	154	161	1930	1370
Turbidity	NTU	-	-	0.1	-	-	-	-	-	-	-
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1	280	269	1.1	114	116	210	248
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	280	269	1.1	114	116	210	248
Ammonia, Total (as N)	mg/L	0.75	-	0.005	0.178	0.0309	<0.0050	0.0108	<0.0050	***1.66***	***4.42***
Chloride (Cl)	mg/L	-	-	0.5	<5.0	<5.0	<0.50	<0.50	<0.50	<10	<5.0
Fluoride (F)	mg/L	0.12	-	0.02	<0.20	<0.20	<0.020	0.047	0.047	<0.40	<0.20
Nitrate (as N)	mg/L	13	-	0.005	<0.050	<0.050	<0.0050	0.166	0.179	0.14	1.55
Nitrite (as N)	mg/L	0.06	-	0.001	<0.010	<0.010	<0.0010	<0.0010	<0.0010	<0.020	0.05
Sulfate (SO4)	mg/L	-	-	0.5	399	427	<0.50	19.1	19	1150	725
Cyanide, Weak Acid Diss	mg/L	-	0.1	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0066
Cyanide, Total	mg/L	-	0.3	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0586
Cyanate	mg/L	-	-	0.2	<0.20	<0.20	<0.20	<0.20	<0.20	0.72	<0.20
Thiocyanate (SCN)	mg/L	-	-	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	3.37
Aluminum (Al)-Total	mg/L	0.005	-	0.003	***0.375***	***0.171***	<0.0030	***0.0143***	***0.0152***	***0.0132***	***0.0163***
Antimony (Sb)-Total	mg/L	-	0.15	0.0001	0.00645	0.00833	<0.00010	<0.00010	<0.00010	0.0531	0.00081
Arsenic (As)-Total	mg/L	0.005	0.15	0.0001	***0.523***	***0.0537***	<0.00010	0.00028	0.00028	***0.394***	***0.0477***
Barium (Ba)-Total	mg/L	-	1	0.00005	0.0626	0.0134	<0.000050	0.0801	0.0778	0.0268	0.0557
Beryllium (Be)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00020	<0.00010
Bismuth (Bi)-Total	mg/L	-	-	0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050
Boron (B)-Total	mg/L	-	-	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	0.149	0.102
Cadmium (Cd)-Total	mg/L	0.000033	0.02	0.00001	***0.00209***	***0.00401***	<0.000010	0.000025	0.000015	***0.00474***	***0.000664***
Calcium (Ca)-Total	mg/L	-	-	0.05	167	171	<0.050	32.1	33.4	385	271
Chromium (Cr)-Total	mg/L	0.0089	0.04	0.0001	0.00062	0.0003	<0.00010	0.00012	0.00013	0.00024	0.00047
Cobalt (Co)-Total	mg/L	-	-	0.0001	0.00199	0.00068	<0.00010	<0.00010	<0.00010	0.00297	0.00792
Copper (Cu)-Total	mg/L	0.002	0.2	0.0005	***0.004***	0.00098	<0.00050	0.00091	0.00075	***0.0256***	***0.00477***
Iron (Fe)-Total	mg/L	0.3	1	0.01	***22.3***	***0.894***	<0.010	0.024	0.033	***1.95***	***13.2***
Lead (Pb)-Total	mg/L	0.001	0.1	0.00005	***0.0246***	0.000547	<0.000050	<0.000050	<0.000050	***0.00196***	0.000145
Lithium (Li)-Total	mg/L	-	-	0.0005	0.00761	0.00821	<0.00050	<0.00050	<0.00050	0.0109	0.00069
Magnesium (Mg)-Total	mg/L	-	-	0.1	59.2	59.7	<0.10	11.5	12.3	91.1	54.4
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	***2.24***	***1.39***	<0.000050	0.0808	0.0597	***6.11***	***6.05***
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	0.000277	0.000441	<0.000050	0.000414	0.000422	0.00465	0.00114
Nickel (Ni)-Total	mg/L	0.1	0.3	0.0005	0.00166	0.00194	<0.00050	<0.00050	<0.00050	0.0045	0.00241
Phosphorus (P)-Total	mg/L	-	-	0.05	0.131	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Total	mg/L	-	-	0.1	3.54	3.4	<0.10	0.7	0.7	21.8	6.95
Selenium (Se)-Total	mg/L	0.001	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00020	0.00023
Silicon (Si)-Total	mg/L	-	-	0.05	8.02	6.33	<0.050	6.17	6.29	4.7	7.22
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	0.000383	0.000012	<0.000010	<0.000010	<0.000010	0.000064	0.000035
Sodium (Na)-Total	mg/L	-	-	0.05	5.69	5.02	<0.050	2.83	2.83	35.1	44.6

Table E-1. Water Quality Results for *in situ* data, lab analysis, and QA/QC program; April 15-17, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-130417-001 WQ-MS-S-03 4/17/2013 11:14:00 AM	0167-130417-002 WQ-DC-DX+105 4/17/2013 11:30:00 AM	0167-130417-003 Field Blank 4/17/2013 11:41:00 AM	0167-130417-005 WQ-VC-U 4/17/2013 9:41:00 AM	0167-130417-006 WQ-VC-REF 4/17/2013 10:07:00 AM	0167-130417-008 WQ-TP 4/17/2013 12:46:00 PM	0167-130417-009 WQ-SEEP 4/17/2013 11:55:00 AM
Strontium (Sr)-Total	mg/L	-	-	0.0002	0.421	0.402	<0.00020	0.358	0.377	0.951	0.783
Sulfur (S)-Total	mg/L	-	-	0.5	132	140	<0.50	6.81	6.87	402	247
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	0.000023	0.000097	<0.000010	<0.000010	<0.000010	0.000367	0.000011
Tin (Sn)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00020	<0.00010
Titanium (Ti)-Total	mg/L	-	-	0.01	0.022	0.011	<0.010	<0.010	<0.010	<0.020	<0.010
Uranium (U)-Total	mg/L	0.015	-	0.00001	0.002	0.00428	<0.000010	0.000893	0.000945	0.00196	0.00285
Vanadium (V)-Total	mg/L	-	-	0.001	0.0026	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020	0.0017
Zinc (Zn)-Total	mg/L	0.03	0.3	0.003	***0.226***	***0.742***	<0.0030	<0.0030	<0.0030	***0.593***	0.0099
Dissolved Metals Filtration Location		-	-	n/a	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD
Aluminum (Al)-Dissolved	mg/L	0.005	-	0.001	0.0038	<0.0010	<0.0010	***0.0053***	0.005	<0.0020	***0.0084***
Antimony (Sb)-Dissolved	mg/L	-	0.15	0.0001	0.00031	0.00853	<0.00010	<0.00010	<0.00010	0.0511	0.00076
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	***0.123***	***0.0273***	***<0.00010***	0.00026	0.00025	***0.0528***	***0.0353***
Barium (Ba)-Dissolved	mg/L	-	1	0.00005	0.0422	0.012	<0.000050	0.0803	0.0773	0.026	0.0545
Beryllium (Be)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00020	<0.00010
Bismuth (Bi)-Dissolved	mg/L	-	-	0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010	<0.00050
Boron (B)-Dissolved	mg/L	-	-	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	0.142	0.091
Cadmium (Cd)-Dissolved	mg/L	0.000033	0.02	0.00001	***0.000676***	***0.00106***	<0.000010	0.000025	0.000015	***0.00433***	***0.000359***
Calcium (Ca)-Dissolved	mg/L	-	-	0.05	174	182	<0.050	32.3	33.8	382	271
Chromium (Cr)-Dissolved	mg/L	0.0089	0.04	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00020	0.00019
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	0.00173	0.0006	<0.00010	<0.00010	<0.00010	0.00294	0.00777
Copper (Cu)-Dissolved	mg/L	0.002	0.2	0.0002	<0.00020	0.00024	<0.00020	0.00082	0.00066	***0.0208***	0.00174
Iron (Fe)-Dissolved	mg/L	0.3	1	0.01	***10.4***	***0.339***	<0.010	0.014	0.014	0.071	***11.4***
Lead (Pb)-Dissolved	mg/L	0.001	0.1	0.00005	0.000059	<0.000050	<0.000050	<0.000050	<0.000050	<0.00010	<0.000050
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	0.00699	0.00814	<0.00050	<0.00050	<0.00050	0.0104	<0.00050
Magnesium (Mg)-Dissolved	mg/L	-	-	0.1	60.7	63.6	<0.10	11.5	12.3	91.8	55.8
Manganese (Mn)-Dissolved	mg/L	-	0.5	0.00005	***2.22***	***1.39***	<0.000050	0.078	0.0577	***6.07***	***5.93***
Mercury (Hg)-Dissolved	mg/L	0.000026	0.005	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	mg/L	0.0073	-	0.00005	0.000213	0.000417	<0.000050	0.000396	0.000431	0.00455	0.00109
Nickel (Ni)-Dissolved	mg/L	0.1	0.3	0.0005	0.00119	0.0018	<0.00050	<0.00050	<0.00050	0.0045	0.00228
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	3.62	3.58	<0.10	0.69	0.69	22.2	6.91
Selenium (Se)-Dissolved	mg/L	0.001	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00020	0.00026
Silicon (Si)-Dissolved	mg/L	-	-	0.05	7.22	6.39	<0.050	6.12	6.31	4.57	7.07
Silver (Ag)-Dissolved	mg/L	0.0001	0.1	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000020	<0.000010
Sodium (Na)-Dissolved	mg/L	-	-	0.05	5.79	5.02	<0.050	2.75	2.8	34	44.7
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	0.405	0.412	<0.00020	0.348	0.379	0.958	0.762
Sulfur (S)-Dissolved	mg/L	-	-	0.5	131	145	<0.50	6.73	6.78	389	242
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001	<0.000010	0.000085	<0.000010	<0.000010	<0.000010	0.000365	<0.000010
Tin (Sn)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00020	<0.00010
Titanium (Ti)-Dissolved	mg/L	-	-	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.020	<0.010
Uranium (U)-Dissolved	mg/L	0.015	-	0.00001	0.00192	0.00441	<0.000010	0.000909	0.000934	0.002	0.00276
Vanadium (V)-Dissolved	mg/L	-	-	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020	0.0011
Zinc (Zn)-Dissolved	mg/L	0.03	0.3	0.001	***0.17***	***0.751***	<0.0010	0.0046	0.0011	***0.567***	0.0086
Chlorophyll a	µg/L	0.01	-	-	-	-	-	-	-	-	-
Pheopigments	µg/L	0.01	-	-	-	-	-	-	-	-	-

Table E-1. Water Quality Results for *in situ* data, lab analysis, and QA/QC program; April 15-17, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-130417-011 WQ-DC-U 4/17/2013 11:30:00 AM	0167-130416-019 WQ-VC-UMN 4/16/2013 12:14:00 PM	0167-130416-020 WQ-VC-DBC-r 4/16/2013 2:47:00 PM	0167-130416-021 WQ-VC-DBC 4/16/2013 2:47:00 PM	QA/QC WQ-VC-DBC-r	0167-130417-023 WQ-VC-R 4/17/2013 9:12:00 AM	0167-130417-027 WQ-PIT1 4/18/2013 9:45:00 AM
Temperature (in-situ)	°C	-	-	-	0.4	0	-	0	-	0	0.1
Specific Conductivity (in-situ)	µS/cm	-	-	-	1920	279.9	-	251.8	-	275	2093
pH (in-situ)	-	6.5 - 9.0	6.0 - 8.5	-	7.48	6.7	-	6.86	-	6.77	7.22
Turbidity (in-situ)	NTU	-	-	-	38.4	0..37	-	0.68	-	0.18	0.42
Colour, True	CU	15	-	5	-	-	-	-	-	-	-
Conductivity	µS/cm	-	-	2	1880	269	242	243	0%	270	2050
Hardness (as CaCO3)	mg/L	-	-	0.5	1150	139	127	129	2%	137	1410
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1	7.88	7.83	7.91	7.88	0%	7.88	7.85
Total Suspended Solids	mg/L	-	50	3	19.8	<3.0	<3.0	<3.0	-	<3.0	<3.0
Total Dissolved Solids	mg/L	-	-	10	1670	162	159	155	3%	174	1940
Turbidity	NTU	-	-	0.1	-	-	-	-	-	-	-
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1	291	114	113	114	1%	111	201
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	291	114	113	114	1%	111	201
Ammonia, Total (as N)	mg/L	0.75	-	0.005	***3.34***	<0.0050	<0.0050	<0.0050	-	<0.0050	0.0118
Chloride (Cl)	mg/L	-	-	0.5	<5.0	<0.50	<0.50	<0.50	-	0.81	<10
Fluoride (F)	mg/L	0.12	-	0.02	<0.20	0.046	0.046	0.046	0%	0.047	<0.40
Nitrate (as N)	mg/L	13	-	0.005	0.967	0.135	0.164	0.166	1%	0.139	<0.10
Nitrite (as N)	mg/L	0.06	-	0.001	0.024	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.020
Sulfate (SO4)	mg/L	-	-	0.5	897	32.8	19.3	19.4	1%	33.7	1190
Cyanide, Weak Acid Diss	mg/L	-	0.1	0.005	0.0113	<0.0050	<0.0050	<0.0050	-	<0.0050	-
Cyanide, Total	mg/L	-	0.3	0.005	0.0378	<0.0050	<0.0050	<0.0050	-	<0.0050	-
Cyanate	mg/L	-	-	0.2	0.84	0.44	0.31	0.33	6%	0.23	-
Thiocyanate (SCN)	mg/L	-	-	0.5	1.58	<0.50	<0.50	<0.50	-	<0.50	-
Aluminum (Al)-Total	mg/L	0.005	-	0.003	***0.0184***	***0.012***	***0.0136***	***0.0127***	7%	***0.0072***	<0.0060
Antimony (Sb)-Total	mg/L	-	0.15	0.0001	0.00082	0.00016	<0.00010	<0.00010	-	0.00028	0.00353
Arsenic (As)-Total	mg/L	0.005	0.15	0.0001	***0.0326***	0.00062	0.0003	0.00027	***10%***	0.00096	***0.00776***
Barium (Ba)-Total	mg/L	-	1	0.00005	0.071	0.0779	0.0818	0.0822	0%	0.0819	0.0147
Beryllium (Be)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00020
Bismuth (Bi)-Total	mg/L	-	-	0.0005	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.0010
Boron (B)-Total	mg/L	-	-	0.01	0.07	<0.010	<0.010	<0.010	-	<0.010	<0.020
Cadmium (Cd)-Total	mg/L	0.000033	0.02	0.00001	***0.000452***	***0.000034***	0.000023	0.000027	17%	0.000027	***0.00517***
Calcium (Ca)-Total	mg/L	-	-	0.05	286	34.4	32.6	33.7	3%	34.8	374
Chromium (Cr)-Total	mg/L	0.0089	0.04	0.0001	0.00034	0.00012	0.00014	0.00011	21%	0.0001	<0.00020
Cobalt (Co)-Total	mg/L	-	-	0.0001	0.00566	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00020
Copper (Cu)-Total	mg/L	0.002	0.2	0.0005	***0.00289***	0.00091	0.00089	0.0009	1%	0.00094	***0.003***
Iron (Fe)-Total	mg/L	0.3	1	0.01	***6.59***	0.022	0.029	0.027	7%	0.012	0.031
Lead (Pb)-Total	mg/L	0.001	0.1	0.00005	0.000199	<0.000050	<0.000050	<0.000050	-	<0.000050	0.00032
Lithium (Li)-Total	mg/L	-	-	0.0005	0.00226	<0.00050	<0.00050	<0.00050	-	0.00071	0.0103
Magnesium (Mg)-Total	mg/L	-	-	0.1	108	12	11.6	12	3%	12.2	112
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	***4.9***	0.128	0.083	0.084	1%	0.0561	0.129
Mercury (Hg)-Total	mg/L	0.000026	0.005	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010
Molybdenum (Mo)-Total	mg/L	0.0073	-	0.00005	0.00107	0.000369	0.000425	0.000427	0%	0.000401	0.00015
Nickel (Ni)-Total	mg/L	0.1	0.3	0.0005	0.00202	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.0010
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	6.98	0.77	0.71	0.73	3%	0.84	4.05
Selenium (Se)-Total	mg/L	0.001	-	0.0001	0.00019	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00020
Silicon (Si)-Total	mg/L	-	-	0.05	7.77	6.08	6.26	6.45	3%	6.18	3.66
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	0.000026	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000020
Sodium (Na)-Total	mg/L	-	-	0.05	38.3	3.49	2.8	2.82	1%	3.86	13.1

Table E-1. Water Quality Results for *in situ* data, lab analysis, and QA/QC program; April 15-17, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-130417-011 WQ-DC-U 4/17/2013 11:30:00 AM	0167-130416-019 WQ-VC-UMN 4/16/2013 12:14:00 PM	0167-130416-020 WQ-VC-DBC-r 4/16/2013 2:47:00 PM	0167-130416-021 WQ-VC-DBC 4/16/2013 2:47:00 PM	QA/QC WQ-VC-DBC-r	0167-130417-023 WQ-VC-R 4/17/2013 9:12:00 AM	0167-130417-027 WQ-PIT1 4/18/2013 9:45:00 AM
Strontium (Sr)-Total	mg/L	-	-	0.0002	0.994	0.35	0.361	0.356	1%	0.338	1.15
Sulfur (S)-Total	mg/L	-	-	0.5	311	11.5	7	7.08	1%	11.9	397
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	0.00001	<0.000010	<0.000010	<0.000010	-	<0.000010	0.000085
Tin (Sn)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00020
Titanium (Ti)-Total	mg/L	-	-	0.01	<0.010	<0.010	<0.010	<0.010	-	<0.010	<0.020
Uranium (U)-Total	mg/L	0.015	-	0.00001	0.0041	0.000924	0.000931	0.000909	2%	0.000875	0.00443
Vanadium (V)-Total	mg/L	-	-	0.001	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0020
Zinc (Zn)-Total	mg/L	0.03	0.3	0.003	0.008	<0.0030	<0.0030	<0.0030	-	<0.0030	***0.698***
Dissolved Metals Filtration Location		-	-	n/a	FIELD	FIELD	FIELD	FIELD	-	FIELD	FIELD
Aluminum (Al)-Dissolved	mg/L	0.005	-	0.001	0.0048	0.0044	***0.0054***	0.0049	9%	0.0036	<0.0020
Antimony (Sb)-Dissolved	mg/L	-	0.15	0.0001	0.00073	0.00016	<0.00010	<0.00010	-	0.00032	0.00332
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	***0.0236***	0.00059	0.00027	0.00024	11%	0.00092	***0.00631***
Barium (Ba)-Dissolved	mg/L	-	1	0.00005	0.0657	0.0788	0.0811	0.0818	1%	0.082	0.0143
Beryllium (Be)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00020
Bismuth (Bi)-Dissolved	mg/L	-	-	0.0005	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.0010
Boron (B)-Dissolved	mg/L	-	-	0.01	0.062	<0.010	<0.010	<0.010	-	<0.010	<0.020
Cadmium (Cd)-Dissolved	mg/L	0.000033	0.02	0.00001	***0.00032***	***0.000038***	0.000026	0.000025	4%	0.000022	***0.00488***
Calcium (Ca)-Dissolved	mg/L	-	-	0.05	282	35.5	32	32.4	1%	35	376
Chromium (Cr)-Dissolved	mg/L	0.0089	0.04	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00020
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	0.00539	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00020
Copper (Cu)-Dissolved	mg/L	0.002	0.2	0.0002	0.00132	0.00085	0.00081	0.00076	6%	0.00086	***0.00225***
Iron (Fe)-Dissolved	mg/L	0.3	1	0.01	***5.13***	<0.010	0.012	0.012	0%	0.013	<0.010
Lead (Pb)-Dissolved	mg/L	0.001	0.1	0.00005	<0.000050	<0.000050	<0.000050	<0.000050	-	<0.000050	<0.00010
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	0.00197	<0.00050	<0.00050	<0.00050	-	0.00066	0.0098
Magnesium (Mg)-Dissolved	mg/L	-	-	0.1	108	12.2	11.4	11.6	2%	12.1	113
Manganese (Mn)-Dissolved	mg/L	-	0.5	0.00005	***4.79***	0.122	0.08	0.0786	2%	0.057	0.083
Mercury (Hg)-Dissolved	mg/L	0.000026	0.005	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	mg/L	0.0073	-	0.00005	0.00104	0.000369	0.000402	0.000387	4%	0.000438	0.00014
Nickel (Ni)-Dissolved	mg/L	0.1	0.3	0.0005	0.00191	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.0010
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	6.94	0.8	0.68	0.71	4%	0.84	4.07
Selenium (Se)-Dissolved	mg/L	0.001	-	0.0001	0.00018	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00020
Silicon (Si)-Dissolved	mg/L	-	-	0.05	7.57	6.18	6.08	6.22	2%	6.08	3.65
Silver (Ag)-Dissolved	mg/L	0.0001	0.1	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000020
Sodium (Na)-Dissolved	mg/L	-	-	0.05	36.2	3.41	2.74	2.69	2%	3.72	12.6
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	0.972	0.348	0.361	0.353	2%	0.382	1.15
Sulfur (S)-Dissolved	mg/L	-	-	0.5	299	11.6	6.83	6.92	1%	11.7	385
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	0.000086
Tin (Sn)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00020
Titanium (Ti)-Dissolved	mg/L	-	-	0.01	<0.010	<0.010	<0.010	<0.010	-	<0.010	<0.020
Uranium (U)-Dissolved	mg/L	0.015	-	0.00001	0.00385	0.000915	0.000891	0.000853	4%	0.00099	0.00442
Vanadium (V)-Dissolved	mg/L	-	-	0.001	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0020
Zinc (Zn)-Dissolved	mg/L	0.03	0.3	0.001	0.0073	0.0031	0.0014	<0.0010	-	0.0021	***0.681***
Chlorophyll a	µg/L	0.01	-	-	-	-	-	-	-	-	0.144
Pheopigments	µg/L	0.01	-	-	-	-	-	-	-	-	0.37

Table E-1. Water Quality Results for *in situ* data, lab analysis, and QA/QC program; April 15-17, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-130417-028 WQ-PIT2 4/18/2013 9:45:00 AM	0167-130417-029 WQ-PIT3 4/18/2013 9:45:00 AM	0167-130417-030 WQ-PW 4/18/2013 9:45:00 AM	TRAVEL BLANK Trip Blank 4/18/2013 9:45:00 AM
Temperature (in-situ)	°C	-	-	-	1.7	4.4	1	-
Specific Conductivity (in-situ)	µS/cm	-	-	-	2103	2808	431.9	-
pH (in-situ)	-	6.5 - 9.0	6.0 - 8.5	-	7.31	6.72	7.2	-
Turbidity (in-situ)	NTU	-	-	-	0.49	0.66	0	-
Colour, True	CU	15	-	5	-	-	<5.0	-
Conductivity	µS/cm	-	-	2	2050	2700	415	<2.0
Hardness (as CaCO3)	mg/L	-	-	0.5	1430	1900	222	-
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1	7.89	7.6	8.11	5.97
Total Suspended Solids	mg/L	-	50	3	<3.0	3.6	-	<3.0
Total Dissolved Solids	mg/L	-	-	10	1930	2750	250	<10
Turbidity	NTU	-	-	0.1	-	-	<0.10	-
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1	201	258	-	<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	201	258	181	<1.0
Ammonia, Total (as N)	mg/L	0.75	-	0.005	0.0136	0.0536	-	<0.0050
Chloride (Cl)	mg/L	-	-	0.5	<10	<10	0.53	<0.50
Fluoride (F)	mg/L	0.12	-	0.02	<0.40	<0.40	0.094	<0.020
Nitrate (as N)	mg/L	13	-	0.005	0.11	<0.10	0.155	<0.0050
Nitrite (as N)	mg/L	0.06	-	0.001	<0.020	<0.020	<0.0010	<0.0010
Sulfate (SO4)	mg/L	-	-	0.5	1160	1640	43.2	<0.50
Cyanide, Weak Acid Diss	mg/L	-	0.1	0.005	-	-	-	<0.0050
Cyanide, Total	mg/L	-	0.3	0.005	-	-	-	<0.0050
Cyanate	mg/L	-	-	0.2	-	-	-	<0.20
Thiocyanate (SCN)	mg/L	-	-	0.5	-	-	-	<0.50
Aluminum (Al)-Total	mg/L	0.005	-	0.003	<0.0060	<0.0060	<0.010	<0.0030
Antimony (Sb)-Total	mg/L	-	0.15	0.0001	0.00307	0.00095	<0.00050	<0.00010
Arsenic (As)-Total	mg/L	0.005	0.15	0.0001	***0.00802***	***0.0105***	0.00038	<0.00010
Barium (Ba)-Total	mg/L	-	1	0.00005	0.0135	0.00987	0.096	<0.000050
Beryllium (Be)-Total	mg/L	-	-	0.0001	<0.00020	<0.00020	-	<0.00010
Bismuth (Bi)-Total	mg/L	-	-	0.0005	<0.0010	<0.0010	-	<0.00050
Boron (B)-Total	mg/L	-	-	0.01	<0.020	<0.020	<0.10	<0.010
Cadmium (Cd)-Total	mg/L	0.000033	0.02	0.00001	***0.00516***	***0.0111***	<0.00020	<0.000010
Calcium (Ca)-Total	mg/L	-	-	0.05	372	476	51.3	<0.050
Chromium (Cr)-Total	mg/L	0.0089	0.04	0.0001	<0.00020	<0.00020	<0.0020	<0.00010
Cobalt (Co)-Total	mg/L	-	-	0.0001	<0.00020	0.00183	-	<0.00010
Copper (Cu)-Total	mg/L	0.002	0.2	0.0005	***0.0028***	***0.0026***	<0.0010	<0.00050
Iron (Fe)-Total	mg/L	0.3	1	0.01	0.033	0.264	<0.030	<0.010
Lead (Pb)-Total	mg/L	0.001	0.1	0.00005	0.00024	0.00017	0.00067	<0.000050
Lithium (Li)-Total	mg/L	-	-	0.0005	0.0094	0.0115	-	<0.00050
Magnesium (Mg)-Total	mg/L	-	-	0.1	113	155	22.9	<0.10
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	0.346	***3.02***	<0.0020	<0.000050
Mercury (Hg)-Total	mg/L	0.000026	0.005	0.00001	<0.000010	<0.000010	<0.00020	<0.000010
Molybdenum (Mo)-Total	mg/L	0.0073	-	0.00005	0.00014	<0.00010	-	<0.000050
Nickel (Ni)-Total	mg/L	0.1	0.3	0.0005	<0.0010	0.002	-	<0.00050
Phosphorus (P)-Total	mg/L	-	-	0.05	<0.050	<0.050	-	<0.050
Potassium (K)-Total	mg/L	-	-	0.1	3.99	5.59	0.97	<0.10
Selenium (Se)-Total	mg/L	0.001	-	0.0001	<0.00020	<0.00020	<0.0010	<0.00010
Silicon (Si)-Total	mg/L	-	-	0.05	3.6	3.78	-	<0.050
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	<0.000020	<0.000020	-	<0.000010
Sodium (Na)-Total	mg/L	-	-	0.05	13.1	15.6	5	<0.050

Color Key:
- ***Exceeds CCME Guideline***
- ***Exceeds Mount Nansen Effluent Quality Standards***
- ***Exceeds both CCME and MN Standards***
- QA/QC Assessment - highlighted if > +/-10%

Note: For those guidelines that are hardness dependent, the most conservative guideline has been applied.

Table E-1. Water Quality Results for *in situ* data, lab analysis, and QA/QC program; April 15-17, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID	0167-130417-028	0167-130417-029	0167-130417-030	TRAVEL BLANK
				WQ Site ID	WQ-PIT2	WQ-PIT3	WQ-PW	Trip Blank
				Date Sampled	4/18/2013 9:45:00 AM	4/18/2013 9:45:00 AM	4/18/2013 9:45:00 AM	4/18/2013 9:45:00 AM
				Detection Limit				
Strontium (Sr)-Total	mg/L	-	-	0.0002	1.15	1.38	-	<0.00020
Sulfur (S)-Total	mg/L	-	-	0.5	395	527	-	<0.50
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	0.000083	0.00011	-	<0.000010
Tin (Sn)-Total	mg/L	-	-	0.0001	<0.00020	<0.00020	-	<0.00010
Titanium (Ti)-Total	mg/L	-	-	0.01	<0.020	<0.020	-	<0.010
Uranium (U)-Total	mg/L	0.015	-	0.00001	0.00435	0.00423	0.00242	<0.000010
Vanadium (V)-Total	mg/L	-	-	0.001	<0.0020	<0.0020	-	<0.0010
Zinc (Zn)-Total	mg/L	0.03	0.3	0.003	***0.69***	***1.11***	<0.050	<0.0030
Dissolved Metals Filtration Location		-	-	n/a	FIELD	FIELD	-	-
Aluminum (Al)-Dissolved	mg/L	0.005	-	0.001	<0.0020	<0.0020	-	-
Antimony (Sb)-Dissolved	mg/L	-	0.15	0.0001	0.00328	0.00069	-	-
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	***0.00656***	***0.00619***	-	-
Barium (Ba)-Dissolved	mg/L	-	1	0.00005	0.0147	0.0101	-	-
Beryllium (Be)-Dissolved	mg/L	-	-	0.0001	<0.00020	<0.00020	-	-
Bismuth (Bi)-Dissolved	mg/L	-	-	0.0005	<0.0010	<0.0010	-	-
Boron (B)-Dissolved	mg/L	-	-	0.01	<0.020	<0.020	-	-
Cadmium (Cd)-Dissolved	mg/L	0.000033	0.02	0.00001	***0.005***	***0.0106***	-	-
Calcium (Ca)-Dissolved	mg/L	-	-	0.05	381	487	-	-
Chromium (Cr)-Dissolved	mg/L	0.0089	0.04	0.0001	<0.00020	<0.00020	-	-
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	<0.00020	0.00166	-	-
Copper (Cu)-Dissolved	mg/L	0.002	0.2	0.0002	***0.00211***	0.00161	-	-
Iron (Fe)-Dissolved	mg/L	0.3	1	0.01	<0.010	0.152	-	-
Lead (Pb)-Dissolved	mg/L	0.001	0.1	0.00005	<0.00010	<0.00010	-	-
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	0.0094	0.0106	-	-
Magnesium (Mg)-Dissolved	mg/L	-	-	0.1	115	167	-	-
Manganese (Mn)-Dissolved	mg/L	-	0.5	0.00005	0.0916	***3.01***	-	-
Mercury (Hg)-Dissolved	mg/L	0.000026	0.005	0.00001	<0.000010	<0.000010	-	-
Molybdenum (Mo)-Dissolved	mg/L	0.0073	-	0.00005	0.00013	<0.00010	-	-
Nickel (Ni)-Dissolved	mg/L	0.1	0.3	0.0005	<0.0010	0.0019	-	-
Phosphorus (P)-Dissolved	mg/L	-	-	0.05	<0.050	<0.050	-	-
Potassium (K)-Dissolved	mg/L	-	-	0.1	4.06	5.84	-	-
Selenium (Se)-Dissolved	mg/L	0.001	-	0.0001	<0.00020	<0.00020	-	-
Silicon (Si)-Dissolved	mg/L	-	-	0.05	3.67	3.77	-	-
Silver (Ag)-Dissolved	mg/L	0.0001	0.1	0.00001	<0.000020	<0.000020	-	-
Sodium (Na)-Dissolved	mg/L	-	-	0.05	12.4	14.8	-	-
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	1.13	1.36	-	-
Sulfur (S)-Dissolved	mg/L	-	-	0.5	393	533	-	-
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001	0.000087	0.00011	-	-
Tin (Sn)-Dissolved	mg/L	-	-	0.0001	<0.00020	<0.00020	-	-
Titanium (Ti)-Dissolved	mg/L	-	-	0.01	<0.020	<0.020	-	-
Uranium (U)-Dissolved	mg/L	0.015	-	0.00001	0.00441	0.00407	-	-
Vanadium (V)-Dissolved	mg/L	-	-	0.001	<0.0020	<0.0020	-	-
Zinc (Zn)-Dissolved	mg/L	0.03	0.3	0.001	***0.69***	***1.09***	-	-
Chlorophyll a	µg/L	0.01	-	-	0.11	<0.010	-	-
Pheopigments	µg/L	0.01	-	-	0.11	0.16	-	-

Table E-2. Water Quality Results for *in situ* data, lab analysis, and QA/QC program; May 6-8, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-130507-001 WQ-VC-UMN 05/07/2013	0167-130507-003 WQ-VC-DBC 05/07/2013	0167-130507-007 WQ-VC-REF 05/07/2013	0167-130507-002 WQ-VC-U 05/07/2013	0167-130507-008 WQ-PC-U 05/07/2013	0167-130507-010 WQ-DC-U 05/07/2013	0167-130507-012 WQ-TP 05/07/2013
Temperature (in-situ)	°C	-	-	-	0	0	0	0	0	0	0.5
Specific Conductivity (in-situ)	µS/cm	-	-	-	486.9	211.5	207	207.6	265.9	1594	2190
pH (in-situ)	-	6.5 - 9.0	6.0 - 8.5	-	6.95	7.22	7.28	7.2	7.27	8	6.74
Turbidity (in-situ)	NTU	-	-	-	2.46	3.1	1.52	1.63	157	25.7	26.1
Colour, True	CU	15	-	5	-	-	-	-	-	-	-
Conductivity	µS/cm	-	-	2	478	211	211	205	259	1550	1990
Hardness (as CaCO3)	mg/L	-	-	0.5	245	104	106	104	121	993	1290
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1	8	8	8.03	7.97	7.61	8.16	7.88
Total Suspended Solids	mg/L	-	50	3	<3.0	5.4	<3.0	4.6	38.2	15.7	17.7
Total Dissolved Solids	mg/L	-	-	10	325	127	128	125	204	1280	1690
Turbidity	NTU	-	-	0.1	-	-	-	-	-	-	-
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1	115	98.7	102	98.4	40.8	232	199
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	115	98.7	102	98.4	40.8	232	199
Ammonia, Total (as N)	mg/L	0.75	-	0.005	0.0962	<0.0050	<0.0050	<0.0050	<0.0050	0.122	***1.2***
Chloride (Cl)	mg/L	-	-	0.5	0.51	<0.50	<0.50	<0.50	1.01	<5.0	<10
Fluoride (F)	mg/L	0.12	-	0.02	0.039	0.035	0.034	0.032	0.03	<0.20	<0.40
Nitrate (as N)	mg/L	13	-	0.005	0.133	0.0827	0.079	0.0786	0.0573	<0.050	0.15
Nitrite (as N)	mg/L	0.06	-	0.001	0.0021	<0.0010	<0.0010	<0.0010	<0.0010	<0.010	<0.020
Sulfate (SO4)	mg/L	-	-	0.5	141	17.9	15.4	15.5	83.5	737	1090
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	<0.0050	<0.0050	<0.0050	<0.0050
Cyanate	mg/L	-	-	0.2	<0.20	<0.20	<0.20	<0.20	<0.20	0.2	0.66
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	0.005	-	0.003	***0.0527***	***0.105***	***0.054***	***0.0992***	***5.44***	***0.263***	***0.255***
Antimony (Sb)-Total	mg/L	-	0.15	0.0001	0.00042	<0.00010	<0.00010	<0.00010	0.00202	0.00227	0.0545
Arsenic (As)-Total	mg/L	0.005	0.15	0.0001	0.00423	0.00062	0.00045	0.00051	***0.0273***	***0.0103***	***0.318***
Barium (Ba)-Total	mg/L	-	1	0.00005	0.074	0.0721	0.0698	0.0721	0.0921	0.0586	0.0281
Beryllium (Be)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	0.00014	<0.00010	<0.00020
Bismuth (Bi)-Total	mg/L	-	-	0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010
Boron (B)-Total	mg/L	-	-	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	0.014	0.126
Cadmium (Cd)-Total	mg/L	0.000033	0.02	0.00001	***0.000119***	***0.000057***	0.000031	***0.000075***	***0.000575***	***0.000159***	***0.00417***
Calcium (Ca)-Total	mg/L	-	-	0.05	63.5	26.5	26.4	25.7	32.8	224	352
Chromium (Cr)-Total	mg/L	0.0089	0.04	0.0001	0.00015	0.00022	0.00016	0.00022	0.00485	0.00058	0.00063
Cobalt (Co)-Total	mg/L	-	-	0.0001	0.00046	0.00012	<0.00010	0.00011	0.00162	0.0009	0.00295
Copper (Cu)-Total	mg/L	0.002	0.2	0.0005	0.00127	0.00127	0.0011	0.00126	***0.00824***	0.00144	***0.0277***
Iron (Fe)-Total	mg/L	0.3	1	0.01	0.171	0.174	0.116	0.175	***5.66***	***2.28***	***1.76***
Lead (Pb)-Total	mg/L	0.001	0.1	0.00005	0.000163	0.000174	0.000072	0.000218	***0.0126***	***0.00191***	***0.00408***
Lithium (Li)-Total	mg/L	-	-	0.0005	0.00115	0.0009	0.00103	0.00087	0.00376	0.00542	0.0107
Magnesium (Mg)-Total	mg/L	-	-	0.1	21.7	9.75	10.1	9.86	9.62	98.4	76.7
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	0.316	0.0842	0.0537	0.0676	0.225	***1.28***	***5.61***

Table E-2. Water Quality Results for *in situ* data, lab analysis, and QA/QC program; May 6-8, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-130507-001 WQ-VC-UMN 05/07/2013	0167-130507-003 WQ-VC-DBC 05/07/2013	0167-130507-007 WQ-VC-REF 05/07/2013	0167-130507-002 WQ-VC-U 05/07/2013	0167-130507-008 WQ-PC-U 05/07/2013	0167-130507-010 WQ-DC-U 05/07/2013	0167-130507-012 WQ-TP 05/07/2013
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	0.000453	0.000427	0.000413	0.000396	0.0004	0.000347	0.0043
Nickel (Ni)-Total	mg/L	0.1	0.3	0.0005	0.0006	<0.00050	<0.00050	<0.00050	0.00316	0.00125	0.0045
Phosphorus (P)-Total	mg/L	-	-	0.05	<0.050	<0.050	<0.050	<0.050	0.139	<0.050	<0.050
Potassium (K)-Total	mg/L	-	-	0.1	2.36	1.5	1.34	1.43	5.59	4.99	19.8
Selenium (Se)-Total	mg/L	0.001	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00020
Silicon (Si)-Total	mg/L	-	-	0.05	5.44	5.34	5.26	5.31	11.9	7.02	4.61
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	0.000301	0.00005	0.000105
Sodium (Na)-Total	mg/L	-	-	0.05	6.06	2.51	2.56	2.48	2.68	10.1	32.3
Strontium (Sr)-Total	mg/L	-	-	0.0002	0.4	0.311	0.335	0.313	0.232	0.775	0.914
Sulfur (S)-Total	mg/L	-	-	0.5	49	6.48	5.68	5.5	27.2	247	364
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	0.00008	0.000012	0.000343
Tin (Sn)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	0.00011	<0.00010	<0.00020
Titanium (Ti)-Total	mg/L	-	-	0.01	<0.010	<0.010	<0.010	<0.010	0.146	0.011	<0.020
Uranium (U)-Total	mg/L	0.015	-	0.00001	0.000959	0.000728	0.000765	0.000692	0.000407	0.00279	0.00179
Vanadium (V)-Total	mg/L	-	-	0.001	<0.0010	<0.0010	<0.0010	<0.0010	0.011	0.0013	<0.0020
Zinc (Zn)-Total	mg/L	0.03	0.3	0.003	0.0079	0.0033	<0.0030	0.0034	***0.0466***	0.0144	***0.519***
Dissolved Metals Filtration Location		-	-	n/a	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD
Aluminum (Al)-Dissolved	mg/L	0.005	-	0.001	***0.0053***	***0.0093***	***0.0109***	***0.0102***	***0.0546***	0.0035	<0.0020
Antimony (Sb)-Dissolved	mg/L	-	0.15	0.0001	0.00038	<0.00010	<0.00010	<0.00010	0.00031	0.00179	0.0533
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	0.00369	0.00043	0.00035	0.00038	0.00345	0.00393	***0.0671***
Barium (Ba)-Dissolved	mg/L	-	1	0.00005	0.0744	0.073	0.0712	0.0699	0.0384	0.0525	0.0256
Beryllium (Be)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00020
Bismuth (Bi)-Dissolved	mg/L	-	-	0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0010
Boron (B)-Dissolved	mg/L	-	-	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	0.012	0.129
Cadmium (Cd)-Dissolved	mg/L	0.000033	0.02	0.00001	***0.000105***	***0.000044***	0.000028	***0.000035***	***0.000297***	***0.000059***	***0.00406***
Calcium (Ca)-Dissolved	mg/L	-	-	0.05	62.4	26	26	25.6	33.7	229	373
Chromium (Cr)-Dissolved	mg/L	0.0089	0.04	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	0.00014	<0.00010	<0.00020
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	0.00043	<0.00010	<0.00010	<0.00010	0.00013	0.00072	0.00278
Copper (Cu)-Dissolved	mg/L	0.002	0.2	0.0002	0.0011	0.00103	0.001	0.00097	0.0017	0.00049	***0.0232***
Iron (Fe)-Dissolved	mg/L	0.3	1	0.01	0.04	0.041	0.049	0.043	0.105	0.215	0.049
Lead (Pb)-Dissolved	mg/L	0.001	0.1	0.00005	<0.000050	<0.000050	<0.000050	<0.000050	0.000197	<0.000050	<0.00010
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	0.00105	0.00081	0.00094	0.00086	<0.00050	0.00475	0.0109
Magnesium (Mg)-Dissolved	mg/L	-	-	0.1	21.6	9.56	9.94	9.82	8.99	102	82.3
Manganese (Mn)-Dissolved	mg/L	-	0.5	0.00005	0.303	0.0766	0.05	0.0583	0.127	1.23	5.81
Mercury (Hg)-Dissolved	mg/L	0.000026	0.005	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	mg/L	0.0073	-	0.00005	0.000432	0.000391	0.000373	0.000365	0.00009	0.000273	0.00439
Nickel (Ni)-Dissolved	mg/L	0.1	0.3	0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00083	0.0046
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	2.34	1.45	1.32	1.38	5.02	5.11	20.9
Selenium (Se)-Dissolved	mg/L	0.001	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00020
Silicon (Si)-Dissolved	mg/L	-	-	0.05	5.34	5.13	5.15	5.2	2.95	6.48	4.3

Table E-2. Water Quality Results for *in situ* data, lab analysis, and QA/QC program; May 6-8, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-130507-001 WQ-VC-UMN 05/07/2013	0167-130507-003 WQ-VC-DBC 05/07/2013	0167-130507-007 WQ-VC-REF 05/07/2013	0167-130507-002 WQ-VC-U 05/07/2013	0167-130507-008 WQ-PC-U 05/07/2013	0167-130507-010 WQ-DC-U 05/07/2013	0167-130507-012 WQ-TP 05/07/2013
Silver (Ag)-Dissolved	mg/L	0.0001	0.1	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	0.000025	<0.000010	<0.000020
Sodium (Na)-Dissolved	mg/L	-	-	0.05	5.95	2.53	2.39	2.43	2.54	9.6	32.3
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	0.386	0.302	0.321	0.306	0.232	0.69	0.916
Sulfur (S)-Dissolved	mg/L	-	-	0.5	47.6	6.44	5.56	5.36	27.8	240	363
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000344
Tin (Sn)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00020
Titanium (Ti)-Dissolved	mg/L	-	-	0.01	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.020
Uranium (U)-Dissolved	mg/L	0.015	-	0.00001	0.000918	0.000669	0.000698	0.000657	0.00026	0.00248	0.00179
Vanadium (V)-Dissolved	mg/L	-	-	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0020
Zinc (Zn)-Dissolved	mg/L	0.03	0.3	0.001	0.0072	0.0024	0.0027	0.0032	0.0106	0.0053	***0.52***

Color Key:
- ***Exceeds CCME Guideline***
- ***Exceeds Mount Nansen Effluent Standards***
- ***Exceeds both CCME and MN Standards***
- QA/QC Assessment - highlighted if > +/-10%

Note: For those guidelines that are hardness dependent, the most conservative guideline has been applied.

Table E-2. Water Quality Results for *in situ* data, lab analysis, and QA/QC program; May 6-8, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-130507-013 WQ-SEEP 05/07/2013	0167-130508-016 WQ-VC-R 05/08/2013	0167-130508-017 WQ-VC-R-r 05/08/2013	QA/QC WQ-VC-R-r	0167-130508-011 WQ-DC-DX+105-r 05/08/2013	0167-130508-005 WQ-DC-DX+105 05/08/2013	QA/QC WQ-DC-DX+105-r
Temperature (in-situ)	°C	-	-	-	1.2	0	-	-	-	0.3	-
Specific Conductivity (in-situ)	µS/cm	-	-	-	1647	401.2	-	-	-	870.1	-
pH (in-situ)	-	6.5 - 9.0	6.0 - 8.5	-	6.75	7.22	-	-	-	6.72	-
Turbidity (in-situ)	NTU	-	-	-	23.2	1.86	-	-	-	14.45	-
Colour, True	CU	15	-	5	-	-	-	-	-	-	-
Conductivity	µS/cm	-	-	2	1590	401	399	0%	856	847	1%
Hardness (as CaCO3)	mg/L	-	-	0.5	884	205	210	2%	493	486	1%
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1	7.47	7.95	7.97	0%	7.83	7.83	0%
Total Suspended Solids	mg/L	-	50	3	33.1	3.5	5.8	66%	8.2	6.8	17%
Total Dissolved Solids	mg/L	-	-	10	1250	276	267	3%	613	643	5%
Turbidity	NTU	-	-	0.1	-	-	-	-	-	-	-
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1	246	107	105	2%	196	195	1%
Alkalinity, Carbonate (as CaCO3)	mg/L	-	-	1	<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	-
Alkalinity, Total (as CaCO3)	mg/L	-	-	1	246	107	105	2%	196	195	1%
Ammonia, Total (as N)	mg/L	0.75	-	0.005	***4.63***	0.0458	0.0455	1%	0.0179	0.0207	16%
Chloride (Cl)	mg/L	-	-	0.5	<5.0	0.53	0.53	0%	<2.5	<2.5	-
Fluoride (F)	mg/L	0.12	-	0.02	<0.20	0.035	0.035	0%	<0.10	<0.10	-
Nitrate (as N)	mg/L	13	-	0.005	1.47	0.101	0.102	1%	0.029	<0.025	-
Nitrite (as N)	mg/L	0.06	-	0.001	0.048	0.0014	<0.0010	-	<0.0050	<0.0050	-
Sulfate (SO4)	mg/L	-	-	0.5	716	105	104	1%	300	294	2%
Cyanide, Weak Acid Diss	mg/L	-	0.1	0.005	0.0065	<0.0050	<0.0050	-	<0.0050	<0.0050	-
Cyanide, Total	mg/L	-	0.3	0.005	0.0414	<0.0050	<0.0050	-	<0.0050	<0.0050	-
Cyanate	mg/L	-	-	0.2	0.51	<0.20	<0.20	-	<0.20	<0.20	-
Thiocyanate (SCN)	mg/L	-	-	0.5	3.36	<0.50	<0.50	-	<0.50	<0.50	-
Aluminum (Al)-Total	mg/L	0.005	-	0.003	***0.0343***	***0.0509***	***0.0602***	18%	***0.26***	***0.344***	32%
Antimony (Sb)-Total	mg/L	-	0.15	0.0001	0.00087	0.00033	0.00034	3%	0.0116	0.0111	4%
Arsenic (As)-Total	mg/L	0.005	0.15	0.0001	***0.0507***	0.00354	0.00356	1%	***0.0614***	***0.0634***	3%
Barium (Ba)-Total	mg/L	-	1	0.00005	0.0553	0.0814	0.0796	2%	0.0221	0.0226	2%
Beryllium (Be)-Total	mg/L	-	-	0.0001	<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	-
Boron (B)-Total	mg/L	-	-	0.01	0.09	<0.010	<0.010	-	<0.010	<0.010	-
Cadmium (Cd)-Total	mg/L	0.000033	0.02	0.00001	***0.000655***	***0.000088***	***0.00009***	2%	***0.00287***	***0.00299***	4%
Calcium (Ca)-Total	mg/L	-	-	0.05	272	53.3	54.2	2%	134	125	7%
Chromium (Cr)-Total	mg/L	0.0089	0.04	0.0001	0.00053	0.00017	0.00019	12%	0.00038	0.00043	13%
Cobalt (Co)-Total	mg/L	-	-	0.0001	0.00871	0.00047	0.00043	9%	0.00058	0.00061	5%
Copper (Cu)-Total	mg/L	0.002	0.2	0.0005	***0.00517***	0.00145	0.00135	7%	***0.00321***	***0.00322***	0%
Iron (Fe)-Total	mg/L	0.3	1	0.01	***12.7***	0.242	0.255	5%	***0.959***	***0.996***	4%
Lead (Pb)-Total	mg/L	0.001	0.1	0.00005	0.000337	0.000184	0.000193	5%	***0.0156***	***0.015***	4%
Lithium (Li)-Total	mg/L	-	-	0.0005	0.00122	0.00121	0.00114	6%	0.00603	0.00558	7%
Magnesium (Mg)-Total	mg/L	-	-	0.1	48.1	17.2	17.6	2%	42.7	40.4	5%
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	***6.26***	0.293	0.287	2%	***1.06***	***1.02***	4%

Table E-2. Water Quality Results for *in situ* data, lab analysis, and QA/QC program; May 6-8, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-130507-013 WQ-SEEP 05/07/2013	0167-130508-016 WQ-VC-R 05/08/2013	0167-130508-017 WQ-VC-R-r 05/08/2013	QA/QC WQ-VC-R-r	0167-130508-011 WQ-DC-DX+105-r 05/08/2013	0167-130508-005 WQ-DC-DX+105 05/08/2013	QA/QC WQ-DC-DX+105-r
Mercury (Hg)-Total	mg/L	0.000026	0.005	0.00001	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	-
Molybdenum (Mo)-Total	mg/L	0.0073	-	0.00005	0.00107	0.000455	0.000444	2%	0.000401	0.000375	6%
Nickel (Ni)-Total	mg/L	0.1	0.3	0.0005	0.00249	0.00068	0.00061	10%	0.00165	0.00161	2%
Phosphorus (P)-Total	mg/L	-	-	0.05	<0.050	<0.050	<0.050	-	<0.050	<0.050	-
Potassium (K)-Total	mg/L	-	-	0.1	7.3	2.04	2.09	2%	4.81	4.5	6%
Selenium (Se)-Total	mg/L	0.001	-	0.0001	0.00022	0.00011	<0.00010	-	<0.00010	<0.00010	-
Silicon (Si)-Total	mg/L	-	-	0.05	7.12	5.33	5.44	2%	5.98	5.81	3%
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	0.000044	0.000237	0.000024	90%	0.000249	0.000241	3%
Sodium (Na)-Total	mg/L	-	-	0.05	46.3	4.9	4.71	4%	4.42	4.26	4%
Strontium (Sr)-Total	mg/L	-	-	0.0002	0.783	0.356	0.355	0%	0.307	0.285	7%
Sulfur (S)-Total	mg/L	-	-	0.5	244	37.2	36.8	1%	104	99.1	5%
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	0.000013	<0.000010	<0.000010	-	0.000081	0.000076	6%
Tin (Sn)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	-
Titanium (Ti)-Total	mg/L	-	-	0.01	<0.010	<0.010	<0.010	-	<0.010	0.011	-
Uranium (U)-Total	mg/L	0.015	-	0.00001	0.0024	0.000884	0.000913	3%	0.00296	0.00272	8%
Vanadium (V)-Total	mg/L	-	-	0.001	0.0018	<0.0010	<0.0010	-	0.0011	0.0013	18%
Zinc (Zn)-Total	mg/L	0.03	0.3	0.003	0.0086	0.0072	0.007	3%	***0.558***	***0.548***	2%
Dissolved Metals Filtration Location		-	-	n/a	FIELD	FIELD	FIELD	-	FIELD	FIELD	-
Aluminum (Al)-Dissolved	mg/L	0.005	-	0.001	***0.0078***	***0.0073***	***0.007***	4%	***0.0057***	***0.006***	5%
Antimony (Sb)-Dissolved	mg/L	-	0.15	0.0001	0.00077	0.00032	0.0003	6%	0.00878	0.00863	2%
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	***0.029***	0.00312	0.00319	2%	***0.0361***	***0.0359***	1%
Barium (Ba)-Dissolved	mg/L	-	1	0.00005	0.0518	0.0794	0.0787	1%	0.0186	0.0192	3%
Beryllium (Be)-Dissolved	mg/L	-	-	0.0001	<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	-
Boron (B)-Dissolved	mg/L	-	-	0.01	0.081	<0.010	<0.010	-	<0.010	<0.010	-
Cadmium (Cd)-Dissolved	mg/L	0.000033	0.02	0.00001	***0.00043***	***0.000085***	***0.000088***	4%	***0.000887***	***0.000888***	0%
Calcium (Ca)-Dissolved	mg/L	-	-	0.05	273	53.6	54.8	2%	128	126	2%
Chromium (Cr)-Dissolved	mg/L	0.0089	0.04	0.0001	0.00031	<0.00010	<0.00010	-	<0.00010	<0.00010	-
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	0.00833	0.00042	0.00041	2%	0.00047	0.00048	2%
Copper (Cu)-Dissolved	mg/L	0.002	0.2	0.0002	0.00169	0.00134	0.00121	10%	0.00172	0.00164	5%
Iron (Fe)-Dissolved	mg/L	0.3	1	0.01	***10.4***	0.108	0.108	0%	***0.369***	***0.368***	0%
Lead (Pb)-Dissolved	mg/L	0.001	0.1	0.00005	<0.000050	<0.000050	<0.000050	-	0.000358	0.000345	4%
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	0.00083	0.00114	0.00111	3%	0.00567	0.00554	2%
Magnesium (Mg)-Dissolved	mg/L	-	-	0.1	48.9	17.3	17.7	2%	42.3	41.9	1%
Manganese (Mn)-Dissolved	mg/L	-	0.5	0.00005	6.06	0.282	0.285	1%	0.995	0.988	1%
Mercury (Hg)-Dissolved	mg/L	0.000026	0.005	0.00001	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	-
Molybdenum (Mo)-Dissolved	mg/L	0.0073	-	0.00005	0.001	0.000409	0.000391	4%	0.000344	0.00034	1%
Nickel (Ni)-Dissolved	mg/L	0.1	0.3	0.0005	0.00233	0.00061	0.00059	3%	0.0021	0.00137	35%
Phosphorus (P)-Dissolved	mg/L	-	-	0.05	<0.050	<0.050	<0.050	-	<0.050	<0.050	-
Potassium (K)-Dissolved	mg/L	-	-	0.1	7.36	2.06	2.1	2%	4.52	4.49	1%
Selenium (Se)-Dissolved	mg/L	0.001	-	0.0001	0.00017	<0.00010	<0.00010	-	<0.00010	<0.00010	-
Silicon (Si)-Dissolved	mg/L	-	-	0.05	6.99	5.28	5.39	2%	5.35	5.29	1%

Table E-2. Water Quality Results for *in situ* data, lab analysis, and QA/QC program; May 6-8, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-130507-013 WQ-SEEP 05/07/2013	0167-130508-016 WQ-VC-R 05/08/2013	0167-130508-017 WQ-VC-R-r 05/08/2013	QA/QC WQ-VC-R-r	0167-130508-011 WQ-DC-DX+105-r 05/08/2013	0167-130508-005 WQ-DC-DX+105 05/08/2013	QA/QC WQ-DC-DX+105-r
Silver (Ag)-Dissolved	mg/L	0.0001	0.1	0.00001	<0.000010	<0.000010	<0.000010	-	0.000015	0.00002	33%
Sodium (Na)-Dissolved	mg/L	-	-	0.05	44.4	4.79	4.83	1%	4.34	4.1	6%
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	0.732	0.35	0.346	1%	0.291	0.283	3%
Sulfur (S)-Dissolved	mg/L	-	-	0.5	228	36.8	37.2	1%	96.6	96.6	0%
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001	<0.000010	<0.000010	<0.000010	-	0.000053	0.000059	11%
Tin (Sn)-Dissolved	mg/L	-	-	0.0001	<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	-
Uranium (U)-Dissolved	mg/L	0.015	-	0.00001	0.00232	0.000849	0.000854	1%	0.00279	0.00274	2%
Vanadium (V)-Dissolved	mg/L	-	-	0.001	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	-
Zinc (Zn)-Dissolved	mg/L	0.03	0.3	0.001	0.0079	0.0071	0.0076	7%	***0.541***	***0.534***	1%

Color Key:
- ***Exceeds CCME Guideline***
- ***Exceeds Mount Nansen Effluent Standards***
- ***Exceeds both CCME and MN Standards***
- QA/QC Assessment - highlighted if > +/-10%

Note: For those guidelines that are hardness dependent, the most conservative guideline has been applied.

Table E-2. Water Quality Results for *in situ* data, lab analysis, and QA/QC program; May 6-8, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-130507-TRAVEL-BLANK BLANK 05/07/2013	0167-130508-018 FIELD BLANK 05/08/2013
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	-	-	-	-	-
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	***5.97***	***5.73***
Total Suspended Solids	mg/L	-	50	3	<3.0	<3.0
Total Dissolved Solids	mg/L	-	-	10	<10	<10
Turbidity	NTU	-	-	0.1	-	-
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1	1.2	1.5
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	1.2	1.5
Ammonia, Total (as N)	mg/L	0.75	-	0.005	0.0212	<0.0050
Chloride (Cl)	mg/L	-	-	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	0.005	-	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	0.15	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	0.001	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

Table E-2. Water Quality Results for *in situ* data, lab analysis, and QA/QC program; May 6-8, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-130507-TRAVEL-BLANK BLANK 05/07/2013	0167-130508-018 FIELD BLANK 05/08/2013
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
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	-	0.15	0.0001	-	<0.00010
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	-	<0.00010
Barium (Ba)-Dissolved	mg/L	-	1	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	0.02	0.00001	-	<0.000010
Calcium (Ca)-Dissolved	mg/L	-	-	0.05	-	<0.050
Chromium (Cr)-Dissolved	mg/L	0.0089	0.04	0.0001	-	<0.00010
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	-	<0.00010
Copper (Cu)-Dissolved	mg/L	0.002	0.2	0.0002	-	0.00046
Iron (Fe)-Dissolved	mg/L	0.3	1	0.01	-	<0.010
Lead (Pb)-Dissolved	mg/L	0.001	0.1	0.00005	-	0.000082
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	-	<0.00050
Magnesium (Mg)-Dissolved	mg/L	-	-	0.1	-	<0.10
Manganese (Mn)-Dissolved	mg/L	-	0.5	0.00005	-	<0.000050
Mercury (Hg)-Dissolved	mg/L	0.000026	0.005	0.00001	-	<0.000010
Molybdenum (Mo)-Dissolved	mg/L	0.0073	-	0.00005	-	<0.000050
Nickel (Ni)-Dissolved	mg/L	0.1	0.3	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

Table E-2. Water Quality Results for *in situ* data, lab analysis, and QA/QC program; May 6-8, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-130507-TRAVEL-BLANK BLANK 05/07/2013	0167-130508-018 FIELD BLANK 05/08/2013
Silver (Ag)-Dissolved	mg/L	0.0001	0.1	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	0.3	0.001	-	<0.0010

Color Key:
- ***Exceeds CCME Guideline***
- ***Exceeds Mount Nansen Effluent Standards***
- ***Exceeds both CCME and MN Standards***
- QA/QC Assessment - highlighted if > +/-10%

Note: For those guidelines that are hardness dependent, the most conservative guideline has been applied.

Table E-3. Water Quality Results for *in situ* data, lab analysis, and QA/QC program; May 15 - 17, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-1305-16-001 WQ-DC-DX+105 5/16/2013	0167-1305-16-002 WQ-DC-DX 5/16/2013	0167-1305-16-003 WQ-BC 5/16/2013	0167-1305-17-004 WQ-ADIT-SEEP 5/17/2013	0167-1305-17-005 WQ-TP 5/17/2013	0167-1305-17-006 WQ-MN 5/17/2013	0167-1305-17-007 WQ-PC-U 5/17/2013	0167-1305-17-013 Field Blank 5/17/2013	0167-1305-16-014 WQ-VC-R 5/16/2013	0167-1305-16-015 WQ-VC_UMN 5/16/2013	0167-1305-17-017 WQ-VC-REF 5/16/2013
Temperature (in-situ)	°C	-	-	-	0.6	0.1	2.8	0.1	0.3	0	0	-	0	0	1.1
Specific Conductivity (in-situ)	µS/cm	-	-	-	201.6	39.5	64.8	68.8	333	25.4	64.8	-	79.2	91.2	50.8
pH (in-situ)	-	6.5 - 9.0	6.0 - 8.5	-	6.81	6.95	7.06	6.89	7.55	***6.32***	6.67	-	6.57	6.86	6.84
Turbidity (in-situ)	NTU	-	-	-	46.8	0.9	783	1	7.08	11.98	16.69	-	14.25	20.2	28.9
Colour, True	CU	15	-	5	-	-	-	-	-	-	-	-	-	-	-
Conductivity	µS/cm	-	-	2	216	86.2	80.9	70.4	374	26.1	68.4	<2.0	79.9	89.5	54.9
Hardness (as CaCO3)	mg/L	-	-	0.5	106	41.7	40.7	37.1	171	14.1	37.3	<0.50	41	48	30.1
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1	7.36	7.29	7.29	7.11	7.27	6.74	7.07	***6.2***	7.42	7.5	7.38
Total Suspended Solids	mg/L	-	50	3	***123***	<3.0	***1970***	20.1	9.8	18.3	8.2	<3.0	17.2	48.6	***114***
Total Dissolved Solids	mg/L	-	-	10	188	115	111	116	261	79	115	<10	62	68	78
Turbidity	NTU	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1	26.2	22.9	26.2	15.2	16.1	8.4	13.4	1.4	27.3	29.5	23.4
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	<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	26.2	22.9	26.2	15.2	16.1	8.4	13.4	1.4	27.3	29.5	23.4
Ammonia, Total (as N)	mg/L	0.75	-	0.005	0.0122	<0.0050	0.0319	<0.0050	0.107	0.0106	0.0091	***3.64***	0.0126	0.0128	0.008
Chloride (Cl)	mg/L	-	-	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	0.042	<0.020	0.042	<0.020	0.05	0.022	<0.020	<0.020	0.031	0.03	0.026
Nitrate (as N)	mg/L	13	-	0.005	<0.0050	<0.0050	0.0129	<0.0050	0.0392	<0.0050	<0.0050	<0.0050	0.022	0.0305	0.0144
Nitrite (as N)	mg/L	0.06	-	0.001	<0.0010	<0.0010	<0.0010	<0.0010	0.0015	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Sulfate (SO4)	mg/L	-	-	0.5	73	15.8	12.3	13.1	155	0.56	12.6	<0.50	10.6	13	3.08
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	<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	<0.0050
Cyanate	mg/L	-	-	0.2	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.4	<0.20	<0.20	<0.20
Thiocyanate (SCN)	mg/L	-	-	0.5	0.84	1.32	0.86	1.09	<0.50	0.84	1.35	<0.50	0.92	0.87	0.79
Aluminum (Al)-Total	mg/L	0.005	-	0.003	***2.6***	***0.107***	***25.2***	***0.293***	***0.236***	***0.568***	***0.311***	<0.0030	***0.888***	***1.08***	***2.02***
Antimony (Sb)-Total	mg/L	-	0.15	0.0001	0.00498	0.00055	0.00312	0.00039	0.015	0.00014	0.00028	<0.00010	0.00029	0.00035	0.00022
Arsenic (As)-Total	mg/L	0.005	0.15	0.0001	***0.0432***	***0.0054***	***0.19***	0.00318	***0.0484***	0.003	0.00281	<0.00010	0.00431	***0.00567***	0.00434
Barium (Ba)-Total	mg/L	-	1	0.00005	0.0619	0.0134	0.581	0.0256	0.00974	0.0474	0.0272	<0.000050	0.0473	0.0516	0.0678
Beryllium (Be)-Total	mg/L	-	-	0.0001	0.00015	<0.00010	0.00103	<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	0.00247	<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	<0.010	<0.010	0.016	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Total	mg/L	0.000033	0.02	0.00001	***0.012***	***0.000046***	***0.00361***	***0.00016***	***0.00353***	***0.000052***	***0.000128***	<0.000010	***0.000122***	***0.000149***	***0.000156***
Calcium (Ca)-Total	mg/L	-	-	0.05	30.3	11.6	22.1	10.9	53.4	4.22	10.9	<0.050	11.2	12.2	8.79
Chromium (Cr)-Total	mg/L	0.0089	0.04	0.0001	0.00342	0.00029	***0.0362***	0.00035	0.0003	0.00113	0.00032	<0.00010	0.00098	0.00131	0.00294
Cobalt (Co)-Total	mg/L	-	-	0.0001	0.00164	<0.00010	0.0172	0.00012	0.00069	0.0007	0.00019	<0.00010	0.00053	0.00071	0.00133
Copper (Cu)-Total	mg/L	0.002	0.2	0.0005	***0.0199***	***0.00235***	***0.0614***	***0.0042***	***0.0425***	***0.00366***	***0.00325***	<0.00050	***0.00451***	***0.00532***	***0.00695***
Iron (Fe)-Total	mg/L	0.3	1	0.01	***4.23***	0.116	***45.1***	0.297	***0.539***	***1.75***	0.3	<0.010	***1.2***	***1.54***	***3.02***
Lead (Pb)-Total	mg/L	0.001	0.1	0.00005	***0.0155***	0.000193	***0.153***	0.000561	***0.0201***	0.000359	0.000237	<0.000050	***0.00207***	***0.00345***	***0.00383***
Lithium (Li)-Total	mg/L	-	-	0.0005	0.0025	<0.00050	0.0165	<0.00050	0.00136	<0.00050	<0.00050	<0.00050	0.00065	0.00129	0.00162
Magnesium (Mg)-Total	mg/L	-	-	0.1	7.27	3.01	10.5	2.23	9.5	0.98	2.2	<0.10	3.3	3.68	2.98
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	0.437	0.0142	***1.81***	0.0142	***0.901***	0.159	0.0416	<0.000050	0.103	0.112	0.0974
Mercury (Hg)-Total	mg/L	0.000026	0.005	0.00001	***0.000032***	0.000013	***0.000087***	0.000014	<0.000010	0.000016	0.000014	<0.000010	0.000013	0.000014	0.000013
Molybdenum (Mo)-Total	mg/L	0.0073	-	0.00005	0.000129	<0.000050	0.00183	0.000056	0.000424	0.000172	0.000051	<0.000050	0.000251	0.000296	0.000289
Nickel (Ni)-Total	mg/L	0.1	0.3	0.0005	0.00423	<0.00050	0.026	0.00101	0.00143	0.00193	0.00098	<0.00050	0.00148	0.00161	0.00257
Phosphorus (P)-Total	mg/L	-	-	0.05	0.162	<0.050	1.62	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.072	0.127
Potassium (K)-Total	mg/L	-	-	0.1	3.12	3.58	4.84	1.35	2.22	1.28	1.35	<0.10	1.47	1.52	1.42
Selenium (Se)-Total	mg/L	0.001	-	0.0001	0.00012	<0.00010	0.00024	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Silicon (Si)-Total	mg/L	-	-	0.05	6.24	2.46	43.2	2.15	1.23	2.52	2.16	<0.050	3.76	4.09	4.93
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	0.000349	0.00004	***0.00149***	0.000036	0.000346	0.00001	0.000027	<0.000010	0.00004	0.000056	0.000056
Sodium (Na)-Total	mg/L	-	-	0.05	0.891	0.575	2.41	0.878	2.42	0.624	0.861	<0.050	1.06	1.16	0.88
Strontium (Sr)-Total	mg/L	-	-	0.0002	0.0697	0.0387	0.158	0.0733	0.119	0.02	0.07	<0.00020	0.0881	0.097	0.0925
Sulfur (S)-Total	mg/L	-	-	0.5	23.6	5.64	4.37	4.72	51.7	0.52	4.56	<0.50	3.76	4.61	1.3
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	0.000108	<0.000010	0.00046	<0.000010	0.00005	<0.000010	<0.000010	<0.000010	0.000016	0.00002	0.000024

Table E-3. Water Quality Results for *in situ* data, lab analysis, and QA/QC program; May 15 - 17, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-1305-16-001 WQ-DC-DX+105 5/16/2013	0167-1305-16-002 WQ-DC-DX 5/16/2013	0167-1305-16-003 WQ-BC 5/16/2013	0167-1305-17-004 WQ-ADIT-SEEP 5/17/2013	0167-1305-17-005 WQ-TP 5/17/2013	0167-1305-17-006 WQ-MN 5/17/2013	0167-1305-17-007 WQ-PC-U 5/17/2013	0167-1305-17-013 Field Blank 5/17/2013	0167-1305-16-014 WQ-VC-R 5/16/2013	0167-1305-16-015 WQ-VC_UMN 5/16/2013	0167-1305-17-017 WQ-VC-REF 5/16/2013
Tin (Sn)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	0.00044	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total	mg/L	-	-	0.01	0.106	<0.010	0.845	<0.010	<0.010	0.016	<0.010	<0.010	0.035	0.043	0.089
Uranium (U)-Total	mg/L	0.015	-	0.00001	0.000434	0.000021	0.0036	0.000108	0.000201	0.000118	0.000101	<0.000010	0.000288	0.000333	0.000545
Vanadium (V)-Total	mg/L	-	-	0.001	0.0092	<0.0010	0.0766	<0.0010	<0.0010	0.0031	<0.0010	<0.0010	0.0021	0.0028	0.006
Zinc (Zn)-Total	mg/L	0.03	0.3	0.003	***1.19***	0.0059	***0.336***	0.0162	***0.382***	0.0084	0.0141	<0.0030	0.0131	0.0166	0.0189
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	***0.206***	***0.0983***	***0.167***	***0.257***	***0.0637***	***0.184***	***0.288***	<0.0010	***0.144***	***0.147***	***0.149***
Antimony (Sb)-Dissolved	mg/L	-	0.15	0.0001	0.00227	0.00057	0.00026	0.00033	0.0116	<0.00010	0.00029	<0.00010	0.00015	0.00017	<0.00010
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	***0.00715***	***0.00522***	0.00319	0.00246	***0.0202***	0.00228	0.00261	<0.00010	0.00141	0.00122	0.00032
Barium (Ba)-Dissolved	mg/L	-	1	0.00005	0.0285	0.0137	0.0278	0.025	0.00769	0.0384	0.027	<0.000050	0.0382	0.0365	0.034
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	<0.010	<0.010	<0.010	0.012	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium (Cd)-Dissolved	mg/L	0.000033	0.02	0.00001	***0.011***	***0.000042***	***0.000168***	***0.000115***	***0.00325***	0.000021	***0.000119***	<0.000010	***0.000074***	***0.000088***	***0.000046***
Calcium (Ca)-Dissolved	mg/L	-	-	0.05	31	11.7	12	11.1	52.9	4.15	11.2	<0.050	11.2	13	8.12
Chromium (Cr)-Dissolved	mg/L	0.0089	0.04	0.0001	0.0002	0.0002	0.00025	0.00025	<0.00010	0.00035	0.00028	<0.00010	0.00012	0.00015	0.00017
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	0.0004	<0.00010	0.00035	<0.00010	0.00062	0.00054	0.00017	<0.00010	0.00027	0.00019	0.00017
Copper (Cu)-Dissolved	mg/L	0.002	0.2	0.0002	***0.0143***	***0.00215***	***0.00476***	***0.00354***	***0.0347***	***0.00256***	***0.00304***	<0.00020	***0.00356***	***0.00353***	***0.00335***
Iron (Fe)-Dissolved	mg/L	0.3	1	0.01	0.198	0.105	***0.349***	0.247	0.186	***1.22***	0.269	<0.010	***0.371***	0.253	0.199
Lead (Pb)-Dissolved	mg/L	0.001	0.1	0.00005	0.000729	0.00008	0.000998	0.000155	***0.00398***	0.000105	0.000176	<0.000050	0.00015	0.000152	<0.000050
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	0.00086	<0.00050	<0.00050	<0.00050	0.00089	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Magnesium (Mg)-Dissolved	mg/L	-	-	0.1	6.92	3.04	2.58	2.27	9.41	0.91	2.28	<0.10	3.18	3.78	2.39
Manganese (Mn)-Dissolved	mg/L	-	0.5	0.00005	0.376	0.0135	0.128	0.00728	***0.865***	0.149	0.04	<0.000050	0.0778	0.0658	0.0326
Mercury (Hg)-Dissolved	mg/L	0.000026	0.005	0.00001	<0.000010	0.000014	<0.000010	0.000013	<0.000010	<0.000010	0.000012	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	mg/L	0.0073	-	0.00005	0.000054	<0.000050	0.000514	<0.000050	0.000332	0.000144	<0.000050	<0.000050	0.000192	0.000198	0.000132
Nickel (Ni)-Dissolved	mg/L	0.1	0.3	0.0005	0.0025	<0.00050	0.00117	0.00095	0.00128	0.0016	0.00093	<0.00050	0.00106	0.0009	0.0008
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	2.92	3.6	1.15	1.39	2.13	1.26	1.42	<0.10	1.31	1.47	1.16
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	<0.00010
Silicon (Si)-Dissolved	mg/L	-	-	0.05	2.66	2.46	2.34	2.13	0.837	1.82	2.18	<0.050	2.33	2.61	2.14
Silver (Ag)-Dissolved	mg/L	0.0001	0.1	0.00001	0.000032	0.000034	0.000025	0.000024	0.000054	<0.000010	0.000021	<0.000010	<0.000010	<0.000010	<0.000010
Sodium (Na)-Dissolved	mg/L	-	-	0.05	0.799	0.554	0.987	0.876	2.37	0.618	0.859	<0.050	0.979	1.07	0.736
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	0.0638	0.0352	0.073	0.0749	0.104	0.0191	0.0738	<0.00020	0.0871	0.103	0.0835
Sulfur (S)-Dissolved	mg/L	-	-	0.5	24.5	5.61	4.37	4.73	50.6	<0.50	4.64	<0.50	3.74	4.92	1.28
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001	0.000013	<0.000010	<0.000010	<0.000010	0.000038	<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	<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	0.000278	0.00002	0.000403	0.000102	0.000163	0.000069	0.000104	<0.000010	0.00023	0.000266	0.000214
Vanadium (V)-Dissolved	mg/L	-	-	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0014	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	mg/L	0.03	0.3	0.001	***1.16***	0.0045	0.005	0.0146	***0.367***	0.005	0.0141	<0.0010	0.0064	0.0068	0.003

Table E-3. Water Quality Results for *in situ* data, lab analysis, and QA/QC program; May 15 - 17, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-1305-16-018 WQ-VC-DBC-r 5/16/2013	0167-1305-16-019 WQ-VC-DBC 5/16/2013	QA/QC WQ-VC-DBC-r	0167-1305-16-020 WQ-VC-U 5/16/2013	0167-1305-16-021 WQ-MS-S-03 5/16/2013	0167-1305-17-022 WQ-PC-D 5/17/2013	0167-1305-17-012 WQ-SEEP-r 5/17/2013	0167-1305-17-023 WQ-SEEP 5/17/2013	QA/QC WQ-VC-DBC-r	0167-1305-17-026 WQ-DC-U 5/17/2013	0167-1305-17-030 WQ-PW 5/17/2013
Temperature (in-situ)	°C	-	-	-	-	0.9	-	0.9	0.6	0	-	1	-	0	0.6
Specific Conductivity (in-situ)	µS/cm	-	-	-	-	63.9	-	60	1089	74.5	-	1200	-	393.6	385.1
pH (in-situ)	-	6.5 - 9.0	6.0 - 8.5	-	-	6.84	-	6.79	6.78	6.8	-	6.8	-	7	7.33
Turbidity (in-situ)	NTU	-	-	-	-	102	-	27.4	64.4	2.34	-	18.23	-	8.49	0
Colour, True	CU	15	-	5	-	-	-	-	-	-	-	-	-	-	<5.0
Conductivity	µS/cm	-	-	2	62.8	63.1	0%	59.2	1180	76.2	1240	1230	1%	400	402
Hardness (as CaCO3)	mg/L	-	-	0.5	35.3	34.5	2%	32.8	706	41.3	644	647	0%	213	220
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1	7.44	7.43	0%	7.45	7.88	7.01	7.73	7.82	1%	7.83	8.26
Total Suspended Solids	mg/L	-	50	3	***320***	***374***	17%	***155***	***74.8***	10.7	26	21.6	17%	21.2	-
Total Dissolved Solids	mg/L	-	-	10	87	88	1%	81	891	118	937	863	8%	307	234
Turbidity	NTU	-	-	0.1	-	-	-	-	-	-	-	-	-	-	0.45
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1	25	26.5	6%	24.5	258	14	188	182	3%	59.1	-
Alkalinity, Carbonate (as CaCO3)	mg/L	-	-	1	<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	-
Alkalinity, Total (as CaCO3)	mg/L	-	-	1	25	26.5	6%	24.5	258	14	188	182	3%	59.1	197
Ammonia, Total (as N)	mg/L	0.75	-	0.005	0.0167	0.0153	8%	0.0094	0.087	0.0113	***3.16***	***3.43***	9%	0.181	-
Chloride (Cl)	mg/L	-	-	0.5	<0.50	<0.50	-	<0.50	<5.0	<0.50	<5.0	<5.0	-	<0.50	<0.50
Fluoride (F)	mg/L	0.12	-	0.02	0.028	0.028	0%	<0.020	<0.20	<0.020	<0.20	<0.20	-	0.047	0.094
Nitrate (as N)	mg/L	13	-	0.005	0.017	0.0169	1%	0.0184	<0.050	<0.0050	1.1	1.12	2%	0.147	0.147
Nitrite (as N)	mg/L	0.06	-	0.001	<0.0010	<0.0010	-	<0.0010	<0.010	<0.0010	0.021	0.031	48%	0.0017	<0.0010
Sulfate (SO4)	mg/L	-	-	0.5	4.68	4.67	0%	3.46	447	15.8	507	520	3%	139	40.7
Cyanide, Weak Acid Diss	mg/L	-	0.1	0.005	<0.0050	<0.0050	-	<0.0050	<0.0050	<0.0050	0.0057	0.005	12%	<0.0050	-
Cyanide, Total	mg/L	-	0.3	0.005	<0.0050	<0.0050	-	<0.0050	<0.0050	<0.0050	0.029	0.0276	5%	<0.0050	-
Cyanate	mg/L	-	-	0.2	<0.20	<0.20	-	<0.20	<0.20	<0.20	<0.20	<0.20	-	<0.20	-
Thiocyanate (SCN)	mg/L	-	-	0.5	0.93	0.95	2%	0.82	<0.50	1.46	2.96	2.67	10%	0.8	-
Aluminum (Al)-Total	mg/L	0.005	-	0.003	***5.44***	***6.08***	12%	***2.75***	***1.37***	***0.468***	***0.074***	***0.0822***	11%	***0.407***	<0.010
Antimony (Sb)-Total	mg/L	-	0.15	0.0001	0.00099	0.00107	8%	0.00027	0.0335	0.00107	0.00081	0.00086	6%	0.00147	<0.00050
Arsenic (As)-Total	mg/L	0.005	0.15	0.0001	***0.0269***	***0.0299***	11%	***0.00577***	***0.224***	***0.00887***	***0.0459***	***0.0498***	8%	***0.0104***	0.00039
Barium (Ba)-Total	mg/L	-	1	0.00005	0.144	0.18	25%	0.101	0.0468	0.0306	0.0564	0.06	6%	0.0332	0.096
Beryllium (Be)-Total	mg/L	-	-	0.0001	0.00022	0.00028	27%	0.00013	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	-
Bismuth (Bi)-Total	mg/L	-	-	0.0005	<0.00050	0.00051	-	<0.00050	0.00101	<0.00050	<0.00050	<0.00050	-	<0.00050	-
Boron (B)-Total	mg/L	-	-	0.01	<0.010	<0.010	-	<0.010	<0.010	<0.010	0.059	0.068	15%	0.015	<0.10
Cadmium (Cd)-Total	mg/L	0.000033	0.02	0.00001	***0.000565***	***0.000673***	19%	***0.000217***	***0.00556***	***0.000476***	***0.000511***	***0.000568***	11%	***0.000506***	<0.00020
Calcium (Ca)-Total	mg/L	-	-	0.05	11.1	13.7	23%	11.9	207	13.8	192	215	12%	52.8	50.9
Chromium (Cr)-Total	mg/L	0.0089	0.04	0.0001	0.00725	0.00775	7%	0.00373	0.00182	0.00054	0.00175	0.00055	69%	0.00055	<0.0020
Cobalt (Co)-Total	mg/L	-	-	0.0001	0.00352	0.00388	10%	0.00179	0.00272	0.00021	0.00606	0.00681	12%	0.00081	-
Copper (Cu)-Total	mg/L	0.002	0.2	0.0005	***0.0136***	***0.0163***	20%	***0.00928***	***0.0151***	***0.0104***	***0.00838***	***0.00893***	7%	***0.00514***	<0.0010
Iron (Fe)-Total	mg/L	0.3	1	0.01	***8.36***	***8.87***	6%	***3.97***	***6.71***	***0.6***	***10.3***	***11.6***	13%	***1.74***	<0.030
Lead (Pb)-Total	mg/L	0.001	0.1	0.00005	***0.0206***	***0.0262***	27%	***0.00519***	***0.103***	***0.00411***	0.000535	0.000609	14%	***0.00448***	0.00064
Lithium (Li)-Total	mg/L	-	-	0.0005	0.00406	0.00441	9%	0.00218	0.0114	<0.00050	<0.00050	0.0008	-	0.00123	-
Magnesium (Mg)-Total	mg/L	-	-	0.1	4.18	4.94	18%	4	67.7	2.96	38.4	41.6	8%	17	22.7
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	0.308	0.356	16%	0.133	***2.35***	0.0346	***4.21***	***4.67***	11%	***0.601***	<0.0020
Mercury (Hg)-Total	mg/L	0.000026	0.005	0.00001	0.000025	0.00002	20%	0.000013	0.000012	0.000014	<0.000010	<0.000010	-	<0.000010	<0.00020
Molybdenum (Mo)-Total	mg/L	0.0073	-	0.00005	0.000598	0.000654	9%	0.000311	0.000515	0.000091	0.00101	0.00116	15%	0.000211	-
Nickel (Ni)-Total	mg/L	0.1	0.3	0.0005	0.00552	0.00616	12%	0.00334	0.00408	0.00128	0.00215	0.00246	14%	0.00152	-
Phosphorus (P)-Total	mg/L	-	-	0.05	0.405	0.471	16%	0.207	<0.050	<0.050	<0.050	<0.050	-	<0.050	-
Potassium (K)-Total	mg/L	-	-	0.1	2.21	2.46	11%	1.81	4.36	1.7	4.99	5.86	17%	2.29	0.9
Selenium (Se)-Total	mg/L	0.001	-	0.0001	<0.00010	0.0001	-	<0.00010	<0.00010	<0.00010	0.0002	0.0002	0%	<0.00010	<0.0010
Silicon (Si)-Total	mg/L	-	-	0.05	11.2	12.1	8%	6.58	9.25	2.7	5.68	6.24	10%	2.72	-
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	0.000215	0.000234	9%	0.00006	***0.00173***	0.000094	0.000056	0.000059	5%	0.000034	-
Sodium (Na)-Total	mg/L	-	-	0.05	3.17	1.45	54%	1.17	5.22	1.03	29.2	32.8	12%	3.25	5.3
Strontium (Sr)-Total	mg/L	-	-	0.0002	0.114	0.138	21%	0.123	0.483	0.0906	0.579	0.672	16%	0.162	-
Sulfur (S)-Total	mg/L	-	-	0.5	1.96	2.27	16%	1.86	168	6.43	170	189	11%	47.3	-
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	0.000091	0.000104	14%	0.000034	0.000212	0.000016	0.000011	0.00001	9%	<0.000010	-

Table E-3. Water Quality Results for *in situ* data, lab analysis, and QA/QC program; May 15 - 17, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-1305-16-018 WQ-VC-DBC-r 5/16/2013	0167-1305-16-019 WQ-VC-DBC 5/16/2013	QA/QC WQ-VC-DBC-r	0167-1305-16-020 WQ-VC-U 5/16/2013	0167-1305-16-021 WQ-MS-S-03 5/16/2013	0167-1305-17-022 WQ-PC-D 5/17/2013	0167-1305-17-012 WQ-SEEP-r 5/17/2013	0167-1305-17-023 WQ-SEEP 5/17/2013	QA/QC WQ-VC-DBC-r	0167-1305-17-026 WQ-DC-U 5/17/2013	0167-1305-17-030 WQ-PW 5/17/2013
Tin (Sn)-Total	mg/L	-	-	0.0001	0.00013	0.00014	8%	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	-
Titanium (Ti)-Total	mg/L	-	-	0.01	0.226	0.244	8%	0.127	0.063	<0.010	<0.010	<0.010	-	0.013	-
Uranium (U)-Total	mg/L	0.015	-	0.00001	0.000907	0.00119	31%	0.000716	0.00427	0.000142	0.00203	0.00238	17%	0.000544	0.00241
Vanadium (V)-Total	mg/L	-	-	0.001	0.0157	0.0178	13%	0.0081	0.0057	<0.0010	0.0016	0.0018	13%	0.0014	-
Zinc (Zn)-Total	mg/L	0.03	0.3	0.003	***0.0571***	***0.0646***	13%	0.025	***1.39***	***0.0453***	0.012	0.0135	13%	***0.0924***	<0.050
Dissolved Metals Filtration Location		-	-	n/a	FIELD	FIELD	-	FIELD	FIELD	FIELD	FIELD	FIELD	-	FIELD	-
Aluminum (Al)-Dissolved	mg/L	0.005	-	0.001	***0.158***	***0.156***	1%	***0.156***	0.002	***0.252***	***0.0309***	***0.0335***	8%	***0.155***	-
Antimony (Sb)-Dissolved	mg/L	-	0.15	0.0001	<0.00010	<0.00010	-	<0.00010	0.0148	0.0005	0.00063	0.00062	2%	0.00136	-
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	0.00069	0.00066	4%	0.00035	***0.08***	0.00288	***0.0317***	***0.0323***	2%	***0.00629***	-
Barium (Ba)-Dissolved	mg/L	-	1	0.00005	0.0328	0.0345	5%	0.0348	0.0197	0.0232	0.0531	0.0516	3%	0.0291	-
Beryllium (Be)-Dissolved	mg/L	-	-	0.0001	<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	-
Boron (B)-Dissolved	mg/L	-	-	0.01	<0.010	<0.010	-	<0.010	<0.010	<0.010	0.055	0.056	2%	0.013	-
Cadmium (Cd)-Dissolved	mg/L	0.000033	0.02	0.00001	***0.000063***	***0.000066***	5%	***0.000045***	***0.00222***	***0.000337***	***0.000358***	***0.000364***	2%	***0.000381***	-
Calcium (Ca)-Dissolved	mg/L	-	-	0.05	9.66	9.4	3%	8.85	184	12.2	194	196	1%	55.7	-
Chromium (Cr)-Dissolved	mg/L	0.0089	0.04	0.0001	0.00016	0.0001	38%	0.00016	<0.00010	0.00022	0.00035	0.00036	3%	0.00015	-
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	0.00018	0.00018	0%	0.00016	0.00158	<0.00010	0.00589	0.00602	2%	0.00072	-
Copper (Cu)-Dissolved	mg/L	0.002	0.2	0.0002	***0.00366***	***0.00357***	2%	***0.00339***	0.00056	***0.0072***	***0.00439***	***0.00455***	4%	***0.00378***	-
Iron (Fe)-Dissolved	mg/L	0.3	1	0.01	0.223	0.215	4%	0.201	***2.48***	0.255	***8.6***	***8.82***	3%	***1.12***	-
Lead (Pb)-Dissolved	mg/L	0.001	0.1	0.00005	0.000162	0.000162	0%	<0.000050	0.00061	0.000691	0.000098	0.000093	5%	0.000369	-
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	<0.00050	<0.00050	-	<0.00050	0.01	<0.00050	<0.00050	0.00052	-	0.0011	-
Magnesium (Mg)-Dissolved	mg/L	-	-	0.1	2.73	2.67	2%	2.6	60.1	2.61	38.8	38.1	2%	18	-
Manganese (Mn)-Dissolved	mg/L	-	0.5	0.00005	0.0399	0.0382	4%	0.026	***1.91***	0.0147	***4.08***	***4.14***	1%	***0.621***	-
Mercury (Hg)-Dissolved	mg/L	0.000026	0.005	0.00001	<0.000010	<0.000010	-	<0.000010	<0.000010	0.000012	<0.000010	<0.000010	-	<0.000010	-
Molybdenum (Mo)-Dissolved	mg/L	0.0073	-	0.00005	0.000174	0.000174	0%	0.000143	0.000358	<0.000050	0.000954	0.000975	2%	0.000184	-
Nickel (Ni)-Dissolved	mg/L	0.1	0.3	0.0005	0.00089	0.00088	1%	0.00083	0.00245	0.00098	0.00199	0.00202	2%	0.00118	-
Phosphorus (P)-Dissolved	mg/L	-	-	0.05	<0.050	<0.050	-	<0.050	<0.050	<0.050	<0.050	<0.050	-	<0.050	-
Potassium (K)-Dissolved	mg/L	-	-	0.1	1.34	1.21	10%	1.22	3.45	1.48	5.09	5.3	4%	2.32	-
Selenium (Se)-Dissolved	mg/L	0.001	-	0.0001	<0.00010	<0.00010	-	<0.00010	<0.00010	<0.00010	0.00019	0.00021	11%	<0.00010	-
Silicon (Si)-Dissolved	mg/L	-	-	0.05	2.45	2.29	7%	2.27	5.98	2.17	5.6	5.49	2%	2.41	-
Silver (Ag)-Dissolved	mg/L	0.0001	0.1	0.00001	<0.000010	<0.000010	-	<0.000010	<0.000010	0.000023	0.000016	0.000015	6%	<0.000010	-
Sodium (Na)-Dissolved	mg/L	-	-	0.05	0.854	0.847	1%	0.802	4.39	0.896	27.7	29.5	6%	3.39	-
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	0.0886	0.0853	4%	0.0904	0.454	0.0786	0.553	0.585	6%	0.168	-
Sulfur (S)-Dissolved	mg/L	-	-	0.5	1.97	1.85	6%	1.42	146	5.57	167	167	0%	48.4	-
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001	<0.000010	<0.000010	-	<0.000010	0.000091	<0.000010	0.000012	<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	-
Titanium (Ti)-Dissolved	mg/L	-	-	0.01	<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	0.000237	0.000243	3%	0.000208	0.00377	0.000099	0.00211	0.00205	3%	0.000551	-
Vanadium (V)-Dissolved	mg/L	-	-	0.001	<0.0010	<0.0010	-	<0.0010	<0.0010	<0.0010	0.001	0.001	0%	<0.0010	-
Zinc (Zn)-Dissolved	mg/L	0.03	0.3	0.001	0.0047	0.0038	19%	0.0039	***1.09***	***0.0335***	0.0102	0.0116	14%	***0.0873***	-

Table E-3. Water Quality Results for *in situ* data, lab analysis, and QA/QC program; May 15 - 17, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	TRIP Trip Blank 5/17/2013
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	-	-	-	-
Colour, True	CU	15	-	5	-
Conductivity	µS/cm	-	-	2	<2.0
Hardness (as CaCO3)	mg/L	-	-	0.5	-
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1	***5.98***
Total Suspended Solids	mg/L	-	50	3	<3.0
Total Dissolved Solids	mg/L	-	-	10	<10
Turbidity	NTU	-	-	0.1	-
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1	<1.0
Alkalinity, Carbonate (as CaCO3)	mg/L	-	-	1	<1.0
Alkalinity, Hydroxide (as CaCO3)	mg/L	-	-	1	<1.0
Alkalinity, Total (as CaCO3)	mg/L	-	-	1	<1.0
Ammonia, Total (as N)	mg/L	0.75	-	0.005	<0.0050
Chloride (Cl)	mg/L	-	-	0.5	<0.50
Fluoride (F)	mg/L	0.12	-	0.02	<0.020
Nitrate (as N)	mg/L	13	-	0.005	<0.0050
Nitrite (as N)	mg/L	0.06	-	0.001	<0.0010
Sulfate (SO4)	mg/L	-	-	0.5	<0.50
Cyanide, Weak Acid Diss	mg/L	-	0.1	0.005	<0.0050
Cyanide, Total	mg/L	-	0.3	0.005	<0.0050
Cyanate	mg/L	-	-	0.2	0.27
Thiocyanate (SCN)	mg/L	-	-	0.5	-
Aluminum (Al)-Total	mg/L	0.005	-	0.003	<0.0030
Antimony (Sb)-Total	mg/L	-	0.15	0.0001	<0.00010
Arsenic (As)-Total	mg/L	0.005	0.15	0.0001	<0.00010
Barium (Ba)-Total	mg/L	-	1	0.00005	<0.000050
Beryllium (Be)-Total	mg/L	-	-	0.0001	<0.00010
Bismuth (Bi)-Total	mg/L	-	-	0.0005	<0.00050
Boron (B)-Total	mg/L	-	-	0.01	<0.010
Cadmium (Cd)-Total	mg/L	0.000033	0.02	0.00001	<0.000010
Calcium (Ca)-Total	mg/L	-	-	0.05	<0.050
Chromium (Cr)-Total	mg/L	0.0089	0.04	0.0001	<0.00010
Cobalt (Co)-Total	mg/L	-	-	0.0001	<0.00010
Copper (Cu)-Total	mg/L	0.002	0.2	0.0005	<0.00050
Iron (Fe)-Total	mg/L	0.3	1	0.01	<0.010
Lead (Pb)-Total	mg/L	0.001	0.1	0.00005	<0.000050
Lithium (Li)-Total	mg/L	-	-	0.0005	<0.00050
Magnesium (Mg)-Total	mg/L	-	-	0.1	<0.10
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	<0.000050
Mercury (Hg)-Total	mg/L	0.000026	0.005	0.00001	<0.000010
Molybdenum (Mo)-Total	mg/L	0.0073	-	0.00005	<0.000050
Nickel (Ni)-Total	mg/L	0.1	0.3	0.0005	<0.00050
Phosphorus (P)-Total	mg/L	-	-	0.05	<0.050
Potassium (K)-Total	mg/L	-	-	0.1	<0.10
Selenium (Se)-Total	mg/L	0.001	-	0.0001	<0.00010
Silicon (Si)-Total	mg/L	-	-	0.05	<0.050
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	<0.000010
Sodium (Na)-Total	mg/L	-	-	0.05	<0.050
Strontium (Sr)-Total	mg/L	-	-	0.0002	<0.00020
Sulfur (S)-Total	mg/L	-	-	0.5	<0.50
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	<0.000010

Color Key: ***Exceeds CCME Guideline***
Exceeds Mount Nansen Effluent Standards
Exceeds both CCME and MN Standards
QA/QC Assessment - highlighted if > +/-10%

Note: For those guidelines that are hardness dependent, the most conservative guideline has been applied.

Table E-3. Water Quality Results for *in situ* data, lab analysis, and QA/QC program; May 15 - 17, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	TRIP Trip Blank 5/17/2013
Tin (Sn)-Total	mg/L	-	-	0.0001	<0.00010
Titanium (Ti)-Total	mg/L	-	-	0.01	<0.010
Uranium (U)-Total	mg/L	0.015	-	0.00001	<0.000010
Vanadium (V)-Total	mg/L	-	-	0.001	<0.0010
Zinc (Zn)-Total	mg/L	0.03	0.3	0.003	<0.0030
Dissolved Metals Filtration Location		-	-	n/a	-
Aluminum (Al)-Dissolved	mg/L	0.005	-	0.001	-
Antimony (Sb)-Dissolved	mg/L	-	0.15	0.0001	-
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	-
Barium (Ba)-Dissolved	mg/L	-	1	0.00005	-
Beryllium (Be)-Dissolved	mg/L	-	-	0.0001	-
Bismuth (Bi)-Dissolved	mg/L	-	-	0.0005	-
Boron (B)-Dissolved	mg/L	-	-	0.01	-
Cadmium (Cd)-Dissolved	mg/L	0.000033	0.02	0.00001	-
Calcium (Ca)-Dissolved	mg/L	-	-	0.05	-
Chromium (Cr)-Dissolved	mg/L	0.0089	0.04	0.0001	-
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	-
Copper (Cu)-Dissolved	mg/L	0.002	0.2	0.0002	-
Iron (Fe)-Dissolved	mg/L	0.3	1	0.01	-
Lead (Pb)-Dissolved	mg/L	0.001	0.1	0.00005	-
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	-
Magnesium (Mg)-Dissolved	mg/L	-	-	0.1	-
Manganese (Mn)-Dissolved	mg/L	-	0.5	0.00005	-
Mercury (Hg)-Dissolved	mg/L	0.000026	0.005	0.00001	-
Molybdenum (Mo)-Dissolved	mg/L	0.0073	-	0.00005	-
Nickel (Ni)-Dissolved	mg/L	0.1	0.3	0.0005	-
Phosphorus (P)-Dissolved	mg/L	-	-	0.05	-
Potassium (K)-Dissolved	mg/L	-	-	0.1	-
Selenium (Se)-Dissolved	mg/L	0.001	-	0.0001	-
Silicon (Si)-Dissolved	mg/L	-	-	0.05	-
Silver (Ag)-Dissolved	mg/L	0.0001	0.1	0.00001	-
Sodium (Na)-Dissolved	mg/L	-	-	0.05	-
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	-
Sulfur (S)-Dissolved	mg/L	-	-	0.5	-
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001	-
Tin (Sn)-Dissolved	mg/L	-	-	0.0001	-
Titanium (Ti)-Dissolved	mg/L	-	-	0.01	-
Uranium (U)-Dissolved	mg/L	0.015	-	0.00001	-
Vanadium (V)-Dissolved	mg/L	-	-	0.001	-
Zinc (Zn)-Dissolved	mg/L	0.03	0.3	0.001	-

Table E-4. Water Quality Results for in situ data, lab analysis, and QA/QC program; May 21-23, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-130522-01 WQ-SEEP 5/22/2013	0167-130522-02 WQ-SEEP-r 5/22/2013	QA/QC WQ-VC-U-r	0167-130522-03 WQ-MS-S-03 5/22/2013	0167-130522-04 WQ-DC-DX+105 5/22/2013	0167-130522-05 WQ-TP 5/22/2013	0167-130522-06 WQ-PC-U 5/22/2013	0167-130522-07 WQ-VC-REF 5/22/2013
Temperature (in-situ)	°C	-	-	-	2.4	-	-	0.7	1.8	3.2	0	2.4
Specific Conductivity (in-situ)	µS/cm	-	-	-	1412	-	-	1160	273.7	492.4	100.5	106.7
pH (in-situ)	-	6.5 - 9.0	6.0 - 8.5	-	7.13	-	-	6.93	7.09	7.65	7.18	7.42
Turbidity (in-situ)	NTU	-	-	-	39	-	-	29.2	29.1	5.59	1.39	13.29
Colour, True	CU	15	-	5	-	-	-	-	-	-	-	-
Conductivity	µS/cm	-	-	2	1400	1400	0%	1180	282	410	103	112
Hardness (as CaCO3)	mg/L	-	-	0.5	733	731	0%	716	141	189	50.6	57.5
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1	7.43	7.45	0%	7.63	7.52	7.21	7.36	7.78
Total Suspended Solids	mg/L	-	50	3	32.3	40.2	24%	***74.9***	***62.8***	7	<3.0	43.8
Total Dissolved Solids	mg/L	-	-	10	1130	1090	4%	918	216	298	109	97
Turbidity	NTU	-	-	0.1	-	-	-	-	-	-	-	-
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1	216	212	2%	256	49.5	16.3	24.6	49.8
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	216	212	2%	256	49.5	16.3	24.6	49.8
Ammonia, Total (as N)	mg/L	0.75	-	0.005	***4.42***	***3.9***	12%	0.0954	0.0142	0.116	0.0116	0.006
Chloride (Cl)	mg/L	-	-	0.5	<5.0	<5.0	-	<5.0	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	mg/L	0.12	-	0.02	<0.20	<0.20	-	<0.20	0.056	0.067	0.023	0.039
Nitrate (as N)	mg/L	13	-	0.005	1.15	1.16	1%	<0.050	<0.0050	0.0244	<0.0050	0.0605
Nitrite (as N)	mg/L	0.06	-	0.001	0.042	0.043	2%	<0.010	<0.0010	0.001	<0.0010	<0.0010
Sulfate (SO4)	mg/L	-	-	0.5	604	601	0%	461	88.9	175	23.6	8.36
Cyanide, Weak Acid Diss	mg/L	-	0.1	0.005	0.0065	0.0053	18%	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Cyanide, Total	mg/L	-	0.3	0.005	0.0263	0.0241	8%	<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
Thiocyanate (SCN)	mg/L	-	-	0.5	2.96	3	1%	<0.50	<0.50	<0.50	<0.50	<0.50
Aluminum (Al)-Total	mg/L	0.005	-	0.003	***0.0463***	***0.0447***	3%	***0.0984***	***1.37***	***0.128***	***0.173***	***0.916***
Antimony (Sb)-Total	mg/L	-	0.15	0.0001	0.00069	0.00068	1%	0.0161	0.00549	0.0167	0.00031	0.00014
Arsenic (As)-Total	mg/L	0.005	0.15	0.0001	***0.0505***	***0.049***	3%	***0.1***	***0.0335***	***0.0413***	0.00285	0.00182
Barium (Ba)-Total	mg/L	-	1	0.00005	0.0575	0.0611	6%	0.022	0.0479	0.00928	0.0288	0.0586
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	0.076	0.071	7%	<0.010	<0.010	0.015	<0.010	<0.010
Cadmium (Cd)-Total	mg/L	0.000033	0.02	0.00001	***0.000514***	***0.000505***	2%	***0.00413***	***0.00321***	***0.00279***	***0.000076***	***0.000083***
Calcium (Ca)-Total	mg/L	-	-	0.05	222	218	2%	180	37.9	62.7	14.7	14.4
Chromium (Cr)-Total	mg/L	0.0089	0.04	0.0001	0.00152	0.00056	63%	0.00072	0.00183	0.00019	0.00023	0.00212
Cobalt (Co)-Total	mg/L	-	-	0.0001	0.00774	0.00747	3%	0.00173	0.0008	0.00058	0.00012	0.00053
Copper (Cu)-Total	mg/L	0.002	0.2	0.0005	***0.0075***	***0.00587***	22%	***0.00326***	***0.00744***	***0.0289***	***0.00215***	***0.00596***
Iron (Fe)-Total	mg/L	0.3	1	0.01	***12.8***	***12.7***	1%	***3.14***	***2.28***	***0.373***	0.246	***1.29***
Lead (Pb)-Total	mg/L	0.001	0.1	0.00005	0.000439	0.000434	1%	***0.0073***	***0.014***	***0.0132***	0.000245	***0.0012***
Lithium (Li)-Total	mg/L	-	-	0.0005	0.00058	0.00053	9%	0.00905	0.00214	0.0012	<0.00050	0.00078
Magnesium (Mg)-Total	mg/L	-	-	0.1	42	41.5	1%	62.9	11.2	9.42	3.35	5.02
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	***5.45***	***5.45***	0%	***2.13***	0.271	***0.941***	0.0338	0.0514
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	0.00131	0.000984	25%	0.000476	0.000145	0.000421	0.000051	0.00047
Nickel (Ni)-Total	mg/L	0.1	0.3	0.0005	0.00249	0.0024	4%	0.00278	0.00789	0.00115	0.00075	0.0016
Phosphorus (P)-Total	mg/L	-	-	0.05	<0.050	<0.050	-	<0.050	0.079	<0.050	<0.050	<0.050
Potassium (K)-Total	mg/L	-	-	0.1	6.14	6.18	1%	3.65	3.2	2.46	1.4	1

Table E-4. Water Quality Results for in situ data, lab analysis, and QA/QC program; May 21-23, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-130522-01 WQ-SEEP 5/22/2013	0167-130522-02 WQ-SEEP-r 5/22/2013	QA/QC WQ-VC-U-r	0167-130522-03 WQ-MS-S-03 5/22/2013	0167-130522-04 WQ-DC-DX+105 5/22/2013	0167-130522-05 WQ-TP 5/22/2013	0167-130522-06 WQ-PC-U 5/22/2013	0167-130522-07 WQ-VC-REF 5/22/2013
Selenium (Se)-Total	mg/L	0.001	-	0.0001	0.00018	0.00019	6%	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Silicon (Si)-Total	mg/L	-	-	0.05	6.16	6.11	1%	6.45	5.14	0.963	2.09	4.47
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	0.000041	0.000045	10%	0.000068	0.000312	0.000395	0.000015	0.000027
Sodium (Na)-Total	mg/L	-	-	0.05	38.3	36.3	5%	4.64	1.2	2.32	1.12	1.41
Strontium (Sr)-Total	mg/L	-	-	0.0002	0.684	0.64	6%	0.426	0.102	0.137	0.102	0.164
Sulfur (S)-Total	mg/L	-	-	0.5	204	203	0%	153	29.6	59.6	8.1	2.97
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	<0.000010	<0.000010	-	0.00011	0.00008	0.000063	<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
Titanium (Ti)-Total	mg/L	-	-	0.01	<0.010	<0.010	-	<0.010	0.053	<0.010	<0.010	0.031
Uranium (U)-Total	mg/L	0.015	-	0.00001	0.00212	0.00201	5%	0.00363	0.000627	0.000158	0.000113	0.000541
Vanadium (V)-Total	mg/L	-	-	0.001	0.0021	0.0018	14%	<0.0010	0.005	<0.0010	<0.0010	0.003
Zinc (Zn)-Total	mg/L	0.03	0.3	0.003	0.0107	0.0107	0%	***1.2***	***0.457***	***0.289***	0.0079	0.008
Dissolved Metals Filtration Location		-	-	n/a	FIELD	FIELD	-	FIELD	FIELD	FIELD	FIELD	FIELD
Aluminum (Al)-Dissolved	mg/L	0.005	-	0.001	***0.0127***	***0.0139***	9%	0.0021	***0.0796***	***0.0302***	***0.135***	***0.0686***
Antimony (Sb)-Dissolved	mg/L	-	0.15	0.0001	0.00059	0.00059	0%	0.0157	0.00308	0.014	0.00027	<0.00010
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	***0.0325***	***0.0325***	0%	***0.0764***	***0.00895***	***0.0207***	0.00247	0.00035
Barium (Ba)-Dissolved	mg/L	-	1	0.00005	0.0546	0.0543	1%	0.019	0.0288	0.00796	0.0272	0.045
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	0.071	0.072	1%	<0.010	<0.010	0.012	<0.010	<0.010
Cadmium (Cd)-Dissolved	mg/L	0.000033	0.02	0.00001	***0.000368***	***0.000374***	2%	***0.00342***	***0.00253***	***0.00252***	***0.000063***	0.000027
Calcium (Ca)-Dissolved	mg/L	-	-	0.05	224	223	0%	185	38.3	60.4	14.8	14.8
Chromium (Cr)-Dissolved	mg/L	0.0089	0.04	0.0001	0.00036	0.00032	11%	<0.00010	0.00014	<0.00010	0.00016	0.00014
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	0.00766	0.00753	2%	0.00158	0.00019	0.00052	<0.00010	0.00011
Copper (Cu)-Dissolved	mg/L	0.002	0.2	0.0002	***0.00254***	***0.00244***	4%	0.00037	***0.00392***	***0.022***	0.00188	***0.00279***
Iron (Fe)-Dissolved	mg/L	0.3	1	0.01	***9.43***	***9.44***	0%	***2.53***	0.158	0.108	0.187	0.149
Lead (Pb)-Dissolved	mg/L	0.001	0.1	0.00005	<0.000050	<0.000050	-	0.000558	0.000367	***0.00143***	0.000087	<0.000050
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	0.00054	0.00059	9%	0.00912	0.00129	0.00111	<0.00050	<0.00050
Magnesium (Mg)-Dissolved	mg/L	-	-	0.1	42	42.1	0%	61.6	10.9	9.15	3.34	4.96
Manganese (Mn)-Dissolved	mg/L	-	0.5	0.00005	***5.35***	***5.19***	3%	***1.9***	0.226	***0.836***	0.0307	0.0186
Mercury (Hg)-Dissolved	mg/L	0.000026	0.005	0.00001	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	mg/L	0.0073	-	0.00005	0.00101	0.00101	0%	0.000324	0.000082	0.00038	<0.000050	0.000239
Nickel (Ni)-Dissolved	mg/L	0.1	0.3	0.0005	0.00233	0.00237	2%	0.00242	0.0015	0.00104	0.00066	0.00057
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	6.36	6.42	1%	3.62	2.98	2.35	1.36	0.88
Selenium (Se)-Dissolved	mg/L	0.001	-	0.0001	0.00018	0.00019	6%	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Silicon (Si)-Dissolved	mg/L	-	-	0.05	6.02	5.99	0%	6.06	2.8	0.698	2.02	3.37
Silver (Ag)-Dissolved	mg/L	0.0001	0.1	0.00001	<0.000010	<0.000010	-	<0.000010	0.00002	0.000067	<0.000010	<0.000010
Sodium (Na)-Dissolved	mg/L	-	-	0.05	37.7	38	1%	4.57	1.09	2.28	1.12	1.41
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	0.663	0.662	0%	0.426	0.0939	0.129	0.0973	0.161
Sulfur (S)-Dissolved	mg/L	-	-	0.5	199	200	1%	149	29.5	57	7.89	3.03
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001	<0.000010	<0.000010	-	0.000092	0.000018	0.000054	<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	0.00197	0.00209	6%	0.00343	0.000527	0.000143	0.000108	0.000382
Vanadium (V)-Dissolved	mg/L	-	-	0.001	0.0011	0.0011	0%	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Dissolved	mg/L	0.03	0.3	0.001	0.0084	0.0085	1%	***1.22***	***0.443***	***0.266***	0.0063	0.0015

Table E-4. Water Quality Results for in situ data, lab analysis, and QA/QC program; May 21-23, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-130522-08 WQ-MN 5/22/2013	0167-130522-10 WQ-BC 5/22/2013	0167-130522-13 Field Blank 5/23/2013	0167-130522-14 WQ-DC-DX 5/22/2013	0167-130523-15 WQ-PW 5/23/2013	0167-130522-16 WQ-VC-U 5/22/2013	0167-130522-09 WQ-VC-U-r 5/22/2013	QA/QC WQ-VC-U-r	0167-130522-17 WQ-VC-DBC 5/22/2013
Temperature (in-situ)	°C	-	-	-	0	3.4	-	0.1	1.1	0.1	-	-	0.2
Specific Conductivity (in-situ)	µS/cm	-	-	-	47	114.6	-	87.1	406.3	114.1	-	-	119
pH (in-situ)	-	6.5 - 9.0	6.0 - 8.5	-	***6.48***	7.6	-	7.03	7.02	7.49	-	-	7.45
Turbidity (in-situ)	NTU	-	-	-	7.26	198	-	1.82	0.72	17.73	-	-	37.9
Colour, True	CU	15	-	5	-	-	-	-	<5.0	-	-	-	-
Conductivity	µS/cm	-	-	2	48.4	152	<2.0	89.8	404	119	119	0%	125
Hardness (as CaCO3)	mg/L	-	-	0.5	24.7	75.1	<0.50	43.8	207	61.6	60.9	1%	63.9
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1	7.19	7.78	***5.86***	7.35	8.08	7.77	7.81	1%	7.79
Total Suspended Solids	mg/L	-	50	3	5.8	***367***	<3.0	4	-	48.1	***58.9***	22%	***140***
Total Dissolved Solids	mg/L	-	-	10	83	140	<10	106	237	99	103	4%	106
Turbidity	NTU	-	-	0.1	-	-	-	-	<0.10	-	-	-	-
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1	22.4	46.6	<1.0	23	-	53.9	51.4	5%	54
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	22.4	46.6	<1.0	23	170	53.9	51.4	5%	54
Ammonia, Total (as N)	mg/L	0.75	-	0.005	0.0204	0.0271	<0.0050	0.0062	-	0.0064	0.0052	19%	0.0113
Chloride (Cl)	mg/L	-	-	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	-	<0.50
Fluoride (F)	mg/L	0.12	-	0.02	0.025	0.057	<0.020	0.04	0.091	0.041	0.041	0%	0.043
Nitrate (as N)	mg/L	13	-	0.005	<0.0050	0.0588	<0.0050	<0.0050	0.148	0.0646	0.0642	1%	0.0626
Nitrite (as N)	mg/L	0.06	-	0.001	<0.0010	0.0017	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010
Sulfate (SO4)	mg/L	-	-	0.5	1.75	27	<0.50	17.8	40.4	8.44	8.43	0%	11.1
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	<0.0050	-	<0.0050	<0.0050	-	<0.0050
Cyanate	mg/L	-	-	0.2	<0.20	<0.20	<0.20	<0.20	-	0.29	<0.20	-	0.22
Thiocyanate (SCN)	mg/L	-	-	0.5	<0.50	<0.50	<0.50	0.74	-	<0.50	<0.50	-	<0.50
Aluminum (Al)-Total	mg/L	0.005	-	0.003	***0.324***	***6.99***	<0.0030	***0.144***	<0.010	***0.948***	***0.829***	13%	***2.51***
Antimony (Sb)-Total	mg/L	-	0.15	0.0001	0.00016	0.00142	<0.00010	0.00057	<0.00050	0.00015	0.00013	13%	0.00049
Arsenic (As)-Total	mg/L	0.005	0.15	0.0001	0.00239	***0.0371***	<0.00010	***0.00524***	0.00039	0.002	0.00185	8%	***0.0105***
Barium (Ba)-Total	mg/L	-	1	0.00005	0.0594	0.171	<0.000050	0.0164	0.094	0.0645	0.0619	4%	0.0975
Beryllium (Be)-Total	mg/L	-	-	0.0001	<0.00010	0.00027	<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	<0.010	<0.010	<0.010	<0.010	<0.10	<0.010	<0.010	-	<0.010
Cadmium (Cd)-Total	mg/L	0.000033	0.02	0.00001	***0.000042***	***0.000792***	<0.000010	***0.00004***	<0.00020	***0.000061***	***0.000074***	21%	***0.000256***
Calcium (Ca)-Total	mg/L	-	-	0.05	6.48	22.8	<0.050	12.3	46.2	15.7	14.9	5%	17.1
Chromium (Cr)-Total	mg/L	0.0089	0.04	0.0001	0.00073	***0.00978***	<0.00010	0.00031	<0.0020	0.00185	0.00125	32%	0.00335
Cobalt (Co)-Total	mg/L	-	-	0.0001	0.0009	0.0041	<0.00010	0.00012	-	0.00061	0.00055	10%	0.00149
Copper (Cu)-Total	mg/L	0.002	0.2	0.0005	***0.00339***	***0.0176***	<0.00050	***0.00219***	<0.0010	***0.00564***	***0.0042***	26%	***0.00698***
Iron (Fe)-Total	mg/L	0.3	1	0.01	***1.97***	***10.6***	<0.010	0.191	<0.030	***1.36***	***1.26***	7%	***3.54***
Lead (Pb)-Total	mg/L	0.001	0.1	0.00005	0.000263	***0.0274***	<0.000050	0.000312	0.00059	***0.00137***	***0.00135***	1%	***0.00768***
Lithium (Li)-Total	mg/L	-	-	0.0005	<0.00050	0.00457	<0.00050	<0.00050	-	0.00075	0.00085	13%	0.00166
Magnesium (Mg)-Total	mg/L	-	-	0.1	1.87	7.11	<0.10	3.31	22.3	5.58	5.36	4%	5.93
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	0.33	***0.528***	<0.000050	0.0296	<0.0020	0.0608	0.0529	13%	0.16
Mercury (Hg)-Total	mg/L	0.000026	0.005	0.00001	<0.000010	***0.00004***	<0.000010	<0.000010	<0.00020	<0.000010	<0.000010	-	<0.000010
Molybdenum (Mo)-Total	mg/L	0.0073	-	0.00005	0.000219	0.00108	<0.000050	<0.000050	-	0.000446	0.000307	31%	0.000516
Nickel (Ni)-Total	mg/L	0.1	0.3	0.0005	0.00205	0.00748	<0.00050	0.00051	-	0.00141	0.00611	333%	0.00272
Phosphorus (P)-Total	mg/L	-	-	0.05	<0.050	0.297	<0.050	<0.050	-	0.056	0.053	5%	0.135
Potassium (K)-Total	mg/L	-	-	0.1	1.38	2.56	<0.10	3.04	0.9	1.03	1.01	2%	1.43

Table E-4. Water Quality Results for in situ data, lab analysis, and QA/QC program; May 21-23, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-130522-08 WQ-MN 5/22/2013	0167-130522-10 WQ-BC 5/22/2013	0167-130522-13 Field Blank 5/23/2013	0167-130522-14 WQ-DC-DX 5/22/2013	0167-130523-15 WQ-PW 5/23/2013	0167-130522-16 WQ-VC-U 5/22/2013	0167-130522-09 WQ-VC-U-r 5/22/2013	QA/QC WQ-VC-U-r	0167-130522-17 WQ-VC-DBC 5/22/2013
Selenium (Se)-Total	mg/L	0.001	-	0.0001	<0.00010	0.00011	<0.00010	<0.00010	<0.0010	<0.00010	<0.00010	-	<0.00010
Silicon (Si)-Total	mg/L	-	-	0.05	3.19	15.2	<0.050	2.39	-	4.83	4.49	7%	7.61
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	<0.000010	0.000307	<0.000010	0.000032	-	0.000035	0.000022	37%	0.000086
Sodium (Na)-Total	mg/L	-	-	0.05	1.09	2.21	<0.050	0.628	5.4	1.57	1.46	7%	1.78
Strontium (Sr)-Total	mg/L	-	-	0.0002	0.0377	0.157	<0.00020	0.0418	-	0.185	0.168	9%	0.176
Sulfur (S)-Total	mg/L	-	-	0.5	0.87	9.12	<0.50	6.28	-	3.11	2.98	4%	3.94
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	<0.000010	0.000134	<0.000010	<0.000010	-	0.000013	0.000013	0%	0.000044
Tin (Sn)-Total	mg/L	-	-	0.0001	<0.00010	0.00013	<0.00010	<0.00010	-	<0.00010	<0.00010	-	<0.00010
Titanium (Ti)-Total	mg/L	-	-	0.01	<0.010	0.254	<0.010	<0.010	-	0.04	0.036	10%	0.107
Uranium (U)-Total	mg/L	0.015	-	0.00001	0.000143	0.00135	<0.000010	0.000023	0.0023	0.00055	0.000516	6%	0.000682
Vanadium (V)-Total	mg/L	-	-	0.001	0.003	0.0197	<0.0010	<0.0010	-	0.0029	0.0026	10%	0.0069
Zinc (Zn)-Total	mg/L	0.03	0.3	0.003	0.006	***0.0677***	<0.0030	0.0054	<0.050	0.0086	0.0084	2%	0.0236
Dissolved Metals Filtration Location		-	-	n/a	FIELD	FIELD	FIELD	FIELD	-	FIELD	FIELD	-	FIELD
Aluminum (Al)-Dissolved	mg/L	0.005	-	0.001	***0.158***	***0.0874***	<0.0010	***0.0703***	-	***0.0643***	***0.069***	7%	***0.0676***
Antimony (Sb)-Dissolved	mg/L	-	0.15	0.0001	0.00013	0.00029	<0.00010	0.00045	-	<0.00010	<0.00010	-	<0.00010
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	0.00193	0.0024	<0.00010	0.00425	-	0.00036	0.00038	6%	0.0006
Barium (Ba)-Dissolved	mg/L	-	1	0.00005	0.0564	0.0377	<0.000050	0.015	-	0.0467	0.0487	4%	0.0464
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	<0.010	<0.010	<0.010	<0.010	-	<0.010	<0.010	-	<0.010
Cadmium (Cd)-Dissolved	mg/L	0.000033	0.02	0.00001	0.000028	***0.000159***	<0.000010	0.000033	-	0.000027	0.000025	7%	***0.000046***
Calcium (Ca)-Dissolved	mg/L	-	-	0.05	6.74	21.4	<0.050	12.1	-	15.7	15.5	1%	16.7
Chromium (Cr)-Dissolved	mg/L	0.0089	0.04	0.0001	0.00025	0.00021	<0.00010	0.00017	-	0.00013	0.00014	8%	0.00013
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	0.00086	0.00023	<0.00010	<0.00010	-	<0.00010	<0.00010	-	0.00011
Copper (Cu)-Dissolved	mg/L	0.002	0.2	0.0002	***0.00275***	***0.00442***	<0.00020	0.00178	-	***0.00262***	***0.00262***	0%	***0.0028***
Iron (Fe)-Dissolved	mg/L	0.3	1	0.01	***1.65***	0.198	<0.010	0.082	-	0.135	0.136	1%	0.14
Lead (Pb)-Dissolved	mg/L	0.001	0.1	0.00005	0.000153	0.000353	<0.000050	0.000061	-	<0.000050	<0.000050	-	0.000064
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	<0.00050	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050	-	<0.00050
Magnesium (Mg)-Dissolved	mg/L	-	-	0.1	1.91	5.23	<0.10	3.29	-	5.43	5.41	0%	5.36
Manganese (Mn)-Dissolved	mg/L	-	0.5	0.00005	0.336	0.178	<0.000050	0.0212	-	0.0209	0.0212	1%	0.0444
Mercury (Hg)-Dissolved	mg/L	0.000026	0.005	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010	-	<0.000010
Molybdenum (Mo)-Dissolved	mg/L	0.0073	-	0.00005	0.000174	0.000605	<0.000050	<0.000050	-	0.000254	0.000257	1%	0.000302
Nickel (Ni)-Dissolved	mg/L	0.1	0.3	0.0005	0.00185	0.00099	<0.00050	<0.00050	-	0.00057	0.00064	12%	0.00067
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	1.39	1.18	<0.10	3.03	-	0.92	0.94	2%	0.91
Selenium (Se)-Dissolved	mg/L	0.001	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010	-	<0.00010
Silicon (Si)-Dissolved	mg/L	-	-	0.05	3.07	3.48	<0.050	2.26	-	3.6	3.58	1%	3.58
Silver (Ag)-Dissolved	mg/L	0.0001	0.1	0.00001	<0.000010	0.000016	<0.000010	0.000016	-	<0.000010	<0.000010	-	<0.000010
Sodium (Na)-Dissolved	mg/L	-	-	0.05	1.07	1.77	<0.050	0.602	-	1.49	1.47	1%	1.5
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	0.0364	0.135	<0.00020	0.0405	-	0.169	0.17	1%	0.167
Sulfur (S)-Dissolved	mg/L	-	-	0.5	0.86	9.26	<0.50	6.09	-	3.06	3.09	1%	3.92
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	0.000125	0.000671	<0.000010	0.000018	-	0.000399	0.000393	2%	0.000436
Vanadium (V)-Dissolved	mg/L	-	-	0.001	0.0019	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010	-	<0.0010
Zinc (Zn)-Dissolved	mg/L	0.03	0.3	0.001	0.0039	0.0026	<0.0010	0.0041	-	0.0013	0.002	***54%***	0.0016

Table E-4. Water Quality Results for in situ data, lab analysis, and QA/QC program; May 21-23, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-130522-18 WQ-DC-R 5/22/2013	0167-130522-19 WQ-VC-UMN 5/22/2013	0167-130522-20 WQ-VC-R 5/22/2013	0167-130522-21 WQ-PC-D 5/22/2013	0167-130522-22 WQ-DC-U 5/22/2013	0167-130522-24 WQ-ADIT-SEEP 5/22/2013	0167-130522-25 WQ-DC-U2 5/22/2013	TRAVEL Trip Blank 5/22/2013
Temperature (in-situ)	°C	-	-	-	0	0	0	1.7	0.5	1.8	0	-
Specific Conductivity (in-situ)	µS/cm	-	-	-	736	165.7	147.3	105.3	633.5	112.2	601.2	-
pH (in-situ)	-	6.5 - 9.0	6.0 - 8.5	-	8.01	7.53	6.66	7.25	7.86	7.8	7.89	-
Turbidity (in-situ)	NTU	-	-	-	19.84	10.83	9.73	13.92	120	2.38	51.1	-
Colour, True	CU	15	-	5	-	-	-	-	-	-	-	-
Conductivity	µS/cm	-	-	2	755	170	154	111	649	107	617	<2.0
Hardness (as CaCO3)	mg/L	-	-	0.5	405	85.6	75	53.5	354	52.9	339	-
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1	8.04	7.89	7.85	7.51	7.94	7.42	7.98	***5.59***
Total Suspended Solids	mg/L	-	50	3	41.3	11.4	8	5.3	***732***	<3.0	***113***	<3.0
Total Dissolved Solids	mg/L	-	-	10	577	139	126	120	491	124	463	<10
Turbidity	NTU	-	-	0.1	-	-	-	-	-	-	-	-
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1	120	58.8	53.2	25.3	103	24.4	104	<1.0
Alkalinity, Carbonate (as CaCO3)	mg/L	-	-	1	<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
Alkalinity, Total (as CaCO3)	mg/L	-	-	1	120	58.8	53.2	25.3	103	24.4	104	<1.0
Ammonia, Total (as N)	mg/L	0.75	-	0.005	0.547	0.0203	0.0168	0.0062	0.0076	0.0084	0.0746	0.0141
Chloride (Cl)	mg/L	-	-	0.5	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	mg/L	0.12	-	0.02	0.073	0.041	0.045	0.023	0.058	0.038	0.062	<0.020
Nitrate (as N)	mg/L	13	-	0.005	0.168	0.0687	0.0607	<0.0050	0.0601	<0.0050	0.0086	<0.0050
Nitrite (as N)	mg/L	0.06	-	0.001	0.0059	<0.0010	<0.0010	<0.0010	0.0023	<0.0010	<0.0010	<0.0010
Sulfate (SO4)	mg/L	-	-	0.5	284	27.3	23.7	26.3	243	25.3	224	<0.50
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
Cyanide, Total	mg/L	-	0.3	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050
Cyanate	mg/L	-	-	0.2	<0.20	0.29	<0.20	<0.20	0.2	<0.20	<0.20	<0.20
Thiocyanate (SCN)	mg/L	-	-	0.5	<0.50	<0.50	<0.50	0.57	<0.50	0.54	<0.50	-
Aluminum (Al)-Total	mg/L	0.005	-	0.003	***0.533***	***0.588***	***0.693***	***0.206***	***6.71***	***0.167***	***1.72***	<0.0030
Antimony (Sb)-Total	mg/L	-	0.15	0.0001	0.00235	0.00035	0.00041	0.00074	0.00548	0.00038	0.00853	<0.00010
Arsenic (As)-Total	mg/L	0.005	0.15	0.0001	***0.022***	0.00342	0.00424	0.0046	***0.0648***	0.00278	***0.0594***	<0.00010
Barium (Ba)-Total	mg/L	-	1	0.00005	0.0594	0.0597	0.0603	0.0267	0.152	0.0274	0.0557	<0.000050
Beryllium (Be)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	0.00023	<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
Boron (B)-Total	mg/L	-	-	0.01	0.02	<0.010	<0.010	<0.010	0.019	<0.010	0.019	<0.010
Cadmium (Cd)-Total	mg/L	0.000033	0.02	0.00001	***0.00046***	***0.000094***	***0.000102***	***0.000211***	***0.00135***	***0.000088***	***0.00178***	<0.000010
Calcium (Ca)-Total	mg/L	-	-	0.05	98.5	22	19.7	15.6	91.4	15.6	81.5	<0.050
Chromium (Cr)-Total	mg/L	0.0089	0.04	0.0001	0.00193	0.00187	0.00097	0.00031	***0.0109***	0.00034	0.00382	<0.00010
Cobalt (Co)-Total	mg/L	-	-	0.0001	0.00158	0.00043	0.00049	<0.00010	0.00475	<0.00010	0.00121	<0.00010
Copper (Cu)-Total	mg/L	0.002	0.2	0.0005	***0.00563***	***0.00499***	***0.00407***	***0.0062***	***0.018***	***0.00262***	***0.0103***	<0.00050
Iron (Fe)-Total	mg/L	0.3	1	0.01	***3.42***	***0.819***	***1.13***	0.285	***15.4***	0.215	***4.8***	<0.010
Lead (Pb)-Total	mg/L	0.001	0.1	0.00005	***0.00293***	***0.0014***	***0.0021***	***0.00153***	***0.0194***	0.000433	***0.0203***	<0.000050
Lithium (Li)-Total	mg/L	-	-	0.0005	0.0018	0.00071	0.00082	<0.00050	0.00629	<0.00050	0.00378	<0.00050
Magnesium (Mg)-Total	mg/L	-	-	0.1	34.7	7.36	6.58	3.6	35.6	3.52	34.7	<0.10
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	***1.3***	0.113	0.125	0.00633	***1.16***	0.005	***0.775***	<0.000050
Mercury (Hg)-Total	mg/L	0.000026	0.005	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	***0.000035***	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Total	mg/L	0.0073	-	0.00005	0.000611	0.000667	0.000392	0.000052	0.000499	0.000073	0.000564	<0.000050
Nickel (Ni)-Total	mg/L	0.1	0.3	0.0005	0.00162	0.00109	0.00127	0.00075	0.00906	0.00074	0.00247	<0.00050
Phosphorus (P)-Total	mg/L	-	-	0.05	<0.050	<0.050	<0.050	<0.050	0.607	<0.050	0.122	<0.050
Potassium (K)-Total	mg/L	-	-	0.1	3.03	1.28	1.31	1.52	3.43	1.43	2.87	<0.10

Table E-4. Water Quality Results for in situ data, lab analysis, and QA/QC program; May 21-23, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-130522-18 WQ-DC-R 5/22/2013	0167-130522-19 WQ-VC-UMN 5/22/2013	0167-130522-20 WQ-VC-R 5/22/2013	0167-130522-21 WQ-PC-D 5/22/2013	0167-130522-22 WQ-DC-U 5/22/2013	0167-130522-24 WQ-ADIT-SEEP 5/22/2013	0167-130522-25 WQ-DC-U2 5/22/2013	TRAVEL Trip Blank 5/22/2013
Selenium (Se)-Total	mg/L	0.001	-	0.0001	0.00013	<0.00010	<0.00010	<0.00010	0.00039	<0.00010	0.00023	<0.00010
Silicon (Si)-Total	mg/L	-	-	0.05	4.03	5	5	2.45	12.5	2.33	5.39	<0.050
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	0.000058	0.000024	0.000035	0.000036	0.000324	0.00002	0.000346	<0.000010
Sodium (Na)-Total	mg/L	-	-	0.05	7.97	2.08	1.98	1.21	4.2	1.26	2.55	<0.050
Strontium (Sr)-Total	mg/L	-	-	0.0002	0.333	0.194	0.164	0.102	0.295	0.102	0.23	<0.00020
Sulfur (S)-Total	mg/L	-	-	0.5	95.2	9.41	8.18	8.97	81.8	8.71	77.3	<0.50
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	0.000016	0.000011	0.000015	<0.000010	0.000109	<0.000010	0.000071	<0.000010
Tin (Sn)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	0.00011	<0.00010	<0.00010	<0.00010
Titanium (Ti)-Total	mg/L	-	-	0.01	0.023	0.017	0.022	<0.010	0.292	<0.010	0.085	<0.010
Uranium (U)-Total	mg/L	0.015	-	0.00001	0.00136	0.000539	0.000514	0.000101	0.00175	0.000098	0.00133	<0.000010
Vanadium (V)-Total	mg/L	-	-	0.001	0.0026	0.0018	0.0021	<0.0010	0.0248	<0.0010	0.0074	<0.0010
Zinc (Zn)-Total	mg/L	0.03	0.3	0.003	***0.0609***	0.0081	0.0098	0.0195	***0.198***	0.0116	***0.236***	<0.0030
Dissolved Metals Filtration Location		-	-	n/a	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	-
Aluminum (Al)-Dissolved	mg/L	0.005	-	0.001	***0.0543***	***0.0619***	***0.0748***	***0.126***	***0.0425***	***0.129***	***0.0134***	-
Antimony (Sb)-Dissolved	mg/L	-	0.15	0.0001	0.00194	0.00026	0.00024	0.00056	0.00341	0.00032	0.00538	-
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	***0.00994***	0.00162	0.00153	0.00284	***0.00588***	0.00209	***0.00753***	-
Barium (Ba)-Dissolved	mg/L	-	1	0.00005	0.0492	0.049	0.0487	0.0249	0.0322	0.0257	0.0256	-
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	0.018	<0.010	<0.010	<0.010	0.014	<0.010	0.016	-
Cadmium (Cd)-Dissolved	mg/L	0.000033	0.02	0.00001	***0.000249***	***0.000063***	***0.000058***	***0.000192***	***0.000278***	***0.000064***	***0.000557***	-
Calcium (Ca)-Dissolved	mg/L	-	-	0.05	103	22.3	19.5	15.6	86.3	15.4	79.6	-
Chromium (Cr)-Dissolved	mg/L	0.0089	0.04	0.0001	0.00015	0.00012	0.00017	0.00017	<0.00010	0.00019	<0.00010	-
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	0.00129	0.00018	0.00022	<0.00010	0.00064	<0.00010	0.00038	-
Copper (Cu)-Dissolved	mg/L	0.002	0.2	0.0002	0.00179	***0.00282***	***0.00288***	***0.00591***	0.00164	***0.00233***	0.00187	-
Iron (Fe)-Dissolved	mg/L	0.3	1	0.01	***1.3***	0.164	0.297	0.156	***0.576***	0.157	0.213	-
Lead (Pb)-Dissolved	mg/L	0.001	0.1	0.00005	0.000144	0.000098	0.000108	0.000456	0.000207	0.000082	0.000304	-
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	0.00149	<0.00050	<0.00050	<0.00050	0.0019	<0.00050	0.00256	-
Magnesium (Mg)-Dissolved	mg/L	-	-	0.1	36	7.28	6.38	3.53	33.6	3.51	34.1	-
Manganese (Mn)-Dissolved	mg/L	-	0.5	0.00005	***1.18***	0.0842	0.0968	0.00405	***0.773***	0.00177	***0.665***	-
Mercury (Hg)-Dissolved	mg/L	0.000026	0.005	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	-
Molybdenum (Mo)-Dissolved	mg/L	0.0073	-	0.00005	0.000322	0.000309	0.000293	<0.000050	0.000194	<0.000050	0.000159	-
Nickel (Ni)-Dissolved	mg/L	0.1	0.3	0.0005	0.001	0.00069	0.00082	0.00074	0.00075	0.00071	0.00062	-
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	3.07	1.12	1.13	1.44	2.49	1.44	2.59	-
Selenium (Se)-Dissolved	mg/L	0.001	-	0.0001	0.0001	<0.00010	<0.00010	<0.00010	0.00012	<0.00010	0.00015	-
Silicon (Si)-Dissolved	mg/L	-	-	0.05	3.27	3.79	3.55	2.28	2.51	2.24	2.37	-
Silver (Ag)-Dissolved	mg/L	0.0001	0.1	0.00001	<0.000010	<0.000010	<0.000010	0.000012	<0.000010	<0.000010	<0.000010	-
Sodium (Na)-Dissolved	mg/L	-	-	0.05	8.17	2.18	2.02	1.22	3.64	1.21	2.31	-
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	0.326	0.178	0.162	0.0997	0.254	0.0975	0.21	-
Sulfur (S)-Dissolved	mg/L	-	-	0.5	97.1	9.35	8.12	8.94	81.9	8.53	75.4	-
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000015	-
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	0.00132	0.000478	0.000443	0.000087	0.00115	0.000089	0.000982	-
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	0.3	0.001	***0.039***	0.0043	0.0042	0.0187	***0.0461***	0.009	***0.114***	-

Table E-5. Water quality results for *in situ* data, lab analysis, and QA/QC program; May 27-29, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID / WQ Site ID / Date Sampled / Detection Limit	0167-130529-013 WQ-DC-DX 5/29/2013	0167-130529-008 WQ-DC-D1 5/29/2013	0167-130529-015 WQ-MS-S-03 5/29/2013	0167-130529-022 WQ-DC-D1b 5/29/2013	0167-130529-002 WQ-DC-DX+105 5/29/2013	0167-130529-019 WQ-SEEP 5/29/2013	0167-130529-020 WQ-TP 5/29/2013	0167-130529-016 WQ-DC-U2 5/29/2013	0167-130529-018 WQ-DC-U-r 5/29/2013	0167-130529-017 WQ-DC-U 5/29/2013	QA/QC WQ-DC-U-r	0167-130528-021 WQ-VC-R 5/28/2013	0167-130528-023 WQ-VC-UMN 5/28/2013
Temperature (in-situ)	°C	-	-	-	1.5	2.0	1.4	0.1	7.3	2.9	10.3	0.7	-	1.1	-	2.4	3.1
Specific Conductivity (in-situ)	µS/cm	-	-	-	143.2	501.1	1229.0	1003.0	296.2	1384.0	695.0	809.9	-	838.1	-	64.3	72.2
pH (in-situ)	-	6.5 - 9.0	6.0 - 8.5	-	7.25	7.62	6.83	7.70	6.99	6.65	7.30	7.66	-	7.29	-	***6.06***	6.83
Turbidity (in-situ)	NTU	-	-	-	45.1	14.2	2.60	16.4	266.0	25.9	-	13.4	-	13.3	-	61.7	60.5
Colour, True	CU	15	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity	µS/cm	-	-	2	128	469	1150	934	286	1290	703	982	850	813	4%	67.9	68.8
Hardness (as CaCO3)	mg/L	-	-	0.5	68	271	735	584	152	705	352	547	462	461	0%	33.2	35.5
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1	7.28	7.87	7.27	8.03	7.39	7.13	7.62	7.95	7.93	7.95	0%	7.42	7.43
Total Suspended Solids	mg/L	-	50	3	***181***	***62.9***	10.9	40.6	***383***	33.1	10.3	***61.8***	42.1	***73.9***	76%	***225***	***195***
Total Dissolved Solids	mg/L	-	-	10	101	349	951	782	213	1060	527	750	614	651	6%	65	71
Turbidity	NTU	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1	39.9	105	276	153	70.3	214	44.4	141	126	124	2%	25.3	25.5
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	<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	39.9	105	276	153	70.3	214	44.4	141	126	124	2%	25.3	25.5
Ammonia, Total (as N)	mg/L	0.75	-	0.005	0.0274	0.0108	0.086	0.168	0.0151	***3.85***	0.311	0.0963	0.362	0.358	1%	0.0214	0.02
Chloride (Cl)	mg/L	-	-	0.5	<0.50	<0.50	<5.0	<5.0	<0.50	<5.0	<0.50	<2.5	<2.5	<2.5	-	<0.50	<0.50
Fluoride (F)	mg/L	0.12	-	0.02	0.037	0.076	***0.47***	<0.20	0.089	***0.33***	0.102	0.1	<0.10	<0.10	-	0.047	0.044
Nitrate (as N)	mg/L	13	-	0.005	0.0257	0.0249	<0.050	<0.050	0.0288	1.08	0.0767	0.032	0.089	0.096	8%	0.0293	0.0294
Nitrite (as N)	mg/L	0.06	-	0.001	0.0035	0.0019	<0.010	<0.010	0.0028	0.04	0.0028	<0.0050	<0.0050	<0.0050	-	<0.0010	<0.0010
Sulfate (SO4)	mg/L	-	-	0.5	34.7	159	476	437	82.4	636	313	412	343	344	0%	9.23	10.7
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	-	<0.0050	<0.0050
Cyanide, Total	mg/L	-	0.3	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0337	<0.0050	<0.0050	<0.0050	<0.0050	-	<0.0050	<0.0050
Cyanate	mg/L	-	-	0.2	<2.0	<0.20	<0.20	<0.20	<0.20	<0.20	0.3	<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	3.66	<0.50	<0.50	0.5	0.56	12%	<0.50	0.54
Aluminum (Al)-Total	mg/L	0.005	-	0.003	***4.35***	***1.08***	***0.0483***	***0.542***	***11.4***	***0.0672***	***0.227***	***0.815***	***0.631***	***0.783***	24%	***3.8***	***3.27***
Antimony (Sb)-Total	mg/L	-	0.15	0.0001	0.00301	0.00585	0.0173	0.0104	0.00544	0.0007	0.0313	0.0048	0.00272	0.00277	2%	0.00057	0.00054
Arsenic (As)-Total	mg/L	0.005	0.15	0.0001	***0.0409***	***0.0401***	***0.0925***	***0.05***	***0.107***	***0.0504***	***0.117***	***0.0154***	***0.0126***	***0.0141***	12%	***0.0124***	***0.0105***
Barium (Ba)-Total	mg/L	-	1	0.00005	0.098	0.0306	0.0185	0.0309	0.168	0.0609	0.0148	0.0516	0.0516	0.0547	6%	0.101	0.0839
Beryllium (Be)-Total	mg/L	-	-	0.0001	0.00017	<0.00010	<0.00010	<0.00010	0.00035	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	0.00015	0.00012
Bismuth (Bi)-Total	mg/L	-	-	0.0005	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	0.00061	<0.00050	<0.00050	<0.00050	-	<0.00050	<0.00050
Boron (B)-Total	mg/L	-	-	0.01	<0.010	<0.010	<0.010	0.031	<0.010	0.071	0.038	0.023	0.019	0.02	5%	<0.010	<0.010
Cadmium (Cd)-Total	mg/L	0.000033	0.02	0.00001	***0.000211***	***0.00228***	***0.00339***	***0.00192***	***0.00183***	***0.000458***	***0.00287***	***0.000315***	***0.000182***	***0.000213***	17%	***0.000353***	***0.000261***
Calcium (Ca)-Total	mg/L	-	-	0.05	19.7	68.9	194	135	42.5	213	99.5	126	108	110	2%	10.5	10.4
Chromium (Cr)-Total	mg/L	0.0089	0.04	0.0001	0.0063	0.00145	0.00011	0.00084	***0.0128***	0.00175	0.00028	0.00153	0.00229	0.00248	8%	0.00497	0.00414
Cobalt (Co)-Total	mg/L	-	-	0.0001	0.00192	0.00078	0.00157	0.00062	0.006	0.00704	0.00114	0.0009	0.0012	0.00132	10%	0.00253	0.00209
Copper (Cu)-Total	mg/L	0.002	0.2	0.0005	***0.0107***	***0.00571***	0.00093	***0.00529***	***0.0279***	***0.00632***	***0.0365***	***0.0033***	***0.0046***	***0.00417***	9%	***0.0106***	***0.00933***
Iron (Fe)-Total	mg/L	0.3	1	0.01	***5.79***	***2.03***	***3.2***	***2.38***	***18.8***	***13***	***1.13***	***1.83***	***2.44***	***2.83***	16%	***5.91***	***4.84***
Lead (Pb)-Total	mg/L	0.001	0.1	0.00005	***0.00761***	***0.00923***	***0.00572***	***0.0137***	***0.0147***	0.000654	***0.047***	***0.00152***	***0.00103***	***0.00143***	39%	***0.00944***	***0.00784***
Lithium (Li)-Total	mg/L	-	-	0.0005	0.00248	0.00335	0.00972	0.00437	0.00731	<0.00050	0.00217	0.00372	0.00246	0.00206	16%	0.00203	0.0017
Magnesium (Mg)-Total	mg/L	-	-	0.1	6.17	21.2	64.2	53.2	15.7	40.8	21.9	53.2	41.2	41.1	0%	3.77	3.69
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	0.104	0.405	***1.97***	***0.844***	***0.584***	***5.29***	***1.48***	***0.726***	***0.936***	***0.937***	0%	0.232	0.176
Mercury (Hg)-Total	mg/L	0.000026	0.005	0.00001	0.000013	<0.000010	<0.000010	<0.000010	***0.000053***	<0.000010	0.000013	<0.000010	<0.000010	<0.000010	-	<0.000010	<0.000010
Molybdenum (Mo)-Total	mg/L	0.0073	-	0.00005	0.000161	0.000204	0.000362	0.00023	0.000314	0.00134	0.000901	0.000291	0.000632	0.000586	7%	0.00046	0.000461
Nickel (Ni)-Total	mg/L	0.1	0.3	0.0005	0.00354	0.00196	0.00262	0.00142	0.00756	0.00235	0.00183	0.00164	0.00151	0.00168	11%	0.00381	0.00312
Phosphorus (P)-Total	mg/L	-	-	0.05	0.168	0.061	<0.050	<0.050	0.271	<0.050	<0.050	0.056	<0.050	0.057	-	0.265	0.183
Potassium (K)-Total	mg/L	-	-	0.1	3.16	2.51	3.66	3.43	3.99	5.7	5.14	3.34	2.8	2.81	0%	1.29	1.23
Selenium (Se)-Total	mg/L	0.001	-	0.0001	0.00012	<0.00010	<0.00010	0.00028	0.00021	0.00021	<0.00010	0.00027	0.00018	0.0002	11%	<0.00010	<0.00010
Silicon (Si)-Total	mg/L	-	-	0.05	8.79	5.32	6.53	4.55	21.4	6.21	1.64	4.99	4.24	4.46	5%	7.4	6.73
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	0.000194	0.000159	0.000047	0.000235	0.000511	0.000056	0.001	0.000047	0.000037	0.000036	3%	0.000113	0.00011
Sodium (Na)-Total	mg/L	-	-	0.05	1.34	2.22	4.84	3.73	1.81	36	6.98	4.4	5.95	5.99	1%	1.1	1.1
Strontium (Sr)-Total	mg/L	-	-	0.0002	0.0693	0.169	0.44	0.335	0.119	0.654	0.248	0.344	0.323	0.321	1%	0.0866	0.0876
Sulfur (S)-Total	mg/L	-	-	0.5	11.1	52.1	160	137	28.1	194	103	131	106	110	4%	3.18	3.65
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	0.000148	0.000067	0.000101	0.00005	0.000409	<0.000010	0.000135	0.000018	0.000012	0.000014	17%	0.000054	0.000046
Tin (Sn)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	0.00014	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010
Titanium (Ti)-Total	mg/L	-	-	0.01	0.155	0.051	<0.010	0.022	0.386	<0.010	<0.010	0.038	0.027	0.035	30%	0.129	0.113
Uranium (U)-Total	mg/L	0.015	-	0.00001	0.000395	0.00115	0.0037	0.00167	0.00113	0.00194	0.000425	0.00173	0.00151	0.00149	1%	0.000855	0.000748
Vanadium (V)-Total	mg/L	-	-	0.001	0.0174	0.0038	<0.0010	0.0022	0.0424	0.0022	<0.0010	0.0038	0.0033	0.0041	24%	0.0113	0.0091
Zinc (Zn)-Total	mg/L	0.03	0.3	0.003	***0.031***	***0.424***	***1.15***	***0.371***	***0.312***	0.0108	***0.257***	***0.0671***	0.0252	0.0292	16%	***0.0327***	0.0267
Dissolved Metals Filtration Location		-	-	n/a	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	-	FIELD	FIELD

Table E-5. Water quality results for *in situ* data, lab analysis, and QA/QC program; May 27-29, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID / WQ Site ID / Date Sampled / Detection Limit	0167-130529-013 WQ-DC-DX 5/29/2013	0167-130529-008 WQ-DC-D1 5/29/2013	0167-130529-015 WQ-MS-S-03 5/29/2013	0167-130529-022 WQ-DC-D1b 5/29/2013	0167-130529-002 WQ-DC-DX+105 5/29/2013	0167-130529-019 WQ-SEEP 5/29/2013	0167-130529-020 WQ-TP 5/29/2013	0167-130529-016 WQ-DC-U2 5/29/2013	0167-130529-018 WQ-DC-U-r 5/29/2013	0167-130529-017 WQ-DC-U 5/29/2013	QA/QC WQ-DC-U-r	0167-130528-021 WQ-VC-R 5/28/2013	0167-130528-023 WQ-VC-UMN 5/28/2013
Aluminum (Al)-Dissolved	mg/L	0.005	-	0.001	***0.0262***	***0.0137***	0.002	***0.007***	***0.0413***	***0.0105***	***0.0244***	***0.0115***	***0.0471***	***0.0503***	7%	***0.104***	***0.102***
Antimony (Sb)-Dissolved	mg/L	-	0.15	0.0001	0.00108	0.00416	0.0157	0.0077	0.00281	0.00052	0.0243	0.00472	0.00268	0.00263	2%	0.00013	0.00015
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	0.00446	***0.00972***	***0.07***	***0.0112***	***0.0053***	***0.0297***	***0.0422***	***0.00686***	***0.0074***	***0.00735***	1%	0.00095	0.00089
Barium (Ba)-Dissolved	mg/L	-	1	0.00005	0.0385	0.0163	0.0177	0.02	0.0375	0.0562	0.0111	0.0383	0.0431	0.0423	2%	0.0245	0.0247
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	<0.010	<0.010	0.03	<0.010	0.066	0.035	0.021	0.018	0.019	6%	<0.010	<0.010
Cadmium (Cd)-Dissolved	mg/L	0.000033	0.02	0.00001	0.000011	***0.000994***	***0.00172***	***0.00075***	***0.000698***	***0.000285***	***0.00245***	***0.000112***	***0.000073***	***0.00007***	4%	***0.000045***	***0.00005***
Calcium (Ca)-Dissolved	mg/L	-	-	0.05	18.9	72.8	191	143	40.9	215	104	129	113	115	2%	9.06	9.61
Chromium (Cr)-Dissolved	mg/L	0.0089	0.04	0.0001	0.00013	<0.00010	<0.00010	<0.00010	0.00015	0.00028	<0.00010	<0.00010	0.00011	0.00013	18%	0.00016	0.00014
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	0.00018	0.00019	0.00143	0.00038	0.00025	0.00665	0.0011	0.00044	0.00094	0.00099	5%	0.00015	0.00015
Copper (Cu)-Dissolved	mg/L	0.002	0.2	0.0002	0.00165	***0.00251***	0.0002	0.00162	***0.00402***	0.00196	***0.0243***	0.00099	0.00114	0.00118	4%	***0.00308***	***0.00303***
Iron (Fe)-Dissolved	mg/L	0.3	1	0.01	***0.773***	0.081	***2.7***	0.204	0.153	***7.61***	0.17	0.168	***0.994***	***1.02***	3%	0.27	0.182
Lead (Pb)-Dissolved	mg/L	0.001	0.1	0.00005	0.000081	0.000144	0.00035	0.000134	0.00012	<0.000050	***0.00291***	0.000212	0.000079	0.00011	39%	0.000168	0.000153
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	<0.00050	0.00275	0.00879	0.00422	0.00064	<0.00050	0.00216	0.00333	0.00216	0.00167	23%	<0.00050	<0.00050
Magnesium (Mg)-Dissolved	mg/L	-	-	0.1	5.07	21.7	62.5	55.1	12.1	41	22.3	54.4	43.4	42.3	3%	2.57	2.79
Manganese (Mn)-Dissolved	mg/L	-	0.5	0.00005	0.0538	0.312	***1.84***	***0.763***	0.244	***5.05***	***1.46***	***0.637***	***0.937***	***0.937***	0%	0.035	0.0314
Mercury (Hg)-Dissolved	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	-	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	mg/L	0.0073	-	0.00005	0.000068	0.000185	0.000335	0.000194	0.000107	0.00092	0.000867	0.00023	0.0003	0.000289	4%	0.000181	0.000184
Nickel (Ni)-Dissolved	mg/L	0.1	0.3	0.0005	<0.00050	0.00093	0.00237	0.00085	0.00086	0.00203	0.00169	0.00065	0.00087	0.00093	7%	0.00059	0.00055
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	2.64	2.38	3.67	3.51	1.89	5.7	5.09	3.42	2.89	2.82	2%	0.7	0.73
Selenium (Se)-Dissolved	mg/L	0.001	-	0.0001	<0.00010	<0.00010	<0.00010	0.0003	<0.00010	0.00021	<0.00010	0.00023	0.00015	0.00016	7%	<0.00010	<0.00010
Silicon (Si)-Dissolved	mg/L	-	-	0.05	2.72	3.88	6.28	3.67	3.06	5.94	1.23	3.94	3.54	3.51	1%	2.06	2.06
Silver (Ag)-Dissolved	mg/L	0.0001	0.1	0.00001	0.000011	0.000024	0.000024	0.000015	<0.000010	0.000023	***0.000121***	<0.000010	<0.000010	0.000021	-	0.000035	0.000011
Sodium (Na)-Dissolved	mg/L	-	-	0.05	1.2	2.15	4.7	3.86	1.54	34.7	6.95	4.35	7.78	6.3	19%	0.849	0.875
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	0.0611	0.168	0.412	0.336	0.0963	0.629	0.251	0.34	0.325	0.328	1%	0.0697	0.0744
Sulfur (S)-Dissolved	mg/L	-	-	0.5	11.5	54.2	154	140	28.8	192	104	132	110	112	2%	3.16	3.67
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001	<0.000010	0.000032	0.000092	0.000023	0.000024	<0.000010	0.000114	<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	<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	0.00004	0.00109	0.00347	0.00167	0.000653	0.00183	0.000415	0.00168	0.00144	0.00144	0%	0.000193	0.0002
Vanadium (V)-Dissolved	mg/L	-	-	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	0.0011	<0.0010	<0.0010	<0.0010	<0.0010	-	<0.0010	<0.0010
Zinc (Zn)-Dissolved	mg/L	0.03	0.3	0.001	0.0016	***0.302***	***1.1***	***0.275***	***0.191***	0.0086	***0.227***	***0.0452***	0.0149	0.0197	32%	0.0025	0.003

Table E-5. Water quality results for *in situ* data, lab analysis, and QA/QC program; May 27-29, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID / WQ Site ID / Date Sampled / Detection Limit	0167-130528-012 WQ-PC-D-r 5/28/2013	0167-130528-007 WQ-PC-D 5/28/2013	QA/QC WQ-PC-D-r	0167-130528-009 WQ-VC-DBC 5/28/2013	0167-130528-026 H-VC-U 5/28/2013	0167-130528-024 WQ-BC 5/28/2013	0167-130528-006 WQ-VC-REF 5/28/2013	0167-130528-003 WQ-DC-R 5/28/2013	TRAVEL TRAVEL BLANK 5/28/2013	0167-130528-031 FIELD BLANK 5/28/2013	0167-130528-010 WQ-ADIT-SEEP 5/28/2013	0167-130528-001 WQ-PC-U 5/28/2013	0167-130528-014 WQ-DC-U1 5/28/2013
Temperature (in-situ)	°C	-	-	-	-	3.1	-	6.1	6.1	7.0	5.9	0.9	-	-	2.5	1.0	0.0
Specific Conductivity (in-situ)	µS/cm	-	-	-	-	90.8	-	50.7	47.5	86.5	47.0	622.8	-	-	88.0	89.6	463.0
pH (in-situ)	-	6.5 - 9.0	6.0 - 8.5	-	-	7.08	-	7.06	7.03	7.28	7.05	7.46	-	-	7.03	7.08	7.37
Turbidity (in-situ)	NTU	-	-	-	-	1.82	-	56.5	39.9	346.0	46.4	44.5	-	-	1.91	2.34	0.99
Colour, True	CU	15	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity	µS/cm	-	-	2	86.9	87.8	1%	49.6	44.9	80.9	43.8	589	<2.0	<2.0	84.1	84.6	612
Hardness (as CaCO3)	mg/L	-	-	0.5	44.7	43	4%	27	25.5	42.8	24.4	333	-	<0.50	43.2	42.7	358
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1	7.41	7.41	0%	7.4	7.37	7.48	7.36	7.89	***5.85***	***5.83***	7.39	7.27	7.73
Total Suspended Solids	mg/L	-	50	3	***57.2***	7.2	87%	***231***	***121***	***1090***	***269***	***77.2***	<3.0	<3.0	<3.0	7.2	5.2
Total Dissolved Solids	mg/L	-	-	10	84	94	12%	59	53	93	51	442	<10	<10	84	82	476
Turbidity	NTU	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1	24.6	24.4	1%	22.8	23.1	28.8	22.8	96.8	1.1	<1.0	23.6	24	91.2
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	24.6	24.4	1%	22.8	23.1	28.8	22.8	96.8	1.1	<1.0	23.6	24	91.2
Ammonia, Total (as N)	mg/L	0.75	-	0.005	0.0059	0.0058	2%	0.0159	0.0123	0.0726	0.0131	0.378	0.0238	<0.0050	0.0058	0.006	0.0097
Chloride (Cl)	mg/L	-	-	0.5	<0.50	<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	0.045	0.05	11%	0.045	0.039	0.069	0.043	0.076	<0.020	<0.020	0.038	0.037	0.041
Nitrate (as N)	mg/L	13	-	0.005	<0.0050	<0.0050	-	0.0244	0.027	0.0527	0.0237	0.0731	<0.0050	<0.0050	<0.0050	<0.0050	0.0062
Nitrite (as N)	mg/L	0.06	-	0.001	<0.0010	<0.0010	-	<0.0010	<0.0010	0.0022	<0.0010	0.0048	<0.0010	<0.0010	<0.0010	<0.0010	0.0018
Sulfate (SO4)	mg/L	-	-	0.5	19.5	19.4	1%	4.06	3.04	14.2	3.01	233	<0.50	<0.50	18.6	18.1	255
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	<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	<0.0050	<0.0050
Cyanate	mg/L	-	-	0.2	<0.20	<0.20	-	<0.20	<0.20	0.34	<0.20	<0.20	<0.20	<0.20	<2.0	<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	<0.50	<0.50
Aluminum (Al)-Total	mg/L	0.005	-	0.003	***0.19***	***0.17***	11%	***3.76***	***3.41***	***17.2***	***3.72***	***0.921***	<0.0030	<0.0030	***0.138***	***0.14***	***0.0715***
Antimony (Sb)-Total	mg/L	-	0.15	0.0001	0.00068	0.00072	6%	0.00051	0.00038	0.00229	0.00043	0.00258	<0.00010	<0.00010	0.0004	0.00041	0.00234
Arsenic (As)-Total	mg/L	0.005	0.15	0.0001	0.0034	0.0031	9%	***0.0114***	***0.00814***	***0.076***	***0.00934***	***0.047***	<0.00010	<0.00010	0.00248	0.00285	***0.00796***
Barium (Ba)-Total	mg/L	-	1	0.00005	0.0254	0.0254	0%	0.0924	0.0841	0.346	0.0915	0.0597	<0.000050	<0.000050	0.0264	0.0271	0.0313
Beryllium (Be)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	-	0.00015	0.00013	0.00072	0.00014	<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	0.00124	<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	-	<0.010	<0.010	<0.010	<0.010	0.012	<0.010	<0.010	<0.010	<0.010	0.018
Cadmium (Cd)-Total	mg/L	0.000033	0.02	0.00001	***0.000192***	***0.000191***	1%	***0.000325***	***0.00029***	***0.00178***	***0.000293***	***0.000314***	<0.000010	<0.000010	***0.000064***	***0.000037***	***0.000105***
Calcium (Ca)-Total	mg/L	-	-	0.05	13.2	12.5	5%	8.5	8.03	19.8	7.81	86.6	<0.050	<0.050	12.7	12.7	86.8
Chromium (Cr)-Total	mg/L	0.0089	0.04	0.0001	0.00033	0.00028	15%	0.00603	0.0047	***0.029***	0.00522	0.00197	<0.00010	<0.00010	0.00026	0.00023	0.00016
Cobalt (Co)-Total	mg/L	-	-	0.0001	0.0001	<0.00010	-	0.00221	0.0021	0.0104	0.00233	0.00131	<0.00010	<0.00010	<0.00010	0.00015	0.00057
Copper (Cu)-Total	mg/L	0.002	0.2	0.0005	***0.00577***	***0.00536***	7%	***0.0112***	***0.00988***	***0.043***	***0.0109***	***0.00426***	<0.00050	<0.00050	***0.00223***	0.00186	0.0013
Iron (Fe)-Total	mg/L	0.3	1	0.01	***0.332***	***0.312***	6%	***5.55***	***5.18***	***25.7***	***5.6***	***4.17***	<0.010	<0.010	0.295	***0.471***	***0.405***
Lead (Pb)-Total	mg/L	0.001	0.1	0.00005	0.000838	0.000814	3%	***0.00905***	***0.00635***	***0.0662***	***0.00716***	***0.00572***	<0.000050	<0.000050	0.000362	0.000212	0.000465
Lithium (Li)-Total	mg/L	-	-	0.0005	<0.00050	<0.00050	-	0.00196	0.00231	0.0132	0.00264	0.00137	<0.00050	<0.00050	<0.00050	<0.00050	0.00196
Magnesium (Mg)-Total	mg/L	-	-	0.1	2.93	2.81	4%	3.04	3	8.78	2.88	26.3	<0.10	<0.10	2.84	2.85	34.9
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	0.011	0.0109	1%	0.16	0.128	***0.891***	0.137	***1.04***	<0.000050	<0.000050	0.00841	0.0618	0.301
Mercury (Hg)-Total	mg/L	0.000026	0.005	0.00001	<0.000010	<0.000010	-	<0.000010	<0.000010	0.000019	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Total	mg/L	0.0073	-	0.00005	0.000063	0.000069	10%	0.000629	0.000406	0.00151	0.000751	0.000322	<0.000050	<0.000050	0.000057	0.000063	0.000211
Nickel (Ni)-Total	mg/L	0.1	0.3	0.0005	0.00068	0.00063	7%	0.00362	0.00323	0.0191	0.00714	0.00177	<0.00050	<0.00050	0.00061	0.0007	0.00074
Phosphorus (P)-Total	mg/L	-	-	0.05	<0.050	<0.050	-	0.205	0.189	0.974	0.198	0.076	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium (K)-Total	mg/L	-	-	0.1	0.94	0.9	4%	1.2	1.32	4.39	1.1	2.38	<0.10	<0.10	0.93	0.91	2.57
Selenium (Se)-Total	mg/L	0.001	-	0.0001	<0.00010	<0.00010	-	<0.00010	<0.00010	0.00014	<0.00010	0.00016	<0.00010	<0.00010	<0.00010	<0.00010	0.00016
Silicon (Si)-Total	mg/L	-	-	0.05	2.69	2.55	5%	7.35	6.95	30.3	7.1	4.13	<0.050	<0.050	2.57	2.56	2.69
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	0.00003	0.000023	23%	0.00015	0.000129	0.000916	0.000147	0.000112	<0.000010	<0.000010	0.000014	0.000016	0.000014
Sodium (Na)-Total	mg/L	-	-	0.05	1.16	1.16	0%	0.966	0.869	2.29	0.884	5.03	<0.050	<0.050	1.19	1.21	2.58
Strontium (Sr)-Total	mg/L	-	-	0.0002	0.0827	0.0854	3%	0.0813	0.0817	0.139	0.0816	0.202	<0.00020	<0.00020	0.0727	0.0822	0.217
Sulfur (S)-Total	mg/L	-	-	0.5	6.68	6.45	3%	1.53	1.2	4.87	1.25	76.6	<0.50	<0.50	6.23	6.11	85.9
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	<0.000010	<0.000010	-	0.000058	0.000048	0.000293	0.000051	0.000018	<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	0.00036	<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	-	0.128	0.121	0.653	0.125	0.041	<0.010	<0.010	<0.010	<0.010	<0.010
Uranium (U)-Total	mg/L	0.015	-	0.00001	0.000086	0.000083	3%	0.000935	0.000984	0.00251	0.00108	0.000986	<0.000010	<0.000010	0.000077	0.000104	0.000982
Vanadium (V)-Total	mg/L	-	-	0.001	<0.0010	<0.0010	-	0.0106	0.0098	0.0536	0.011	0.005	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Total	mg/L	0.03	0.3	0.003	0.0157	0.0152	3%	***0.0308***	0.0272	***0.164***	***0.0303***	***0.0377***	<0.0030	<0.0030	0.0061	0.0045	0.0216
Dissolved Metals Filtration Location		-	-	n/a	FIELD	FIELD	-	FIELD	FIELD	FIELD	FIELD	FIELD	-	FIELD	FIELD	FIELD	FIELD

Table E-5. Water quality results for *in situ* data, lab analysis, and QA/QC program; May 27-29, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID / WQ Site ID / Date Sampled / Detection Limit	0167-130528-012 WQ-PC-D-r 5/28/2013	0167-130528-007 WQ-PC-D 5/28/2013	QA/QC WQ-PC-D-r	0167-130528-009 WQ-VC-DBC 5/28/2013	0167-130528-026 H-VC-U 5/28/2013	0167-130528-024 WQ-BC 5/28/2013	0167-130528-006 WQ-VC-REF 5/28/2013	0167-130528-003 WQ-DC-R 5/28/2013	TRAVEL TRAVEL BLANK 5/28/2013	0167-130528-031 FIELD BLANK 5/28/2013	0167-130528-010 WQ-ADIT-SEEP 5/28/2013	0167-130528-001 WQ-PC-U 5/28/2013	0167-130528-014 WQ-DC-U1 5/28/2013
Aluminum (Al)-Dissolved	mg/L	0.005	-	0.001	***0.0842***	***0.0862***	2%	***0.0967***	***0.0953***	***0.0986***	***0.0967***	***0.0289***	-	<0.0010	***0.0815***	***0.092***	***0.0554***
Antimony (Sb)-Dissolved	mg/L	-	0.15	0.0001	0.00053	0.00056	6%	<0.00010	<0.00010	0.00031	<0.00010	0.00179	-	<0.00010	0.00037	0.00034	0.00245
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	0.00226	0.0022	3%	0.00077	0.00056	0.00283	0.00056	***0.0155***	-	<0.00010	0.00188	0.00211	***0.00625***
Barium (Ba)-Dissolved	mg/L	-	1	0.00005	0.024	0.0237	1%	0.0236	0.0235	0.0197	0.0226	0.0393	-	<0.000050	0.0245	0.0255	0.0303
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	<0.010	-	<0.010	<0.010	<0.010	<0.010	0.013	-	<0.010	<0.010	<0.010	0.015
Cadmium (Cd)-Dissolved	mg/L	0.000033	0.02	0.00001	***0.000149***	***0.000158***	6%	***0.000043***	0.000029	***0.00011***	***0.000035***	***0.000044***	-	<0.000010	***0.000049***	0.000027	***0.000049***
Calcium (Ca)-Dissolved	mg/L	-	-	0.05	13.2	12.6	5%	7.43	6.9	12.4	6.7	88.9	-	<0.050	12.7	12.5	86.1
Chromium (Cr)-Dissolved	mg/L	0.0089	0.04	0.0001	0.00016	0.00019	19%	0.00014	0.00014	0.00019	0.00014	0.00016	-	<0.00010	0.00018	0.00017	<0.00010
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00010	-	0.00015	0.00015	0.00022	0.00018	0.00078	-	<0.00010	<0.00010	0.00012	0.00052
Copper (Cu)-Dissolved	mg/L	0.002	0.2	0.0002	***0.00458***	***0.00466***	2%	***0.00314***	***0.00309***	***0.00398***	***0.00319***	0.00086	-	<0.00020	0.00189	0.00164	0.00084
Iron (Fe)-Dissolved	mg/L	0.3	1	0.01	0.16	0.158	1%	0.21	0.224	0.258	0.206	***0.6***	-	<0.010	0.158	0.228	0.217
Lead (Pb)-Dissolved	mg/L	0.001	0.1	0.00005	0.000215	0.000222	3%	0.000138	0.000118	0.00062	0.000112	0.000216	-	<0.000050	0.000065	0.000077	0.000166
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	<0.00050	<0.00050	-	<0.00050	<0.00050	<0.00050	<0.00050	0.00087	-	<0.00050	<0.00050	<0.00050	0.00201
Magnesium (Mg)-Dissolved	mg/L	-	-	0.1	2.88	2.8	3%	2.05	2.01	2.83	1.86	27	-	<0.10	2.81	2.81	34.8
Manganese (Mn)-Dissolved	mg/L	-	0.5	0.00005	0.00801	0.0085	6%	0.0256	0.0218	0.0749	0.0245	***0.915***	-	<0.000050	0.00548	0.0569	0.28
Mercury (Hg)-Dissolved	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	<0.000010
Molybdenum (Mo)-Dissolved	mg/L	0.0073	-	0.00005	<0.000050	0.000061	-	0.000172	0.000171	0.000447	0.00015	0.000287	-	<0.000050	0.000058	0.000052	0.000187
Nickel (Ni)-Dissolved	mg/L	0.1	0.3	0.0005	0.0006	0.00063	5%	0.00054	0.00051	0.00091	0.00053	0.00073	-	<0.00050	0.00059	0.00064	0.00063
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	0.91	0.9	1%	0.7	0.75	0.93	0.68	2.34	-	<0.10	0.92	0.88	2.5
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	0.00015
Silicon (Si)-Dissolved	mg/L	-	-	0.05	2.51	2.42	4%	2.08	1.99	2.6	1.99	2.66	-	<0.050	2.44	2.42	2.59
Silver (Ag)-Dissolved	mg/L	0.0001	0.1	0.00001	<0.000010	0.000041	-	0.000018	<0.000010	0.00003	<0.000010	0.000092	-	<0.000010	0.000033	<0.000010	<0.000010
Sodium (Na)-Dissolved	mg/L	-	-	0.05	1.15	1.14	1%	0.851	0.675	1.13	0.647	5.16	-	<0.050	1.15	1.19	2.72
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	0.0808	0.0809	0%	0.0613	0.0652	0.0683	0.0553	0.237	-	<0.00020	0.0772	0.0773	0.213
Sulfur (S)-Dissolved	mg/L	-	-	0.5	6.56	6.5	1%	1.46	1.15	4.76	1.14	78.8	-	<0.50	6.07	5.97	84.3
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	<0.000010	<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	0.000073	0.000074	1%	0.000166	0.000181	0.00028	0.00017	0.00101	-	<0.000010	0.000078	0.000091	0.00096
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	0.3	0.001	0.0126	0.0123	2%	0.0013	0.0031	0.0021	0.0011	0.0099	-	<0.0010	0.0048	0.0042	0.02

Table E-5. Water quality results for *in situ* data, lab analysis, and QA/QC program; May 27-29, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-130528-025 WQ-MN 5/28/2013	0167-130529-030 WQ-PW 5/29/2013
Temperature (in-situ)	°C	-	-	-	0.6	2.0
Specific Conductivity (in-situ)	µS/cm	-	-	-	45.8	433.2
pH (in-situ)	-	6.5 - 9.0	6.0 - 8.5	-	***6.38***	***6.42***
Turbidity (in-situ)	NTU	-	-	-	26.3	0.31
Colour, True	CU	15	-	5	-	<5.0
Conductivity	µS/cm	-	-	2	43.9	401
Hardness (as CaCO3)	mg/L	-	-	0.5	21.7	219
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1	7.07	7.60
Total Suspended Solids	mg/L	-	50	3	***62.5***	-
Total Dissolved Solids	mg/L	-	-	10	72	225
Turbidity	NTU	-	-	0.1	-	<0.10
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1	21.2	-
Alkalinity, Carbonate (as CaCO3)	mg/L	-	-	1	<1.0	-
Alkalinity, Hydroxide (as CaCO3)	mg/L	-	-	1	<1.0	-
Alkalinity, Total (as CaCO3)	mg/L	-	-	1	21.2	-
Ammonia, Total (as N)	mg/L	0.75	-	0.005	0.0611	-
Chloride (Cl)	mg/L	-	-	0.5	<0.50	<0.50
Fluoride (F)	mg/L	0.12	-	0.02	0.029	0.093
Nitrate (as N)	mg/L	13	-	0.005	0.0269	0.15
Nitrite (as N)	mg/L	0.06	-	0.001	0.0044	<0.0010
Sulfate (SO4)	mg/L	-	-	0.5	2.06	41
Cyanide, Weak Acid Diss	mg/L	-	0.1	0.005	<0.0050	-
Cyanide, Total	mg/L	-	0.3	0.005	<0.0050	-
Cyanate	mg/L	-	-	0.2	<0.20	-
Thiocyanate (SCN)	mg/L	-	-	0.5	<0.50	-
Aluminum (Al)-Total	mg/L	0.005	-	0.003	***1.13***	<0.010
Antimony (Sb)-Total	mg/L	-	0.15	0.0001	0.00026	<0.00050
Arsenic (As)-Total	mg/L	0.005	0.15	0.0001	0.0048	0.00038
Barium (Ba)-Total	mg/L	-	1	0.00005	0.0788	0.095
Beryllium (Be)-Total	mg/L	-	-	0.0001	<0.00010	-
Bismuth (Bi)-Total	mg/L	-	-	0.0005	<0.00050	-
Boron (B)-Total	mg/L	-	-	0.01	<0.010	<0.10
Cadmium (Cd)-Total	mg/L	0.000033	0.02	0.00001	***0.000101***	<0.00020
Calcium (Ca)-Total	mg/L	-	-	0.05	6.46	50.5
Chromium (Cr)-Total	mg/L	0.0089	0.04	0.0001	0.00261	<0.0020
Cobalt (Co)-Total	mg/L	-	-	0.0001	0.00159	-
Copper (Cu)-Total	mg/L	0.002	0.2	0.0005	***0.00536***	<0.0010
Iron (Fe)-Total	mg/L	0.3	1	0.01	***5.4***	<0.030
Lead (Pb)-Total	mg/L	0.001	0.1	0.00005	0.000839	0.00062
Lithium (Li)-Total	mg/L	-	-	0.0005	0.00064	-
Magnesium (Mg)-Total	mg/L	-	-	0.1	1.93	22.6
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	0.442	<0.0020
Mercury (Hg)-Total	mg/L	0.000026	0.005	0.00001	0.000012	<0.00020
Molybdenum (Mo)-Total	mg/L	0.0073	-	0.00005	0.000285	-
Nickel (Ni)-Total	mg/L	0.1	0.3	0.0005	0.00323	-
Phosphorus (P)-Total	mg/L	-	-	0.05	0.068	-
Potassium (K)-Total	mg/L	-	-	0.1	1.2	0.91
Selenium (Se)-Total	mg/L	0.001	-	0.0001	0.00016	<0.0010
Silicon (Si)-Total	mg/L	-	-	0.05	4.79	-
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	0.000022	-
Sodium (Na)-Total	mg/L	-	-	0.05	1.16	5.1
Strontium (Sr)-Total	mg/L	-	-	0.0002	0.0359	-
Sulfur (S)-Total	mg/L	-	-	0.5	0.96	-
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	0.00002	-
Tin (Sn)-Total	mg/L	-	-	0.0001	<0.00010	-
Titanium (Ti)-Total	mg/L	-	-	0.01	0.038	-
Uranium (U)-Total	mg/L	0.015	-	0.00001	0.000266	0.0023
Vanadium (V)-Total	mg/L	-	-	0.001	0.0076	-
Zinc (Zn)-Total	mg/L	0.03	0.3	0.003	0.0105	<0.050
Dissolved Metals Filtration Location		-	-	n/a	FIELD	-

Color Key: ***Exceeds CCME Guideline***
Exceeds Mount Nansen Effluent Standards
Exceeds both CCME and MN Standards
QA/QC Assessment - highlighted if > +/-10%

Note: For those guidelines that are hardness dependent, the most conservative guideline has been applied.

Table E-5. Water quality results for *in situ* data, lab analysis, and QA/QC program; May 27-29, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-130528-025 WQ-MN 5/28/2013	0167-130529-030 WQ-PW 5/29/2013
Aluminum (Al)-Dissolved	mg/L	0.005	-	0.001	***0.122***	-
Antimony (Sb)-Dissolved	mg/L	-	0.15	0.0001	0.00016	-
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	0.00258	-
Barium (Ba)-Dissolved	mg/L	-	1	0.00005	0.0522	-
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	0.02	0.00001	0.000024	-
Calcium (Ca)-Dissolved	mg/L	-	-	0.05	5.98	-
Chromium (Cr)-Dissolved	mg/L	0.0089	0.04	0.0001	0.00039	-
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	0.00082	-
Copper (Cu)-Dissolved	mg/L	0.002	0.2	0.0002	***0.00228***	-
Iron (Fe)-Dissolved	mg/L	0.3	1	0.01	***3.28***	-
Lead (Pb)-Dissolved	mg/L	0.001	0.1	0.00005	0.000237	-
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	<0.00050	-
Magnesium (Mg)-Dissolved	mg/L	-	-	0.1	1.64	-
Manganese (Mn)-Dissolved	mg/L	-	0.5	0.00005	0.348	-
Mercury (Hg)-Dissolved	mg/L	0.000026	0.005	0.00001	<0.000010	-
Molybdenum (Mo)-Dissolved	mg/L	0.0073	-	0.00005	0.000182	-
Nickel (Ni)-Dissolved	mg/L	0.1	0.3	0.0005	0.00173	-
Phosphorus (P)-Dissolved	mg/L	-	-	0.05	<0.050	-
Potassium (K)-Dissolved	mg/L	-	-	0.1	1.03	-
Selenium (Se)-Dissolved	mg/L	0.001	-	0.0001	<0.00010	-
Silicon (Si)-Dissolved	mg/L	-	-	0.05	3.35	-
Silver (Ag)-Dissolved	mg/L	0.0001	0.1	0.00001	<0.000010	-
Sodium (Na)-Dissolved	mg/L	-	-	0.05	1.11	-
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	0.0313	-
Sulfur (S)-Dissolved	mg/L	-	-	0.5	0.86	-
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	0.000111	-
Vanadium (V)-Dissolved	mg/L	-	-	0.001	0.0029	-
Zinc (Zn)-Dissolved	mg/L	0.03	0.3	0.001	0.0049	-

Table E-6. Water Quality Results for *in situ* data, lab analysis, and QA/QC program; June 10-12, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID / WQ Site ID / Date Sampled / Detection Limit	0167-130612-003 WQ-DC-D1b 06/12/2013	0167-130612-010 WQ-DC-DX-r 06/12/2013	0167-130612-011 WQ-DC-DX 06/12/2013	QA/QC WQ-DC-DX-r	0167-130612-002 WQ-ADIT-SEEP 06/12/2013	0167-130612-007 WQ-DC-U 06/12/2013	0167-130612-006 WQ-PC-D 06/12/2013	0167-130612-009 WQ-PC-U 06/12/2013	0167-130612-001 WQ-DC-U1 06/12/2013	0167-130612-005 WQ-DC-U2 06/12/2013	0167-130612-004 WQ-DC-R 06/12/2013	0167-130611-015 WQ-VC-R 06/11/2013	0167-130611-016 WQ-MN 06/11/2013	0167-130611-020 WQ-BC 06/11/2013
Temperature (in-situ)	°C	-	-	-	1.3	-	1.6	-	2.1	2.5	2.8	1.6	0.4	1.3	1.2	4.0	2.0	6.7
Specific Conductivity (in-situ)	µS/cm	-	-	-	1111.0	-	310.5	-	196.5	611.2	207.0	190.8	681.7	662.2	500.5	162.0	41.6	206.8
pH (in-situ)	-	6.5 - 9.0	6.0 - 8.5	-	7.66	-	7.40	-	7.51	7.51	7.27	7.24	7.36	7.21	6.93	7.44	6.88	7.77
Turbidity (in-situ)	NTU	-	-	-	6.0	-	92.3	-	1.1	24.0	2.2	1.3	2.8	7.5	31.1	8.8	23.1	53.3
Dissolved Oxygen (in-situ)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Colour, True	CU	15	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity	µS/cm	-	-	2	1080	302	304	1%	194	598	196	187	664	649	487	162	39.8	205
Hardness (as CaCO3)	mg/L	-	-	0.5	658	150	150	0%	91.3	328	91.1	87.3	379	358	254	77.8	20.6	107
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1	8.12	7.75	7.8	1%	7.81	8.01	7.82	7.73	8	7.91	7.9	7.96	7.32	8.01
Total Suspended Solids	mg/L	-	50	3	11.3	***527***	***557***	6%	3.3	***58***	<3.0	<3.0	19.3	***53.3***	***105***	28	***51.3***	***445***
Total Dissolved Solids	mg/L	-	-	10	889	214	214	0%	144	463	156	149	465	504	362	113	55	111
Turbidity	NTU	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1	186	50.1	53	6%	37.9	90.4	38.9	37	106	83.9	74.9	56.8	16.4	67.6
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	<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	<1.0
Alkalinity, Total (as CaCO3)	mg/L	-	-	1	186	50.1	53	6%	37.9	90.4	38.9	37	106	83.9	74.9	56.8	16.4	67.6
Ammonia, Total (as N)	mg/L	0.75	-	0.005	0.102	0.0691	0.0672	3%	<0.0050	0.243	<0.0050	<0.0050	0.0129	0.0574	0.226	0.0172	0.0432	0.0302
Chloride (Cl)	mg/L	-	-	0.5	<5.0	<0.50	<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	***0.28***	0.055	0.057	4%	0.047	0.07	0.049	0.045	0.08	0.068	0.069	0.053	0.055	0.067
Nitrate (as N)	mg/L	13	-	0.005	0.087	0.0169	0.017	1%	0.006	0.102	0.0122	<0.0050	0.0921	0.0495	0.101	0.0908	0.015	0.0523
Nitrite (as N)	mg/L	0.06	-	0.001	<0.010	<0.0010	<0.0010	-	<0.0010	0.0025	<0.0010	<0.0010	0.0012	0.0017	0.006	<0.0010	<0.0010	<0.0010
Sulfate (SO4)	mg/L	-	-	0.5	479	100	101	1%	56.2	236	57.9	54.5	264	271	183	26.8	1.21	39.9
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	<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	<0.0050	<0.0050	<0.0050
Cyanate	mg/L	-	-	0.2	<0.20	0.3	<0.20	-	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.21	<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	<0.50	<0.50	<0.50
Aluminum (Al)-Total	mg/L	0.005	-	0.003	***0.117***	***8.42***	***6.84***	19%	***0.0449***	***0.895***	***0.0455***	***0.0521***	***0.189***	***0.492***	***1.42***	***0.405***	***0.983***	***4.33***
Antimony (Sb)-Total	mg/L	-	0.15	0.0001	0.0111	0.00417	0.00326	22%	0.00075	0.00151	0.00122	0.0006	0.00237	0.00205	0.00765	0.0004	0.00031	0.00076
Arsenic (As)-Total	mg/L	0.005	0.15	0.0001	***0.0436***	***0.114***	***0.085***	25%	0.00188	***0.0119***	0.00347	0.00182	***0.00573***	***0.00778***	***0.0816***	0.00318	0.00441	***0.0138***
Barium (Ba)-Total	mg/L	-	1	0.00005	0.022	0.178	0.151	15%	0.0329	0.0609	0.0297	0.032	0.0296	0.0392	0.0669	0.0524	0.0695	0.129
Beryllium (Be)-Total	mg/L	-	-	0.0001	<0.00010	0.00036	0.00023	36%	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00021
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	<0.00050	<0.00050
Boron (B)-Total	mg/L	-	-	0.01	0.038	<0.010	<0.010	-	<0.010	0.018	<0.010	<0.010	0.023	0.017	0.016	<0.010	<0.010	<0.010
Cadmium (Cd)-Total	mg/L	0.000033	0.02	0.00001	***0.000974***	***0.000474***	***0.000369***	22%	***0.000035***	***0.000113***	***0.00017***	0.000017	0.000029	***0.000063***	***0.000694***	***0.00006***	***0.000091***	***0.000596***
Calcium (Ca)-Total	mg/L	-	-	0.05	154	44	44.3	1%	25.8	78.3	25.9	24.3	87.6	87.1	63.3	20	5.96	33.3
Chromium (Cr)-Total	mg/L	0.0089	0.04	0.0001	0.00034	***0.0132***	***0.00911***	31%	0.00117	0.00162	0.00021	0.00026	0.00111	0.00092	0.00263	0.00078	0.00333	0.00813
Cobalt (Co)-Total	mg/L	-	-	0.0001	0.00025	0.00506	0.00421	17%	<0.00010	0.00131	<0.00010	<0.00010	0.00053	0.00063	0.00148	0.00036	0.00105	0.00279
Copper (Cu)-Total	mg/L	0.002	0.2	0.0005	***0.00261***	***0.023***	***0.0157***	32%	***0.00321***	***0.00436***	***0.00462***	0.00142	***0.00273***	***0.00207***	***0.00599***	***0.00304***	***0.00751***	***0.0172***
Iron (Fe)-Total	mg/L	0.3	1	0.01	***0.573***	***15.6***	***12.2***	22%	0.075	***2.83***	0.062	0.123	***0.615***	***1.4***	***4.55***	***1.05***	***3.49***	***6.52***
Lead (Pb)-Total	mg/L	0.001	0.1	0.00005	***0.0204***	***0.0168***	***0.0135***	20%	0.000199	***0.0011***	0.000659	0.000104	0.000172	0.000635	***0.0336***	0.000943	0.000683	***0.0102***
Lithium (Li)-Total	mg/L	-	-	0.0005	0.00486	0.00589	0.00432	27%	<0.00050	0.0016	<0.00050	<0.00050	0.00247	0.00211	0.00154	<0.00050	<0.00050	0.00322
Magnesium (Mg)-Total	mg/L	-	-	0.1	63.3	13.7	13.2	4%	6.23	29.3	6.16	5.8	37.4	33.8	22.3	6.52	1.69	8.8
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	0.368	0.261	0.194	26%	0.0014	***0.612***	0.00282	0.00683	0.136	0.394	***0.75***	0.0869	0.172	0.499
Mercury (Hg)-Total	mg/L	0.000026	0.005	0.00001	<0.000010	0.000022	***0.000029***	32%	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	0.000019	<0.000010
Molybdenum (Mo)-Total	mg/L	0.0073	-	0.00005	0.000192	0.000526	0.000185	65%	0.000295	0.000378	0.000066	0.000061	0.00046	0.000289	0.000409	0.000374	0.000843	0.00116
Nickel (Ni)-Total	mg/L	0.1	0.3	0.0005	0.00091	0.00711	0.00568	20%	0.00052	0.00201	<0.00050	<0.00050	0.00097	0.00129	0.00233	0.00111	0.00349	0.00595
Phosphorus (P)-Total	mg/L	-	-	0.05	<0.050	0.571	0.497	13%	<0.050	0.052	<0.050	<0.050	<0.050	0.051	0.1	<0.050	0.053	0.356
Potassium (K)-Total	mg/L	-	-	0.1	3.84	4.44	4.2	5%	0.63	2.09	0.63	0.56	2.51	2.03	1.91	0.75	0.8	1.55
Selenium (Se)-Total	mg/L	0.001	-	0.0001	<0.00010	0.00023	0.00019	17%	<0.00010	0.00014	<0.00010	<0.00010	<0.00010	<0.00010	0.00013	<0.00010	0.00016	0.00011
Silicon (Si)-Total	mg/L	-	-	0.05	5.04	15.9	13.7	14%	4.79	4.65	4.64	4.78	3.84	5.22	5.38	5.12	5.6	11.8
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	0.000171	0.000329	0.000228	31%	0.000018	0.000024	0.000013	<0.000010	0.000019	0.000014	0.00052	0.00002	0.000019	0.000095
Sodium (Na)-Total	mg/L	-	-	0.05	4.79	2.62	2.71	3%	2.51	5.03	2.56	2.52	3.45	3.82	4.6	2.01	1.19	2.69
Strontium (Sr)-Total	mg/L	-	-	0.0002	0.338	0.149	0.141	5%	0.175	0.244	0.17	0.17	0.222	0.256	0.203	0.172	0.0332	0.209
Sulfur (S)-Total	mg/L	-	-	0.5	151	31.4	31.9	2%	18.1	74.7	18.3	17.2	86.5	89.6	57.9	8.79	0.66	12.7
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	0.000033	0.000222	0.00018	19%	<0.000010	0.000016	<0.000010	<0.000010	<0.000010	0.000011	0.000032	<0.000010	0.000018	0.000061
Tin (Sn)-Total	mg/L	-	-	0.0001	<0.00010	0.00015	0.00012	20%	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00011
Titanium (Ti)-Total	mg/L	-	-	0.01	<0.010	0.388	0.341	12%	<0.010	0.041	<0.010	<0.010	<0.010	0.026	0.062	0.013	0.035	0.205
Uranium (U)-Total	mg/L	0.015	-	0.00001	0.00207	0.00102	0.000726	29%	0.000077	0.0012	0.000078	0.000135	0.00113	0.0011	0.00101	0.000512	0.000249	0.00118
Vanadium (V)-Total	mg/L	-	-	0.001	<0.0010	0.039	0.0307	21%	<0.0010	0.0043	<0.0010	<0.0010	0.0011	0.0025	0.0062	0.002	0.0065	0.0152
Zinc (Zn)-Total	mg/L	0.03	0.3	0.003	***0.278***	***0.0636***	***0.0544***	14%	0.0078	0.0151	0.0167	<0.0030	0.0203	0.0247	***0.0515***	0.0047	0.0108	***0.0357***
Dissolved Metals Filtration Location		-	-	n/a	FIELD	FIELD	FIELD	-	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD
Aluminum (Al)-Dissolved	mg/L	0.005	-	0.001	0.0048	***0.0134***	***0.0127***	5%	***0.0283***	***0.125***	***0.0293***	***0.0356***	***0.0645***	***0.0158***	***0.107***	***0.0559***	***0.174***	***0.0355***
Antimony (Sb)-Dissolved	mg/L	-	0.15	0.0001	0.00795	0.0011	0.00108	2%	0.00061	0.00121	0.00115	0.00054	0.00226	0.0018	0.00193	0.00027	0.00017	0.00037
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	***0.0194***	0.00441	0.00436	1%	0.00166	***0.00659***	0.00311	0.00161	0.00297	0.0041	***0.0205***	0.00183	0.00246	0.00329
Barium (Ba)-Dissolved	mg/L	-	1	0.00005	0.0194	0.0572	0.0551	4%	0.0331	0.0468	0.0303	0.032	0.0274	0.0309	0.0437	0.0465	0.0486	0.0442
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	<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	<0.00050
Boron (B)-Dissolved	mg/L	-	-	0.01	0.039	<0.010	<0.010	-	<0.010	0.018	<0.010	<0.010	0.02	0.013	0.013	<0.010	<0.010	<0.010

Table E-6. Water Quality Results for *in situ* data, lab analysis, and QA/QC program; June 10-12, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-130612-003 WQ-DC-D1b 06/12/2013	0167-130612-010 WQ-DC-DX-r 06/12/2013	0167-130612-011 WQ-DC-DX 06/12/2013	QA/QC WQ-DC-DX-r	0167-130612-002 WQ-ADIT-SEEP 06/12/2013	0167-130612-007 WQ-DC-U 06/12/2013	0167-130612-006 WQ-PC-D 06/12/2013	0167-130612-009 WQ-PC-U 06/12/2013	0167-130612-001 WQ-DC-U1 06/12/2013	0167-130612-005 WQ-DC-U2 06/12/2013	0167-130612-004 WQ-DC-R 06/12/2013	0167-130611-015 WQ-VC-R 06/11/2013	0167-130611-016 WQ-MN 06/11/2013	0167-130611-020 WQ-BC 06/11/2013
Cadmium (Cd)-Dissolved	mg/L	0.000033	0.02	0.00001	***0.000667***	<0.000010	<0.000010	-	0.000032	0.000032	***0.000201***	0.000012	0.000018	0.000022	***0.000054***	0.000017	0.000018	***0.000064***
Calcium (Ca)-Dissolved	mg/L	-	-	0.05	159	42.1	42.3	0%	26.3	81.1	26.3	25.2	90	87.6	64.2	20.3	5.77	30.8
Chromium (Cr)-Dissolved	mg/L	0.0089	0.04	0.0001	<0.00010	<0.00010	<0.00010	-	0.00014	0.00022	0.00014	0.00013	0.00011	<0.00010	0.00023	0.00015	0.00039	0.00014
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	0.0002	0.00025	0.00027	8%	<0.00010	0.00084	<0.00010	<0.00010	0.00047	0.00036	0.00084	0.00019	0.00055	0.00017
Copper (Cu)-Dissolved	mg/L	0.002	0.2	0.0002	0.00105	0.00109	0.00111	2%	0.00147	0.00169	***0.00439***	0.00125	0.00097	0.00077	0.00174	0.00195	***0.00273***	***0.00253***
Iron (Fe)-Dissolved	mg/L	0.3	1	0.01	0.122	***1.21***	***0.944***	22%	0.045	***0.983***	0.041	0.097	0.247	***0.586***	***1.67***	***0.489***	***2.2***	0.207
Lead (Pb)-Dissolved	mg/L	0.001	0.1	0.00005	0.000418	<0.000050	<0.000050	-	<0.000050	0.000065	0.00017	<0.000050	<0.000050	<0.000050	***0.00109***	0.000121	0.000135	0.000143
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	0.00546	<0.00050	<0.00050	-	<0.00050	0.00258	<0.00050	<0.00050	0.00242	0.00176	0.00074	<0.00050	<0.00050	<0.00050
Magnesium (Mg)-Dissolved	mg/L	-	-	0.1	63.3	10.8	10.8	0%	6.23	30.4	6.19	5.95	37.5	33.8	22.7	6.6	1.51	7.3
Manganese (Mn)-Dissolved	mg/L	-	0.5	0.00005	0.365	0.0811	0.0728	10%	0.000344	***0.595***	0.00218	0.00612	0.128	0.369	***0.725***	0.0735	0.14	0.307
Mercury (Hg)-Dissolved	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	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	mg/L	0.0073	-	0.00005	0.000214	<0.000050	<0.000050	-	0.00006	0.000324	0.000058	0.000053	0.000242	0.000256	0.000342	0.00033	0.00018	0.000751
Nickel (Ni)-Dissolved	mg/L	0.1	0.3	0.0005	0.00085	<0.00050	<0.00050	-	<0.00050	0.00105	<0.00050	<0.00050	0.00078	0.00079	0.00109	0.00065	0.00213	0.00067
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	<0.050
Potassium (K)-Dissolved	mg/L	-	-	0.1	3.7	3.43	3.3	4%	0.61	2.04	0.61	0.57	2.52	2.01	1.8	0.71	0.71	0.81
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	<0.00010	0.0001	<0.00010
Silicon (Si)-Dissolved	mg/L	-	-	0.05	4.77	3.84	3.78	2%	4.77	3.66	4.66	4.87	3.73	4.58	3.62	4.62	4.7	5.42
Silver (Ag)-Dissolved	mg/L	0.0001	0.1	0.00001	0.000022	0.000016	<0.000010	-	<0.000010	<0.000010	0.000032	0.000013	0.000017	0.000014	0.000014	0.000027	0.000027	<0.000010
Sodium (Na)-Dissolved	mg/L	-	-	0.05	4.84	2.37	2.4	1%	2.52	5.24	2.51	2.49	3.34	3.66	4.7	2	1.17	2.44
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	0.381	0.129	0.129	0%	0.167	0.235	0.171	0.165	0.215	0.243	0.199	0.163	0.0299	0.184
Sulfur (S)-Dissolved	mg/L	-	-	0.5	150	32.3	32.3	0%	18.1	76.5	18.4	17.5	86.2	88.3	59.3	8.69	0.6	12.8
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001	0.000023	<0.000010	<0.000010	-	<0.000010	<0.000010	<0.000010	<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	<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	<0.010
Uranium (U)-Dissolved	mg/L	0.015	-	0.00001	0.00223	0.000058	0.000063	9%	0.000077	0.00102	0.000074	0.00013	0.0011	0.000958	0.000868	0.000424	0.000104	0.000691
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	0.0021	<0.0010
Zinc (Zn)-Dissolved	mg/L	0.03	0.3	0.001	***0.275***	0.0013	0.0023	77%	0.0056	0.0064	0.0182	0.0033	0.0185	0.0161	0.0099	0.0016	0.0021	0.0015

Table E-6. Water Quality Results for *in situ* data, lab analysis, and QA/QC program; June 10-12, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID / WQ Site ID / Date Sampled / Detection Limit	0167-130611-022 WQ-TP 06/11/2013	0167-130611-024 WQ-SP-1 06/11/2013	0167-130611-026 WQ-SEEP 06/11/2013	0167-130611-031 WQ-DC-DX+105 06/11/2013	0167-130611-025 WQ-VC-REF 06/11/2013	0167-130611-023 WQ-SP-2 06/11/2013	0167-130611-019 WQ-VC-U 06/11/2013	0167-130611-018 WQ-VC-DBC 06/11/2013	0167-130611-014 WQ-MS-S-03 06/11/2013	0167-130611-021 WQ-VC-UMN 06/11/2013	0167-130611-017 WQ-VC-UMN-r 06/11/2013	QA/QC WQ-VC-UMN-r	0167-130611-027 WQ-PIT-1 06/11/2013	0167-130611-029 WQ-PIT-3 06/11/2013
Temperature (in-situ)	°C	-	-	-	13.5	9.3	6.2	2.3	5.1	3.4	4.5	4.6	1.1	4.5	-	-	8.7	4.5
Specific Conductivity (in-situ)	µS/cm	-	-	-	853.0	959.0	1470.0	803.8	128.0	1621.0	128.5	138.5	1247.0	185.1	-	-	1167.0	2071.0
pH (in-situ)	-	6.5 - 9.0	6.0 - 8.5	-	7.76	7.22	6.77	6.77	7.57	6.77	7.47	7.46	6.64	7.46	-	-	7.82	7.14
Turbidity (in-situ)	NTU	-	-	-	22.2	25.0	47.6	35.9	11.1	78.4	6.2	6.9	2.0	5.8	-	-	2.3	3.6
Dissolved Oxygen (in-situ)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11.6	8.8
Colour, True	CU	15	-	5	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity	µS/cm	-	-	2	1000	970	1440	784	128	1420	128	137	1220	186	184	1%	1130	1700
Hardness (as CaCO3)	mg/L	-	-	0.5	555	508	788	448	64.1	754	64	68.1	737	90.4	89	2%	686	1070
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1	7.91	7.85	7.64	7.74	7.97	7.61	7.97	7.99	7.78	8.02	8	0%	7.78	7.94
Total Suspended Solids	mg/L	-	50	3	36.7	9.3	32	***86.7***	13.3	26	12.7	20.7	10.7	10.7	14.7	37%	6.2	6
Total Dissolved Solids	mg/L	-	-	10	795	755	1150	616	94	1160	97	95	994	133	106	20%	929	1540
Turbidity	NTU	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1	66.4	161	219	166	55.2	220	62.8	62.2	256	64.6	61.3	5%	85.7	158
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	<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	<1.0
Alkalinity, Total (as CaCO3)	mg/L	-	-	1	66.4	161	219	166	55.2	220	62.8	62.2	256	64.6	61.3	5%	85.7	158
Ammonia, Total (as N)	mg/L	0.75	-	0.005	0.375	***1.93***	***4.04***	<0.0050	<0.0050	***7.09***	<0.0050	<0.0050	0.0621	0.0118	0.0117	1%	<0.0050	<0.0050
Chloride (Cl)	mg/L	-	-	0.5	<2.5	0.54	<5.0	<0.50	<0.50	<5.0	<0.50	<0.50	<5.0	<0.50	<0.50	-	<5.0	<5.0
Fluoride (F)	mg/L	0.12	-	0.02	***0.16***	0.063	<0.20	***0.148***	0.047	<0.20	0.042	0.045	***0.29***	0.047	0.051	9%	***0.22***	***0.24***
Nitrate (as N)	mg/L	13	-	0.005	0.138	1.91	1.07	0.0424	0.0865	1.68	0.0876	0.0848	<0.050	0.101	0.103	2%	<0.050	<0.050
Nitrite (as N)	mg/L	0.06	-	0.001	0.0091	0.0463	0.028	<0.0010	<0.0010	***0.068***	<0.0010	<0.0010	<0.010	<0.0010	<0.0010	-	<0.010	<0.010
Sulfate (SO4)	mg/L	-	-	0.5	504	381	660	292	9.93	639	9.96	13.3	500	32.1	31.8	1%	608	972
Cyanide, Weak Acid Diss	mg/L	-	0.1	0.005	<0.0050	0.0064	0.006	<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	0.0393	0.023	<0.0050	<0.0050	0.05	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	-	-	-
Cyanate	mg/L	-	-	0.2	<0.20	0.42	<0.20	0.28	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	-	-	-
Thiocyanate (SCN)	mg/L	-	-	0.5	<0.50	<0.50	2.9	<0.50	<0.50	1.8	<0.50	<0.50	<0.50	<0.50	<0.50	-	-	-
Aluminum (Al)-Total	mg/L	0.005	-	0.003	***0.27***	***0.114***	***0.0416***	***2.1***	***0.302***	***0.11***	***0.331***	***0.407***	***0.0134***	***0.231***	***0.244***	6%	***0.041***	***0.0624***
Antimony (Sb)-Total	mg/L	-	0.15	0.0001	0.0402	0.00055	0.00062	0.0112	0.00017	0.0008	0.00016	0.00022	0.0262	0.00034	0.0004	18%	0.00238	0.00313
Arsenic (As)-Total	mg/L	0.005	0.15	0.0001	***0.148***	***0.0103***	***0.0476***	***0.044***	0.00126	***0.0332***	0.00121	0.00182	***0.0523***	0.00262	0.00268	2%	0.00483	***0.00614***
Barium (Ba)-Total	mg/L	-	1	0.00005	0.0168	0.0681	0.0616	0.0579	0.0528	0.0676	0.0534	0.0548	0.0163	0.0492	0.0507	3%	0.0166	0.0237
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	-	<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	-	<0.00050	<0.00050
Boron (B)-Total	mg/L	-	-	0.01	0.071	0.041	0.083	<0.010	<0.010	0.074	<0.010	<0.010	<0.010	<0.010	<0.010	-	<0.010	<0.010
Cadmium (Cd)-Total	mg/L	0.000033	0.02	0.00001	***0.00325***	***0.000444***	***0.000495***	***0.00565***	***0.000048***	***0.000513***	***0.000041***	***0.000061***	***0.00931***	***0.000044***	***0.000054***	23%	***0.00486***	***0.00567***
Calcium (Ca)-Total	mg/L	-	-	0.05	156	149	232	113	16.3	235	16.6	18.4	193	23.2	22.8	2%	191	293
Chromium (Cr)-Total	mg/L	0.0089	0.04	0.0001	0.00029	<0.00060	0.00058	0.00349	<0.00060	<0.00070	<0.00060	<0.00070	<0.00020	<0.00060	0.00047	-	0.00101	0.00081
Cobalt (Co)-Total	mg/L	-	-	0.0001	0.00138	0.00542	0.00714	0.00152	0.00022	0.0081	0.00022	0.00026	0.00234	0.00022	0.00021	5%	0.00018	0.00019
Copper (Cu)-Total	mg/L	0.002	0.2	0.0005	***0.0433***	***0.00963***	***0.00736***	***0.00599***	<0.0030	***0.0069***	<0.0030	<0.0035	<0.0020	<0.0025	***0.00253***	-	***0.00364***	***0.00407***
Iron (Fe)-Total	mg/L	0.3	1	0.01	***1.14***	***3.71***	***10.4***	***3.28***	***0.515***	***8.72***	***0.528***	***0.667***	***1.94***	***0.504***	***0.511***	1%	0.06	0.078
Lead (Pb)-Total	mg/L	0.001	0.1	0.00005	***0.0348***	0.000894	0.000358	***0.00391***	0.000692	***0.00137***	0.000706	0.00089	***0.00175***	0.000765	0.000797	4%	***0.00128***	***0.00168***
Lithium (Li)-Total	mg/L	-	-	0.0005	0.0064	<0.00050	0.00146	0.00669	0.00062	<0.00050	0.00061	0.00066	0.00859	0.00061	<0.00050	-	0.00496	0.00783
Magnesium (Mg)-Total	mg/L	-	-	0.1	37.3	31.7	46.6	36.5	5.54	43.3	5.53	5.9	61.2	7.49	7.64	2%	50	82.7
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	***1.93***	***2.49***	***5.35***	***0.902***	0.024	***5.46***	0.0261	0.0675	***2.13***	0.0754	0.0794	5%	0.19	0.268
Mercury (Hg)-Total	mg/L	0.000026	0.005	0.00001	0.000016	<0.000010	<0.000010	<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	0.00139	<0.00070	0.00136	<0.00030	<0.00040	<0.0010	<0.00035	<0.00045	<0.00035	<0.00040	0.000369	-	0.000284	0.000283
Nickel (Ni)-Total	mg/L	0.1	0.3	0.0005	0.00233	0.00232	0.00241	0.00348	0.00062	0.00276	0.00061	0.00073	0.00349	0.0006	0.00064	7%	0.00111	0.00119
Phosphorus (P)-Total	mg/L	-	-	0.05	<0.050	<0.050	<0.050	0.069	<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	8.73	3.66	6.03	3.48	0.63	5.85	0.59	0.66	3.46	0.72	0.76	6%	2.12	3.25
Selenium (Se)-Total	mg/L	0.001	-	0.0001	<0.00010	0.00015	0.00021	0.00013	<0.00010	0.00021	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010
Silicon (Si)-Total	mg/L	-	-	0.05	2.32	4.67	6.65	7.82	4.89	6.33	4.95	5.28	6.11	4.89	4.9	0%	1.97	2.87
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	0.00074	0.000081	0.000043	0.000129	0.000033	0.000055	0.000029	0.000027	0.00002	0.000022	0.000014	36%	0.000015	0.000028
Sodium (Na)-Total	mg/L	-	-	0.05	12.4	18.3	36.4	3.39	1.7	37.2	1.73	1.83	4.69	2.2	2.22	1%	6.16	10.9
Strontium (Sr)-Total	mg/L	-	-	0.0002	0.376	0.473	0.678	0.261	0.19	0.693	0.192	0.188	0.395	0.192	0.194	1%	0.515	0.926
Sulfur (S)-Total	mg/L	-	-	0.5	168	128	217	93.1	3.42	212	3.43	4.57	163	10.3	10.2	1%	197	312
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	0.000208	0.000016	<0.000010	0.000133	0.000014	0.000016	<0.000010	<0.000010	0.000124	<0.000010	<0.000010	-	0.000046	0.000067
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	-	<0.00010	<0.00010
Titanium (Ti)-Total	mg/L	-	-	0.01	<0.010	<0.010	<0.010	0.101	<0.010	<0.010	0.011	0.018	<0.010	<0.010	<0.010	-	<0.010	<0.010
Uranium (U)-Total	mg/L	0.015	-	0.00001	0.000719	0.00211	0.00219	0.00241	0.000459	0.00224	0.000456	0.000487	0.00353	0.000497	0.000525	6%	0.00185	0.00359
Vanadium (V)-Total	mg/L	-	-	0.001	<0.0010	<0.0010	0.0021	0.0093	0.0012	0.0015	0.0012	0.0015	<0.0010	0.0011	0.001	9%	<0.0010	<0.0010
Zinc (Zn)-Total	mg/L	0.03	0.3	0.003	***0.272***	0.0148	0.0088	***0.96***	0.0035	0.0142	0.0047	0.0048	***1.95***	0.0043	0.0048	12%	***0.566***	***0.699***
Dissolved Metals Filtration Location		-	-	n/a	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	FIELD	-	FIELD	FIELD
Aluminum (Al)-Dissolved	mg/L	0.005	-	0.001	***0.0173***	***0.0206***	***0.0084***	***0.0141***	***0.0387***	***0.0128***	***0.0412***	***0.0356***	0.0013	***0.0316***	***0.0319***	1%	0.0024	0.0011
Antimony (Sb)-Dissolved	mg/L	-	0.15	0.0001	0.0379	0.00038	0.00054	0.0119	<0.00010	0.0005	<0.00010	0.00013	0.0269	0.00028	0.00028	0%	0.00257	0.00297
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	***0.0496***	0.00288	***0.028***	***0.00785***	0.00053	0.00471	0.00054	0.00087	***0.0354***	0.0018	0.00176	2%	0.00366	0.00455
Barium (Ba)-Dissolved	mg/L	-	1	0.00005	0.0139	0.0651	0.0595	0.0374	0.0476	0.0596	0.0502	0.0474	0.0162	0.0476	0.0465	2%	0.017	0.0232
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	<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	<0.00050
Boron (B)-Dissolved	mg/L	-	-	0.01	0.061	0.031	0.07	<0.010	<0.010	0.066	<0.010	<0.010	<0.010	<0.010	<0.010	-	<0.010	<0.010

Table E-6. Water Quality Results for *in situ* data, lab analysis, and QA/QC program; June 10-12, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-130611-022 WQ-TP 06/11/2013	0167-130611-024 WQ-SP-1 06/11/2013	0167-130611-026 WQ-SEEP 06/11/2013	0167-130611-031 WQ-DC-DX+105 06/11/2013	0167-130611-025 WQ-VC-REF 06/11/2013	0167-130611-023 WQ-SP-2 06/11/2013	0167-130611-019 WQ-VC-U 06/11/2013	0167-130611-018 WQ-VC-DBC 06/11/2013	0167-130611-014 WQ-MS-S-03 06/11/2013	0167-130611-021 WQ-VC-UMN 06/11/2013	0167-130611-017 WQ-VC-UMN-r 06/11/2013	QA/QC WQ-VC-UMN-r	0167-130611-027 WQ-PIT-1 06/11/2013	0167-130611-029 WQ-PIT-3 06/11/2013
Cadmium (Cd)-Dissolved	mg/L	0.000033	0.02	0.00001	***0.00264***	***0.000323***	***0.000351***	***0.00503***	0.000013	***0.000391***	0.000016	0.00002	***0.00838***	0.000021	0.000021	0%	***0.005***	***0.0056***
Calcium (Ca)-Dissolved	mg/L	-	-	0.05	160	151	238	118	16.6	233	16.7	18	196	23.6	23.2	2%	193	295
Chromium (Cr)-Dissolved	mg/L	0.0089	0.04	0.0001	<0.00010	0.00023	0.00031	<0.00010	0.00013	0.0002	0.00012	0.00012	<0.00010	0.00012	0.0001	17%	<0.00010	<0.00010
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	0.00132	0.00525	0.0072	0.00066	<0.00010	0.00769	<0.00010	<0.00010	0.00226	0.00013	0.00012	8%	0.00016	0.00017
Copper (Cu)-Dissolved	mg/L	0.002	0.2	0.0002	***0.0272***	***0.00743***	***0.00247***	0.001	0.00188	***0.00394***	0.00192	0.00189	<0.00020	0.00192	0.00185	4%	0.0016	***0.00211***
Iron (Fe)-Dissolved	mg/L	0.3	1	0.01	0.119	***0.468***	***5.89***	0.125	0.137	***0.411***	0.13	0.14	***1.78***	0.175	0.173	1%	<0.010	<0.010
Lead (Pb)-Dissolved	mg/L	0.001	0.1	0.00005	***0.00204***	<0.000050	<0.000050	0.000206	0.000053	0.000099	0.000051	0.000059	0.000298	0.000094	0.000095	1%	0.000182	0.000332
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	0.00472	<0.00050	<0.00050	0.00455	<0.00050	<0.00050	0.0005	<0.00050	0.0088	0.00055	<0.00050	-	0.00507	0.0078
Magnesium (Mg)-Dissolved	mg/L	-	-	0.1	37.5	31.8	47	37.4	5.51	42.1	5.44	5.64	60.2	7.64	7.57	1%	49.6	82
Manganese (Mn)-Dissolved	mg/L	-	0.5	0.00005	***1.89***	***2.41***	***5.44***	***0.882***	0.0163	***5.21***	0.0193	0.0537	***2.1***	0.0682	0.0711	4%	0.189	0.259
Mercury (Hg)-Dissolved	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	<0.000010	-	<0.000010	<0.000010
Molybdenum (Mo)-Dissolved	mg/L	0.0073	-	0.00005	0.00141	0.000531	0.000919	0.000197	0.000314	0.000802	0.000305	0.000348	0.000335	0.000352	0.000348	1%	0.000112	0.000111
Nickel (Ni)-Dissolved	mg/L	0.1	0.3	0.0005	0.00229	0.0021	0.00223	0.00195	<0.00050	0.00244	<0.00050	<0.00050	0.00338	<0.00050	<0.00050	-	0.00108	0.00111
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	<0.050
Potassium (K)-Dissolved	mg/L	-	-	0.1	8.57	3.73	6.19	3.31	0.56	5.8	0.52	0.56	3.39	0.71	0.7	1%	2.08	3.16
Selenium (Se)-Dissolved	mg/L	0.001	-	0.0001	<0.00010	0.00016	0.0002	<0.00010	<0.00010	0.00019	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	<0.00010	<0.00010
Silicon (Si)-Dissolved	mg/L	-	-	0.05	1.74	4.5	6.51	5.16	4.53	5.81	4.52	4.56	6.02	4.65	4.57	2%	1.86	2.7
Silver (Ag)-Dissolved	mg/L	0.0001	0.1	0.00001	0.000098	0.000033	0.000025	0.000014	0.00002	0.000016	0.000024	0.000013	0.000019	<0.000010	0.00001	-	<0.000010	<0.000010
Sodium (Na)-Dissolved	mg/L	-	-	0.05	12.3	18	36.8	3.38	1.69	35.6	1.78	1.78	4.6	2.27	2.22	2%	6.19	11
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	0.4	0.386	0.681	0.274	0.183	0.636	0.18	0.18	0.404	0.189	0.189	0%	0.566	0.91
Sulfur (S)-Dissolved	mg/L	-	-	0.5	167	126	213	95.2	3.39	202	3.38	4.46	157	10.4	10.4	0%	193	309
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001	0.000198	0.000012	<0.000010	0.000058	<0.000010	0.000012	<0.000010	<0.000010	0.000124	<0.000010	<0.000010	-	0.000059	0.000065
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	<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	<0.010
Uranium (U)-Dissolved	mg/L	0.015	-	0.00001	0.000736	0.00179	0.00222	0.00229	0.000366	0.00208	0.000384	0.000401	0.00365	0.000461	0.000452	2%	0.00198	0.00356
Vanadium (V)-Dissolved	mg/L	-	-	0.001	<0.0010	<0.0010	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	0.3	0.001	***0.21***	0.0088	0.0067	***0.963***	0.0011	0.0111	<0.0010	0.004	***1.96***	0.002	0.0013	35%	***0.577***	***0.696***

Table E-6. Water Quality Results for *in situ* data, lab analysis, and QA/QC program; June 10-12, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-130611-028 WQ-PIT-2 06/11/2013	0167-130612-030 WQ-PW 06/12/2013	0167-130612-012 WQ-DRY 06/12/2013	TRAVEL 0167-130611-TRAVEL-BLANK 06/11/2013	FIELD 0167-130611-FIELD-BLANK 06/11/2013
Temperature (in-situ)	°C	-	-	-	8.3	1.7	0.9	-	-
Specific Conductivity (in-situ)	µS/cm	-	-	-	1580.0	420.8	322.8	-	-
pH (in-situ)	-	6.5 - 9.0	6.0 - 8.5	-	7.36	7.35	7.53	-	-
Turbidity (in-situ)	NTU	-	-	-	2.6	0.4	0.5	-	-
Dissolved Oxygen (in-situ)	mg/L	-	-	-	10.7	-	-	-	-
Colour, True	CU	15	-	5	-	<5.0	-	-	-
Conductivity	µS/cm	-	-	2	1290	394	323	<2.0	<2.0
Hardness (as CaCO3)	mg/L	-	-	0.5	730	213	174	<0.50	<0.50
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1	8.02	8.12	8.2	***6.01***	***5.92***
Total Suspended Solids	mg/L	-	50	3	4	-	<3.0	<3.0	<3.0
Total Dissolved Solids	mg/L	-	-	10	1110	244	205	<10	<10
Turbidity	NTU	-	-	0.1	-	<0.10	-	-	-
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1	106	-	145	1.2	<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	106	176	145	1.2	<1.0
Ammonia, Total (as N)	mg/L	0.75	-	0.005	<0.0050	-	<0.0050	<0.0050	<0.0050
Chloride (Cl)	mg/L	-	-	0.5	<5.0	<0.50	<0.50	<0.50	<0.50
Fluoride (F)	mg/L	0.12	-	0.02	***0.23***	0.107	0.049	<0.020	<0.020
Nitrate (as N)	mg/L	13	-	0.005	<0.050	0.15	0.565	<0.0050	<0.0050
Nitrite (as N)	mg/L	0.06	-	0.001	<0.010	<0.0010	<0.0010	<0.0010	<0.0010
Sulfate (SO4)	mg/L	-	-	0.5	698	39.9	26.1	<0.50	<0.50
Cyanide, Weak Acid Diss	mg/L	-	0.1	0.005	-	-	<0.0050	<0.0050	<0.0050
Cyanide, Total	mg/L	-	0.3	0.005	-	-	<0.0050	<0.0050	<0.0050
Cyanate	mg/L	-	-	0.2	-	-	<0.20	<0.20	<0.20
Thiocyanate (SCN)	mg/L	-	-	0.5	-	-	<0.50	-	-
Aluminum (Al)-Total	mg/L	0.005	-	0.003	***0.0569***	<0.010	***0.006***	<0.0030	<0.0030
Antimony (Sb)-Total	mg/L	-	0.15	0.0001	0.00333	<0.00050	0.00037	<0.00010	<0.00010
Arsenic (As)-Total	mg/L	0.005	0.15	0.0001	***0.00608***	0.0004	0.0006	<0.00010	<0.00010
Barium (Ba)-Total	mg/L	-	1	0.00005	0.0234	0.092	0.0675	<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	<0.10	<0.010	<0.010	<0.010
Cadmium (Cd)-Total	mg/L	0.000033	0.02	0.00001	***0.00632***	<0.00020	<0.000010	<0.000010	<0.000010
Calcium (Ca)-Total	mg/L	-	-	0.05	253	49.1	48.7	<0.050	<0.050
Chromium (Cr)-Total	mg/L	0.0089	0.04	0.0001	0.0002	<0.0020	<0.00010	<0.00010	<0.00010
Cobalt (Co)-Total	mg/L	-	-	0.0001	0.0002	-	<0.00010	<0.00010	<0.00010
Copper (Cu)-Total	mg/L	0.002	0.2	0.0005	***0.00302***	<0.0010	<0.0010	<0.00050	<0.00050
Iron (Fe)-Total	mg/L	0.3	1	0.01	0.066	<0.030	0.012	<0.010	<0.010
Lead (Pb)-Total	mg/L	0.001	0.1	0.00005	***0.00152***	0.00061	<0.000050	<0.000050	<0.000050
Lithium (Li)-Total	mg/L	-	-	0.0005	0.00605	-	0.00143	<0.00050	<0.00050
Magnesium (Mg)-Total	mg/L	-	-	0.1	69.1	21.9	13.1	<0.10	<0.10
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	0.228	<0.0020	0.000518	<0.000050	<0.000050
Mercury (Hg)-Total	mg/L	0.000026	0.005	0.00001	<0.000010	<0.00020	<0.000010	<0.000010	<0.000010
Molybdenum (Mo)-Total	mg/L	0.0073	-	0.00005	0.000126	-	<0.00010	<0.000050	<0.000050
Nickel (Ni)-Total	mg/L	0.1	0.3	0.0005	0.00138	-	<0.00050	<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	2.66	0.91	2.53	<0.10	<0.10
Selenium (Se)-Total	mg/L	0.001	-	0.0001	<0.00010	<0.0010	<0.00010	<0.00010	<0.00010
Silicon (Si)-Total	mg/L	-	-	0.05	2.54	-	5.12	<0.050	<0.050
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	0.000019	-	0.000018	<0.000010	<0.000010
Sodium (Na)-Total	mg/L	-	-	0.05	9	5	2.39	<0.050	<0.050
Strontium (Sr)-Total	mg/L	-	-	0.0002	0.797	-	0.139	<0.00020	<0.00020
Sulfur (S)-Total	mg/L	-	-	0.5	263	-	8.73	<0.50	<0.50
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	0.000061	-	0.000011	<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	0.00287	0.00227	0.000306	<0.000010	<0.000010
Vanadium (V)-Total	mg/L	-	-	0.001	<0.0010	-	<0.0010	<0.0010	<0.0010
Zinc (Zn)-Total	mg/L	0.03	0.3	0.003	***0.753***	<0.050	<0.0030	<0.0030	<0.0030
Dissolved Metals Filtration Location		-	-	n/a	FIELD	-	FIELD	-	FIELD
Aluminum (Al)-Dissolved	mg/L	0.005	-	0.001	0.0015	-	0.0045	-	<0.0010
Antimony (Sb)-Dissolved	mg/L	-	0.15	0.0001	0.00254	-	0.00034	-	<0.00010
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	0.00362	-	0.0006	-	<0.00010
Barium (Ba)-Dissolved	mg/L	-	1	0.00005	0.0167	-	0.0672	-	<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

Color Key: ***Exceeds CCME Guideline***
Exceeds Mount Nansen Effluent Standards
Exceeds both CCME and MN Standards
QA/QC Assessment - highlighted if > +/-10%

Note: For those guidelines that are hardness dependent, the most conservative guideline has been applied.

Table E-6. Water Quality Results for *in situ* data, lab analysis, and QA/QC program; June 10-12, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-130611-028 WQ-PIT-2 06/11/2013	0167-130612-030 WQ-PW 06/12/2013	0167-130612-012 WQ-DRY 06/12/2013	TRAVEL 0167-130611-TRAVEL-BLANK 06/11/2013	FIELD 0167-130611-FIELD-BLANK 06/11/2013
Cadmium (Cd)-Dissolved	mg/L	0.000033	0.02	0.00001	***0.00469***	-	<0.000010	-	<0.000010
Calcium (Ca)-Dissolved	mg/L	-	-	0.05	204	-	48.7	-	<0.050
Chromium (Cr)-Dissolved	mg/L	0.0089	0.04	0.0001	<0.00010	-	<0.00010	-	<0.00010
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	0.00015	-	<0.00010	-	<0.00010
Copper (Cu)-Dissolved	mg/L	0.002	0.2	0.0002	0.00166	-	0.00067	-	<0.00020
Iron (Fe)-Dissolved	mg/L	0.3	1	0.01	<0.010	-	<0.010	-	<0.010
Lead (Pb)-Dissolved	mg/L	0.001	0.1	0.00005	0.000174	-	0.000189	-	<0.000050
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	0.00497	-	0.00136	-	<0.00050
Magnesium (Mg)-Dissolved	mg/L	-	-	0.1	53.9	-	12.8	-	<0.10
Manganese (Mn)-Dissolved	mg/L	-	0.5	0.00005	0.177	-	0.000384	-	<0.000050
Mercury (Hg)-Dissolved	mg/L	0.000026	0.005	0.00001	<0.000010	-	<0.000010	-	<0.000010
Molybdenum (Mo)-Dissolved	mg/L	0.0073	-	0.00005	0.000107	-	0.000056	-	<0.000050
Nickel (Ni)-Dissolved	mg/L	0.1	0.3	0.0005	0.00103	-	<0.00050	-	<0.00050
Phosphorus (P)-Dissolved	mg/L	-	-	0.05	<0.050	-	<0.050	-	<0.050
Potassium (K)-Dissolved	mg/L	-	-	0.1	2.11	-	2.44	-	<0.10
Selenium (Se)-Dissolved	mg/L	0.001	-	0.0001	<0.00010	-	<0.00010	-	<0.00010
Silicon (Si)-Dissolved	mg/L	-	-	0.05	1.97	-	5.02	-	<0.050
Silver (Ag)-Dissolved	mg/L	0.0001	0.1	0.00001	<0.000010	-	<0.000010	-	<0.000010
Sodium (Na)-Dissolved	mg/L	-	-	0.05	6.08	-	2.3	-	<0.050
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	0.577	-	0.132	-	<0.00020
Sulfur (S)-Dissolved	mg/L	-	-	0.5	208	-	8.54	-	<0.50
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001	0.000049	-	<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	0.00194	-	0.000289	-	<0.000010
Vanadium (V)-Dissolved	mg/L	-	-	0.001	<0.0010	-	<0.0010	-	<0.0010
Zinc (Zn)-Dissolved	mg/L	0.03	0.3	0.001	***0.55***	-	<0.0010	-	<0.0010

Table E-7. Water Quality Results for *in situ* data, lab analysis, and QA/QC program; June 24-26, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID / WQ Site ID / Date Sampled / Detection Limit	0167-130625-021 FIELD BLANK 6/25/2013	0167-130625-002 WQ-DC-U 6/25/2013	0167-130625-019 WQ-MS-S-03 6/25/2013	0167-130625-017 WQ-DC-DX+105 6/25/2013	0167-130625-014 WQ-PC-D 6/25/2013	0167-130626-TRAVEL-BLANK TRAVEL BLANK 6/26/2013	0167-130625-004 WQ-SEEP 6/25/2013	0167-130625-024 WQ-DC-U2 6/25/2013	0167-130625-013 WQ-PC-U 6/25/2013	0167-130625-015 WQ-PC-U-r 6/25/2013	QA/QC WQ-PC-U-r
Temperature (in-situ)	°C	-	-	-	-	19.5	10.4	1.7	6.0		11.1	7.8	8.6	-	-
Specific Conductivity (in-situ)	µS/cm	-	-	-	-	1240.0	1207.0	1184.0	411.1		1708.0	991.0	391.8	-	-
pH (in-situ)	-	6.5 - 9.0	6.0 - 8.5	-	-	7.8	7.2	7.0	6.9		6.8	7.3	7.0	-	-
Turbidity (in-situ)	NTU	-	-	-	-	24.6	14.0	13.3	4.6		24.8	79.7	2.4	-	-
Dissolved Oxygen (in-situ)	mg/L	-	-	-	-	-	-	-	-		-	-	-	-	-
Colour, True	CU	15	-	5	-	-	-	-	-	-	-	-	-	-	-
Conductivity	µS/cm	-	-	2	<2.0	1150	1160	1120	410	<2.0	1540	951	389	390	0%
Hardness (as CaCO3)	mg/L	-	-	0.5	<0.50	734	764	713	219	<0.50	876	610	204	203	0%
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1	***5.68***	8.15	7.38	7.15	6.98	***5.82***	6.9	7.62	7.16	7.09	1%
Total Suspended Solids	mg/L	-	50	3	<3.0	30	4.7	<3.0	8.7	<3.0	32.7	***157***	3.3	13.3	303%
Total Dissolved Solids	mg/L	-	-	10	<1.0	914	927	874	262	<1.0	1310	742	247	246	0%
Turbidity	NTU	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1	1.4	191	254	248	105	1	232	173	71.3	69.2	3%
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	1.4	191	254	248	105	1	232	173	71.3	69.2	3%
Ammonia, Total (as N)	mg/L	0.75	-	0.005	<0.0050	0.567	0.0139	0.0091	<0.0050	<0.0050	***6.03***	0.115	<0.0050	<0.0050	-
Chloride (Cl)	mg/L	-	-	0.5	<0.50	<5.0	<5.0	<5.0	<0.50	<0.50	<5.0	<5.0	<0.50	<0.50	-
Fluoride (F)	mg/L	0.12	-	0.02	<0.020	<0.20	***0.26***	***0.22***	0.051	<0.020	<0.20	<0.20	0.041	0.042	2%
Nitrate (as N)	mg/L	13	-	0.005	<0.0050	0.209	<0.050	<0.050	0.446	<0.0050	1.07	0.131	<0.0050	<0.0050	-
Nitrite (as N)	mg/L	0.06	-	0.001	<0.0010	<0.010	<0.010	<0.010	0.0063	<0.0010	0.046	<0.010	<0.0010	<0.0010	-
Sulfate (SO4)	mg/L	-	-	0.5	<0.50	535	500	469	113	<0.50	772	424	126	127	1%
Cyanide, Weak Acid Diss	mg/L	-	0.1	0.005	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	<0.0050	0.0053	<0.0050	<0.0050	<0.0050	-
Cyanide, Total	mg/L	-	0.3	0.005	<0.0050	0.0063	<0.0050	<0.0050	<0.0050	<0.0050	0.0491	<0.0050	<0.0050	<0.0050	-
Cyanate	mg/L	-	-	0.2	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.45	<0.20	<0.20	<0.20	-
Thiocyanate (SCN)	mg/L	-	-	0.5	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	4.4	<0.50	<0.50	<0.50	-
Aluminum (Al)-Total	mg/L	0.005	-	0.003	<0.0030	***0.52***	***0.038***	***0.0313***	***0.0626***	<0.0030	***0.0249***	***3.04***	***0.0943***	***0.0908***	4%
Antimony (Sb)-Total	mg/L	-	0.15	0.0001	<0.00010	0.00245	0.0111	0.018	0.00639	<0.00010	0.00077	0.0038	0.00056	0.00058	4%
Arsenic (As)-Total	mg/L	0.005	0.15	0.0001	<0.00010	***0.0196***	***0.0164***	***0.0277***	***0.00659***	<0.00010	***0.0558***	***0.027***	0.00232	0.00228	2%
Barium (Ba)-Total	mg/L	-	1	0.00005	<0.000050	0.0766	0.0278	0.0143	0.028	<0.000050	0.0666	0.0983	0.0735	0.073	1%
Beryllium (Be)-Total	mg/L	-	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00011	<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	<0.010	0.03	0.01	<0.010	<0.010	<0.010	0.086	0.026	<0.010	<0.010	-
Cadmium (Cd)-Total	mg/L	0.000033	0.02	0.00001	<0.000010	***0.000116***	***0.00344***	***0.00916***	***0.00162***	<0.000010	***0.000647***	***0.000307***	***0.000044***	***0.000042***	5%
Calcium (Ca)-Total	mg/L	-	-	0.05	<0.050	168	188	176	65.8	<0.050	258	133	59.3	59	1%
Chromium (Cr)-Total	mg/L	0.0089	0.04	0.0001	<0.00010	0.00105	0.00012	0.0001	0.00018	<0.00010	0.00059	0.00608	0.00028	0.00029	4%
Cobalt (Co)-Total	mg/L	-	-	0.0001	<0.00010	0.0014	0.00109	0.00064	<0.00010	<0.00010	0.00922	0.00194	0.00013	0.00013	0%
Copper (Cu)-Total	mg/L	0.002	0.2	0.0005	<0.00050	***0.00268***	0.00135	0.0007	***0.0169***	<0.00050	***0.00438***	***0.00932***	0.00118	0.00118	0%
Iron (Fe)-Total	mg/L	0.3	1	0.01	<0.010	***2.59***	***0.563***	0.18	0.12	<0.010	***13.2***	***6.01***	0.181	0.178	2%
Lead (Pb)-Total	mg/L	0.001	0.1	0.00005	<0.000050	0.000674	***0.00208***	0.00011	***0.0043***	<0.000050	0.000183	***0.00341***	0.000179	0.000192	7%
Lithium (Li)-Total	mg/L	-	-	0.0005	<0.00050	0.00245	0.00787	0.00867	<0.00050	<0.00050	0.00067	0.00552	<0.00050	<0.00050	-
Magnesium (Mg)-Total	mg/L	-	-	0.1	<0.10	71	61.5	60.2	14.5	<0.10	46.5	59.3	12.7	12.7	0%
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	<0.000050	***1.29***	***1.33***	***1.24***	0.0423	<0.000050	***6.49***	***0.736***	0.0273	0.0261	4%
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	<0.000050	0.000696	0.000277	0.000332	0.00008	<0.000050	0.00118	0.000624	0.000077	0.000069	10%
Nickel (Ni)-Total	mg/L	0.1	0.3	0.0005	<0.00050	0.00141	0.00187	0.00255	0.00066	<0.00050	0.00269	0.00425	0.0006	0.00055	8%
Phosphorus (P)-Total	mg/L	-	-	0.05	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.17	<0.050	<0.050	-
Potassium (K)-Total	mg/L	-	-	0.1	<0.10	4.17	4.22	3.85	1.11	<0.10	7.88	3.75	0.49	0.49	0%
Selenium (Se)-Total	mg/L	0.001	-	0.0001	<0.00010	0.00012	<0.00010	<0.00010	<0.00010	<0.00010	0.0002	0.00028	<0.00010	<0.00010	-
Silicon (Si)-Total	mg/L	-	-	0.05	<0.050	5.81	6.06	5.82	5.87	<0.050	6.89	8.7	5.95	5.94	0%
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	<0.000010	0.000018	0.000041	0.000101	0.000046	<0.000010	0.000042	0.000088	0.000015	0.000103	587%
Sodium (Na)-Total	mg/L	-	-	0.05	<0.050	10.8	4.76	4.69	3.78	<0.050	46.4	5.5	4.11	4.03	2%
Strontium (Sr)-Total	mg/L	-	-	0.0002	<0.00020	0.595	0.443	0.406	0.398	<0.00020	0.783	0.403	0.377	0.408	8%
Sulfur (S)-Total	mg/L	-	-	0.5	<0.50	188	167	160	41.2	<0.50	255	141	45	46.2	3%
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	<0.000010	0.000013	0.000074	0.000109	0.000011	<0.000010	0.000016	0.000055	<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	<0.00010	<0.00010	<0.00010	-
Titanium (Ti)-Total	mg/L	-	-	0.01	<0.010	0.021	<0.010	<0.010	<0.010	<0.010	<0.010	0.137	<0.010	<0.010	-

Table E-7. Water Quality Results for *in situ* data, lab analysis, and QA/QC program; June 24-26, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID / WQ Site ID / Date Sampled / Detection Limit	0167-130625-021 FIELD BLANK 6/25/2013	0167-130625-002 WQ-DC-U 6/25/2013	0167-130625-019 WQ-MS-S-03 6/25/2013	0167-130625-017 WQ-DC-DX+105 6/25/2013	0167-130625-014 WQ-PC-D 6/25/2013	0167-130626-TRAVEL-BLANK TRAVEL BLANK 6/26/2013	0167-130625-004 WQ-SEEP 6/25/2013	0167-130625-024 WQ-DC-U2 6/25/2013	0167-130625-013 WQ-PC-U 6/25/2013	0167-130625-015 WQ-PC-U-r 6/25/2013	QA/QC WQ-PC-U-r
Uranium (U)-Total	mg/L	0.015	-	0.00001	<0.000010	0.00321	0.00345	0.00419	0.00076	<0.000010	0.00195	0.00288	0.000194	0.000208	7%
Vanadium (V)-Total	mg/L	-	-	0.001	<0.0010	0.0035	<0.0010	<0.0010	<0.0010	<0.0010	0.0022	0.0132	<0.0010	<0.0010	-
Zinc (Zn)-Total	mg/L	0.03	0.3	0.003	<0.0030	0.0088	***0.825***	***1.24***	***0.153***	<0.0030	0.0132	***0.0491***	0.0045	0.0044	2%
Dissolved Metals Filtration Location		-	-	n/a	FIELD	FIELD	FIELD	FIELD	FIELD	-	FIELD	FIELD	FIELD	FIELD	-
Aluminum (Al)-Dissolved	mg/L	0.005	-	0.001	<0.0010	***0.0377***	***0.0079***	0.0019	***0.0116***	-	***0.0116***	***0.0122***	***0.0163***	***0.0146***	10%
Antimony (Sb)-Dissolved	mg/L	-	0.15	0.0001	<0.00010	0.00224	0.0106	0.0178	0.00729	-	0.00073	0.00311	0.00053	0.00053	0%
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	<0.00010	***0.0111***	***0.012***	***0.0104***	0.00442	-	***0.0482***	0.00425	0.00188	0.00184	2%
Barium (Ba)-Dissolved	mg/L	-	1	0.00005	<0.000050	0.0626	0.028	0.0144	0.0263	-	0.0667	0.0484	0.0719	0.0708	2%
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	-
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	-
Boron (B)-Dissolved	mg/L	-	-	0.01	<0.010	0.025	<0.010	<0.010	<0.010	-	0.075	0.021	<0.010	<0.010	-
Cadmium (Cd)-Dissolved	mg/L	0.000033	0.02	0.00001	<0.000010	0.000025	***0.00352***	***0.0087***	***0.0016***	-	***0.000313***	0.000019	***0.000036***	***0.000036***	0%
Calcium (Ca)-Dissolved	mg/L	-	-	0.05	<0.050	173	196	180	65.4	-	268	140	61	60.7	0%
Chromium (Cr)-Dissolved	mg/L	0.0089	0.04	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	-	0.00041	<0.00010	<0.00010	0.00011	-
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	<0.00010	0.00109	0.00104	0.00063	<0.00010	-	0.00902	0.00045	<0.00010	<0.00010	-
Copper (Cu)-Dissolved	mg/L	0.002	0.2	0.0002	<0.00020	0.001	0.0009	<0.00020	***0.0157***	-	0.00172	0.00052	0.00098	0.00086	12%
Iron (Fe)-Dissolved	mg/L	0.3	1	0.01	<0.010	0.149	***0.371***	0.029	0.012	-	***11.2***	***0.384***	0.047	0.049	4%
Lead (Pb)-Dissolved	mg/L	0.001	0.1	0.00005	<0.000050	<0.000050	<0.000050	<0.000050	0.000962	-	<0.000050	<0.000050	<0.000050	<0.000050	-
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	<0.00050	0.00191	0.00756	0.00678	<0.00050	-	<0.00050	0.00234	<0.00050	<0.00050	-
Magnesium (Mg)-Dissolved	mg/L	-	-	0.1	<0.10	73.5	66.5	63.9	13.5	-	50.3	63.3	12.5	12.4	1%
Manganese (Mn)-Dissolved	mg/L	-	0.5	0.00005	<0.000050	***1.25***	***1.31***	***1.24***	0.0298	-	***6.62***	***0.667***	0.0148	0.0144	3%
Mercury (Hg)-Dissolved	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	-
Molybdenum (Mo)-Dissolved	mg/L	0.0073	-	0.00005	<0.000050	0.000591	0.000265	0.000323	0.00007	-	0.00109	0.000376	0.000056	0.000053	5%
Nickel (Ni)-Dissolved	mg/L	0.1	0.3	0.0005	<0.00050	0.0008	0.0018	0.00248	0.00053	-	0.0024	0.00071	0.00052	<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	-
Potassium (K)-Dissolved	mg/L	-	-	0.1	<0.10	3.83	4.18	3.68	0.95	-	8.18	3.42	0.45	0.44	2%
Selenium (Se)-Dissolved	mg/L	0.001	-	0.0001	<0.00010	0.0001	<0.00010	<0.00010	<0.00010	-	0.00024	<0.00010	<0.00010	<0.00010	-
Silicon (Si)-Dissolved	mg/L	-	-	0.05	<0.050	4.93	6.06	5.86	5.63	-	6.91	4.74	5.84	5.82	0%
Silver (Ag)-Dissolved	mg/L	0.0001	0.1	0.00001	<0.000010	<0.000010	<0.000010	<0.000010	0.000011	-	<0.000010	<0.000010	<0.000010	<0.000010	-
Sodium (Na)-Dissolved	mg/L	-	-	0.05	<0.050	10.9	4.61	4.67	3.7	-	46.1	5.56	4.06	3.85	5%
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	<0.00020	0.577	0.432	0.392	0.391	-	0.769	0.379	0.378	0.392	4%
Sulfur (S)-Dissolved	mg/L	-	-	0.5	<0.50	187	165	159	40.8	-	249	146	45.3	45.5	0%
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001	<0.000010	<0.000010	0.000069	0.000105	0.000011	-	0.000018	<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	-
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	-
Uranium (U)-Dissolved	mg/L	0.015	-	0.00001	<0.000010	0.00303	0.00331	0.00405	0.000692	-	0.00189	0.0022	0.000189	0.000191	1%
Vanadium (V)-Dissolved	mg/L	-	-	0.001	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	-	0.0018	<0.0010	<0.0010	<0.0010	-
Zinc (Zn)-Dissolved	mg/L	0.03	0.3	0.001	<0.0010	0.0016	***0.822***	***1.28***	***0.152***	-	0.0087	0.0114	0.0039	0.0033	15%

Table E-7. Water Quality Results for *in situ* data, lab analysis, and QA/QC program; June 24-26, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID / WQ Site ID / Date Sampled / Detection Limit	0167-130625-010 WQ-VC-DBC 6/25/2013	0167-130625-003 WQ-TP 6/25/2013	0167-130625-018 WQ-DC-D1b 6/25/2013	0167-130625-009 WQ-VC-U 6/25/2013	0167-130625-020 WQ-DC-U1 6/25/2013	0167-130625-016 WQ-DC-DX 6/25/2013	0167-130625-011 WQ-DC-R 6/25/2013	0167-130625-007 WQ-VC-UMN 6/25/2013	0167-130625-012 WQ-VC-UMN-r 6/25/2013	QA/QC WQ-VC-UMN-R	0167-130625-006 WQ-VC-REF 6/25/2013	0167-130625-005 WQ-VC-R 6/25/2013
Temperature (in-situ)	°C	-	-	-	7.9	19.7	7.6	7.9	7.5	4.9	7.3	7.8	-	-	10.9	8.0
Specific Conductivity (in-situ)	µS/cm	-	-	-	189.1	1142.0	1250.0	177.5	1122.0	653.5	1069.0	252.0	-	-	178.5	235.7
pH (in-situ)	-	6.5 - 9.0	6.0 - 8.5	-	7.4	8.0	7.7	7.4	7.6	7.3	7.6	7.7	-	-	7.6	7.3
Turbidity (in-situ)	NTU	-	-	-	27.9	8.1	1.5	24.1	8.2	33.8	50.0	30.4	-	-	23.3	52.2
Dissolved Oxygen (in-situ)	mg/L	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Colour, True	CU	15	-	5	-	-	-	-	-	-	-	-	-	-	-	-
Conductivity	µS/cm	-	-	2	189	1090	1190	181	1070	630	1020	253	254	0%	182	240
Hardness (as CaCO3)	mg/L	-	-	0.5	95.3	647	791	87.7	704	347	630	131	132	1%	90.3	122
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1	7.86	8.12	7.87	7.82	7.76	7.41	7.74	7.92	7.95	0%	7.93	7.96
Total Suspended Solids	mg/L	-	50	3	9.3	<3.0	26.7	6.7	***58***	37.3	***58.7***	16	15.3	4%	11.3	14
Total Dissolved Solids	mg/L	-	-	10	107	901	989	95.9	867	451	805	147	146	1%	97.4	138
Turbidity	NTU	-	-	0.1	-	-	-	-	-	-	-	-	-	-	-	-
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1	83.5	75.1	215	78.1	173	94.5	176	86.7	84.2	3%	78.8	82.9
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	83.5	75.1	215	78.1	173	94.5	176	86.7	84.2	3%	78.8	82.9
Ammonia, Total (as N)	mg/L	0.75	-	0.005	<0.0050	0.222	0.123	<0.0050	0.0254	0.0161	***0.779***	0.0252	0.0245	3%	<0.0050	0.0282
Chloride (Cl)	mg/L	-	-	0.5	<0.50	<5.0	<5.0	<0.50	<5.0	<0.50	<5.0	<0.50	<0.50	-	<0.50	<0.50
Fluoride (F)	mg/L	0.12	-	0.02	0.065	<0.20	<0.20	0.049	<0.20	0.054	<0.20	0.049	0.05	2%	0.048	0.05
Nitrate (as N)	mg/L	13	-	0.005	0.0924	0.187	0.161	0.0734	0.193	0.0177	0.28	0.0911	0.089	2%	0.0691	0.0843
Nitrite (as N)	mg/L	0.06	-	0.001	0.0016	0.012	<0.010	<0.0010	0.051	<0.0010	0.015	<0.0010	<0.0010	-	0.0031	0.0027
Sulfate (SO4)	mg/L	-	-	0.5	19.9	598	584	15.4	519	260	465	44.4	44.4	0%	15.5	40.6
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	<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	<0.0050
Cyanate	mg/L	-	-	0.2	<0.20	<0.20	<0.20	<0.20	<0.20	<0.20	0.34	<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	<0.50
Aluminum (Al)-Total	mg/L	0.005	-	0.003	***1.15***	***0.143***	***0.555***	***1.45***	***1.28***	***1.82***	***0.766***	***1.13***	***1.35***	19%	***1.54***	***2.22***
Antimony (Sb)-Total	mg/L	-	0.15	0.0001	0.00022	0.0448	0.0161	0.00025	0.00274	0.00189	0.00238	0.00041	0.00042	2%	0.00022	0.00047
Arsenic (As)-Total	mg/L	0.005	0.15	0.0001	0.00204	***0.17***	***0.0574***	0.00196	***0.00699***	***0.0256***	***0.0385***	0.00366	0.0037	1%	0.00206	0.00485
Barium (Ba)-Total	mg/L	-	1	0.00005	0.0762	0.0152	0.0314	0.0784	0.0635	0.0771	0.0779	0.0742	0.0796	7%	0.0791	0.0931
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	0.072	0.054	<0.010	0.037	<0.010	0.025	<0.010	<0.010	-	<0.010	<0.010
Cadmium (Cd)-Total	mg/L	0.000033	0.02	0.00001	***0.000047***	***0.00272***	***0.00128***	***0.000046***	***0.000049***	***0.000105***	***0.000159***	***0.000047***	***0.000045***	4%	***0.000047***	***0.000068***
Calcium (Ca)-Total	mg/L	-	-	0.05	24.7	176	180	22.6	151	99.8	141	33.6	35.5	6%	23.2	34.2
Chromium (Cr)-Total	mg/L	0.0089	0.04	0.0001	0.00127	0.00031	0.00099	0.00146	0.00247	0.00256	0.00157	0.00116	0.00149	28%	0.00152	0.00206
Cobalt (Co)-Total	mg/L	-	-	0.0001	0.0006	0.00127	0.00056	0.00067	0.00119	0.00138	0.00196	0.00063	0.00065	3%	0.00068	0.00112
Copper (Cu)-Total	mg/L	0.002	0.2	0.0005	***0.00327***	***0.0417***	***0.00387***	***0.0037***	***0.00293***	***0.00423***	***0.00543***	***0.00348***	***0.0035***	1%	***0.00372***	***0.00551***
Iron (Fe)-Total	mg/L	0.3	1	0.01	***1.44***	***1.21***	***1.42***	***1.63***	***2.04***	***3.28***	***4.45***	***1.53***	***1.6***	5%	***1.72***	***2.82***
Lead (Pb)-Total	mg/L	0.001	0.1	0.00005	***0.00138***	***0.04***	***0.0209***	***0.00152***	0.000795	***0.00421***	***0.00447***	***0.00154***	***0.00152***	1%	***0.00141***	***0.00236***
Lithium (Li)-Total	mg/L	-	-	0.0005	0.00098	0.00567	0.00694	0.00079	0.00478	0.00096	0.00197	0.00078	0.00086	10%	0.00126	0.00164
Magnesium (Mg)-Total	mg/L	-	-	0.1	8.21	42.6	78.9	7.94	72.3	24.8	52.1	10.5	11.2	7%	8.1	10.5
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	0.104	***1.57***	***0.773***	0.0638	0.234	***0.584***	***1.47***	0.135	0.141	4%	0.0588	0.162
Mercury (Hg)-Total	mg/L	0.000026	0.005	0.00001	<0.000010	0.000012	<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	0.000589	0.00155	0.000317	0.000587	0.000324	0.000125	0.000567	0.00057	0.00068	19%	0.000553	0.00065
Nickel (Ni)-Total	mg/L	0.1	0.3	0.0005	0.00103	0.00221	0.00131	0.00117	0.00257	0.00167	0.002	0.00108	0.00112	4%	0.00121	0.00549
Phosphorus (P)-Total	mg/L	-	-	0.05	<0.050	<0.050	<0.050	<0.050	0.122	0.13	0.05	<0.050	<0.050	-	<0.050	0.064
Potassium (K)-Total	mg/L	-	-	0.1	1	10.7	4.8	1.07	4.54	5.44	3.26	1.19	1.37	15%	1.09	1.46
Selenium (Se)-Total	mg/L	0.001	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00012	0.0001	<0.00010	<0.00010	-	<0.00010	<0.00010
Silicon (Si)-Total	mg/L	-	-	0.05	7.34	2.03	5.61	7.83	6.11	6.97	5.65	7.34	7.88	7%	8.02	9.48
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	0.000025	0.000807	0.000222	0.000051	<0.000010	0.00009	0.000081	0.000044	0.000036	18%	0.000048	0.000053
Sodium (Na)-Total	mg/L	-	-	0.05	2.44	14.3	6.1	2.35	5.69	4.62	11.2	3.08	3.25	6%	2.4	3.26
Strontium (Sr)-Total	mg/L	-	-	0.0002	0.261	0.434	0.467	0.269	0.406	0.279	0.466	0.275	0.298	8%	0.239	0.258
Sulfur (S)-Total	mg/L	-	-	0.5	7.28	199	191	5.62	174	94.6	145	15.9	16.5	4%	5.99	15.3
Thallium (Tl)-Total	mg/L	0.0008	-	0.00001	0.000014	0.000232	0.000051	0.000016	0.000025	0.000058	0.000015	0.000013	0.000018	38%	0.000018	0.000022
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	0.033	<0.010	0.027	0.038	0.071	0.089	0.033	0.039	0.036	8%	0.047	0.061

Table E-7. Water Quality Results for *in situ* data, lab analysis, and QA/QC program; June 24-26, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID / WQ Site ID / Date Sampled / Detection Limit	0167-130625-010 WQ-VC-DBC 6/25/2013	0167-130625-003 WQ-TP 6/25/2013	0167-130625-018 WQ-DC-D1b 6/25/2013	0167-130625-009 WQ-VC-U 6/25/2013	0167-130625-020 WQ-DC-U1 6/25/2013	0167-130625-016 WQ-DC-DX 6/25/2013	0167-130625-011 WQ-DC-R 6/25/2013	0167-130625-007 WQ-VC-UMN 6/25/2013	0167-130625-012 WQ-VC-UMN-r 6/25/2013	QA/QC WQ-VC-UMN-R	0167-130625-006 WQ-VC-REF 6/25/2013	0167-130625-005 WQ-VC-R 6/25/2013
Uranium (U)-Total	mg/L	0.015	-	0.00001	0.000819	0.000816	0.00289	0.00078	0.00232	0.000391	0.00229	0.000889	0.000932	5%	0.000732	0.00101
Vanadium (V)-Total	mg/L	-	-	0.001	0.0032	<0.0010	0.0024	0.0038	0.0048	0.0071	0.004	0.0032	0.0037	16%	0.004	0.0058
Zinc (Zn)-Total	mg/L	0.03	0.3	0.003	0.0065	***0.244***	***0.276***	0.0068	0.014	0.0146	0.0128	0.0068	0.0072	6%	0.0073	0.0113
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	***0.0194***	***0.0121***	0.003	***0.0203***	***0.0158***	***0.0077***	***0.0241***	***0.0178***	***0.0188***	6%	***0.0214***	***0.0263***
Antimony (Sb)-Dissolved	mg/L	-	0.15	0.0001	0.00012	0.0411	0.0122	0.00011	0.00317	0.00111	0.00177	0.00025	0.00025	0%	<0.00010	0.00026
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	0.00074	***0.0556***	***0.0177***	0.00048	***0.00547***	***0.0073***	***0.0157***	0.00162	0.00164	1%	0.00048	0.00172
Barium (Ba)-Dissolved	mg/L	-	1	0.00005	0.0608	0.0129	0.0218	0.0605	0.0392	0.0603	0.0685	0.0626	0.0632	1%	0.0593	0.0626
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	0.07	0.051	<0.010	0.034	<0.010	0.025	<0.010	<0.010	-	<0.010	<0.010
Cadmium (Cd)-Dissolved	mg/L	0.000033	0.02	0.00001	0.000025	***0.00179***	***0.000571***	0.000018	0.000024	0.000014	0.00003	0.00002	0.000019	5%	0.000013	0.000019
Calcium (Ca)-Dissolved	mg/L	-	-	0.05	25.2	184	181	22.8	158	100	155	35.1	35.6	1%	23.4	33
Chromium (Cr)-Dissolved	mg/L	0.0089	0.04	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.00012	<0.00010	0.00011	-	0.0001	0.00011
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	<0.00010	0.00116	0.0003	<0.00010	0.00032	0.00054	0.00171	0.00013	0.00013	0%	<0.00010	0.0002
Copper (Cu)-Dissolved	mg/L	0.002	0.2	0.0002	0.00141	***0.0217***	0.00075	0.00149	0.00065	0.00072	0.00072	0.00138	0.00147	7%	0.00136	0.00154
Iron (Fe)-Dissolved	mg/L	0.3	1	0.01	0.046	0.051	0.157	0.041	***0.347***	***0.847***	***0.685***	0.05	0.053	6%	0.042	0.223
Lead (Pb)-Dissolved	mg/L	0.001	0.1	0.00005	<0.000050	***0.00106***	0.000181	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	-	<0.000050	0.000067
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	<0.00050	0.00571	0.00721	<0.00050	0.00373	<0.00050	0.00174	<0.00050	<0.00050	-	<0.00050	<0.00050
Magnesium (Mg)-Dissolved	mg/L	-	-	0.1	7.86	45.9	82.3	7.47	75	23.7	59	10.5	10.4	1%	7.74	9.62
Manganese (Mn)-Dissolved	mg/L	-	0.5	0.00005	0.0707	***1.42***	***0.69***	0.0306	0.201	***0.613***	***1.57***	0.1	0.0996	0%	0.0234	0.0976
Mercury (Hg)-Dissolved	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	<0.000010
Molybdenum (Mo)-Dissolved	mg/L	0.0073	-	0.00005	0.000495	0.00162	0.000287	0.000447	0.000339	0.000082	0.000579	0.000458	0.000432	6%	0.000426	0.000429
Nickel (Ni)-Dissolved	mg/L	0.1	0.3	0.0005	<0.00050	0.00198	0.0008	<0.00050	0.0008	<0.00050	0.00116	<0.00050	<0.00050	-	<0.00050	0.00055
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	0.72	11	4.14	0.69	4.07	4.78	3.48	0.95	0.93	2%	0.73	0.92
Selenium (Se)-Dissolved	mg/L	0.001	-	0.0001	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	0.0001	0.00011	<0.00010	<0.00010	-	<0.00010	<0.00010
Silicon (Si)-Dissolved	mg/L	-	-	0.05	5.35	1.77	4.68	5.24	4.49	4.34	5.12	5.43	5.38	1%	5.35	5.4
Silver (Ag)-Dissolved	mg/L	0.0001	0.1	0.00001	<0.000010	0.000047	<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	2.43	14.6	5.66	2.29	5.65	4.45	12.5	3.17	3.19	1%	2.22	3
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	0.251	0.453	0.485	0.26	0.408	0.29	0.504	0.277	0.248	10%	0.242	0.243
Sulfur (S)-Dissolved	mg/L	-	-	0.5	7.27	202	192	5.69	177	93.2	159	16.2	16.1	1%	5.8	14.7
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001	<0.000010	0.000228	0.000026	<0.000010	<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	<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	0.000661	0.000864	0.00303	0.000626	0.00233	0.000302	0.00241	0.000738	0.000673	9%	0.000593	0.00068
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	0.3	0.001	0.0021	***0.116***	***0.215***	<0.0010	0.0078	0.0029	0.0028	0.001	0.0019	90%	<0.0010	0.0013

Table E-7. Water Quality Results for *in situ* data, lab analysis, and QA/QC program; June 24-26, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-130625-001 WQ-BC 6/25/2013	0167-130625-008 WQ-MN 6/25/2013	0167-130626-030 WQ-PW 6/26/2013
Temperature (in-situ)	°C	-	-	-	14.9	4.5	1.5
Specific Conductivity (in-situ)	µS/cm	-	-	-	310.4	84.5	411.8
pH (in-situ)	-	6.5 - 9.0	6.0 - 8.5	-	8.0	6.3	70.7
Turbidity (in-situ)	NTU	-	-	-	1.1	11.1	0.2
Dissolved Oxygen (in-situ)	mg/L	-	-	-	-	-	-
Colour, True	CU	15	-	5	-	-	<5.0
Conductivity	µS/cm	-	-	2	303	86	376
Hardness (as CaCO3)	mg/L	-	-	0.5	163	41	207
pH (lab)	pH	6.5 - 9.0	6.0 - 8.5	0.1	8.22	7.39	7.69
Total Suspended Solids	mg/L	-	50	3	<3.0	<3.0	-
Total Dissolved Solids	mg/L	-	-	10	186	47	220
Turbidity	NTU	-	-	0.1	-	-	-
Alkalinity, Bicarbonate (as CaCO3)	mg/L	-	-	1	103	40.3	-
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	103	40.3	-
Ammonia, Total (as N)	mg/L	0.75	-	0.005	0.0103	0.0598	-
Chloride (Cl)	mg/L	-	-	0.5	<0.50	<0.50	<0.50
Fluoride (F)	mg/L	0.12	-	0.02	0.076	0.055	0.096
Nitrate (as N)	mg/L	13	-	0.005	0.0341	0.0257	0.144
Nitrite (as N)	mg/L	0.06	-	0.001	0.0032	<0.0010	<0.0010
Sulfate (SO4)	mg/L	-	-	0.5	59.8	2.68	38.8
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	0.005	-	0.003	***0.0881***	***0.16***	<0.010
Antimony (Sb)-Total	mg/L	-	0.15	0.0001	0.00025	0.00017	<0.00050
Arsenic (As)-Total	mg/L	0.005	0.15	0.0001	0.00283	0.00308	0.00036
Barium (Ba)-Total	mg/L	-	1	0.00005	0.0626	0.0769	0.091
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	<0.10
Cadmium (Cd)-Total	mg/L	0.000033	0.02	0.00001	***0.000062***	***0.00004***	<0.00020
Calcium (Ca)-Total	mg/L	-	-	0.05	46.1	11	47.8
Chromium (Cr)-Total	mg/L	0.0089	0.04	0.0001	0.00024	0.00064	<0.0020
Cobalt (Co)-Total	mg/L	-	-	0.0001	0.00021	0.00113	-
Copper (Cu)-Total	mg/L	0.002	0.2	0.0005	0.00181	***0.00289***	<0.0010
Iron (Fe)-Total	mg/L	0.3	1	0.01	0.196	***2.96***	<0.030
Lead (Pb)-Total	mg/L	0.001	0.1	0.00005	0.000198	0.000138	0.00052
Lithium (Li)-Total	mg/L	-	-	0.0005	0.00081	<0.00050	-
Magnesium (Mg)-Total	mg/L	-	-	0.1	10.8	3.34	21.3
Manganese (Mn)-Total	mg/L	-	0.5	0.00005	0.465	0.313	<0.0020
Mercury (Hg)-Total	mg/L	0.000026	0.005	0.00001	<0.000010	<0.000010	<0.00020
Molybdenum (Mo)-Total	mg/L	0.0073	-	0.00005	0.000837	0.000327	-
Nickel (Ni)-Total	mg/L	0.1	0.3	0.0005	0.00059	0.00252	-
Phosphorus (P)-Total	mg/L	-	-	0.05	<0.050	<0.050	-
Potassium (K)-Total	mg/L	-	-	0.1	1.18	1.1	0.92
Selenium (Se)-Total	mg/L	0.001	-	0.0001	<0.00010	0.00011	<0.0010
Silicon (Si)-Total	mg/L	-	-	0.05	6.42	7.08	-
Silver (Ag)-Total	mg/L	0.0001	0.1	0.00001	<0.000010	<0.000010	-
Sodium (Na)-Total	mg/L	-	-	0.05	3.49	1.92	5
Strontium (Sr)-Total	mg/L	-	-	0.0002	0.245	0.061	-
Sulfur (S)-Total	mg/L	-	-	0.5	21.5	1.31	-
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	-

Color Key: ***Exceeds CCME Guideline***
Exceeds Mount Nansen Effluent Standards
Exceeds both CCME and MN Standards
QA/QC Assessment - highlighted if > +/-10%

Note: For those guidelines that are hardness dependent, the most conservative guideline has been applied.

Table E-7. Water Quality Results for *in situ* data, lab analysis, and QA/QC program; June 24-26, 2013 Trip.

Analyte	Units	CCME-WATER-FAL	Mount Nansen Effluent Discharge Standards	Sample ID WQ Site ID Date Sampled Detection Limit	0167-130625-001 WQ-BC 6/25/2013	0167-130625-008 WQ-MN 6/25/2013	0167-130626-030 WQ-PW 6/26/2013
Uranium (U)-Total	mg/L	0.015	-	0.00001	0.00114	0.000218	0.0019
Vanadium (V)-Total	mg/L	-	-	0.001	0.0015	0.0024	-
Zinc (Zn)-Total	mg/L	0.03	0.3	0.003	<0.0030	0.0037	<0.050
Dissolved Metals Filtration Location		-	-	n/a	FIELD	FIELD	-
Aluminum (Al)-Dissolved	mg/L	0.005	-	0.001	***0.0261***	***0.103***	-
Antimony (Sb)-Dissolved	mg/L	-	0.15	0.0001	0.00024	0.00015	-
Arsenic (As)-Dissolved	mg/L	0.005	0.15	0.0001	0.00271	0.0026	-
Barium (Ba)-Dissolved	mg/L	-	1	0.00005	0.0625	0.0756	-
Beryllium (Be)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00010	-
Bismuth (Bi)-Dissolved	mg/L	-	-	0.0005	<0.00050	<0.00050	-
Boron (B)-Dissolved	mg/L	-	-	0.01	<0.010	<0.010	-
Cadmium (Cd)-Dissolved	mg/L	0.000033	0.02	0.00001	***0.000049***	***0.000036***	-
Calcium (Ca)-Dissolved	mg/L	-	-	0.05	47.9	11	-
Chromium (Cr)-Dissolved	mg/L	0.0089	0.04	0.0001	<0.00010	0.00047	-
Cobalt (Co)-Dissolved	mg/L	-	-	0.0001	0.00018	0.00107	-
Copper (Cu)-Dissolved	mg/L	0.002	0.2	0.0002	***0.00246***	***0.00246***	-
Iron (Fe)-Dissolved	mg/L	0.3	1	0.01	0.069	***2.22***	-
Lead (Pb)-Dissolved	mg/L	0.001	0.1	0.00005	<0.000050	0.000092	-
Lithium (Li)-Dissolved	mg/L	-	-	0.0005	0.00074	0.00075	-
Magnesium (Mg)-Dissolved	mg/L	-	-	0.1	10.5	3.27	-
Manganese (Mn)-Dissolved	mg/L	-	0.5	0.00005	0.454	0.312	-
Mercury (Hg)-Dissolved	mg/L	0.000026	0.005	0.00001	<0.000010	<0.000010	-
Molybdenum (Mo)-Dissolved	mg/L	0.0073	-	0.00005	0.000808	0.000292	-
Nickel (Ni)-Dissolved	mg/L	0.1	0.3	0.0005	0.00052	0.00244	-
Phosphorus (P)-Dissolved	mg/L	-	-	0.05	<0.050	<0.050	-
Potassium (K)-Dissolved	mg/L	-	-	0.1	1	1	-
Selenium (Se)-Dissolved	mg/L	0.001	-	0.0001	<0.00010	0.00011	-
Silicon (Si)-Dissolved	mg/L	-	-	0.05	6.32	6.96	-
Silver (Ag)-Dissolved	mg/L	0.0001	0.1	0.00001	<0.000010	<0.000010	-
Sodium (Na)-Dissolved	mg/L	-	-	0.05	3.47	1.92	-
Strontium (Sr)-Dissolved	mg/L	-	-	0.0002	0.236	0.0596	-
Sulfur (S)-Dissolved	mg/L	-	-	0.5	21.6	1.3	-
Thallium (Tl)-Dissolved	mg/L	0.0008	-	0.00001	<0.000010	<0.000010	-
Tin (Sn)-Dissolved	mg/L	-	-	0.0001	<0.00010	<0.00010	-
Titanium (Ti)-Dissolved	mg/L	-	-	0.01	<0.010	<0.010	-
Uranium (U)-Dissolved	mg/L	0.015	-	0.00001	0.00112	0.000198	-
Vanadium (V)-Dissolved	mg/L	-	-	0.001	0.0011	0.0017	-
Zinc (Zn)-Dissolved	mg/L	0.03	0.3	0.001	0.0011	0.0029	-

APPENDIX F METEOROLOGICAL DATA

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Table F-1. Mount Nansen Daily Meteorological Data (April 1st to June 30th, 2013)

Date	Air Temperature (°C)			Ground Temperature (°C)			Rainfall (mm)		Snow Depth (cm)		Wind Speed (m/s)		Wind Direction (deg.)
	Min.	Max.	Mean	Min.	Max.	Mean	Max.	Total	Max.	Mean	Max.	Mean	Mean
01/04/2013	-	-	-	-	-	-	-	-	-	-	-	-	-
02/04/2013	-6.515	-1.584	-4.292	-3.717	-3.473	-3.613	0.2	0.3	195	69.106	2.305	1.204	207.813
03/04/2013	-8.84	-3.875	-6.625	-3.475	-3.282	-3.375	2.1	2.3	195	75.809	5.219	2.971	265.85
04/04/2013	-13.23	-3.38	-7.878	-3.301	-3.259	-3.274	0.2	0.2	70.24	69.274	4.235	1.947	222.58
05/04/2013	-17.72	-12.13	-15.007	-3.785	-3.276	-3.475	0	0	69.04	68.508	4.323	2.485	155.138
06/04/2013	-17.96	-11.67	-14.808	-4.313	-3.785	-4.146	0	0	68.32	68.022	4.375	3.109	72.493
07/04/2013	-17.9	-6.894	-12.538	-5.782	-4.313	-5.211	0	0	67.91	67.578	5.426	4.209	56.921
08/04/2013	-6.894	1.179	-1.856	-5.326	-3.446	-4.3	0	0	67.27	66.636	7.518	4.99	151.365
09/04/2013	-4.05	0.21	-1.913	-3.446	-2.953	-3.227	0	0	66.28	65.948	6.629	4.9	163.642
10/04/2013	-7.946	1.16	-2.49	-3.02	-2.624	-2.853	0	0	65.93	64.952	12.69	6.684	147.615
11/04/2013	-12.55	-5.304	-8.417	-2.816	-2.628	-2.718	0	0	63.81	63.564	7.031	3.783	208.985
12/04/2013	-13.61	-6.077	-10.295	-3.213	-2.816	-3.059	0	0	63.49	63.223	5.287	2.16	152.04
13/04/2013	-13.55	-8.9	-11.506	-3.883	-3.213	-3.646	0	0	63.47	63.265	5.994	4.761	89.031
14/04/2013	-14.48	-6.639	-10.689	-4.007	-3.827	-3.906	0	0	63.39	63.014	3.47	1.744	232.955
15/04/2013	-13.36	-5.854	-9.422	-3.983	-3.818	-3.885	0	0	63.25	62.844	3.385	1.53	260.833
16/04/2013	-10.64	-2.252	-6.933	-4.056	-3.771	-3.923	0	0	63.19	62.91	3.898	3.077	120.321
17/04/2013	-9.92	-4.477	-6.801	-3.774	-3.375	-3.619	0	0	69.11	64.073	3.644	1.636	122.366
18/04/2013	-8.84	-1.606	-6.048	-3.375	-3.069	-3.229	3	4.1	69.54	68.404	3.937	1.527	241.099
19/04/2013	-12.29	-7.673	-9.933	-3.072	-2.996	-3.019	0.6	0.6	69.72	69.431	4.095	2.737	280.738
20/04/2013	-13.75	-6.606	-10.749	-3.104	-3.004	-3.046	0.2	0.3	69.84	69.288	3.564	2.165	266.862
21/04/2013	-13.31	-3.122	-7.478	-3.218	-3.103	-3.18	0.3	0.3	69.29	68.727	3.564	1.641	196.295
22/04/2013	-9.8	0.15	-4.533	-3.262	-3.197	-3.235	0	0	68.89	68.349	3.855	1.808	216.906
23/04/2013	-6.654	2.025	-2.232	-3.236	-3.088	-3.182	0	0	68.32	67.332	3.725	1.811	226.248
24/04/2013	-5.582	2.628	-1.128	-3.091	-2.912	-3.023	0	0	66.74	66.292	4.2	2.364	228.321
25/04/2013	-6.395	-2.277	-3.506	-2.912	-2.623	-2.763	1	3.2	71.1	69.528	4.006	2.718	259.788
26/04/2013	-10.08	-3.808	-6.692	-2.623	-2.467	-2.537	0.1	0.1	70.65	69.854	5.772	2.833	222.409
27/04/2013	-13.88	-7.483	-10.377	-2.648	-2.453	-2.546	0	0	69.78	69.137	6.367	2.405	279.192
28/04/2013	-12.8	-6.7	-9.97	-2.879	-2.648	-2.784	0	0	68.92	68.386	2.614	1.541	275.515

Date	Air Temperature (°C)			Ground Temperature (°C)			Rainfall (mm)		Snow Depth (cm)		Wind Speed (m/s)		Wind Direction (deg.)
	Min.	Max.	Mean	Min.	Max.	Mean	Max.	Total	Max.	Mean	Max.	Mean	Mean
29/04/2013	-17.27	-9.52	-13.14	-3.289	-2.879	-3.102	0	0	68.89	68.573	3.345	2.13	284.94
30/04/2013	-14.9	-4.491	-9.167	-3.343	-3.255	-3.307	0	0	68.97	68.644	3.818	2.314	269.687
01/05/2013	-10.06	-2.647	-6.083	-3.261	-3.016	-3.157	0	0	68.78	68.259	2.919	2.05	219.423
02/05/2013	-7.991	-1.911	-4.219	-3.016	-2.766	-2.904	0.2	0.3	70.05	68.56	4.155	1.866	134.316
03/05/2013	-2.57	5.568	1.68	-2.766	-0.108	-1.81	0	0	70.48	67.048	6.457	3.475	207.394
04/05/2013	-0.269	6.328	2.984	-0.499	0.044	-0.168	0	0	63.74	61.837	6.723	4.872	191.106
05/05/2013	0.509	6.154	3.385	-0.092	0.165	0.075	0	0	58.62	53.874	9.68	5.209	182.194
06/05/2013	-2.788	1.782	-0.011	-0.73	0.11	-0.234	0	0	45.43	42.872	8.99	3.086	223.956
07/05/2013	-4.595	2.021	-1.679	-0.671	0.144	-0.266	0	0	40.39	38.641	2.909	1.471	218.538
08/05/2013	-3.277	3.407	-0.133	-1.134	0.22	-0.349	0	0	37.09	35.792	2.508	1.437	239.727
09/05/2013	-1.514	4.973	1.876	-0.867	0.261	-0.19	0	0	34.33	33.574	1.874	1.156	227.927
10/05/2013	-2.664	6.74	2.813	-1.207	0.419	-0.197	0	0	33.3	31.665	2.932	1.999	168.469
11/05/2013	2.322	11.55	7.033	-0.321	1.06	0.36	0	0	30	28.031	2.721	1.673	104.32
12/05/2013	2.567	10.65	5.902	-0.031	1.861	0.777	0.9	4.1	26.05	24.006	3.307	1.749	191.023
13/05/2013	-0.003	6.146	2.625	0.122	2.966	1.219	0.5	3.4	21.02	19.506	4.668	2.813	238.556
14/05/2013	0.77	6.482	3.396	-0.113	4.912	2.141	0.2	0.4	17.07	14.893	7.754	3.95	192.585
15/05/2013	-0.673	5.23	2.422	-1.069	4.718	1.634	0	0	12.69	11.955	6.438	4.132	197.271
16/05/2013	-2.185	4.053	1.161	-1.271	4.47	1.294	1.1	1.4	12.16	10.934	6.438	3.141	203.896
17/05/2013	-2.525	5.066	1.357	-1.761	5.18	1.355	0	0	10.78	9.148	7.442	3.787	193.654
18/05/2013	-0.298	6.934	3.118	-0.718	4.844	1.604	0	0	7.642	6.418	8.4	5.82	171.396
19/05/2013	-5.817	7.326	3.437	-2.322	7.694	3.067	0	0	4.643	2.051	7.891	5.852	181.469
20/05/2013	-9.25	-5.548	-7.332	-4.773	-2.018	-3.292	0	0	1.669	1.066	5.67	3.91	262.979
21/05/2013	-9.09	0.291	-4.379	-5.15	0.378	-2.128	0.1	0.1	1.161	0.475	3.497	2.129	226.681
22/05/2013	-3.841	5.621	1.41	-3.913	5.16	1.151	0	0	1.193	0.032	3.252	1.988	99.271
23/05/2013	0.167	8.17	4.169	-1.331	10.59	4.18	0	0	0.311	-0.128	5.183	2.947	65.723
24/05/2013	0.167	11.65	6.506	-1.014	11.24	5.728	0	0	0.045	-0.356	3.884	2.016	147.035
25/05/2013	5.514	13.27	10.006	1.869	12.66	8.203	0	0	0.093	-0.292	4.619	3.059	54.31
26/05/2013	7.803	16.27	11.685	5.642	16.78	10.57	0	0	0.54	-0.147	3.16	1.969	144.455
27/05/2013	8.21	17.43	13.004	6.606	18.66	12.874	0	0	0.654	-0.105	6.628	3.801	188.423
28/05/2013	9.64	18.65	13.987	6.493	20.45	13.08	0	0	0.578	-0.188	4.293	2.053	155.92

Date	Air Temperature (°C)			Ground Temperature (°C)			Rainfall (mm)		Snow Depth (cm)		Wind Speed (m/s)		Wind Direction (deg.)
	Min.	Max.	Mean	Min.	Max.	Mean	Max.	Total	Max.	Mean	Max.	Mean	Mean
29/05/2013	9.09	16.77	13.275	9.24	17.6	12.942	0.1	0.1	0.278	-0.079	4.705	2.604	190.803
30/05/2013	7.328	17.87	12.371	5.462	20.68	12.993	0	0	0.491	-0.106	4.645	2.12	147.845
31/05/2013	9.39	17.11	12.117	8.72	21.66	12.939	6	7.9	0.492	-0.056	3.484	1.967	187.888
01/06/2013	9.37	18.67	13.45	6.04	19.98	13.385	0.4	0.5	0.307	-0.176	4.335	1.96	186.472
02/06/2013	5.857	14.8	10.546	8.12	17.44	11.853	0.6	1	0.284	-0.031	3.836	1.749	171.358
03/06/2013	3.391	12.63	7.492	6.098	14.39	9.781	0.7	1.8	0.368	-0.028	3.07	1.533	163.433
04/06/2013	2.881	13.9	8.957	4.272	18.06	11.276	0	0	0.524	-0.11	6.818	3.591	177.217
05/06/2013	1.766	11.64	6.334	2.484	16.98	9.796	0	0	0.667	0.009	7.482	4.288	204.927
06/06/2013	-0.187	7.056	3.234	2.258	11	5.68	4.3	12.8	1.351	0.208	5.372	2.696	219.675
07/06/2013	1.934	11.34	7.391	2.331	13.83	8.498	0.1	0.2	0.606	0.007	3.459	2.467	153.195
08/06/2013	6.464	12.7	9.462	5.01	14.22	9.916	0.1	0.1	0.37	-0.03	5.615	2.636	127.06
09/06/2013	5.875	11.44	8.396	4.965	11.59	8.609	2.5	3.6	0.187	-0.015	3.624	1.907	250.41
10/06/2013	7.437	16.07	11.583	6.346	17.12	11.638	0	0	0.586	-0.065	3.676	2.187	217.805
11/06/2013	7.133	13.63	10.038	7.703	15.62	10.799	1.5	4	0.431	0.106	3.551	2.295	235.417
12/06/2013	5.443	9.45	6.764	5.713	10.9	8.062	2.5	5.2	0.439	0.253	2.125	1.399	238.169
13/06/2013	4.454	11.24	7.527	5.236	13	8.817	0.3	0.4	0.543	0.258	4.919	1.916	173.431
14/06/2013	4.447	10.91	7.046	4.798	13.36	8.814	1.3	2.6	0.739	0.139	5.35	1.853	145.559
15/06/2013	4.367	15.59	9.938	2.67	17.76	10.911	0	0	0.886	0.06	2.562	1.327	191.498
16/06/2013	9.52	19.75	15.173	6.474	21.74	15.469	0	0	0.278	-0.037	3.196	1.791	186.058
17/06/2013	13.6	21.5	17.802	11.58	22.38	17.311	0	0	0.369	0.11	3.042	2.155	270.203
18/06/2013	6.269	15.86	11.574	8.66	16.86	13.511	0	0	0.558	-0.11	7.218	4.337	107.541
19/06/2013	3.832	15.29	10.308	5.208	18.73	12.617	0	0	0.466	-0.086	5.607	4.138	65.413
20/06/2013	8.16	18.18	13.829	8.27	22.32	16.146	0	0	0.596	0.008	3.193	2.097	116.597
21/06/2013	10.41	17.88	14.605	10.07	21.11	16.02	1.2	2.4	1.238	0.159	4.795	1.567	127.736
22/06/2013	8.73	19.2	13.294	10.24	19.31	14.481	1.9	3	1.12	0.407	4.135	2.186	162.208
23/06/2013	10.85	20.26	15.497	8.72	24.93	16.752	0	0	1.24	0.119	3.51	2.065	184.652
24/06/2013	10.46	17.88	14.121	11.26	23.58	17.234	0	0	0.846	0.194	4.402	2.395	199.306
25/06/2013	11.26	23.19	17.757	9.86	27.97	19.752	0	0	1.1	0.079	5.019	2.413	93.863
26/06/2013	16.3	24.11	20.175	15.94	29.44	22.244	0	0	0.676	0.174	6.045	3.935	74.65
27/06/2013	14.38	22.32	18.709	14.81	29.22	21.816	0	0	1.003	0.238	3.628	2.252	97.677

Date	Air Temperature (°C)			Ground Temperature (°C)			Rainfall (mm)		Snow Depth (cm)		Wind Speed (m/s)		Wind Direction (deg.)
	Min.	Max.	Mean	Min.	Max.	Mean	Max.	Total	Max.	Mean	Max.	Mean	Mean
28/06/2013	15.95	25.73	20.44	14.5	31.18	23.195	0	0	0.957	0.151	4.349	2.149	173.723
29/06/2013	10.25	18.17	14.667	13.46	23.8	18.52	1.4	1.4	1.811	0.597	4.587	2.28	179.595
30/06/2013	10.41	19	14.441	13.02	26.69	18.617	0.4	0.5	0.997	0.467	3.367	1.809	208.552
01/07/2013	11.48	20.59	15.904	11.92	28.3	20.317	0	0	1.453	0.346	5.442	2.721	178.29

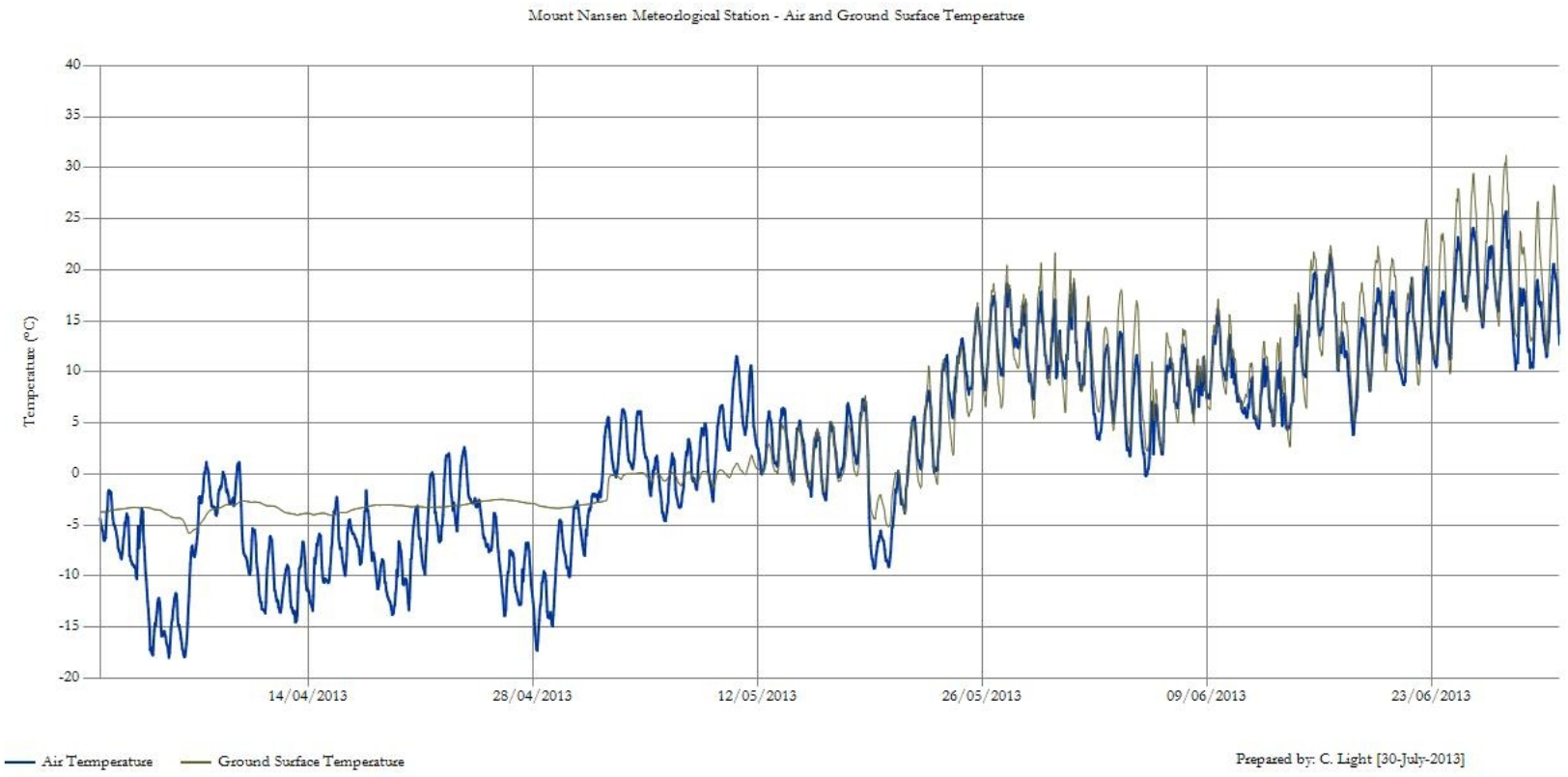

Figure F-1 Mount Nansen mean hourly air and ground temperature, April 1st to June 30th, 2013.

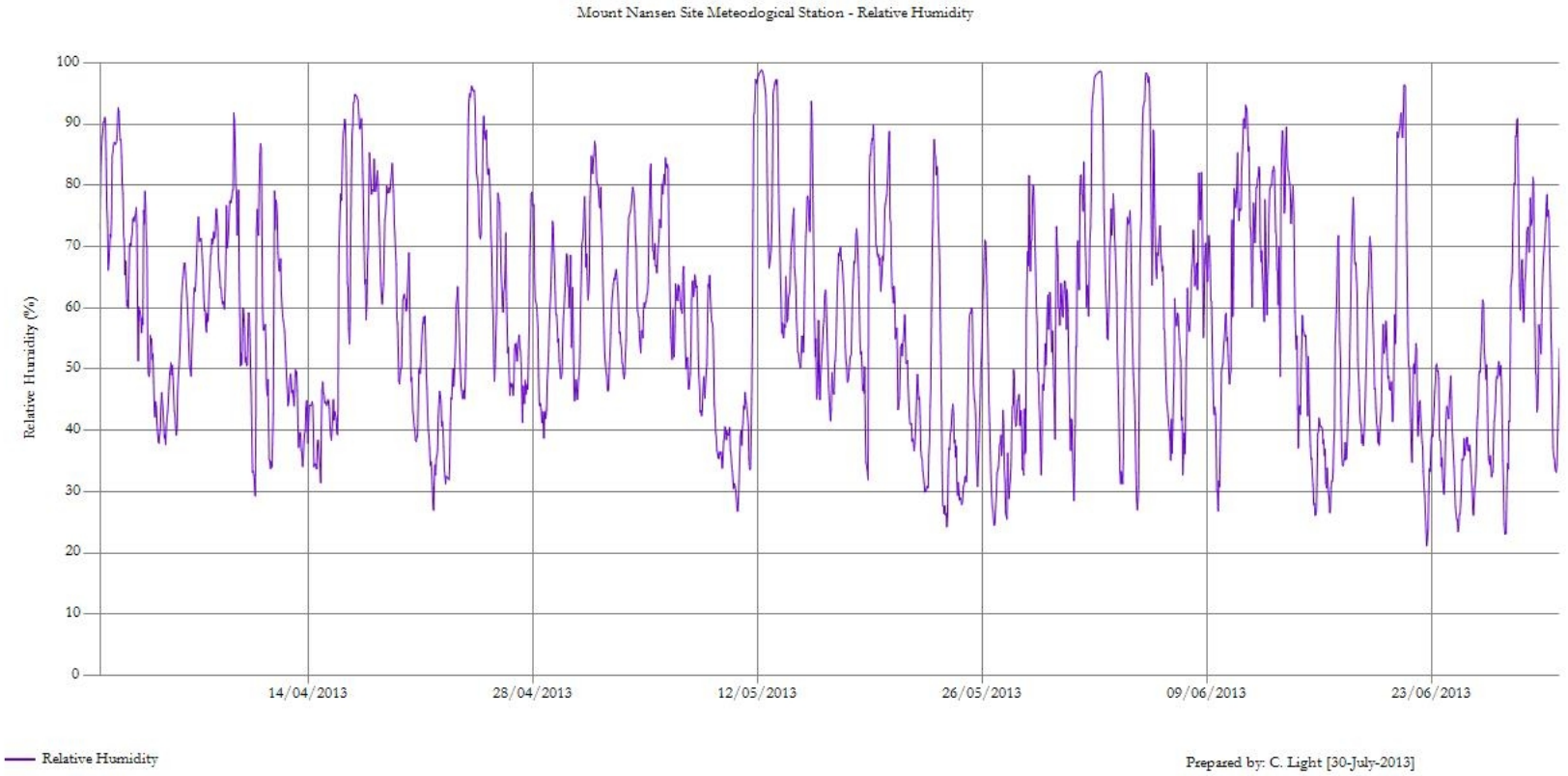

Figure F-2 Mount Nansen mean hourly relative humidity, April 1st to June 30th, 2013.

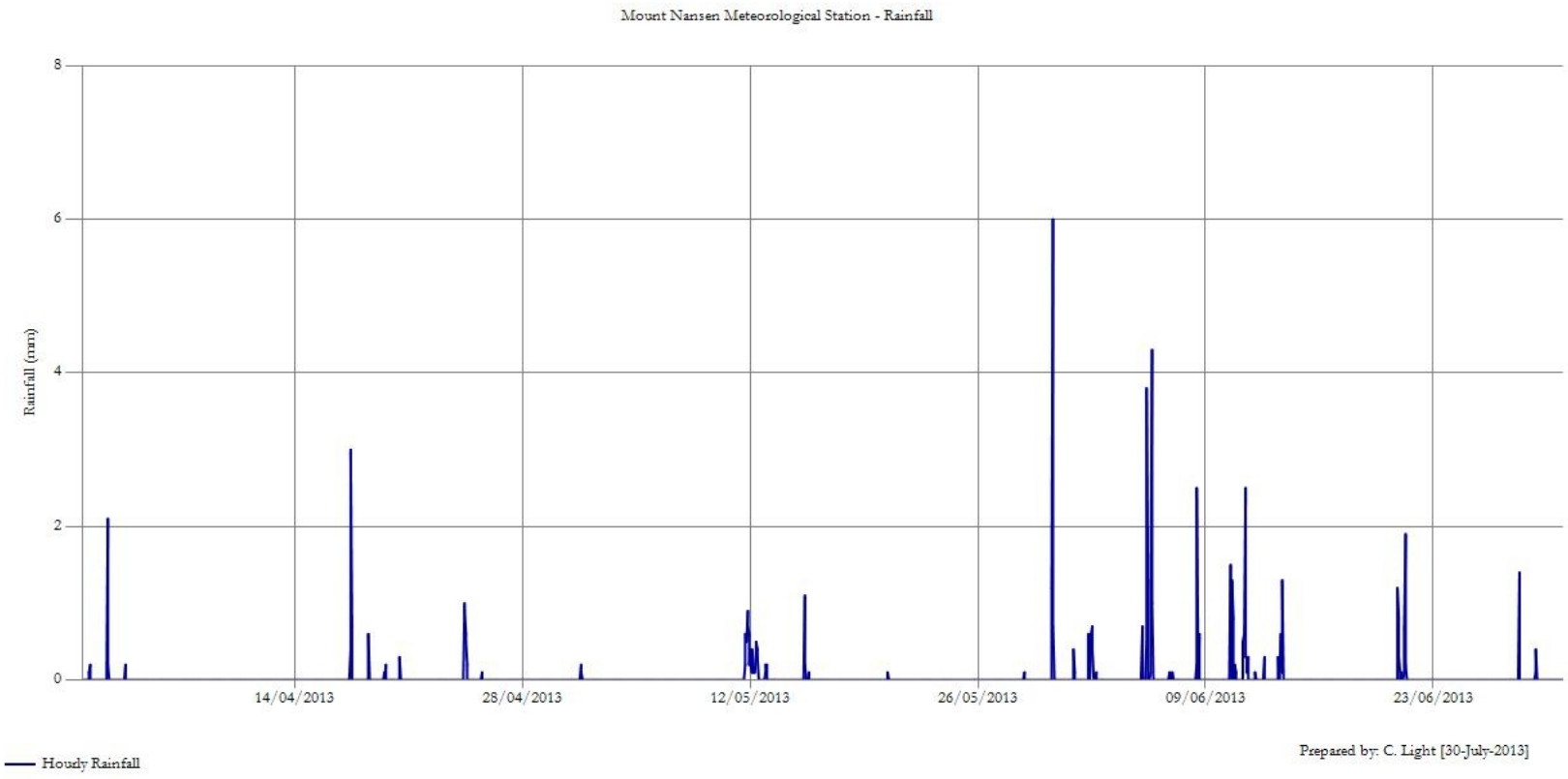

Figure F-3 Mount Nansen mean hourly precipitation as rainfall, April 1st to June 30th, 2013.

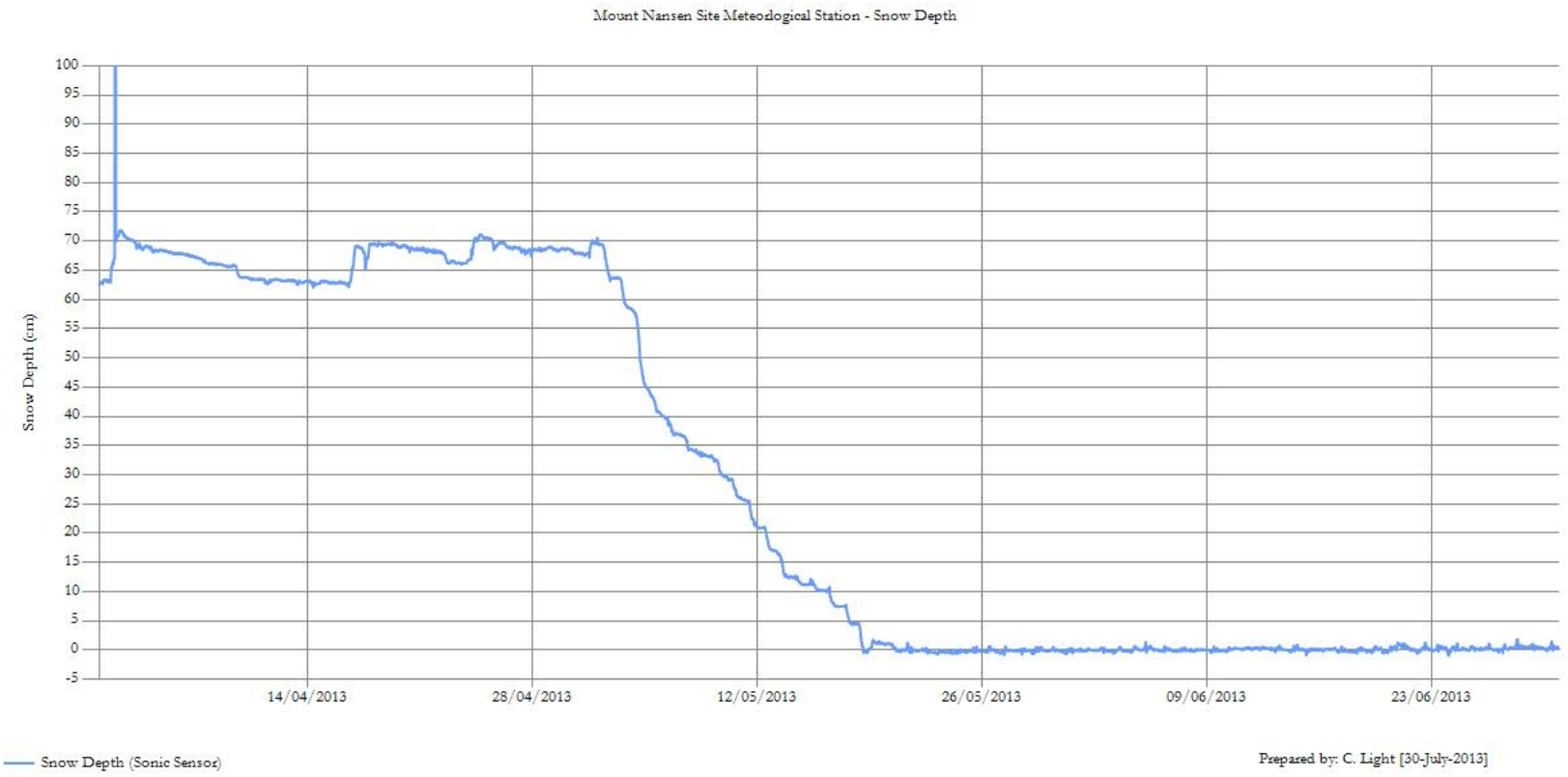

Figure F-4 Mount Nansen mean hourly snow depth, April 1st to June 30th, 2013.

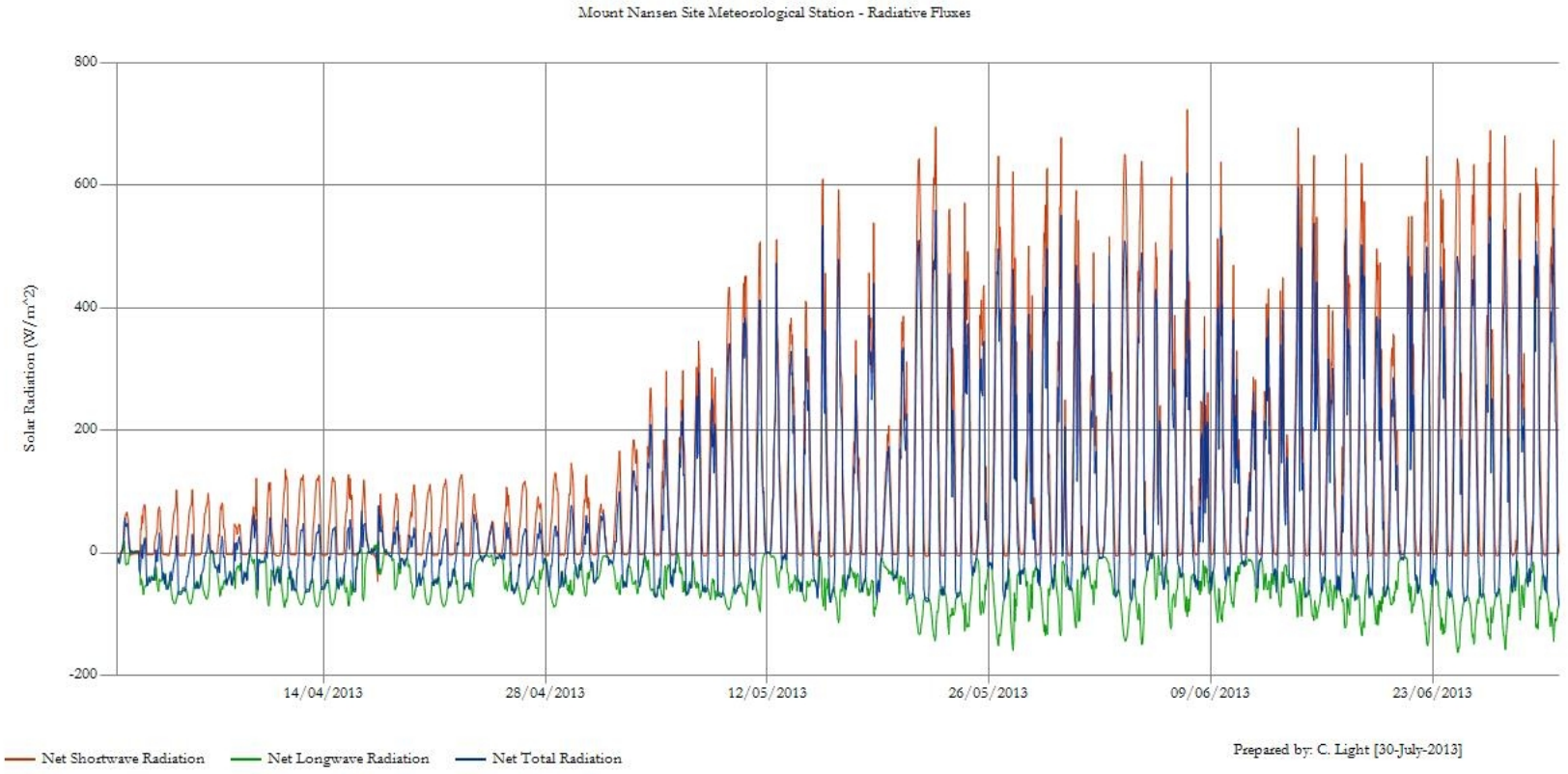

Figure F-5 Mount Nansen mean hourly net shortwave, long wave and total radiation, April 1st to June 30th, 2013.

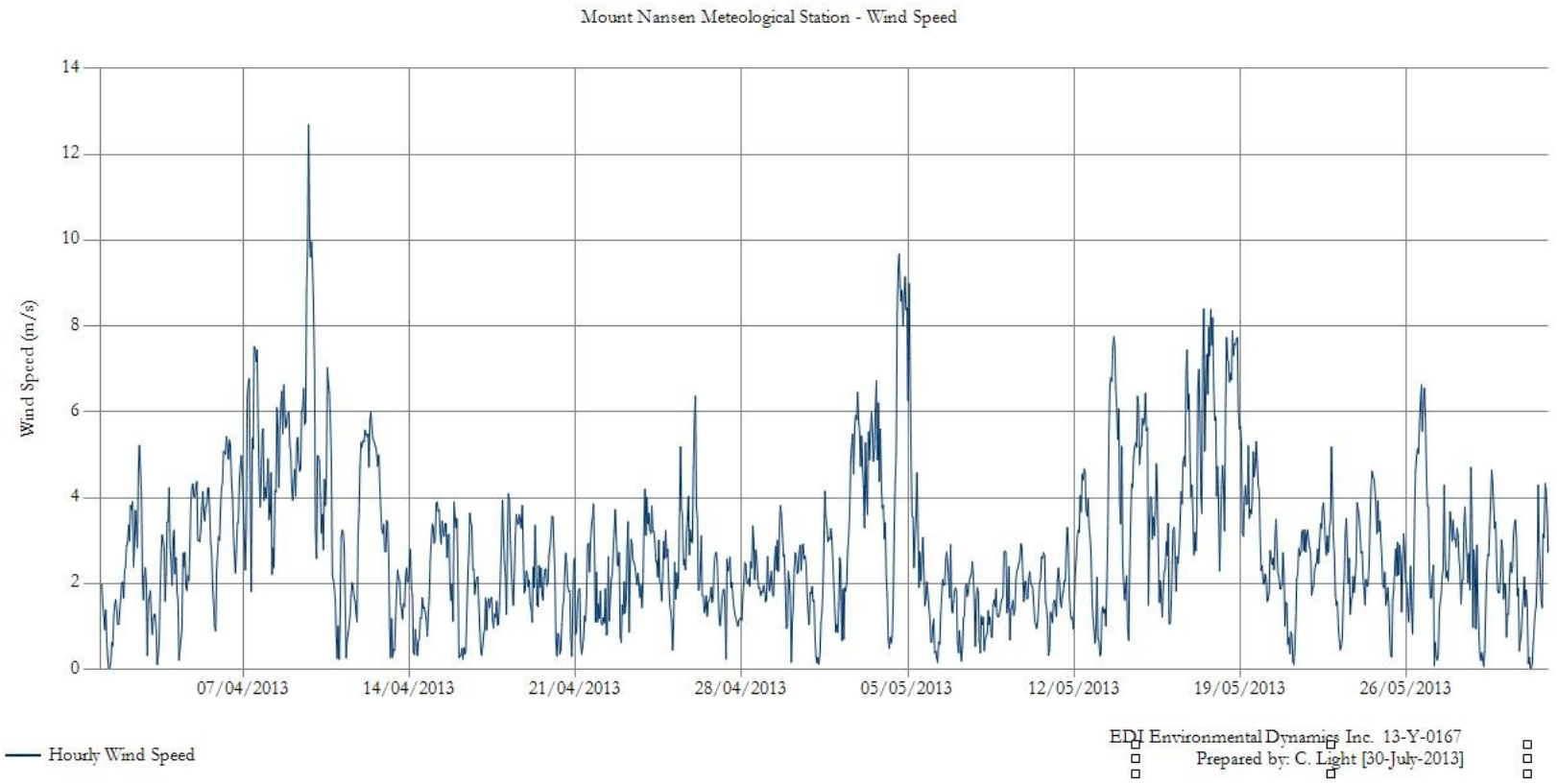

Figure F-6 Mount Nansen mean hourly wind speed, April 1st to June 30th, 2013.

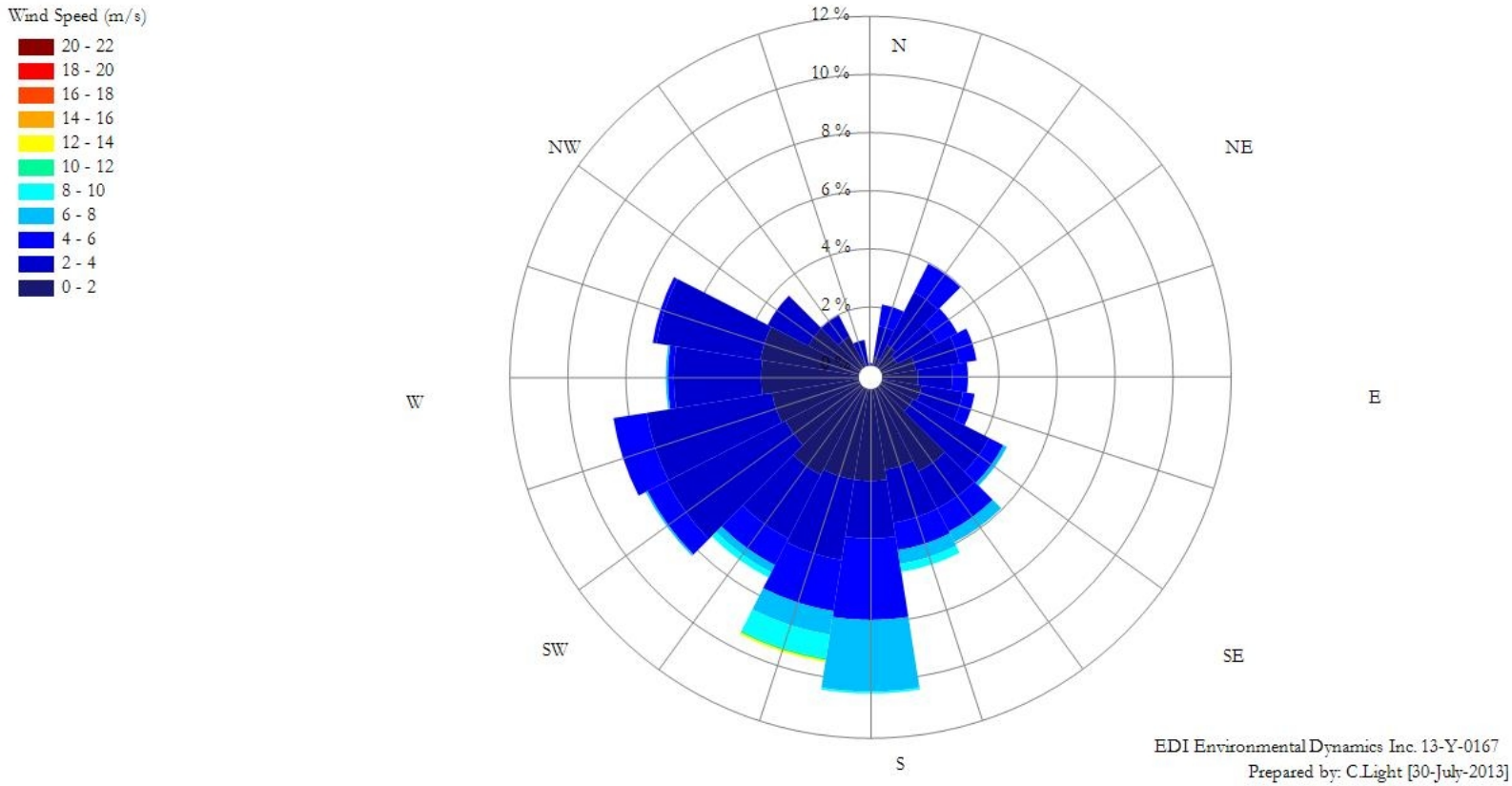

Figure F-7 Mount Nansen wind speed and direction, April 1st to June 30th, 2013.